# Willow Village Master Plan Project

# Final Environmental Impact Report

# APPENDICES

October 2022

Appendix 1
# Comment Letters Received on the Draft EIR

Letter A1

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Wilson, Joanne <jwilson@sfwater.org> |
| **Sent:** | Tuesday, May 17, 2022 11:52 AM |
| **To:** | Perata, Kyle T |
| **Cc:** | Natesan, Ellen; Wayne, Lisa B; Russell, Rosanna S; Rando, Casey; Read, Emily; Herman, Jane; Feng, Stacie |
| **Subject:** | FW: Willow Village Master Plan Project EIR |
| **Attachments:** | FINAL Interim Water Pipeline Right of Way Policy.pdf; FINAL-Amended Right of Way Integrated Vegetation Management Policy.pdf |



To: Kyle Perata
Acting Planning Manager
Community Development, City of Menlo Park
701 Laurel St., Menlo Park, CA 94025
ktperata@menlopark.org

Hello Mr. Perata: Thank you for the opportunity to provide comments on the above-referenced draft environmental impact report (Draft EIR) on behalf of the San Francisco Public Utilities Commission (SFPUC).

A1-1 The proposed project includes the construction of a roundabout on the SFPUC's right-of-way (ROW) property and is described in the Draft EIR as follows: *At the southeast corner of the main Project Site, the Proposed Project would create a new four-legged roundabout at O'Brien Drive to accommodate site access and area circulation. This intersection would require realignment of O'Brien Drive where it passes through the roundabout. The southern half of the roundabout would then overlay the Hetch Hetchy right-of-way. The new roundabout would provide direct access to Main Street and East Loop Road.*

The Draft EIR states that the intersection design is still being developed; it may include a four-way signal-controlled intersection. Further, the Draft EIR states that the SFPUC must approve the use of its fee-owned ROW and the design of the intersection would be subject to review and approval by the City of Menlo Park and the SFPUC. Because this element of the proposal requires the approval of the SFPUC for the use of its ROW, the Draft EIR identifies the SFPUC as a "Responsible Agency".

In its analysis of potential land use impacts, the Draft EIR states that through adherence to the SFPUC's approval process, the Proposed Project would be consistent with SFPUC's "Right-of-Way Encroachment Policy" and result in a less-than-significant impact.

Thank you for disclosing this information; the SFPUC generally agrees with the Draft EIR analysis. For further clarification, the SFPUC provides the following comments:

A1-2

1. Rather than "SFPUC Right-of-Way Encroachment Policy", the Draft EIR should reference the following two policies (attached) regarding the SFPUC ROW:
   a. SFPUC Interim Water Pipeline Right of Way Use Policy for San Mateo, Santa Clara, and Alameda Counties (Approved January 13, 2015)

A1-2 cont. b. Amendment to the Right of Way Integrated Vegetation Management Policy (Approved January 13, 2015)

A1-3 2. Please be advised that pursuant to the above-referenced SFPUC ROW policies, the SFPUC does not allow third-parties to use SFPUC lands to fulfill any third-party development requirements or to use SFPUC lands to mitigate third-party project impacts. If the use of the SFPUC ROW were to be approved for the proposed project, the authorization would be through a revocable license or other agreement that the SFPUC could revoke if necessary for utility purposes. In addition, the SFPUC charges fair market value for the use of its ROW property by third parties.

A1-4 3. The SFPUC's approval process referenced in the Draft EIR is called Project Review. For more information about Project Review and to submit a Project Review Application, the Project Sponsor may visit the SFPUC's website: https://sfpuc.org/construction-contracts/lands-rights-of-way/project-review-and-land-use-bay-area

Again, thank you for the opportunity to comment on the environmental review document for the proposed project.

If you have any questions or need further information, please contact me.

Sincerely,

*Joanne Wilson*

Joanne Wilson
Senior Land and Resources Planner
Natural Resources and Lands Management Division
Water Enterprise
1657 Rollilns Road
Burlingame, CA 94010

Hetch Hetchy
Regional Water System
Services of the San Francisco Public Utilities Commission

# SFPUC Interim Water Pipeline Right of Way Use Policy for San Mateo, Santa Clara, and Alameda Counties

**Approved January 13, 2015**

**by**

**SFPUC Resolution No. 15-0014**

**as an amendment to the SFPUC Real Estate Guidelines**

# SFPUC Water Pipeline Right of Way Use Policy for San Mateo, Santa Clara, and Alameda Counties

As part of its utility system, the San Francisco Public Utilities Commission (SFPUC) operates and maintains hundreds of miles of water pipelines. The SFPUC provides for public use on its water pipeline property or right of way (ROW) throughout Alameda, Santa Clara, and San Mateo counties consistent with our existing plans and policies. The following controls will help inform how and in which instances the ROW can serve the needs of third parties—including public agencies, private parties, nonprofit organizations, and developers—seeking to provide recreational and other use opportunities to local communities.

Primarily, SFPUC land is used to deliver high quality, efficient and reliable water, power, and sewer services in a manner that is inclusive of environmental and community interests, and that sustains the resources entrusted to our care. The SFPUC's utmost priority is maintaining the safety and security of the pipelines that run underneath the ROW.

Through our formal Project Review and Land Use Application and Project Review process, we may permit a secondary use on the ROW if it benefits the SFPUC, is consistent with our mission and policies, and does not in any way interfere with, endanger, or damage the SFPUC's current or future operations, security or facilities.[1] No secondary use of SFPUC land is permitted without the SFPUC's consent.

These controls rely on and reference several existing SFPUC policies, which should be read when noted in the document. Being mindful of these policies while planning a proposed use and submitting an application will ease the process for both the applicant and the SFPUC. These controls are subject to change over time and additional requirements and restrictions may apply depending on the project.

The SFPUC typically issues five-year revocable licenses for use of our property, with a form of rent and insurance required upon signing.[2]

*Note: The project proponent is referred to as the "Applicant" until the license agreement is signed, at which point the project proponent is referred to as the "Licensee."*

---

[1] SFPUC Guidelines for the Real Estate Services Division, Section 2.0.
[2] SFPUC Guidelines for the Real Estate Services Division, Section 3.3.

## I. *Land Use, Structures, and Compliance with Law*

The following tenets govern the specifics of land use, structures, and accessibility for a project. Each proposal will still be subject to SFPUC approval on a case-by-case basis.

A. SFPUC Policies. The Applicant's proposed use must conform to policies approved by the SFPUC's Commission, such as the SFPUC's Land Use Framework (http://sfwater.org/index.aspx?page=586).

B. Americans with Disabilities Act Compliance. The Applicant must demonstrate that a Certified Access Specialist (CASp) has reviewed and approved its design and plans to confirm that they meet all applicable accessibility requirements.

C. Environmental Regulations. The SFPUC's issuance of a revocable license for use of the ROW is subject to compliance with the California Environmental Quality Act (CEQA). The Applicant is responsible for assessing the potential environmental impacts under CEQA of its proposed use of the ROW. The SFPUC must be named as a Responsible Agency on any CEQA document prepared for the License Area. In addition, the Applicant shall provide to SFPUC a copy of the approved CEQA document prepared by the Applicant, the certification date, and documentation of the formal approval and adoption of CEQA findings by the CEQA lead agency. The SFPUC will not issue a license for the use of the ROW until CEQA review and approval is complete.

D. Crossover and Other Reserved Rights. For a ROW parcel that bisects a third party's land, the Applicant's proposed use must not inhibit that party's ability to cross the ROW. The Applicant must demonstrate any adjoining owner with crossover or other reserved rights approves of the proposed recreational use and that the use does not impinge on any reserved rights.

E. Width. The License Area must span the entire width of the ROW.
   - *For example, the SFPUC will not allow a 10-foot wide trail license on a ROW parcel that is 60 feet wide.*

F. Structures. Structures on the ROW are generally prohibited. The Licensee shall not construct or place any structure or improvement in, on, under or about the entire License Area that requires excavation, bored footings or concrete pads that are greater than six inches deep.

   i. Structures such as benches and picnic tables that require shallow (four to six inches deep) cement pads or footings are generally permitted on the ROW. No such structure may be placed directly on top of a pipeline or within 20 feet of the edge of a pipeline.

   ii. The SFPUC will determine the permitted weight of structures on a case-by-case basis.

- *When the SFPUC performs maintenance on its pipelines, structures of significant weight and/or those that require footings deeper than six inches are very difficult and time-consuming to move and can pose a safety hazard to the pipelines. The longer it takes the SFPUC to reach the pipeline in an emergency, the more damage that can occur.*

G. Paving Materials. Permitted trails or walkways should be paved with materials that both reduce erosion and stormwater runoff (e.g., permeable pavers).

H. License Area Boundary Marking. The License Area's boundaries should be clearly marked by landscaping or fencing, with the aim to prevent encroachments.

I. Fences and Gates. Any fence along the ROW boundary must be of chain-link or wooden construction with viewing access to the ROW. The fence must include a gate that allows SFPUC access to the ROW.[3] Any gate must be of chain-link construction and at least 12 feet wide with a minimum 6-foot vertical clearance.

## II. *Types of Recreational Use*

Based on our past experience and research, the SFPUC will allow simple parks without play structures, community gardens and limited trails.

A. Fulfilling an Open Space Requirement. An applicant may not use the ROW to fulfill a development's open space, setback, emergency access or other requirements.[4] In cases where a public agency has received consideration for use of SFPUC land from a third party, such as a developer, the SFPUC may allow such recreational use if the public agency applicant pays full Fair Market Rent.

B. Trail Segments. At this time, the SFPUC will consider trail proposals when a multi-jurisdictional entity presents a plan to incorporate specific ROW parcels into a fully connected trail. Licensed trail segments next to unlicensed parcels may create a trail corridor that poses liability to the SFPUC. The SFPUC will only consider trail proposals where the trail would not continue onto, or encourage entry onto, another ROW parcel without a trail and the trail otherwise meet all SFPUC license requirements.

## III. *Utilities*

A. Costs. The Licensee is responsible for all costs associated with use of utilities on the License Area.

[3] SFPUC Right of Way Requirements.
[4] SFPUC Guidelines for the Real Estate Services Division, Section 2.0.

B. Placement. No utilities may be installed on the ROW running parallel to the SFPUC's pipelines, above or below grade.[5] With SFPUC approval, utilities may run perpendicular to the pipelines.

C. Lights. The Licensee shall not install any light fixtures on the ROW that require electrical conduits running parallel to the pipelines. With SFPUC approval, conduits may run perpendicular to and/or across the pipelines.

- Any lighting shall have shielding to prevent spill over onto adjacent properties.

D. Electricity. Licensees shall purchase all electricity from the SFPUC at the SFPUC's prevailing rates for comparable types of electrical load, so long as such electricity is reasonably available for the Licensee's needs.

## IV. *Vegetation*

A. The Applicant shall refer to the SFPUC Integrated Vegetation Management Policy for the *minimum* requirements concerning types of vegetation and planting. (http://www.sfwater.org/index.aspx?page=431.) The Licensee is responsible for all vegetation maintenance and removal.

B. The Applicant shall submit a Planting Plan as part of its application.

*(Community garden applicants should refer to Section VII.C for separate instructions.)*

i. The Planting Plan should include a layout of vegetation placement (grouped by hydrozone) and sources of irrigation, as well as a list of intended types of vegetation. The SFPUC will provide an area drawing including pipelines and facilities upon request.

ii. The Applicant shall also identify the nursery(ies) supplying plant stock and provide evidence that each nursery supplier uses techniques to reduce the risk of plant pathogens, such as Phytophthora ramorum.

## V. *Measures to Promote Water Efficiency*[6]

A. The Licensee shall maintain landscaping to ensure water use efficiency.

B. The Licensee shall choose and arrange plants in a manner best suited to the site's climate, soil, sun exposure, wildfire susceptibility and other factors. Plants with similar water needs must be grouped within an area controlled by a single irrigation valve

[5] SFPUC Land Engineering Requirements.
[6] SFPUC Rules and Regulations Governing Water Service to Customers, Section F.

C. Turf is not allowed on slopes greater than 25 percent.

D. The SFPUC encourages the use of local native plant species in order to reduce water use and promote wildlife habitat.

E. Recycled Water. Irrigation systems shall use recycled water if recycled water meeting all public health codes and standards is available and will be available for the foreseeable future.

F. Irrigation Water Runoff Prevention. For landscaped areas of any size, water runoff leaving the landscaped area due to low head drainage, overspray, broken irrigation hardware, or other similar conditions where water flows onto adjacent property, walks, roadways, parking lots, structures, or non-irrigated areas, is prohibited.

## VI. *Other Requirements*

A. Financial Stability. The SFPUC requires municipalities or other established organizations with a stable fiscal history as Licensees.

   i. Applicants must also demonstrate sufficient financial backing to pay rent, maintain the License Area, and fulfill other license obligations over the license term.

B. Smaller, community-based organizations without 501(c)(3) classifications must partner with a 501(c)(3) classified organization or any other entity through which it can secure funding for the License Area over the license term. Maintenance. The Licensee must maintain the License Area in a clean and sightly condition at its sole cost.[7] Maintenance includes, but is not limited to, regular weed abatement, mowing, and removing graffiti, dumping, and trash.

C. Mitigation and Restoration. The Licensee will be responsible, at its sole cost, for removing and replacing any recreational improvements in order to accommodate planned or emergency maintenance, repairs, replacements, or projects done by or on behalf of the SFPUC. If the Licensee refuses to remove its improvements, SFPUC will remove the improvements I at the Licensee's sole expense without any obligation to replace them.

D. Encroachments. The Licensee will be solely responsible for removing any encroachments on the License Area. An encroachment is any improvement on SFPUC property not approved by the SFPUC. Please read the SFPUC ROW Encroachment Policy for specific requirements. If the Licensee fails to remove encroachments, the SFPUC will remove them at Licensee's sole expense. The Licensee must regularly patrol the License Area to spot encroachments and remove them at an early stage.

---

[7] SFPUC Framework for Land Management and Use.

E. Point of Contact. The Licensee will identify a point of contact (name, position title, phone number, and address) to serve as the liaison between the Licensee, the local community, and the SFPUC regarding the License Agreement and the License Area. In the event that the point of contact changes, the Licensee shall immediately provide the SFPUC with the new contact information. Once the License Term commences, the point of contact shall inform local community members to direct any maintenance requests to him or her. In the event that local community members contact the SFPUC with such requests, the SFPUC will redirect any requests or complaints to the point of contact.

F. Community Outreach.

   i. Following an initial intake conversation with the SFPUC, the Applicant shall provide a Community Outreach Plan for SFPUC approval. This Plan shall include the following information:

      1. Identification of key stakeholders to whom the Applicant will contact and/or ask for input, along with their contact information;

      2. A description of the Applicant's outreach strategy, tactics, and materials

      3. A timeline of outreach (emails/letters mailing date, meetings, etc.); and

      4. A description of how the Applicant will incorporate feedback into its proposal.

   ii. The Applicant shall conduct outreach for the project at its sole cost and shall keep the SFPUC apprised of any issues arising during outreach.

   iii. During outreach, the Applicant shall indicate that it in no way represents the SFPUC.

G. Signage. The SFPUC will provide, at Licensee's cost, a small sign featuring the SFPUC logo and text indicating SFPUC ownership of the License Area at each entrance. In addition, the Licensee will install, at its sole cost, an accompanying sign at each entrance to the License Area notifying visitors to contact the organization's point of contact and provide a current telephone number in case the visitors have any issues. The SFPUC must approve the design and placement of the Licensee's sign.

## VII. *Community Gardens*

The following requirements also apply to community garden sites. As with all projects, the details of the operation of a particular community garden are approved on a case-by-case basis.

A. The Applicant must demonstrate stable funding. The Applicant must provide information about grants received, pending grants, and any ongoing foundational support.

B. The Applicant must have an established history and experience in managing urban agriculture or community gardening projects. Alternatively, the Applicant may demonstrate a formal partnership with an organization or agency with an established history and experience in managing urban agriculture or community gardening projects

C. During the Project Review process, the Applicant shall submit a Community Garden Planting Plan that depicts the proposed License Area with individual plot and planter box placements, landscaping, and a general list of crops that may be grown in the garden.

D. The Applicant shall designate a Garden Manager to oversee day-to-day needs and serve as a liaison between the SFPUC and garden plot holders. The Garden Manager may be distinct from the point of contact, see Section VI.E.

E. The Licensee must ensure that the Garden Manager informs plot holders about the potential for and responsibilities related to SFPUC repairs or emergency maintenance on the License Area. In such circumstances, the SFPUC is not liable for the removal and replacement of any features on the License Area or the costs associated with such removal and replacement.

F. The Licensee must conduct all gardening within planter boxes with attached bottoms that allow for easy removal without damaging the crops.

Hetch Hetchy
Regional Water System
Services of the San Francisco Public Utilities Commission

# AMENDMENT TO THE

# RIGHT OF WAY INTEGRATED VEGETATION MANAGEMENT POLICY

**Approved January 13, 2015**

**by**

**SFPUC Resolution No. 15-0014**

## 12.000 RIGHT OF WAY INTEGRATED VEGETATION MANAGEMENT POLICY

### 12.001 General

The San Francisco Public Utilities Commission ("SFPUC") is responsible for the delivery of potable water and the collection and treatment of wastewater for some 800,000 customers within the City of San Francisco; it is also responsible for the delivery of potable water to 26 other water retailers with a customer base of 1.8 million. **The following policy is established to manage vegetation on the transmission, distribution and collection systems within the SFPUC Right of Way ("ROW") so that it does not pose a threat or hazard to the system's integrity and infrastructure or impede utility maintenance and operations.**

The existence of large woody vegetation[1], hereinafter referred to as vegetation, and water transmission lines within the ROW are not compatible and, in fact, are mutually exclusive uses of the same space. Roots can impact transmission pipelines by causing corrosion. The existence of trees and other vegetation directly adjacent to pipelines makes emergency and annual maintenance very difficult, hazardous, and expensive, and increases concerns for public safety. The risk of fire within the ROW is always a concern and the reduction of fire ladder fuels within these corridors is another reason to modify the vegetation mosaic. In addition to managing vegetation in a timely manner to prevent any disruption in utility service, the SFPUC also manages vegetation on its ROW to comply with local fire ordinances enacted to protect public safety.

One of the other objectives of this policy is to reduce and eliminate as much as practicable the use of herbicides on vegetation within the ROW and to implement integrated pest management (IPM).

### 12.002 Woody Vegetation Management

1.0 Vegetation of any size or species will not be allowed to grow within certain critical portions of the ROW, pumping stations or other facilities as determined by a SFPUC qualified professional, and generally in accordance with the following guidelines.

1.1 Emergency Removal

SFPUC Management reserves the right to remove any vegetation without prior public notification that has been assessed by a SFPUC qualified professional as an immediate threat to transmission lines or other utility infrastructure, human life and property due to acts of God, insects, disease, or natural mortality.

1.2 Priority Removal

Vegetation that is within 15 feet of the edge of any pipe will be removed and the vegetative debris will be cut into short lengths and chipped whenever possible. Chips will be spread upon the site where the vegetation was removed. Material that cannot be chipped will be hauled away to a proper disposal site.

---

[1] Woody vegetation is defined as all brush, tree and ornamental shrub species planted in (or naturally occurring in) the native soil having a woody stem that at maturity exceeds 3 inches in diameter.

If vegetation along the ROW is grouped in contiguous stands[2], or populations, a systematic and staggered removal of that vegetation will be undertaken to replicate a natural appearance. Initial removal[3] will be vegetation immediately above or within 15 feet of the pipeline edges; secondary vegetation[4] within 15 to 25 feet from pipelines will then be removed.

1.3 Standard Removal

Vegetation that is more than 25 feet from the edge of a pipeline and up to the boundary of the ROW will be assessed by a SFPUC qualified professional for its age and condition, fire risk, and potential impact to the pipelines. Based on this assessment, the vegetation will be removed or retained.

1.4 Removal Standards

Each Operating Division will develop its own set of guidelines or follow established requirements in accordance with local needs.

2.0 All stems of vegetation will be cut flush with the ground and where deemed necessary or appropriate, roots will be removed. All trees identified for removal will be clearly marked with paint and/or a numbered aluminum tag.

3.0 Sprouting species of vegetation will be treated with herbicides where practicable, adhering to provisions of Chapter 3 of the San Francisco Environment Code.

4.0 Erosion control measures, where needed, will be completed before the work crew or contractors leave the work site or before October 15 of the calendar year.

5.0 Department personnel will remove in a timely manner any and all material that has been cut for maintenance purposes within any stream channel.

6.0 All vegetation removal work and consultation on vegetation retention will be reviewed and supervised by a SFPUC qualified professional. All vegetation removal work and/or treatment will be made on a case-by-case basis by a SFPUC qualified professional.

7.0 Notification process for areas of significant resource impact that are beyond regular and ongoing maintenance:

7.1 County/City Notification – The individual Operating Division will have sent to the affected county/city a map showing the sections of the ROW which will be worked, a written description of the work to be done, the appropriate removal time for the work crews, and a contact person for more information. This should be done approximately 10 days prior to start of work. Each Operating Division will develop its own set of guidelines in accordance with local need.

---

[2] A stand is defined as a community of trees possessing sufficient uniformity in composition, structure, age, arrangement, or condition to be distinguishable from adjacent forest communities to form a management unit.
[3] Initial removal is defined as the vegetation removed during the base year or first year of cutting.
[4] Secondary vegetation is defined as the vegetative growth during the second year following the base year for cutting.

7.2 Public Notification – The Operating Division will have notices posted at areas where the vegetation is to be removed with the same information as above also approximately 10 days prior to removal. Notices will also be sent to all property owners within 300 feet of the removal site. Posted notices will be 11- by 17-inches in size on colored paper and will be put up at each end of the project area and at crossover points through the ROW. Questions and complaints from the public will be handled through a designated contact person. Each Operating Division will develop its own set of guidelines in accordance with local needs.

**12.003 Annual Grass and Weed Management**

Annual grasses and weeds will be mowed, disked, sprayed or mulched along the ROW as appropriate to reduce vegetation and potential fire danger annually. This treatment should be completed before July 30 of each year. This date is targeted to allow the grasses, forbs and weeds to reach maturity and facilitate control for the season.

**12.004 Segments of ROW that are covered by Agricultural deed rights**

The only vegetation that may be planted within the ROW on those segments where an adjacent owner has Deeded Agricultural Rights will be: non-woody herbaceous plants such as grasses, flowers, bulbs, or vegetables.

**12.005 Segments of ROW that are managed and maintained under a Lease or License**

Special allowance may be made for these types of areas, as the vegetation will be maintained by the licensed user as per agreement with the City, and not allowed to grow unchecked. Only shallow rooted plants may be planted directly above the pipelines.

Within the above segments, the cost of vegetation maintenance and removal will be borne by the tenant or licensee exclusively. In a like fashion, when new vegetative encroachments are discovered they will be assessed by a SFPUC qualified professional on a case-by-case basis and either be permitted or proposed for removal.

The following is a guideline for the size at maturity of plants (small trees, shrubs, and groundcover) that may be permitted to be used as landscape materials. Note: All distance measurements are for mature trees and plants measured from the edge of the drip-line to the edge of the pipeline.

- Plants that may be permitted to be planted directly above existing and future pipelines: shallow rooted plants such as ground cover, grasses, flowers, and very low growing plants that grow to a maximum of one foot in height at maturity.
- Plants that may be permitted to be planted 15–25 feet from the edge of existing and future pipelines: shrubs and plants that grow to a maximum of five feet in height at maturity.
- Plants that may be permitted to be planted 25 feet or more from the edge of existing and future pipelines: small trees or shrubs that grow to a maximum of twenty feet in height and fifteen feet in canopy width.

Trees and plants that exceed the maximum height and size limit (described above) may be permitted within a leased or licensed area provided they are in containers and are above ground. Container load and placement location(s) are subject to review and approval by the SFPUC.

Low water use plant species are encouraged and invasive plant species are not allowed.

All appurtenances, vaults, and facility infrastructure must remain visible and accessible at all times. All determinations of species acceptability will be made by a SFPUC qualified professional.

**The above policy is for general application and for internal administration purposes only and may not be relied upon by any third party for any reason whatsoever. The SFPUC reserves the right at its sole discretion, to establish stricter policies in any particular situation and to revise and update the above policy at any time.**

Letter A2

# CITY OF EAST PALO ALTO
## Office of the City Manager

May 20, 2022

Kyle Perata, Acting Planning Manager
Community Development Department
City of Menlo Park
701 Lauren Street
Menlo Park, CA 94025

**Subject**: Notice of Availability for the Facebook Willow Master Plan Project

Dear Mr. Perata:

A2-1 This letter is provided in response to the Notice of Availability (NOA) for the Facebook Willow Master Plan Project. Thank you for providing an opportunity to comment. East Palo Alto values its relationship with Menlo Park and we hope to continue to work cooperatively on the many issues common to both of our communities.

The City commented on the Notice of Preparation on October 17, 2019, and incorporates those comments by reference.

A2-2 **Proximity to East Palo Alto Residential Neighborhoods**

The project site is in very close proximity to East Palo Alto residences, specifically three single family residential neighborhoods: Kavanaugh, University Village and Palo Alto Park. In some instances, the residences are within 300 feet of the site. Given the size of the project and the five-year construction time period, the City requests that equal consideration be given to these neighborhoods as Menlo Park neighborhoods. In some cases, these East Palo Alto neighborhoods would be more impacted by this project. The City has concerns about various impacts (described below) as well as air quality, biological resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, and hydrology and water quality.

A2-3 **Proximity to the Ravenswood Priority Development Area and the Ravenswood/Four Corners Specific Plan Update**

The project site is located less than 2,000 feet from the Ravenswood Business District (RBD), which is a priority development area and an important jobs center for East Palo Alto. The City is in the process of updating the Specific Plan, which may include increasing the amount of both nonresidential and residential square footage. The Notice of Preparation for the update was released on May 9, 2022; however, the update has

A2-3 cont. been in process, including multiple public hearings, since mid-2020. While the Draft EIR includes the four projects proposed for the RBD area, the text does not acknowledge or discuss the RBD Specific Plan update. The Draft EIR should explicitly include in its analysis the RBD Specific Plan Update. Given the importance of the RBD area for East Palo Alto, that it is a designated priority development area and the pending update, the City is very concerned about the potential impact of the Willow Village project on the ability to develop the RBD area. Specifically, traffic impacts from the Willow Village would directly impact the RBD area.

A2-4 **Jobs Housing Ratio**

The City of East Palo Alto provides a significant amount of housing stock in Silicon Valley. East Palo Alto has more housing units than jobs, the lowest market rate prices in the region, and approximately 30% (or 2,405 of 7,759 units) of the total housing units are currently registered (non-exempt) in the Rent Stabilization Program. The City is concerned that the proposed development of a significant amount of nonresidential square footage would exacerbate the existing housing crisis in East Palo Alto.

A2-5 **Cumulative Impacts**

The Draft EIR tiers off the ConnectMenlo EIR prepared for the General Plan update. ConnectMenlo did not include East Palo Alto projects in the cumulative scenario due to a water moratorium that paused projects in East Palo Alto during the preparation of the DEIR. This DEIR includes a list-based approach for the cumulative analysis. The list used for the cumulative analysis is incomplete. It does not include two projects that were approved but not yet constructed (Clarum University and Sobrato Phase II) nor the RBD Specific Plan Update. Clarum University, located at 2331 University, was approved for the construction of a 47,594 square foot four-story mixed-use building with retail space and parking on the ground level and 33 residential dwelling units on the levels above the ground floor. The Sobrato Phase II project was approved for the demolition of two existing buildings and construction of an eight-story structure with approximately 231,883 square feet of office space and a five-story, 284,094-square-foot parking structure. The City respectfully requests that the DEIR analyze these three projects for cumulative and traffic impacts.

**Aesthetics**

A2-6 The Aesthetics analysis included the viewsheds from two locations within the City of East Palo Alto. The DEIR included a photosimulation which simulated potential views from the Kavanaugh View shed, one of three single family neighborhoods located within 300 feet of the project site. The photosimulation clearly shows the project will significantly alter middle ground views. Buildings over 70 feet in height would clearly be visible from the neighborhood. Although there are no identified scenic vistas, the project would change the character of the area with a significantly taller structures both for the project and cumulatively. The Draft EIR should be revised to incorporate mitigation to reduce the impacts on the viewshed to a less than significant impact.

A2-7 **Construction and Air Quality**

The DEIR identifies three significant unavoidable impacts for air quality. There are a significant number of sensitive receptors within the three East Palo Alto single-family neighborhoods near the perimeter of the project site. The DEIR states that extended construction hours are proposed over the five-year construction period. Work is proposed between 7:00 a.m. to 10:00 p.m. Monday through Saturday. Construction is also proposed on Sunday from 8:00 a.m. to 6:00 p.m. Although it is recognized that air quality issues are beyond the control of any one jurisdiction, the City is significantly concerned about the extended construction hours and five-year time period and the potential impact on East Palo Alto residents and sensitive receptors.

Mitigation Measures AQ 1.1, AQ 2b2 require that prior to the issuance of a building permit that the applicant provide a supplemental analysis by a qualified air quality specialist that the construction would not create air quality impacts that exceed Bay Area Air Quality Management District regulations and CEQA guidelines. Due to the potential direct impacts on East Palo Alto residents, the City requests that the mitigation measure also require submittal of the construction air quality analysis that includes analysis for East Palo Alto impacts be submitted for East Palo Alto review.

**Construction and Noise/Vibration impacts**

A2-8 The DEIR identifies three significant unavoidable impacts related to noise and vibration. As described above, there are three neighborhoods in the City of East Palo Alto that will be directly impacted. The City is significantly concerned due to the proximity of East Palo neighborhoods to the project.

Noise 1.1 and 2a require a construction noise control plan and a noise and vibration analysis to assess and mitigate potential noise and vibration impacts. The plan and analysis should be evaluated to prevent noise impacts on East Palo Alto neighborhoods. Activities that cannot comply with the noise limit of 60dBA at the residential or noise sensitive land use or exceed maximum level of 0.2 in/sec for vibrations should not be permitted. The City also requests to review the noise control plan and noise/vibration analysis prior to the issuance of a building permit.

**Settlement Agreement**

A2-9 Pursuant to Section 2.6 of the Menlo Park General Plan Settlement Agreement, when the preparation of an EIR is required, concurrent with the preparation of the EIR, Menlo Park will conduct a Housing Needs Assessment (HNA). The scope of the HNA, to the extent possible, shall include an analysis of the multiplier effect for indirect and induced employment by the development project and its relationship to the regional housing needs market and displacement. The DEIR includes a HNA in the appendix. The discussion in the DEIR should be consistent with all relevant terms of the Settlement Agreement. The City requests that a summary of the required analysis be incorporated into the DEIR

A2-10 **Population and Housing**

According to the DEIR main report and Housing Needs Assessment Appendix, the growth in units from the Proposed Project is estimated to result in a housing unit deficit of 815 regionally. The DEIR notes that because ABAG and MTC Plan Bay Area Projections 2040 incorporate growth under ConnectMenlo, cumulative impacts related to population and housing are less than significant. The ABAG/MTC housing projections are based on all future housing development, not concurrent development (to the Proposed Project), within Menlo Park and in the region. The regional balancing of jobs and housing from the Proposed Project and other similar projects will only occur if neighboring jurisdictions, including East Palo Alto, but also Palo Alto, Redwood City, and other cities within the commute area keep up with planned housing production, the evidence for which is lacking.

Of particular concern in the Housing Needs Assessment is the estimated number of Extremely-Low, Very-Low, and Low-Income units included in the net decrease in available housing in the region as a result of the Proposed Project: 127 Extremely Low, 270 Very Low, and 727 Low. Given that lower-income housing units have been, and continue to be, produced at much lower levels than above-moderate housing, with most jurisdictions in the region not meeting their lower-income Regional Housing Needs Allocations (RHNA), the deficit from this Proposed Project deserves particular attention.

Since not all new employees will seek housing in Menlo Park, it is estimated that induced employment from the Proposed Project will lead to employees seeking housing elsewhere, with an additional 26 employee households ultimately living in East Palo Alto. This very low number, particularly in combination with findings of the HNA that, "on balance, the analysis suggests the proposed Project would likely, at most, represent a minor contributing factor to the substantial pre-existing displacement pressures in East Palo Alto and Belle Haven," should be viewed with scrutiny to ensure that it is accurate.

**Public Services**

A2-11 East Palo Alto has significant concerns regarding the ability to provide public safety services. Traffic is already having an impact for public safety services post pandemic. Since returning to "normal" following the pandemic, and people returning to work, traffic has increased during commute hours, thus creating congestion throughout the city with traffic coming from Highway 84 to SR 101 in the morning and from SR 101 to Highway 84 in the afternoon. The traffic typically lasts for approximately 3 hours during the morning and afternoon. However, commuter traffic doesn't remain on University Avenue. The traffic spills into our neighborhoods which isn't fair to our residents who live and work in this area, as they must negotiate and navigate through traffic just to get home, pick up children from school or just conduct their daily lives.

During the afternoon, commuters use Pulgas Avenue, Clarke Avenue and Cooley Avenue as a cut through to Bay Road. They also use Euclid Avenue, to Glen Way via Runnymede Street to Bay Road as a cut through, and Dumbarton Avenue to Bay Road during the afternoon. The City already have narrow streets due to a high volume of parked vehicles and it is already difficult to navigate through these streets during peak commute times

A2-11 cont. while performing normal patrol duties. When an emergency occurs during commute times, getting the necessary emergency apparatus to the scene when time is of the essence always is a difficult task because of heavy traffic. There have been at least two occasions when a life flight (helicopter) had to be requested to transport trauma patients to Stanford Hospital (less than 5 miles away), because the commute traffic was so congested an ambulance couldn't get to the scene soon enough. Willow Village Project will add to the traffic congestion and traffic issues we already have with our existing commute traffic. With the potential of increased traffic resulting from this project, this will negatively impact our ability to provide efficient public safety services in a timely manner and thus negatively impact the safety and security of our residents.

**TDM and TMA**

A2-12 The City understands that the project will be required to prepare and implement a Transportation Demand Management program designed to reduce the number of vehicular trips. As noted above, traffic impacts are a regional issue that extend beyond individual city borders. The City of East Palo Alto recently adopted a TDM ordinance requiring that average daily trips be reduced by 40% and has been exploring the formation of a Transportation Management Association (TMA). There is an economy of scale for TDM measures and TMAs. The City requests that the project applicant be required to consult with the City of East Palo Alto to find opportunities to pool resources where feasible to reduce vehicular trips. This can include the formation of a TMA or measures such as coordinating or sharing shuttles or rideshare programs. This would benefit both the City of East Palo Alto and Menlo Park.

**Transportation**

A2-13 East Palo Alto's General Plan identifies a vision for University Avenue which is to transform it from a regional cut-through corridor to a mixed-use boulevard with high density housing and multi-model transportation options. The goal is to reduce traffic volumes, reduce traffic speeds, make the area desirable for pedestrians with wide sidewalks, streetscape improvements such as signage and street trees, and add multi-modal transportation options. The proposed Willow Village project will add a significant amount of traffic onto University Avenue - intersections will be beyond acceptable levels of service; there will be congestion during AM/PM peak hour, significant impacts at interchanges. These issues can be mitigated by design and construction of the University Avenue Improvements project (Grand Corridor) in East Palo Alto. Improvements along University Avenue will be vital and should be constructed alongside the Willow Village project.

Impacts at Kavanaugh Drive/O'Brien Drive should be studied further and a traffic signal/roundabout analysis should be performed. Any necessary improvements to this intersection should be a part of the Willow Village project.

Modification of existing dead-end cul-de-sacs into through streets will increase cut through traffic onto University Avenue. This will impact both O'Brien Drive, Kavanaugh Drive, Gloria Way, and Bay Road. Traffic safety and traffic calming improvements along these roads should be a part of the Willow Village project. These improvements may include roundabouts at intersections, radar speed feedback signs, lighting, ADA improvements, signage and striping, and bulb-outs.

In order to enforce traffic related impacts in the City of East Palo Alto, a traffic enforcement officer should be budgeted for the City of East Palo Alto for a few years upon project completion to ensure effectiveness of traffic controls.

The EIR should clearly identify show all of the fair-share calculation formulas for affected East Palo intersections.

Because several Menlo Park streets adjacent to the proposed project have restricted parking and Kavanaugh street in East Palo Alto does not, there is concern that overflow parking will spill into East Palo Alto streets. The applicant shall work with the City of East Palo Alto to address potential solutions to prohibit overflow parking onto City of East Palo Alto city-streets, primarily within the Kavanagh Drive/Gloria Way neighborhoods.

In order to ensure bike trail connectivity from the proposed project onto the Bay Trail as well as other trails in East Palo Alto, an analysis of bike trail connectivity should be performed and bike trails should be striped as a part of this project.

Cut through traffic along City of East Palo Alto city streets is a major potential concern with the implementation of this project. A cut-through traffic analysis should be performed and measures should be implemented to discourage cut through traffic within City of East Palo Alto neighborhood streets. Measures can include signage in both cities of Menlo Park as well as East Palo Alto.

A2-14

**Utilities and Service Systems**
Because the Kavanaugh Drive/Gloria Way neighborhoods in East Palo Alto are adjacent to the proposed project site, these streets should be improved aesthetically. Undergrounding of power lines in these neighborhoods can significantly improve aesthetics in and around the proposed project site.

There are drainage issues in the vicinity of the proposed project site that can be improved. Primarily, at the north end of Ralmar Avenue to 1170 O'Brien Drive, Menlo Park. There is occasional flooding of Ralmar street in East Palo Alto due to an inadequate drainage system. Collaboration is needed between Menlo Park and East Palo Alto to ensure a storm drain system can be constructed through 1170 O'Brien Drive to avoid flooding in the City of East Palo Alto.

A2-15

**Hydrology**
A detailed hydrology plan would show existing and proposed storm drain systems and drainage areas around the vicinity of the proposed project. This information would be useful to verify whether any of the storm drain systems in the City of East Palo Alto would be impacted. This information should be shared with the City of East Palo Alto when available.

A2-16 **Project Considerations and Concerns**
Since its incorporation in 1983, the City has struggled to achieve economic growth and financial sustainability, especially in comparison to other nearby communities. To address this reality, the City's leadership has ensured a strong focus on actions that strengthen the City's economic profile, with the ultimate goal of improving the lives and enhancing the well-being of East Palo Alto residents.

Staff is concerned that the Project may result in unintended financial consequences for the City of East Palo Alto. For example, it is expected that the Project will include a large grocery store, which is a beneficial amenity for the Belle Haven neighborhood and Menlo Park as a whole, but it is unclear how this store will benefit East Palo Alto. If a significant number of residents shop at this new store, the few smaller grocery stores in East Palo Alto may experience negative impacts to their businesses, and the City will
A2-17 receive decreased sales tax revenues. In addition, increased traffic created by East Palo Alto residents traveling to the new store will only worsen current traffic concerns.

A2-18 Staff is also concerned that the East Palo Alto Police Department could be impacted by an increase in calls for service, which would require the City of East Palo Alto to fund more police officers during a time when the City has a significant budget deficit.

A2-19 The Facebook/Meta expansion is located just feet away from the Cesar Chavez Ravenswood Middle School, which already experiences traffic congestion during common drop-off and pick-up hours. Staff hopes that Facebook/Meta and the City of Menlo Park will develop strategies to ensure that the Project does not impact the students, staff, and other community members connected to the middle school campus. It is not that long ago a tragic schoolgirl fatality occurred in this area.

A2-20 The greatest areas of concern for staff are the related issues of traffic and air quality, resulting from increased vehicle travelling through East Palo Alto to access to future Project. Staff hopes that Facebook/Meta and the City of Menlo Park will acknowledge these realities and partner with the City of East Palo Alto to consider necessary infrastructure projects that may be of mutual benefit.

A2-21 The City of East Palo Alto has a critical need for emergency-access water storage locations. As such, staff hopes that Facebook/Meta and Menlo Fire will collaborate to determine if water storage may be included in the Project's design, thus offering support to East Palo Alto residents during a potential emergency.

A2-22 In conclusion, the City values its relationship with the City of Menlo Park and Facebook/Meta, yet many aspects of the Project raise concerns that may impact the City of East Palo Alto's goal of achieving financial self-sufficiency and economic growth for our residents. However, an effective partnership between the City of Menlo Park, Facebook/Meta, and the City of East Palo Alto may successfully mitigate these concerns, thus ensuring that all three entities thrive in the future. The City would be eager to engage in these discussions.

Sincerely,

Patrick Heisinger
Interim City Manager

CALIFORNIA STATE TRANSPORTATION AGENCY GAVIN NEWSOM, GOVERNOR

**California Department of Transportation**

DISTRICT 4
OFFICE OF TRANSIT AND COMMUNITY PLANNING
P.O. BOX 23660, MS–10D | OAKLAND, CA 94623-0660
www.dot.ca.gov

May 24, 2022

SCH #: 2019090428
GTS #: 04-SM-2019-00431
GTS ID: 17175
Co/Rt/Pm: SM/ 114/ 5.765

Kyle Peralta, Planning Manager
City of Menlo Park
Community Development – Planning Division
701 Laurel Street
Menlo Park, CA 94025

**Re: Willow Village Master Plan Project Draft Environmental Impact Report (DEIR)**

Dear Kyle Peralta:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Willow Village Master Plan Project. We are committed to ensuring that impacts to the State's multimodal transportation system and to our natural environment are identified and mitigated to support a safe, sustainable, integrated and efficient transportation system. The following comments are based on our review of the April 2022 DEIR.

**Project Understanding**

A3-1 The proposed Project would demolish all existing onsite buildings and landscaping and construct new buildings and site improvements. The proposed Project would result in a net increase of approximately 1 million square feet (sf) of nonresidential uses (office space and non-office commercial/retail), for a total of approximately 2 million sf of nonresidential uses at the Project site. The nonresidential sf would include approximately 1,750,000 sf offices, up to 200,000 sf retail/non-office commercial uses, and approximately 10,000 sf community serving space. In addition, the Proposed Project would include multi-family housing units (approximately 1,735 units), a hotel (approximately 200-250 rooms), an approximately 4-acre park, and other public open space. The Project Site would include a circulation network for vehicles, bicycles, and pedestrians inclusive of both.

A3-1 (cont.)

**Travel Demand Analysis**
With the enactment of Senate Bill (SB) 743, Caltrans is focused on maximizing efficient development patterns, innovative travel demand reduction strategies, and multimodal improvements. For more information on how Caltrans assesses Transportation Impact Studies, please review Caltrans' Transportation Impact Study Guide (*link*).

Caltrans' acknowledges that the project Vehicle Miles Travelled (VMT) analysis and significance determination are undertaken in a manner consistent with the Office of Planning and Research's (OPR) Technical Advisory. Per the DEIR, this project is found to have significant VMT impacts. Caltrans supports the Transportation Demand Management (TDM) Program and encourages yearly monitoring to evaluate the effectiveness of the TDM measures proposed, in conjunction with the City of Menlo Park and C/CAG.

Regarding the Transportation Impact Analysis (TIA), please consider the following:

- Include the Hamilton North and Hamilton South redevelopment sites in all Figures in the TIA depicting the proposed project;
- To fully understand the movement of the Bayfront Expressway between Marsh Road and University Avenue, include a typical field observation day, instead of the atypical observation day (page 44);
- Clarify the method and tools used for the Freeway Analysis. Note that the Freeway Analysis should be conducted for the 2040 Cumulative Conditions;
- Provide details of freeway analysis to substantiate information in Table 23 (i.e., demand volumes, capacities that reflect field conditions). Also, clarify if demand volumes or count volumes are used in the analysis;
- Clarify if the Traffic Volumes of both existing and near term plus project conditions used in the Ramp Capacity Analysis are count volumes or demand volumes. The analysis should be based on demand volumes; and
- The notes in Table 26 in the TIA indicated the existing volumes referenced intersection counts collected in 2019. Provide said traffic counts for review (Appendix A: Traffic Counts is missing from the TIA). Also, provide the calculation of demand volumes for review.

A3-2

**Environmental Analysis- Cultural Artifacts**
Should ground-disturbing activities take place within Caltrans' Right-of-Way (ROW) and there is an inadvertent archaeological or burial discovery, in compliance with CEQA, PRC 5024.5, and the SER, all construction within 60 feet of the find shall cease and the Caltrans District 4 Office of Cultural Resource Studies (OCRS) shall be immediately contacted at (510) 847-1977.

A3-3 **Hydraulics and Maintenance**

Please note the following:

- Coordinate with Caltrans to review the proposed development, as Caltrans is responsible for design and maintenance of pump stations along State Route (SR)- 84. The entire project area and surrounding areas drain to a major trunk line that leads to the Caltrans Ravenswood Pump Station. The pump station pumps the stormwater trunk line to Ravenswood Slough in San Francisco Bay on the north side of SR- 84.
- As part of a holistic approach to understanding existing conditions and impacts from proposed flood protection measures being considered, Caltrans encourages the Project development staff to coordinate with the Strategy to Advance Flood Protection, Ecosystems and Recreation (SAFER) Bay project. The proposed flood protection measures from both projects may impact the tailwater conditions, potential conflicts, flood-related design objectives due to sea level rise and other factors.

A3-4 **Equitable Access**

If any Caltrans facilities are impacted by the project, those facilities must meet American Disabilities Act (ADA) Standards after project completion. As well, the project must maintain bicycle and pedestrian access during construction. These access considerations support Caltrans' equity mission to provide a safe, sustainable, and equitable transportation network for all users.

A3-5 **Encroachment Permit**

Please be advised that any permanent work or temporary traffic control that encroaches onto Caltrans' ROW requires a Caltrans-issued encroachment permit. As part of the encroachment permit submittal process, you may be asked by the Office of Encroachment Permits to submit a completed encroachment permit application package, digital set of plans clearly delineating Caltrans' ROW, digital copy of signed, dated and stamped (include stamp expiration date) traffic control plans, this comment letter, your response to the comment letter, and where applicable, the following items: new or amended Maintenance Agreement (MA), approved Design Standard Decision Document (DSDD), approved encroachment exception request, and/or airspace lease agreement. Your application package may be emailed to D4Permits@dot.ca.gov.

Please note that Caltrans is in the process of implementing an online, automated, and milestone-based Caltrans Encroachment Permit System (CEPS) to replace the current permit application submittal process with a fully electronic system, including online payments. The new system is expected to be available during 2022. To obtain information about the most current encroachment permit process and to download

A3-5 cont. the permit application, please visit https://dot.ca.gov/programs/traffic-operations/ep/applications.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, or for future notifications and requests for review of new projects, please email LDR-D4@dot.ca.gov.

Sincerely,

Mark Leong

MARK LEONG
District Branch Chief
Local Development Review

c: State Clearinghouse

Letter A4

**Perata, Kyle T**

**From:** Johnston, Jon <JonJ@MenloFire.org>
**Sent:** Wednesday, May 25, 2022 4:39 PM
**To:** Perata, Kyle T
**Cc:** Lorenzen, Mark; Johnston, Jon
**Subject:** Willow Village EIR comments



Kyle,

Please find the Menlo Park Fire District response to impacts from the Willow Village proposed project.

A4-1 We find that Menlo Park Fire District responses in the ConnectMenlo Final EIR are still applicable to this project.

A4-2 The water infrastructure at this location currently cannot meet the demand for this buildout. Water infrastructure improvements are needed to be able to build and meet Fire supply requirements of the CA Fire Code.

A4-3 This project is located within current adopted time standards for our required resources. However as traffic demands increase on continued narrowed roadways, increased development, and massive pass through traffic on Willow Rd and other pass through roads to the Dumbarton Bridge, response times to this project area continue to diminish. Cumulative projects along with increased traffic and decreased road arteries and decreased road capacities will delay emergency response times.

A4-4 Meta/Facebook as the largest employer in Menlo Park is also one of our largest call volumes. Moving from warehouse buildings with very little occupancy, to a development of major business and residential component will draw increased daily work time emergency response, but also 24/7 response due to the housing element that did not exist before.

A4-5 The Willow Village project is also causing a demand for PGE to increase capacity in the area. This has an impact to our Urban Search and Rescue/Menlo Park Fire District Rescue Training Site located at the PGE station located near the Dumbarton Bridge.

The site has been in use since the late 1980's when location looking for a place to train an Urban Search and Rescue Team as part of our FEMA proposal package.
We would estimate that we over time have spent upwards of $250k for fencing, concrete and the construction of rescue and training props. The burn props cost $750,000 and the rest of the site is an estimated total of 1.5 million in total costs invested over time.
Per contract, Menlo Park Fire would need to return the site to original condition prior to PGE utilizing the site for growth.

The Menlo Park Fire District and USAR TF3 has trained people from all over the world, Country, State, Region and our own agency. From FDNY to Mexico, Japan, Taiwan, China, to every FEMA Task Force, State Task Force, every Bay Area Fire Department and the list goes on. The site trains multiple law enforcement agencies, FBI, Sheriff, local law enforcement including Menlo Park PD, various government agencies, fire investigations for the region and scientific research companies from both sides of the bay.
The site is used regularly for training with multiple fire agencies in San Mateo County as this is the only live fire props. Also the site has the only west coast dog training site for search and rescue.

A4-5 cont. The debris plies made of wood and concrete are some of the largest in the western United States. They provide a very specific real world training experience needed to practice and perfect critical search, rescue and recovery skills, joint operations and highly scarce and rare skills needed to train people and animals.

Other training props are designed to support shoring, lifting and moving of heavy objects, crane operations, technical rope rescue and other related specialized search and rescue skills needed for very specific specialized trainings for National Security and Response in support of Urban Search and Rescue Task Force's to be able to effectively operate on a National stage during a significant emergency like the collapse of the World Trade Center, or the Oklahoma City Bombing.

We are also central to the Bay Area, and being near the Bay for joint water or bridge operations and specifically removed from populated areas allows us to conduct burns and noisy operations like breaching and breaking of concrete that also can create some dust.

Recognized Monuments and historical pieces at this site.
We have a singular inspirational "monument" specifically made from the ruins of the Oklahoma City Bombing and dedicated to all the rescuers who come to be trained to deal with similar, horrific and unimaginable situations.
In addition, we have a concrete column from the Embarcadero Expressway that shot out during demolition. It's the last know piece of the SF Embarcadero Freeway and we also have the Missile prop that was located outside the Commanders Office at the Contra Costa Naval Weapons Station.

This site has provided a pivotal opportunity to simulate, train and test tens of thousands of first responders in specialized skills needed to ultimately save life and property under the most difficult of conditions.

**Jon Johnston**
**Division Chief/Fire Marshal**
Menlo Park Fire Protection District | 170 Middlefield Road | Menlo Park, CA 94025
(650) 688-8431
jonj@menlofire.org
***Mission Statement: To protect and preserve life and property from the impact of fire, disaster, injury and illness.***
menlofire.org

***Community Development***
***& Transportation***
***Department***

Planning Division
1017 Middlefield Road
Redwood City, CA 94063

(650) 780-7234
planning@redwoodcity.org
www.redwoodcity.org

May 26, 2022

Kyle Perata
Community Development, City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

Dear Kyle,

Thank you or the opportunity comment on the Draft Environmental Impact Report (EIR) for the Willow Village Master Plan Project. The City of Redwood City has reviewed the EIR and has the following comments to offer:

A5-1 We have reviewed the Traffic Impact Analysis (TIA) and EIR findings. No intersection within Redwood City were studied, with Marsh Road intersections being the closest ones to our jurisdiction. As mentioned in the recommended improvements (multiple locations in TIA including Table ES-6), the mitigation measure related to road widening to mitigate the traffic impact is not feasible. The recommendation for a contribution to TIF (Transportation Impact Fee) program for future alternative modes (bike and pedestrian) improvements would be our recommendation as well.

Sincerely,

Brandon Northart
Contract Associate Planner

Cc: Mark Muenzer (mmuenzer@redwoodcity.org), Sue Exline (sueexline@redwoodcity.org)

KRONICK

Letter T1

KRONICK
MOSKOVITZ
TIEDEMANN
& GIRARD

**HOLLY ROBERSON**
hroberson@kmtg.com

May 22, 2022

**VIA ELECTRONIC MAIL AND CERTIFIED MAIL – Return Receipt Required**

Kyle Perata, Acting Planning Manager
City of Menlo Park Community Development Department
701 Laurel Street
Menlo Park, CA 94025
Email: ktperata@menlopark.org

**Re: Tamien Nation Comment Letter on Willow Village Master Plan Project Draft EIR**

Dear Mr. Perata:

I am writing to you on behalf of the Tamien Nation, a California Native American Tribe, in response to the Willow Village Master Plan Project ("Project") Draft Environmental Impact Report ("DEIR"). The Project is located on the ancestral and unceded aboriginal homeland of the Tamien Nation of the greater Santa Clara Valley. Tamien Nation has direct lineal descendancy to precontact Tamien speaking villages and districts including San Juan Bautista Rancheria, San Jose Cupertino Rancheria, San Carlos Rancheria, San Antonio Rancheria, Santa Ysabel Rancheria, Santa Clara Rancheria and San Francisco Solano Rancheria.

T1-1 Although the Tamien Nation has been engaged with the City of Menlo Park ("City") in the government to government consultation process to address impacts to tribal cultural resources as required by the California Environmental Quality Act ("CEQA") and Assembly Bill 52 (Gatto, 2014) ("AB 52"), we remain concerned because significant environmental impacts to tribal cultural resources are still unaddressed and unmitigated in the DEIR. We have provided substantial evidence of tribal cultural resources, a tribal cultural landscape, and the cultural significance of these resources to the City during consultation. We have also recommended appropriate mitigation measures, such as avoidance and preservation in place, which are preferred mitigation methods under AB 52. We hope that by providing this letter and continuing to engage with the City and the project applicant through the consultation process the final EIR will better address these concerns, but if not, we are prepared to take appropriate legal action against the Project to protect these significant tribal cultural resources, including the Tamien Nation's Ancestors and sacred sites.

T1-2 The Project is a major redevelopment of a 59-acre industrial site and three additional parcels west of Willow Road in Menlo Park. The Project is a multi-phase, mixed use development. The Project overlaps with and will substantially impact Tamien Nation tribal cultural resources

T1-2 cont. including sacred burial grounds and cultural sites, specifically, a Shellmound burial site referred to as the Hiller Mound (CA-SMA-160/H (P-41-000160)). The Tamien Nation submits this comment letter to request that the City ensure environmental impacts to the Hiller Mound are fully identified, analyzed, and mitigated as required by CEQA. The Project must also be consistent with the Menlo Park General Plan and ConnectMenlo FEIR.

T1-3 While the Tamien Nation is engaged in tribal consultation with the City pursuant to AB 52, the Tamien Nation's input has been ignored and not taken as a serious Project concern. The Tamien Nation wants to cooperate with the City, but the City's failure to reciprocate has resulted in this letter, which must be added to the administrative record for the Project. A key aspect of AB 52 is to enable California Native American tribes to manage and accept conveyances of, and act as caretakers of, tribal cultural resources. Further, it requires parties to act in good faith in developing mitigation measures. (Public Resources Code § 21080.3.2.) In passing AB 52, the legislature intended for lead agencies to recognize and respect that "California Native American prehistoric, historic, archaeological, cultural, and sacred places are essential elements in tribal cultural traditions, heritages, and identities." (AB 52 § 1.) Project proponents need to recognize and should give deference to California Native American tribes because they "have expertise with regard to their tribal history and practices, which concern the tribal cultural resources with which they are traditionally and culturally affiliated". Since CEQA "calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue should be included in environmental assessments for projects that may have a significant impact on those resources." (*Id.*)

The Tamien Nation has used, and continues to use, the natural setting of the Hiller Mound to conduct religious observances, ceremonies, and cultural practices; this sacred site ties the Tamien Nation to their native land and cultural heritage. The Tamien Nation has expertise and a deep connection with and understanding of the tribal cultural resources that are on the Project site. In order to comply with the legal requirements of AB 52 consultation, the City needs to engage in consultation in good faith and put forth reasonable effort to create effective mitigation measures – not dismiss, belittle, and disregard the concerns of the Tamien Nation in favor of the Project proponent's desire not to add appropriate mitigation measures, as has been done by City planning staff in consultation thus far. (See Public Resources Code § 21080.3.2.)

T1-4

**<u>Environmental Impacts and Current Inadequate Mitigation Measures</u>**

The Project will lead to significant environmental impacts to tribal cultural resources, specifically causing disturbance to Ancestral human remains of the Tamien Nation. Overall, the analysis is inadequate, and the mitigation measures disregard the Tamien Nation's culture, traditional uses, and the deep importance of the Hiller Mound as a significant tribal cultural resource. The mitigation measures proposed in the DEIR are inadequate and do not reduce the level of significance of the environmental impact to tribal cultural resources.

T1-4 cont. Before delving into the Project DEIR's proposed mitigation measures, we would like to point out that the mitigation measures discussed in the DEIR only focus on the core of the Hiller Mound.[1] Yet, CEQA requires an EIR to provide the information needed to alert the public and the decision makers of the significant impacts a project would create and to discuss feasible mitigation measures. (Public Resources Code § 21100; *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 523.) To fulfill the EIR's informational role, the discussion of the mitigation measures must contain facts and analysis, not bare conclusions and opinions. (*Golden Door Properties, LLC v. County of San Diego* (2020) 50 Cal.App.5th 467, 544 citing to *King & Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814, 869.) The level of detail CEQA required in the EIR's discussion of facts and analysis of the mitigation measures depends on "whether the EIR includes enough detail 'to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project.'" (*Ibid.*) Here, the mitigation measures are blatantly insufficient because the EIR fails to adequately address **<u>75%</u>** of the sacred site.[2] The DEIR inaccurately describes the Hiller Mound Core as "the most culturally sensitive" archeological component of Hiller Mound and the proceeds to only focus on the Hiller Mound Core. (DEIR p. 3.8-24.) First, the Hiller Mound Core is culturally sensitive, as is the *entire* Hiller Mound area. Second, even for argument's sake if the Hiller Mound Core was more culturally sensitive than another area, it does not give license for the Project to disregard the environmental impacts to the rest of the sacred site. The DEIR's mitigation measures are inadequate.

Mitigation measures must be feasible and minimize the Project's significant impacts. (Public Resources Code §§ 21002.1(a), 21100(b)(3); CEQA Guidelines § 15126.4(a).) The EIR must also analyze any significant effects of the measures it describes. (CEQA Guidelines § 15126.4(a); see also *Stevens v. City of Glendale,* 125 Cal.App.3d 986, 995 (1981).) Mitigation measures for impacts to tribal cultural resources must be enforceable, related to the significant impact and culturally appropriate. (Public Resources Code § 21084.3; CEQA Guidelines §§ 15126.4(a)(2); 15126.4(a)(4).) Pursuant to AB 52, public agencies shall, when feasible, avoid damaging effect to any tribal cultural resource. (Public Resources Code § 21084.3.) As acknowledged in the DEIR, "[a]voidance and preservation in place are the preferable forms of mitigation for archeological sites." (DEIR p. 3.8-24.) Measures that may be considered to avoid or minimize significant adverse impacts include planning and construction to <u>avoid</u> the tribal cultural resource and protect the cultural and natural context or planning open space to incorporate the resources with culturally appropriate protection. To comply with AB 52, the lead

[1] The only measure the DEIR applies to the entire Hiller Mound as a whole is a mitigation measure to "note on any plans that require ground-disturbing excavation that there is potential for exposing buried cultural resources" and that "site information supplied to the contractor shall be considered and marked confidential." (DEIR p. 3.8-25, ES-33.) As discussed further in the letter, this proposed measure is unclear and does nothing to mitigate environmental impacts.

[2] The DEIR only addressed the Hiller Mound Core, which is 1.77 acres, while the entire Hiller Mound (referred to as "revised site boundary") is 7.03 acres.] The Hiller Core Mound is only 25% of the entire site. (1.77 / 7.03 = 0.2518.) The DEIR must analyze the entire Hiller Mound, and avoid it if feasible, in order to comply with CEQA. The City should choose an alternative that avoids this sacred site.

T1-4 cont. agency must treat tribal cultural resources with culturally appropriate dignity and take tribal cultural values and the meaning of the resources into account. This can be done by protecting the cultural character and integrity, traditional use, and confidentiality of the resource. (Public Resources Code § 21084.3.) We recognize there is some effort to mitigate significant impacts in the DEIR, but the measures need to consider and give greater deference to avoidance, adequate measures to provide preservation in place, and our cultural values.

Mitigation measures cannot be developed without first achieving a full understanding of the extent of a tribal cultural resource so as to properly identify the impacts on tribal cultural resources from a project. (See *Save the Agoura Cornell Knoll v. City of Agoura Hills* (2020) 46 Cal.App.5th 665, 686-689 where the City lost in court because it failed to determine the extent of tribal cultural resources or if the entire site could be avoided, or that it was impractical or infeasible for the City to make this determination as part of its initial review.) Mitigation measures should be described specifically and not deferred for future formulation. (Guidelines § 15126.4(a)(1)(B); see generally *POET, LLC v. Cal. Air Resources Control Board,* 218 Cal.App.4th at 681, where lead agency stated it would implement a measure to mitigate significant impacts but failed to specify compliance and monitoring requirements.) Specific details of mitigation measures may be developed after project approval only "when it is impractical or infeasible to include those details during the project's environmental review," and the agency "adopts specific performance standards the mitigation will achieve." (CEQA Guidelines, § 15126. subd. (a)(1)(B).) Therefore, mitigation of post-construction uses of the land use needs to be analyzed now, and those impacts must be addressed in the DEIR.

T1-5 Here, the DEIR does not fully address mitigation measures related to the use of space above the Hiller Mound Core and only concludes that the Hiller Mound Core will be incorporated into open space to avoid construction of other structures. (DEIR p. 3.8-24.) While we recognize that the Project would incorporate the Hiller Mound Core into open space – the DEIR fails to specify how the open space will be used. (DEIR p. 3.8-24.) As already expressed, the entire Hiller Mound should be avoided, not just the core. If Hiller Mound is to be converted into open space, there must be additional restrictions regarding use of the open space above the Shellmound, which is a tribal cemetery and sacred site. It would be disrespectful and a complete divergence from our traditional cultural values if this open space is used for parks or recreational uses. The Hiller Mound meets the definition of a cemetery[3] – it would be difficult to fathom recreational activities taking place immediately above the graves of departed loved ones if those Ancestors were not Native American. This Project would not be allowed at Menlo Park's Holy Cross or Saint Patrick's Cemeteries, and we must ask why should Native American sacred places and Ancestral remains be treated any differently? The City would never contemplate designating these places as open space for the public to trample over their ancestors. Such cemeteries are only a few hundred years old as opposed to Shellmound, which date back over five thousand years. The Tamien

[3] See Health and Safety Code § 7003 which defines a cemetery as, "a place where six or more human bodies are buried." There are more than six human bodies in the Hiller Mound area and therefore the Hiller Mound is considered a cemetery.

T1-5 cont. Nation is merely asking for equality: for their Ancestors to be treated the same as those buried in other local cemeteries. The Hiller Mound is a Tamien Nation sacred site and anything other than complete avoidance preferably, or at a minimum non-destructive preservation in place, is unacceptable.

The DEIR must recognize and respect that the open space designation requires greater definition and use restrictions. We will not accept as consolation mere signage acknowledging the Tamien Nation's historical presence in the Hiller Mound area. This would be an unacceptable mitigation measure considering signage does nothing to mitigate the impacts to tribal cultural resources and only benefits and educates others who do not know the Tamien Nation's history. Therefore, we recommend establishment of a tribal cultural resources' conservation easement over the Hiller Mound. With the use of tribal cultural ecological knowledge and stewardship, the land could be landscaped with culturally relevant California Native plants and maintained by the Tamien Nation, creating a beautiful natural environment at the heart of the Project.

We recognize that the Project as proposed would add fill as a protective cover, thereby potentially preserving portions of the Hiller Mound in place. (Measure CR-2.1, DEIR p. 3.8-24.) However, the additional fill and concentrated pressure from compaction of the fill will damage and harm the Tamien Nation's Ancestors' remains and funerary and ceremonial objects. According to the DEIR, plans that require ground disturbing excavation note where there is the potential for exposing buried cultural resources and such information will be provided to the contractor and be marked confidential – yet it is unclear how this will prevent significant impacts to tribal cultural resources. (Mitigation Measure CR 2.1.) What does it mean for a contractor to *consider* the archeological site information? It is unclear how this measure will mitigate damage if the contractor merely *considers* location of human remains and proceeds anyway. Rather, a detailed and enforceable mitigation measure that includes tribal input and deference to tribal knowledge as expertise should be included as part of the Final EIR.

T1-6 Other standard mitigation measures include cultural sensitivity training for workers and construction superintendents and development of an Archeological Monitoring Plan. (Mitigation Measure CR 2.2.) The Archaeological Monitoring Plan should be a Tribal Cultural Resources and Archaeological Monitoring plan and include substantial input from the Tamien Nation.

T1-7 Furthermore, the Project and related construction activities will disturb known tribal cultural resources – specifically, the cumulative stresses induced by gravity load of construction of the estimated 40 scaffolding towers (for construction of a glass atrium within the Hiller Mound Core) along with the gravity load from the fill cap and existing soil. The DEIR notes that such concentrated pressure on the mound would be potentially significant. (DEIR pp. 3.8-24-25.) Additionally, there is anticipated leveling of the fill cap to install the scaffolding towers and potential for disturbance 12 inches <u>beneath the surface of the fill cap</u>. Construction activity above the Shellmound will cause destruction by crushing the Tamien Nation's Ancestors' remains and funerary objects, breaking them under the weight of compaction, thereby desecrating the Tamien Nation's sacred place.

T1-8 It does not matter that there will be an archeological consultant on site to determine if they think protective measures should be required prior to boring into the ground – any contact with Hiller Mound should be completely avoided. To protect the cultural integrity of the Hiller Mound Core, the Final EIR must include 15 feet of engineered fill above the Hiller Mound Core to function as a protective cover for our Ancestors and the Hiller Mound Core. With an increased depth of engineered fill, Ancestral remains, funerary, burial and ceremonial items will be better protected from disturbance.

T1-9 In addition, the DEIR recommends archeological data recovery when encountering archeological resources that cannot be avoided. This mitigation measure is inappropriate and fails to mitigate the significant impacts of the Project. It *worsens* the significant impact because it is culturally inappropriate and disrespectful to the Tamien Nation. (See Public Resources Code § 21084.3; CEQA Guidelines §§ 15126.4(a)(2); 15126.4(a)(4)).) Any form of archeological testing or data recovery fails to meet the standards of preservation with culturally appropriate dignity and consideration of tribal cultural values that are required by AB 52. In order to comply with the AB 52, any handling of human remains must include substantial input from the Tamien Nation. Mitigation measures must not themselves create environmental impacts. If mitigation measures do create additional impacts, those impacts must also be analyzed in CEQA. (See *Stevens v. City of Glendale* (1981) 125 Cal.App.3d 986.)

Because the Project will impact tribal cultural resources the City should consider how to support the tribal cultural preservation and restoration endeavors of California Native American Tribes whose tribal cultural resources are impacted by the Project. For example, this could include providing support for the Tamien Nation's goals of language preservation and land acquisition to protect our sacred sites, cultural resources, and manage the environment using tribal ecological knowledge.

T1-10 **<u>Inadequate Analysis of Cumulative Impacts</u>**

The DEIR does not adequately discuss the cumulative impacts of the Project on tribal cultural resources and provides a conclusory analysis. "An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable," which means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (14 C.C.R. § 15065; see also *Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 3 Cal.5th 497, 512.) It is improper for an EIR to conclude that a project's cumulative impacts are insignificant merely because the project contributes to an existing and unacceptable environmental condition. (See *Los Angeles Unified School District v. City of Los Angeles* (1997) 58 Cal.App.4th 1019, 1025-26; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 718.) Rather, in assessing cumulative impacts, the determination of whether the project's contribution is cumulatively considerable should take into account both the project's incremental effect and the nature and severity of the pre-exiting

T1-10 cont. significant cumulative effect. (*Communities for a Better Environment v. Cal. Resources Agency* (2002) 103 Cal.App.4th 98, 119-20.)

First, the DEIR fails to identify other Shellmound and describe previous and potential future damage to shellmounds within the San Francisco Bay Area that will likely impact Tamien Nation and other tribes' tribal cultural resources and the greater tribal cultural landscape. (Refer to "Attachment 1" for a map of shellmound locations in the San Francisco Bay Area.) Many of these shellmounds are older than the Egyptian pyramids and are historically significant for all Californians. They also remain culturally significant to Indigenous people today. This historical damage and potential for future damage to these shellmounds need to be included in the cumulative impacts assessment of the DEIR. Second, the DEIR merely concludes that the Project would not be a cumulatively considerable contributor to a significant cumulative impact on cultural and tribal cultural resources because Project-level and applicable ConnectMenlo mitigation measures are in place and future projects would be required to comply with existing federal, state, and local regulations. As described above, the mitigation measures proposed in the DEIR *will themselves cause significant impacts.* If the same mitigation measures are repeated for other projects, the incremental effect of the cumulative impact over time will be cumulatively substantial.

It is important to note a cultural distinction, the Hiller Mound does not lose significance and value to the Tamien Nation even though the Hiller Mound was previously damaged and disturbed. The damage and disturbance to the Tamien Nation's Ancestors' remains is extremely painful. This burial site carries deep cultural and spiritual meaning. It may seem to other cultures that, once damaged, the Hiller Mound would lose value, but it is still a part of the Tamien Nation's culture, and we will continue to protect the area to the best of our abilities.

T1-11

**CalNAGPRA and Repatriation to Tamien Nation**

The Native American Graves Protection and Repatriation Act ("NAGPRA") provides a procedure for repatriation of human remains, funerary objects, sacred objects, or objects of cultural significance to the appropriate lineal descendant, Indian Tribe, or Native Hawaiian organization according to a statutory schedule of priority. (25 U.S.C. § 3002.) The California Native American Graves Protection and Repatriation Act of 2001 ("CalNAGPRA"), codified as Health & Safety Code section 8010, et. seq., requires agencies that have possession or control over Native American human remains to facilitate repatriation to the relevant Tribes. (Health and Safety Code § 8010 et. seq.) A lineal descendant or California Indian Tribe can claim relationship with Native American remains or cultural items and request repatriation (Health and Safety Code § 8014-8016.) Once applicable requirements are met, the agency must repatriate the requested human remains or cultural items to the requesting California Indian Tribe. (Health and Safety Code § 8016.) Disposition is according to the wishes of the lineal descendants or affiliated Tribe. The repatriation of human remains, funerary objects, sacred objects, or objects of cultural patrimony must be accomplished consulting with the Tribe to determine the place and manner of the repatriation. (43 C.F.R. § 10.10 (2015).)

T1-11 cont. Pursuant to NAGPRA and CalNAGPRA, we have the right to be consulted and decide the place and manner of repatriation of our ancestors' human remains, funerary objects, sacred objects, and objects of cultural significance. We strongly oppose excavated Native American human remains or associated funerary objects or ceremonial objects being curated and stored at Sonoma State University, or any other university or museum. We demand the Tamien Nation's Ancestors' remains, funerary objects, sacred objects, and objects of cultural significance be respectfully reinterred within the Hiller Mound area in a place not subject to further disturbance. The only culturally appropriate and acceptable option is to return the Tamien Nation's Ancestors back to their final and rightful resting place. The area shall not be subject to further disturbance and must be appropriately capped.

T1-12 In closing, Chairwoman Geary provided the following statement regarding the Project and its devastating impact on the Tamien Nation:

> *"Shellmounds are not trash heaps. They are sacred spaces interweaving thousands of years of Indigenous culture, history, and religion. Today, the Hiller Mound is a Tamien Nation sanctified cemetery - our place of prayer where we honor and provide offerings to our deities and ancestors. Shellmounds have physical features that are both above and below the ground surface level and the entire space they occupy is sacred. Even Shellmounds that have been previously impacted are of great significance and continue to have cultural integrity to Tamien Nation.*
>
> *Before colonial contact, there were thousands of Shellmounds in California. The Hiller Mound is one of the few Shellmounds left that are still visible. Therefore, the Hiller Mound is not only significant to the Tamien Nation, but its protection should be important to everyone."*

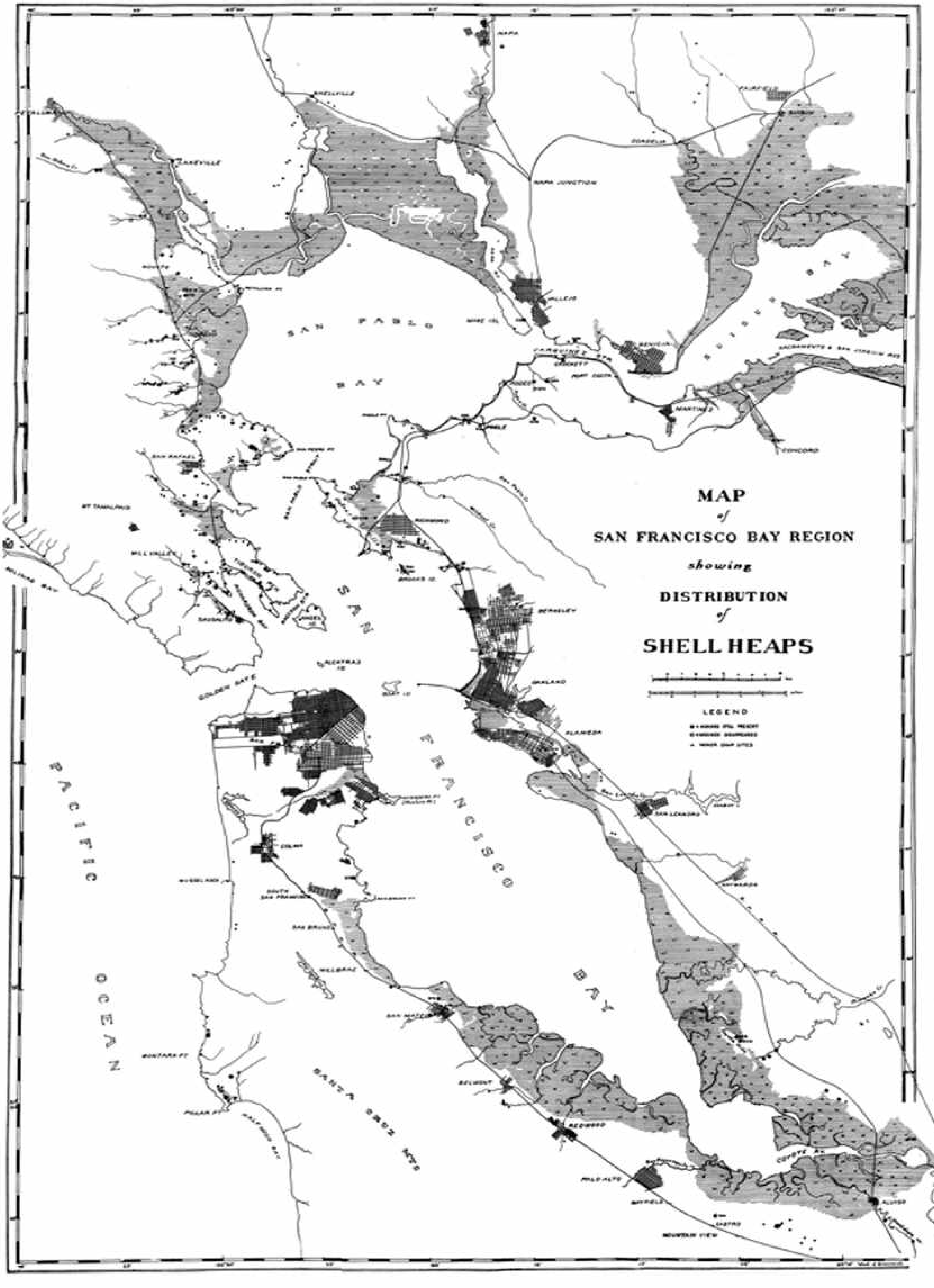
I sincerely hope that we can work together to protect this sacred site and Native American burial ground through the ongoing government to government consultation process.

Very truly yours,

H. Roberson

Holly A. Roberson
Shareholder
Kronick, Moskovitz, Tiedemann & Girard
A Professional Corporation

Enclosure: Map of San Francisco Bay Region Showing Distribution of Shellheaps. (Univ. of Calif. Publ. Am. Arch. Ethn. Vol. 7, Map 1)


MAP
of
SAN FRANCISCO BAY REGION
showing
DISTRIBUTION
of
SHELL HEAPS
LEGEND
SAN PABLO BAY
SAN FRANCISCO BAY
PACIFIC OCEAN
SANTA CRUZ MTS
SUISUN BAY
NAPA
VALLEJO
BENICIA
MARTINEZ
CONCORD
RICHMOND
BERKELEY
OAKLAND
ALAMEDA
SAN LEANDRO
HAYWARDS
SAN RAFAEL
SAUSALITO
MILL VALLEY
GOLDEN GATE
COLMA
SAN BRUNO
MILLBRAE
SAN MATEO
BELMONT
REDWOOD
PALO ALTO
MOUNTAIN VIEW
ALVISO
NAPA JUNCTION
CROCKETT
PINOLE
FAIRFIELD
SUISUN
COYOTE CR.
PILLAR PT.
MONTARA PT.
HALF MOON BAY

# *Amah Mutsun Tribal Band of Mission San Juan Bautista*

June 1, 2022

Kyle Perata, Principal Planner
The City of Menlo Park
Sent Via Email: ktperata@menlopark.org
Willow Village Master Plan Project

*Dear Mr. Perata,*

T2-1 *I am writing to thank the City of Menlo Park for its consultation with The Amah Mutsun Tribal Band of Mission San Juan Bautista regarding Willow Village under AB 52. The Tribe has been involved with the project since 2015 when we were appointed as the Most Likely Descendant for Native American burials associated with the archaeological site within the project by the California Native American Heritage Commission. In addition, the Tribe has been consulted by the project proponent in regard to Native American concerns regarding the potential project for many years.*

*The Amah Mutsun Tribal Band of Mission San Juan Bautista have been appointed by the Native American Heritage Commission as Most Likely Descendants for CA-SMA-160/H. The Tribe has provided recommendations for Native American burials exposed during construction and have participated in their recovery and reburial since 2013. We have worked with the archaeologists and owner to excavate and analyze the burials and artifacts to develop our tribal history. The Tribe has selected reburial locations within the property and ceremonially reburied the remains.*

*Most importantly the Tribe has been consulted by Facebook during the development process since 2017. We have participated in both archaeological monitoring by providing Tribal Monitors and in reviewing proposed project plans to provide Tribal input regarding Native American cultural resources.*

**3030 Soda Bay Road**
**Lakeport, CA 95453**
**650 851 7489**
**amtbinc21@gmail.com**

# *Amah Mutsun Tribal Band of Mission San Juan Bautista*

T2-2 *We were also consulted formally by the City of Menlo Park under AB52 related to the Draft Environmental Impact report for Willow Village, including the proposed Mitigation Measures for the project. The Amah Mutsun Tribal Band of Mission San Juan Bautista approves of the proposed Mitigation Measures for Willow Village related to tribal cultural resources and looks forward to continued consultation with both the City of Menlo Park and Facebook to ensure that Tribal Cultural Resources are protected.*

*If you have any questions, please feel free to contact the Tribe at the below contact information.*

*Sincerely,*
*Irenne Zwierlein Tribal Chief and Chairwoman*
*Amah Mutsun Tribal Band of Mission San Juan Bautista*


***3030 Soda Bay Road***

***Lakeport, CA 95453***

***650 851 7489***

***amtbinc21@gmail.com***

# MUWEKMA OHLONE INDIAN TRIBE

## OF THE SAN FRANCISCO BAY AREA REGION

**'Innu Huššištak Makiš Mak-Muwekma *"The Road To The Future For Our People"***



June 21, 2022 Via Email: ktperata@menlopark.org

City of Menlo Park
Mr. Kyle Perata, Acting Planning Manager
701 Laurel Street
Menlo Park, CA 94025

RE: Willow Village

Horše Túuxi Mr. Perata:

T3-1

On behalf of the Muwekma Ohlone Tribe of the San Francisco Bay Area, I am following up on the City of Menlo Park's consultation with the Tribe on Willow Village. We appreciated the opportunity to consult with the City of Menlo Park and Signature Development Group following our request for consultation under AB52.

As you may know, the present-day Muwekma Ohlone Tribe is comprised of all of the known surviving American Indian lineages aboriginal to the San Francisco Bay Region who trace their ancestry through Missions Dolores, Santa Clara, and San Jose; and who were also members of the historic Federally Recognized Verona Band of Alameda County.

T3-2

The Tribe has consulted with both the City of Menlo Park and Signature Development Group on tribal cultural issues for Willow Village and on mitigation measures developed for the project. This includes avoidance, preservation and protection measures and requires archeological monitoring plans during construction and archeological treatment plans in the case where human remains, or artifacts are discovered during project excavations.

The Muwekma Ohlone Tribe supports the mitigation measures described in the Environmental Impact Report (EIR) for Willow Village to protect and respect Tribal cultural resources. We look forward to continued consultation, coordination, and collaboration with both the City of Menlo Park and Signature Development Group as the project continues into construction.

Please don't hesitate to contact me via email monicavarellano@gmail.com or on my cell phone at 408-205-9714 if you have questions or need additional information.

'Úni ~ Respectfully,

Monica V. Arellano, Vice Chairwoman and MLD Representative
Muwekma Ohlone Tribe of the San Francisco Bay Area

Letter O1

April 21, 2022

Menlo Park Planning Commission
701 Laurel St.
Menlo Park, CA 94025

**RE: Support for Willow Village Project**

Dear Chair Doran and Members of the Planning Commission,

O1-1 The Bay Area Council is a public policy advocacy organization working to support civic and business leaders in solving our regions most challenging issues. On behalf of the more than 300 members of the Council, I write in support of the proposed Willow Village development in Menlo Park.

California is experiencing an unprecedented housing crisis that will worsen without significant intervention. The California Department of Housing and Community Development estimates that the state must build 180,000 new units of housing annually by 2025 to address the state's housing affordability crisis - over 100,000 more units than we are currently creating. This shortage will disproportionately impact low-income communities and communities of color that are being priced out of Bay Area communities from the lack of affordable housing options. To combat this, every county and city must do its part to produce more housing.

The Willow Village project will create 1,729 units in total, of which 320 units will be BMR at low-income and very low-income rent levels. Facebook is expected to invest $75 million in amenities into Menlo Park and its surrounding communities, which goes far beyond what developers are typically able to contribute to a project. In addition to residential, retail, and office space, this project contains substantial open space – including a two-acre elevated park and dedicated pedestrian paths and bike lanes that link to surrounding and regional trails. This is a massive opportunity for housing, economic, and community development in Menlo Park that should not be missed.

Since more than 50% of Facebook employees walk, bike, rideshare, or take public or company transit, access to public transportation will be an important asset for new community members which in turn will promote low carbon emissions. In addition to reduced transportation emissions, the project will be one of the most sustainable communities of its kind thanks to its integration of LEED Gold standards: all-electric buildings, recycled water, highly sustainable office building materials, increased photovoltaics and other environmental measures.

This project is an excellent opportunity for dense, mixed-use development directly adjacent to transit and within a downtown context to grow the supply of housing and reduce dependence on cars. This is a clear example of sustainable and inclusive growth for future generations and we encourage you to support it.

Sincerely,

Matt Regan

Matt Regan
Senior Vice President, Bay Area Council

Letter O2

**Perata, Kyle T**

**From:** Vince Rocha <vrocha@svlg.org>
**Sent:** Thursday, April 21, 2022 1:28 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** Silicon Valley Leadership Group supports Willow Village

**Follow Up Flag:** Follow up
**Flag Status:** Completed

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Dear Planning Commissioners,

O2-1 I am writing on behalf of the Silicon Valley Leadership Group to express our support for the Willow Village project. I urge you to advance the project through the EIR process and the remaining steps toward approval.

Regards,


**Vince Rocha (he/him)**
Vice President, Housing & Community Development
408.910.4616 | svlg.org
Connect with us: Twitter | LinkedIn | Facebook

Letter O3

YIMBY Law

57 Post St, Suite 908

San Francisco, CA 94104

hello@yimbylaw.org

YIMBY LAW

4/22/2022

Menlo Park Planning Commission
701 Laurel St.
Menlo Park, CA 94025

planning.commission@menlopark.org
Via Email

Re: 1380 Willow Road

Dear Menlo Park Planning Commission,

O3-1 YIMBY Law is a 501(c)3 non-profit corporation, whose mission is to increase the accessibility and affordability of housing in California. YIMBY Law sues municipalities when they fail to comply with state housing laws, including the Housing Accountability Act (HAA). As you know, the Planning Commission has an obligation to abide by all relevant state housing laws when evaluating the above captioned proposal, including the HAA. Should the City fail to follow the law, YIMBY Law will not hesitate to file suit to ensure that the law is enforced.

Willow Village turns an inward-facing, 59-acre, 1970s low-density R&D site with endless surface parking into a community-serving, mixed-use project with parks, open-space, housing and affordable housing, and badly needed community-serving retail. The neighborhood of Belle Haven lacks basic amenities like a grocery store, pharmacy services and adequate open space. Willow Village delivers all of these amenities in one project. Moreover, once built, Willow Village will increase Menlo Park's existing rental affordable housing stock by more than 60%. Willow Village was designed around more than five years of neighbor and community input and shows what responsible, community-focused mixed-use development can look like.

California Government Code § 65589.5, the Housing Accountability Act, prohibits localities from denying housing development projects that are compliant with the locality's zoning ordinance or general plan at the time the application was deemed complete, unless the locality can make findings that the proposed housing development would be a threat to public health and safety.

The above captioned proposal is zoning compliant and general plan compliant, therefore, your local agency must approve the application, or else make findings to the effect that the proposed project would have an adverse impact on public health and safety, as described above. Should the City fail to comply with the law, YIMBY Law will not hesitate to take legal action to ensure that the law is enforced.

I am signing this letter both in my capacity as the Executive Director of YIMBY Law, and as a resident of California who is affected by the shortage of housing in our state.

Sincerely,

Sonja Trauss
Executive Director
YIMBY Law

Letter O4

SAN FRANCISCO FAIRFIELD SAN JOSE SANTA ROSA WALNUT CREEK

GREENBELT ALLIANCE

April 22, 2022

RE: Endorsement of Willow Village

Dear Menlo Park Planning Commission,

For over 60 years, Greenbelt Alliance has helped create cities and neighborhoods that make the Bay Area a better place to live - healthy places where people can walk and bike; communities with parks, shops, transportation options; homes that are affordable - and defend the Bay Area's natural and agricultural landscapes from sprawl development. Greenbelt Alliance's "Grow Smart Bay Area" goals call for fully protecting the Bay Area's greenbelt and directing growth into our existing communities, and accomplishing both in a way that equitably benefits all Bay Area residents. Our endorsement program helps further these goals by providing independent validation of smart infill housing (development of vacant land within urban areas) and mixed-use projects (allowing for various uses like office, commercial and residential).

O4-1 **Greenbelt Alliance is pleased to conceptually endorse Willow Village**

As a mixed-use development, Willow Village would bring housing, jobs, neighborhood-serving retail, and other community amenities including a 4.1 acre public park, 2.1 acre elevated park, dog park, plazas and 1.6 acre town square to a neighborhood without neighborhood-serving retail and service uses. This 1,735 unit, mixed-use development, proposed by Sunset Development will have a commitment for affordability. 18% of units across the project will be offered at Below-Market-Rate Rents (with 100 units reserved for very low income seniors) for households ranging from 30-120% of the Area Median Income (AMI).

This Project would reduce VMT by introducing neighborhood-serving retail, including a full-service grocery store and pharmacy, and other community amenities, to an existing neighborhood without such amenities. The addition of such amenities to the area would reduce the number and length of automobile retail trips of existing residents and employees. Willow Village is also located within 1/2 mile of Facebook's major employment center with bike, pedestrian and shuttle routes available so that employees do not have to drive. Similarly, the inclusion of retail in the Project causes the VMT from Project residents and employees to be lower than it would be if the Project did not include retail uses.

Approximately 1.25M square feet of traditional office space featuring next generation, LEED-Gold design and 500,000 square feet of accessory space that includes a public visitor center and flexible meeting, collaboration and conference space for employees and office guests. This is the kind of climate-smart development that we need in the Bay Area to meet our housing goals, reduce

O4-1 cont. greenhouse gas emissions, and make sure that local residents are able to grow and thrive in their own communities as housing costs rise.

This project will help the city of Menlo Park make significant progress towards its Regional Housing Needs Assessment (RHNA) goals. Every city in the Bay Area must play their part to increase their housing stock to make sure the local workforce can afford to live close to jobs, schools, and services — spending more time with family and friends and less time in traffic congestion — improving the social fabric of our communities and reducing the climate-damaging greenhouse gas emissions produced by driving.

We recommend the City of Menlo Park approve both of these projects. We hope its approval will resonate with other Bay Area cities, and encourage them to redouble their efforts to grow smartly.

Sincerely,
Zoe Siegel

Director of Climate Resilience, Greenbelt Alliance

MENLO TOGETHER

April 25, 2022

Re: Willow Village, items F1 and G1

Dear Planning Commission and City Staff,

Menlo Together is a group of Menlo Park and Peninsula residents who envision an integrated and diverse, multi-generational, and environmentally sustainable city. We advocate for an accessible and inviting Menlo Park with housing at all affordability levels, and with pedestrian and bike-friendly spaces, developed to be carbon-free. We value equity, sustainability, inclusion, health, and racial and economic justice.

We write with comments on the Willow Village project to inform your study session this evening.

O5-1 We appreciate that the Willow Village commercial office project has designed homes and community service amenities into the overall proposal, and that the community amenities are included in the first phase of development. We ask that the Planning Commission study ways to improve the project's jobs/housing balance and fit, increase confidence in the long term viability of the community serving grocery and pharmacy, and improve circulation, pedestrian, and bike safety.

O5-2 BMR Housing:

Menlo Together appreciates the plan for housing at all levels of affordability and ages in this proposal, and we would like to see a significantly higher number of affordable units at steeper affordability with preference for those most impacted by the project, who have greatest need.

1) **We value inclusion and feel strongly that the market rate apartment buildings should include at least 15% BMR homes at a range of affordability levels.** The city's BMR guidelines require market rate housing projects to provide 15% of the units at Below Market Rate (BMR) affordability. Specifically, the guidelines require all units to be affordable at low income, or a mix of affordability levels that is equivalent in terms of overall subsidy. We believe that the inclusionary BMR housing should include a relatively even

O5-2 cont.

distribution of Very Low, Low, and Moderate income affordable units and propose that Meta increase their investment in our community to achieve this outcome.

2) We are glad to see that city staff is open to explore, but is not yet supporting the proposal to eliminate the 75% cap on moderate income rents. We believe the cap is an important tool to ensure that our "Below Market Rate" units do in fact maintain below market rate rents.
3) **In addition to the integrated 15% BMR units above, we support the proposal to produce 100% affordable housing on-site, and encourage doing so by donating land and finances and partnering with a non-profit housing developer.** Stand-alone 100% affordable housing is able to draw upon county, state and federal financing, and as such can be more deeply affordable. When produced and managed by a mission-aligned non-profit, the units are managed to support tenant success and perpetual affordability. We are glad to see that the developer is working with Mercy Housing to establish such a partnership.
   a) **A portion of the stand-alone affordable units should follow Menlo Park BMR preferences.** County, State, and Federal financing comes with rules about who can apply as tenants. To ensure that Menlo Park has priority to fill a portion of these units, Menlo Park must contribute financing to the project. We propose that the developer make a land *and* financial contribution to ensure that a good portion (30%?) of units can receive Menlo Park preference.
   b) We support age-restricted senior housing, and would also support multi-generational homes for extremely low income families, and/or people with disabilities.
4) Consider converting some rental units (including some BMR units) into ownership units to diversify the type of housing, offer residential stability, and wealth-building opportunities.
5) **Although not proposed by the developer, we would encourage the use of the density bonus to produce an additional 200 units (according to the option studied in the EIR) for additional units that are affordable to ELI/VL/LI households.** Menlo Park has a multi-year debt to the region in terms of housing to support the new jobs we have created. This debt has been and continues to be most strongly felt in Belle Haven through eviction, homelessness, displacement, overcrowding, and extreme housing cost burden. The impacted demographic is 50% Black and Hispanic and has a median income of $50-60,000/year. In addition, Belle Haven has carried a disproportionate impact of our city's growth. That is why we propose that we use the density bonus to produce an additional 200 units but do so in a way that meets the affordability needs of those most impacted by the job/housing imbalance who need housing affordable to households with extremely low, very low, and low incomes.

Circulation, Pedestrian and Bike Safety

O5-3 We appreciate the focus of the project on improving circulation and safety, and have some concerns and suggestions.

Relating to circulation, the EIR identifies that the project will put pressure on the intersections of Willow and Bayfront and Willow and University. Would it be feasible to add a third entrance/exit to Bayfront from what is currently being proposed as a loop road? This could create a stronger "grid" with multiple options to enter and exit the area, relieving the pressure on the two other intersections.

The current proposal includes expanding the right of way to add a turn lane, which diminishes safety for people walking and bicycling.

With regard to Willow, we would like to see major improvements to pedestrian crossings at all of the intersections along the corridor, especially Hamilton as a major crossing for Belle Haven residents to access the services, and in addition, Park, Ivy, and O'Brien.

With regard to the details of pedestrian and bicycle circulation and safety, we would encourage the project to be reviewed by the Complete Streets Commission.

O5-4 With regard to trip caps and vehicle parking, we would like to see analysis that is based on goals for mode share - what is the number of people who are expected for the various uses, and what percentage of them are expected to be driving vs. using transit, walking and bicycling. Mountain View has used these methods in its transportation for mixed use developments in the North Bayshore developments around Google's headquarters.

We are concerned that a trip cap focused primarily on peak commute hours may be less relevant in a post-covid era that may have persistently less peak travel. And we are concerned that the all-day trip cap may be equivalent to supporting driving by a very large share of users of the development, which would be unsupportive of the city's goals for sustainable transportation.

Sincerely,

The Menlo Together Team
info@menlotogether.org

Letter O6

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Perata, Kyle T |
| **Sent:** | Thursday, May 19, 2022 2:19 PM |
| **To:** | Perata, Kyle T |
| **Subject:** | FW: [Sent to Planning ]Please vote in support of the Willow Village Project |
| **Attachments:** | [Edited] HAC Letter of Support Willow Village.pdf; letter_report_223457_20220426_0212.csv |

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Hi Commissioners,

O6-1 **I'm writing on behalf of the Housing Action Coalition to express my support for a creative new project at Willow Village** that would bring over 1,730 much-needed homes to Menlo Park and **urge you to approve this worthy project.**

The HAC is a member-supported nonprofit that advocates for creating more housing for residents of all income levels to help alleviate the Bay Area and California's housing shortage, displacement, and affordability crisis.

**We have formally endorsed this project-- I have attached our letter of support for your reference.**

Additionally, I am attaching letters of support from Menlo Park residents, and housing advocates; I believe due to a technical error these letters only went to the chair.

In solidarity,

Ali Sapirman

--

**Ali Sapirman** | Pronouns: They/Them

South Bay Organizer | Housing Action Coalition
95 Brady Street, San Francisco, CA 94103
Cell: (407) 739-8818 | Email: ali@sfhac.org | Web: sfhac.org

To opt out of all HAC emails, respond to this email with "unsubscribe all".

**Kyle T. Perata**
Acting Planning Manager
City Hall - 1st Floor
701 Laurel St.
tel  650-330-6721
menlopark.org

HOUSING
ACTION
COALITION

95 Brady Street
San Francisco, CA 94103
415 541 9001
bayhac@sfhac.org
www.sfhac.org/bayhac

To Whom It May Concern:

O6-2 The Housing Action Coalition is pleased to endorse Signature Development's exemplary mixed-use project at Willow Village in Menlo Park. After a detailed presentation, the committee determined the project exceeds our high standards in addressing the regional affordability and displacement crisis.

The committee commends the excellent land use of the project, which replaces a 59 acre site of warehouses and office space with 1,729 new homes, over 1.2 million square feet of office space, 200,000 square feet of retail space, and significant public space in the forms of parklands, a town square, and public plazas. At 99 units per acre, Willow Village will offer much-needed dense housing to the Peninsula and justifies increased spending on local public transportation. The committee recommended the project team work with local elected leaders to bring more transit options to Willow Village.

The project site sits between the Belle Haven neighborhood and East Palo Alto, two historically underserved communities with relatively minimal public transit. Willow Village will include over 2,000 bike spaces and 6,000 car spaces, and while the committee would prefer less car parking to encourage alternate transit use, we understand feasibility concerns for this area. Additionally, the Committee recognizes that a large portion of the parking is dedicated for the new office spaces. Beyond the environmental benefits that increased housing density will bring, all of Willow Village's buildings will be built with LEED Gold certification. Buildings will be equipped with 100% electric power, and use recycled water, sustainable materials, and increased photovoltaics. Using mass timber as the primary structure material will also substantially reduce carbon emissions. Included in the project is a community space covered by a glass canopy, which the committee thought innovative and beneficial to the public. The committee also admired the project team's dedication to sustainability, and believes that Willow Village will be a model of sustainable development in the future.

Approximately 20% of Willow Village's homes will be subsidized affordable, equalling 320 homes. Of these, 120 will be reserved for very-low and extremely low-income seniors. The affordable count has increased in response to community input, and goes above and beyond local standards. In totality, Willow Village will be the largest market rate and affordable home project in Menlo Park.

The project team has been communicating with neighbors for almost four years, and has been responsive to community feedback. This has included prioritizing a grocery store affordable for all residents, reserving retail space for local businesses, adding more affordable homes, and decreasing office space to create a more balanced ratio of homes and offices. In response to concerns about physical and economic separation between Belle Haven and Willow Village, the project introduced an elevated parkway that will cross Willow Road, a major thoroughfare, to connect with Belle Haven. The project will also construct a tunnel under Highway 84 to provide safe access to miles of bayside trails. The committee applauds Signature's commitment to engaging with the community. At the same time, we would like to see

O6-2 cont.

increased accessibility to the sky bridge, and also encourage additional connections on the south side of the site.

Overall, we appreciate the project team's commitment to alleviating the impact on the nearby community. The team has demonstrated continued community involvement by amending plans that achieve the best possible housing outcomes and community open space. We are excited that Signature has committed to union labor for a large portion of the project, and encourage them to continue conversations with labor groups.

The Housing Action Coalition applauds the project team for striving to achieve the best possible project for the community. Ultimately, we are proud to endorse Willow Village, which will provide well-designed and well-located homes that help address our region's ongoing affordability and displacement crisis.

Sincerely,

Todd David, *Executive Director*

| Timestamp (EST) | First name | Last name | Email | Address | City | State/Province | State/Prov | ZIP code | Country | Language | Mobile Number | Mobile Op | Source | Referer | Target Name | Target State | Target District | Target OCDID | Letter Subject | Letter Body |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022-04-22 18:44:10 EST | Joanne | Wong-Lam | jwonglam@gmail.com | | San Carlos | California | CA | 94070-2820 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-22 18:47:06 EST | Ali | Sapirman | ali@housingactioncoalition.org | | San Jose | California | CA | 95130 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-22 22:37:45 EST | Bertha | Benton | Bertha.benton@yahoo.com | | Palo Alto | California | CA | 94303 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-23 03:57:45 EST | George | Ruiz | ruiz.george87@yahoo.com | 1321 hull drive | San Carlos | California | CA | 94070 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-23 21:07:22 EST | Caryn | Kali | Caryn@obrienhomes.net | | Millbrae | California | CA | 94030 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-24 19:25:49 EST | John | Paolini | johnpaolini@gmail.com | | Burlingame | California | CA | 94010 | US | en | | 0 | direct_link | | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-24 21:59:02 EST | Justin | Lardinois | me@justinlardinois.com | | San Jose | California | CA | 95117 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-25 14:35:11 EST | Uma | Krishnan | umakrishnan@gmail.com | | Brisbane | California | CA | 94010 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-25 15:14:48 EST | Tim | Clark | tclark@factpoint.com | 140 LUCERO WAY | Portola Valley | California | CA | 94028 | US | en | 16502086997 | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village | Hello, |
| 2022-04-25 17:04:45 EST | Corey | Smith | corey@sfhac.org | 74 Delmar Street, None | San Francisco | California | CA | 94103 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |
| 2022-04-25 17:46:54 EST | Shirley | Liu | rabbit121208@yahoo.com | 321 Commercial Ave #15 | South San Francisco | California | CA | 94080 | US | en | | 0 | | group-greenbelt-alliance | Michael Doran | DC | | ocd-division/country:us/state:vi/sldl: | Support homes at Willow Village! | Hello, |

**Perata, Kyle T**

**To:** Perata, Kyle T
**Subject:** Greenbelt Alliance supports Willow Village

**From:** Zoe Siegel [mailto:zsiegel@greenbelt.org]
**Sent:** Friday, May 20, 2022 3:00 PM
**To:** _CCIN <city.council@menlopark.org>
**Cc:** connect@willowvillage.com
**Subject:** Greenbelt Alliance supports Willow Village

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Dear Councilmembers,

O7-1 In advance of next weeks council meeting where Willow Village will be discussed, I would like to share that Greenbelt Alliance is pleased to endorse Willow Village. Please see our attached support letter.

Regards,

Zoe

--
**Zoe Siegel (she/her/hers)**
Director of Climate Resilience | **Greenbelt Alliance**
(510) 367-4464 | *Let's connect on LinkedIn* | @thezoesiegel
Schedule a meeting with me through Calendly

**Check out my Chronicle Op Ed about why infill housing is a critical climate solution.** greenbelt.org | Facebook | Twitter | Instagram

May 20th, 2022

RE: Endorsement of Willow Village

GREENBELT ALLIANCE ENDORSED

Dear Menlo Park City Council

O7-1 cont.

For over 60 years, Greenbelt Alliance has helped create cities and neighborhoods that make the Bay Area a better place to live - healthy places where people can walk and bike; communities with parks, shops, transportation options; homes that are affordable - and defend the Bay Area's natural and agricultural landscapes from sprawl development. Greenbelt Alliance's "Grow Smart Bay Area" goals call for fully protecting the Bay Area's greenbelt and directing growth into our existing communities, and accomplishing both in a way that equitably benefits all Bay Area residents. Our endorsement program helps further these goals by providing independent validation of smart infill housing (development of vacant land within urban areas) and mixed-use projects (allowing for various uses like office, commercial and residential).

**Greenbelt Alliance is pleased to conceptually endorse Willow Village**

As a mixed-use development, Willow Village would bring housing, jobs, neighborhood-serving retail, and other community amenities including a 4.1 acre public park, 2.1 acre elevated park, dog park, plazas and 1.6 acre town square to a neighborhood without neighborhood-serving retail and service uses. This 1,735 unit, mixed-use development, proposed by Sunset Development will have a commitment for affordability. 18% of units across the project will be offered at Below-Market-Rate Rents (with 100 units reserved for very low income seniors) for households ranging from 30-120% of the Area Median Income (AMI).

This Project would reduce VMT by introducing neighborhood-serving retail, including a full-service grocery store and pharmacy, and other community amenities, to an existing neighborhood without such amenities. The addition of such amenities to the area would reduce the number and length of automobile retail trips of existing residents and employees. Willow Village is also located within 1/2 mile of Facebook's major employment center with bike, pedestrian and shuttle routes available so that employees do not have to drive. Similarly, the inclusion of retail in the Project causes the VMT from Project residents and employees to be lower than it would be if the Project did not include retail uses.

Approximately 1.25M square feet of traditional office space featuring next generation, LEED-Gold design and 500,000 square feet of accessory space that includes a public visitor center and flexible meeting, collaboration and conference space for employees and office guests. This is the kind of climate-smart development that we need in the Bay Area to meet our housing goals, reduce

O7-1 cont. greenhouse gas emissions, and make sure that local residents are able to grow and thrive in their own communities as housing costs rise.

This project will help the city of Menlo Park make significant progress towards its Regional Housing Needs Assessment (RHNA) goals. Every city in the Bay Area must play their part to increase their housing stock to make sure the local workforce can afford to live close to jobs, schools, and services — spending more time with family and friends and less time in traffic congestion — improving the social fabric of our communities and reducing the climate-damaging greenhouse gas emissions produced by driving.

We recommend the City of Menlo Park approve both of these projects. We hope its approval will resonate with other Bay Area cities, and encourage them to redouble their efforts to grow smartly.

Sincerely,
Zoe Siegel

Director of Climate Resilience, Greenbelt Alliance

Letter O8

**CITIZENS COMMITTEE TO COMPLETE THE REFUGE**

P.O. Box 23957, San Jose, CA 95153 650 493-5540 cccrrefuge@gmail.com www.BayRefuge.org

May 23, 2022

Kyle Perata, Acting Planning Manager
City of Menlo Park
Community Development Department, Planning Division
701 Laurel Street
Menlo Park, CA 94025
**SUBMITTAL** by Email: ktperata@menlopark.org

Dear Mr. Perata:

O8-1 The Citizens Committee to Complete the Refuge respectfully submits the following comments regarding the Draft Environmental Impact Report (DEIR) of Willow Village Master Plan Project.

For decades the Citizens Committee has paid close attention to and submitted comments on projects in the ConnectMenlo area, including prior Meta projects. Always our intention is to seek the best outcomes for the environmental health of wildlife, their habitats, the Bay and the Don Edwards National Wildlife Refuge. Such is the thrust of our comments today.

In the discussion below, we address three areas of concern.

1. Issues of general concern about the DEIR.
2. Various Issues regarding Biological Resources specific to light pollution, bird safe design and shading.
3. The importance of and actions needed regarding the Willows Wetland.
4. Issues of Hydrology analysis that are significant to the Project's long term sustainability.

O8-2

## Issues of General Concern about the DEIR

The DEIR documents can be described as massive in size and extensive in detail, consistent with the size and complexity of the Project. While calling itself a "Master Plan", the Project is also described as tiering off the ConnectMenlo Update. As the document also describes phasing of its actions, time is then a factor in its decisions. Despite the depth of detail regarding the various aspects of development, time may uncover issues not anticipated and/or changes may occur in regulations. Such changes merit further environmental review and possible additional mitigation. As appropriate, public CEQA action, tiering off ConnectMenlo and, it appears, this "Master Plan" may be needed.  The DEIR should describe these potential actions that may affect outcomes of the Project.

O8-3

## Biological Resources

While the role of the Project EIR is to analyze and define mitigation of biological resource impacts, it relies on three Biological Resource Assessments (BRA)(Appdx 3.9) as its primary source. Doing so, as discussed below, we note that the DEIR discussion sometimes ignores certain BRA findings that may be significant, the BRA conclusions may ignore its own findings and finally the BRA findings may need updating or inclusion of additional information. We address such issues here to prompt reconsideration of certain biological resource impacts and mitigations of the DEIR.

O8-4

**Light Pollution**

<u>Night light pollution above and transmission out towards the Bay</u>**.**

While appreciating the specific attention given to bird-safe design in this document, It is a concern that issues raised in the Willow Village Master Plan are not addressed: "suggesting that increases in ambient light may interfere with these processes across a wide range of species, resulting in impacts on wildlife populations." (BSD BRA p. 47).

Artificial light at night (ALAN) from this Project and cumulatively may cause significant environmental impacts. Light disrupts the circadian rhythm and behavior of living beings which can impact mating, foraging, and migration behaviors, sometimes with lethal results.  Light at night also attracts some species (especially birds and insects), resulting in disorientation and disruption of critical behaviors. As stated in the DEIR,Indeed, Artificial Light at Night has been implicated in ecosystem-wide disruptions in terrestrial and aquatic ecosystems.  Light pollution

O8-4 cont.

has also been correlated with increased cancer risks and hormone disruption in humans.

A primary impact of ALAN is its attractivity to insects, which form the major basis of the avian food chain. Light has been implicated as one of the drivers of the loss of the numbers and species of insects worldwide, with ecosystem level impact."[1]

Special attention is given to the Atrium and other areas that "have a greater potential to (1) spill northwards into sensitive habitats along the San Francisco Bay, and (2) attract and/or disorient migrating birds during the spring and fall". (BSD BRA p. 57). The following must be included in the environmental review of impacts.

- The DEIR, in addition to the light pollution analysis, include recognition that night lighting negatively alters behaviors of animals and provide measures that reduce this impact on insect and wildlife populations.
- The DEIR must identify, analyze and mitigate direct and indirect impacts on all wetlands to the north and east of the site (willow wetlands, CalTran's salt marsh harvest mouse mitigation site, south of the Dumbarton Corridor) for impacts of trespass that may be exacerbated by the proposed project, ambient nigh lighting, vehicle traffic, loop road fixtures, etc.
- The DEIR should analyze and mitigate all night lighting inclusive the impact of lighting sourced from the entire Project, not only the areas closest to habitat. Trespass and impact analysis should address any light visible from outside or above the project. We recommend using the most recent International Dark Association Guidance (amended June 2021), reflecting state of the art science, Analysis should consider including the five principles of responsible lighting[2] of the Guidance and the recommended ordinance[3] . These provide feasible, achievable and environmentally responsible best practices that should be adopted by the Project.
- Light trespass toward all habitats and the Bay should be considered on both a Project and Cumulative impact, inclusive of prior Meta development as well

[1] Owens AC, Cochard P, Durrant J, Farnworth B, Perkin EK, Seymoure B. Light pollution is a driver of insect declines. Biological Conservation. 2020 Jan 1;241:108259
https://www.science.org/doi/10.1126/sciadv.abi8322
https://www.science.org/content/article/can-scientists-help-insects-survive-their-fatal-attraction-light-night
https://www.smithsonianmag.com/smart-news/light-pollution-contributes-insect-apocalypse-180973642/
https://www.ipbes.net/events/launch-ipbes-ipcc-co-sponsored-workshop-report-biodiversity-and-climate-change IPBES-IPCC Co-Sponsored Workshop Report on Biodiversity and Climate Change (6/1/21) IPBES

[2] https://www.darksky.org/our-work/lighting/lighting-principles/

[3] https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/2021/08/BOARD-policy-application-of-light-FINAL-June-24-2021.docx.pdf

O8-4 cont.

as other shoreline development, proposed, in construction or completed along the City's Bay shoreline.

**Light trespass in existing Bird Safe Design guideline:**
Mitigation Measure 7 of the existing Bird Safe Design requirements states, " All lighting shall be fully shielded to block illumination from shining outward towards all Bay shoreline habitats to the north. No light trespass shall be permitted more than 80 feet beyond the site's northern property line (i.e., beyond the JPB rail corridor)." (BSD BRA p.58)

- As technology is available to limit light trespass so none escapes beyond a property. 80-ft trespass is unjustifiable, The DEIR analysis should be altered to prohibit light trespass toward habitats.
- The DEIR must include addition of a monitoring and management plan to ensure that light trespass performance is attained and maintained on an ongoing basis.

**Light Pollution, additional ways to reduce**

Given the significant biological resources that could be adversely impacted he DEIR should identify additional measures to improve light pollution impacts

- Analyze the effect of structure height and related light source elevation. Should higher standards (LZ-1) apply to floors above the first floor?
- Analyze timing for closing blinds. Why is 10 PM the standard for closing blinds? Given the large amount of glass and the height of the buildings a 9 PM closure of blinds would reduce light pollution. As the angle and time of sunset are in continuous change, can the standard for closing blinds adjust quarterly on dates of the solstices and.equinoxes?
- Revise the Visitor Center guideline which specifies 11 PM for blind closure.
- Evaluate night closure of the elevated park to help reduce light pollution
- Evaluate requiring use of motion-detected or other light avoidance technologies for exterior locations that have habitat impacts on the north and northeast wetlands.

O8-5 **Bird Nesting**

<u>Impacts of Design and Materials on nesting</u>

The DEIR does not address the likely possibility that birds, wasps and possibly other species may be attracted to the buildings as nesting locations. **The DEIR should discuss, provide guidelines and mitigation to manage nesting** on the structures consistent with the International Migratory Bird Act and other law and

O8-5 cont.

with the intention of not contributing an "ecological  sink" e.g. reducing the breeding success of a migratory bird species.

<u>Bird Safe Design Waivers</u>

Discussion in the Bird Safe Design BRA reveals that the Project requests waivers for some of the most hazardous architectural elements. These waivers will relax the requirements of the City's Bird-Safe Design Mitigation Measure BIO-1 of the ConnectMenlo EIR. Waivers requested apply to these BSD requirements (BSD BRA p. 44):

- E. Glass skyways or walkways, free-standing (see-through) glass walls and handrails, and transparent building corners shall not be allowed; and
- F. Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with roof decks, patios and roofs with landscape vegetation.

It is worthwhile to further consider this BRA's discussion of waiver alternatives it proposes.(BSD BRA p.45):

> "Specifically, all glazing on free-standing glass railings in exterior areas adjacent to the atrium shall have a **Threat Factor** (see footnote 1 above) **less than or equal to 15**. This Threat Factor is relatively low (and the effectiveness of the bird-safe treatment correspondingly high) due to the relatively high risk of bird collisions with free-standing glass railings."
>
> And:
> "The only untreated glazing on the atrium will be located on the vertical façade beneath the elevated park, which **does not create a collision hazard due to landscape vegetation on roofs**."

The first statement applies a calculated risk assessment. We oppose a waiver on this basis and, **if issued**, **require that the railings at issue have continuous monitoring that assesses and reports the actual level of impacts compared to the risk assessment value used.**

The second statement provides no justification for its assumption that rooftop vegetation will keep birds from flying beneath the elevated park. We oppose this waiver on this basis and, **if the waiver is issued, continuous monitoring of bird presence and collisions under the elevated park must be provided and reported.**

Monitoring and reporting of BSD waivers issued that incorporate any expectation of impacting birds need to be included as a mitigation measure in the DEIR.

O8-6 Trash pollution: Wind, trash and balloons

The elevated park is expected to attract people for many reasons. Given the exposure of its height and its location in Menlo Park's often windy shoreline area and deflection of winds by proposed taller buildings, the park could be a source of wind-scattered trash, food scraps, plastic bottles and any kind of balloon, Wind will be a concern anywhere in the project footprint but elevation will exacerbate it and impact habitats near and far, particularly helium balloons. Trash of all kinds, plastics and balloons are a known severe impact on habitat lands and on the species that use them.

- Mitigations/Measures that provide maximum control of all forms of trash for public areas should be provided.
- Helium-filled balloons be prohibited anywhere on the Project site including the elevated park and Hamilton North and South.

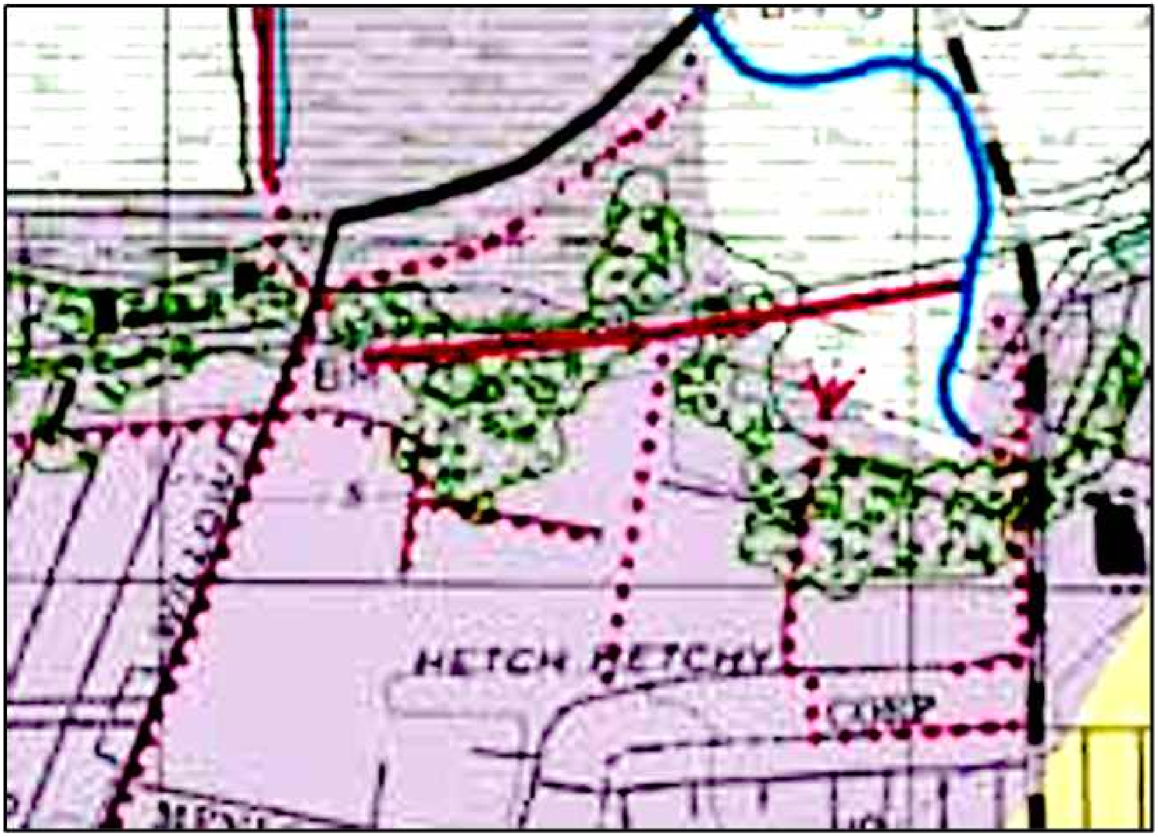
O8-7

## Willow Wetlands

Biological Resource Assessment of the WVMP identified an ecologically rare, isolated, forested habitat dominated by Arroyo willows on and adjoining the north edge of the main Project site that is discussed in the DEIR. Historically a major habitat at the Project site, recognized in the name "Willow Road", even its small footprint here calls for efforts to avoid all impacts that threaten its survival. The excerpted image just below from the Baylands & Creeks of South San Francisco Bay map of the Oakland Museum of California[4] demonstrates the willows habitat on the site circa 1850. The bold red-black line shows the drainage ditch running along the north edge, just outside the Project site.[5]

[4] Oakland Museum of California, Baylands & Creeks of South San Francisco Bay, 2005; http://explore.museumca.org/creeks/1460-OMEPA.html#
[5] http://explore.museumca.org/creeks/1460-OMEPA.html#

O8-7
cont.




From the Master Plan BRA, p. 50: "These wetlands are small and isolated, being in depressional areas, rather than having a surface connection to more extensive wetlands. Due to their small, isolated nature and lack of high-quality habitat for wildlife, these are not high-quality habitat features. Nevertheless, forested wetlands are relatively scarce along the edge of the bay, and seasonal wetlands along the edge of the bay have declined due to development and fill. Therefore, <u>we consider these wetlands to be sensitive habitat areas</u>." (emphasis added)

We agree that willow wetlands are sensitive habitat areas .Arroyo Willow is listed as a sensitive species by CDFW.[6] The fact that the habitat is "sensitive" and requires application of Menlo Park's a number of relevant BIO, LU, and OSC policies referenced in the ConnectMenlo EIR. We disagree with the DEIR finding (3.9-16) that "The wetlands are not associated with a stream and therefore would not constitute sensitive riparian habitat claimed by CDFW". The willows habitat, as a *unique* finding of this DEIR, requires substantive impact analysis of potential impacts and mitigations. Some of these issues are discussed in the WVMP BRA. Others are not or are insufficiently considered. We raise most such issues here:

---

[6] https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities#natural%20communities%20lists

O8-7 cont.

- Improve DEIR impact analysis by describing and explaining ecological relevance of historic conditions in determination of potential impacts of the project and inclusive protection of the existing willow habitat.
- Analyze the cumulative impact of bayside development on willow habitats in the area e.g the Redwood City through Palo Alto Bay shoreline.
- Describe more fully how the north edge of the property will interface with the existingt willow grove habitat, identify potential impacts to avoid or mitigate..
- Apply all applicable City conservation policies inclusive of effects on sensitive species and impacts on adjoining properties.

O8-8 Shading by new construction should be considered an impact for the existing willows habitat. We ask for a more thorough analysis of this topic and calculation of the impacts from shading of the forested wetland:

> "The increased height of the proposed buildings is not expected to result in a substantial change in the ambient light reaching nearby wetlands. The isolated forested wetlands immediately north of the project boundary are currently bordered to the south by an area of tall trees that already provide some shade, and under the proposed project, regardless of the height of buildings that are constructed nearby, these wetlands would still have exposure to the eastern sky, unimpeded by new buildings. Thus, shading of this wetland under the proposed project is not expected to increase substantially over current levels." (WVMP BRA p.50)

The omitted analysis discussed here is how Project shading will affect the existing willows habitat. The Atrium dome that would be nearby would be ~120' tall, substantially taller than the existing trees. CalTrans studied the topic of shading and lists Arroyo willow (Salix lasiolepis) as Intolerant of shade.[7] The question is whether there is sufficient sunlight for Willow Habitat.

**We ask** that shading and other impacts of concern listed above are analyzed and avoided or mitigated.

[7] Pincetich C. Assessing Permanent Shading Impacts on Riparian Plant and Aquatic Species and Habitat. Caltrans Division of Research. Innovation and System Information. 2019.

O8-9 Potential hydrological impact on the willows wetland.

Photo 4. Willow dominated isolated forested wetland located in the northern potions of the study area.

Willow Village DEIR Appendix 3.9, p. 25


In these comments we turn to focus on the water sources that have allowed these willows to survive and are requirements of survival.

Locations where willows occur are sometimes called "willow marshes" alluding to the moist ground on which they depend. Wetlands of that characteristic, sausals, acquire their fresh water supply from seasonal and pooled surface water and also from underground flow that may or may not be continuous from upland-sourced, subsurface flow. Given repeated years of drought, lack of seasonal rain and proximity to saline marsh, it appears likely these willows are fed by unidentified, underground freshwater flows.

Our concern is: **will any action of the Project disrupt or terminate these flows?** That concern needs to be addressed by impact analysis that:

- Identifies the willows' underground freshwater source, delivery direction and path.
- Identifies all Project action along the northern boundary that may interrupt the flows to the willows, temporarily or permanently.
- To the northwest and if underground flow comes from that direction, analyze whether construction and installation of the 18' high by 42'-50' wide Willow Road Tunnel would temporarily or permanently interfere with flow to the willows.

O8-9 cont.

- If underground water is found to be sourced from ground saturation by nearby landscape irrigation that the Project will remove, identify options to replace that loss.
- Given that the Project site has a known history as a heavily-used site by local native people, it should be determined if willows have significant cultural meaning or value to them.
- Consult the Regional Water Quality Control Board, determine if this willow sausal qualifies as Waters of the State and requires State mitigation if disturbed.[8]

Willows Wetlands Summary

Where conditions allow, willows are a dominant, keystone species that creates a habitat that expands biodiversity wherever it occurs. Diverse species of wildlife benefit, providing foraging, nesting, resting, refuge for any species that depends on this kind of habitat. The Project has a significant ecological element present on its northern edge and beyond. It needs a dedicated effort to assure its survival and the possibility of expanding beyond its current edges as a historically important ecotone habitat along the South Bay edge.

**We ask the Project to address the willows wetland and its place in Menlo Park's shoreline ecology.**

O8-10

## Interrelated impacts of Hydrology on Water Quality, Geology, Soils, Hazardous materials and Biological Resources

The DEIR provides a thorough discussion of city-mandated and regulated issues of hydrology including sea level rise. In discussion here, we bring your attention to issues that emerging science has identified and may be significant to the Project site. Under CEQA these issues are not required analysis but may nonetheless be in the best interest of the lead agency and/or the project proponent.

### Climate Challenge: Water above and below ground

Associated with climate change, meteorological shifts have already changed the local climate: extended periods of drought and less frequent but intense, major storms or sequenced storms such as last October's atmospheric river. Such storms test local stormwater systems and, by infiltration, sewer systems while producing surface ponding and localized flooding. Steadily, over the decades of usable life for

[8] Willow Village DEIR, Appendix 3.9, Sec. 5.3.3, p.38.

O8-10 cont. the Willow Village Project, rising groundwater (subsurface aquifers) will exacerbate the problem.

Sea level rise

While the DEIR fulfills City and FEMA requirements for sea level rise (SLR), it is a concern that the SLR standard used is already out of date especially for a Project that, at build-out, is expected to exist for 30 years or more. For SLR inundation, the DEIR uses 24" of SLR by 2050, common to data sourcing from the Ocean Protection Council's (OPC) 2018 Update of Sea-Level Rise Guidelines.[9] This document provides a range of risk-aversion data points from which jurisdictions can select. These data points are calculated from greenhouse gas emission levels based on data from 2014. In April 2020, the OPC published Principles for Aligned State Action[10] that proposed broad, regional planning using a standard of 3.5'(42") by 2050 and commitment to the "best available science". Those principles encourage regional commitment which is not binding but published due to increasingly serious SLR concerns. To our knowledge, One Shoreline, San Mateo County's regional SLR resilience agency, has not adopted the 3.5' by 2050 standard. **We would encourage the Project to take two actions: (1) Incorporate monitoring of the Principles and (2) adopt a dynamic updating standard that reassesses construction, operations and mitigation standards whenever the OPC releases updates of its Sea-Level Rise Guidance whether or not local jurisdiction requires it to do so**. The latter action is already used in Mountain View, embedded in its Public Works' North of Bayshore (shoreline) CIP requirements.

The OPC updates its documents periodically, after each release of new findings by the Intergovernmental Panel on Climate Change (IPCC), most recently earlier this year. Updates of these OPC documents are expected, date or dates TBD.

Subsurface Groundwater

Unfortunately neither of those documents nor current inundation maps of BCDC and FEMA include rising groundwater consideration or guidance. SLR's inundation effects have long been widely discussed, during which time scientists understood that SLR would also produce lowland risk of rising groundwater (subsurface aquifer) but the best science available on the issue simply did not exist.

---

[9] California Sea-Level-Rise Guidelines, Ocean Protection Council, 2018, https://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf

[10] California Sea-Level-Rise Principles for Aligned State Action,April 2020, http://www.opc.ca.gov/webmaster/_media_library/2020/05/State-SLR-Principles_FINAL_April-2020.pdf

O8-10 cont.

Scientific studies take time but are finally producing verifiable information. For California and including the entire Bay Area shoreline, in 2020 Befus et al published groundwater studies including a Nature Climate Change article, "Increasing threat of coastal groundwater hazards from sea level rise in California"[11] and made a suite of data files available for local scientific study.[12][13][14] Those findings are not yet incorporated in risk assessment maps produced by BCDC, FEMA and others but they are incorporated in online risk evaluation tools published by the USGS[15] and Point Blue Conservation Science (ourcoastourfuture.org).

A revealing reference to consult is a technical addendum prepared by the San Francisco Estuary Institute (SFEI) and others for the City of Sunnyvale's upcoming Moffett Park Specific Plan Update DEIR: "Sea-level rise impacts on shallow groundwater in Moffett Park".[16] The addendum is specific to findings in Moffett Park but its analysis is useful, discussing potential impacts and adaptation action for development. As food for thought, we list the potential impacts of rising groundwater compiled in the Moffett Park report.

- Corrosion. Salinity impact on below-ground infrastructure due to age or materials use
- Buoyancy. Buoyant force impact on foundations, buried utilities and pipes, roads. Together corrosion and buoyancy pose risks onsite and to service delivery systems inbound to and outbound from the Project site.
- Seepage. Seepage into subsurface structures, floors, walls, construction weak points, flaws that destroyed the Surfside condominiums in Florida
- Infiltration: Infiltration into stormwater and sewage pipelines reducing capacity
- Liquefaction: Rising water tables can increase liquefaction risk
- Damage to vegetation: Saturated soils and/or higher salinity can impact vegetation

---

[11] Befus et al, "Increasing threat of coastal groundwater hazards from sea level rise in California, Nature Climate Change, 08/17/2020, Subscriber access only online, **Attached**.

[12] Befus et al, "Projected responses of the coastal water table for California using present-day and future sea-level rise scenarios" 08/11/2020, https://www.sciencebase.gov/catalog/item/5b8ef008e4b0702d0e7ec72b

[13] Befus et al, "Projected groundwater emergence and shoaling for coastal California using present-day and future sea-level rise scenarios",08/11/2020, https://www.sciencebase.gov/catalog/item/5bd9f318e4b0b3fc5cec20ed

[14] Befus et al, "Projected groundwater head for coastal California using present-day and future sea-level rise scenarios", 08/11/2020, https://www.sciencebase.gov/catalog/item/5bda14abe4b0b3fc5cec39b0

[15] US Geological Survey, Coastal Storm Modeling System (CoSMoS) for Central California, v3.1, https://www.sciencebase.gov/catalog/item/5b280118e4b0592076260491

[16] SFEI et al, "Sea-level rise impacts on shallow groundwater in Moffett Park",November 2021, https://static1.squarespace.com/static/5e38a3dd6f9db304821e8e5e/t/61a7b37743ec4b770e11ee73/1638380421678/Moffett+Park+Specific+Plan+Groundwater+Addendum.pdf

O8-10 cont.

- Contaminant mobilization: Varying by location and contaminant type, movement vertically or laterally of existing remediation or of unknown contaminant
- Emergence flooding. Surfacing of groundwater; even non-emergent levels can exacerbate surface flooding by reducing depth to surface.

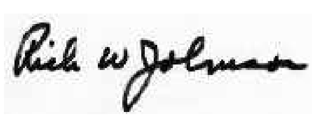
The DEIR discussion in Hydrology and Water Quality describes certain groundwater studies but, as it is not required, the risk potential of rising groundwater is not studied. But with seas notably rising, the best time to assess a groundwater baseline is now. The site has a history of fill, masking groundwater conditions across the full Project. **We recommend that the Project assess the subsurface groundwater status throughout the full site, setting a baseline for operations monitoring and adaptations to come.**

---

The Citizens Committee offers the comments of this letter with the intention of improving the environmental actions and values of the Willow Village Master Plan Project. Please contact us as and if desireed.

Yours truly,

Eileen McLaughlin
Board Member
Citizens Committee to Complete the Refuge



Rick Johnson
Conservation Advocate
Citizens Committee to Complete the Refuge

**CC**: Carin High, Co-chair CCCR
Gail Raabe, Co-Chair CCCR

**ATTACHED**: Befus et al, "Increasing threat of coastal groundwater hazards from sea-level rise in California", Nature Climate Change, 08/17/2020

nature climate change

ARTICLES
https://doi.org/10.1038/s41558-020-0874-1

Check for updates

# Increasing threat of coastal groundwater hazards from sea-level rise in California

K. M. Befus [1,2] ✉, P. L. Barnard [3], D. J. Hoover [3], J. A. Finzi Hart [3] and C. I. Voss [4]

**Projected sea-level rise will raise coastal water tables, resulting in groundwater hazards that threaten shallow infrastructure and coastal ecosystem resilience. Here we model a range of sea-level rise scenarios to assess the responses of water tables across the diverse topography and climates of the California coast. With 1 m of sea-level rise, areas flooded from below are predicted to expand ~50–130 m inland, and low-lying coastal communities such as those around San Francisco Bay are most at risk. Coastal topography is a controlling factor; long-term rising water tables will intercept low-elevation drainage features, allowing for groundwater discharge that damps the extent of shoaling in ~70% (68.9–82.2%) of California's coastal water tables. Ignoring these topography-limited responses increases flooded-area forecasts by ~20% and substantially underestimates saltwater intrusion. All scenarios estimate that areas with shallow coastal water tables will shrink as they are inundated by overland flooding or are topographically limited from rising inland.**

Over the next century, rising sea levels are predicted to cause widespread inundation of coastal terrestrial areas[1,2], wetland loss[3] and more severe nuisance flooding[4,5]. Relative sea levels are projected to increase for much of Earth's coastlines[6], presenting a wide range of coastal hazards for the ~1 billion people living in low-elevation coastal areas by 2050 (ref. [7]). Along with the increasing exposure of coastal communities to overland flood risk[1,8,9], rising sea levels will cause unconfined coastal groundwater levels (that is, water tables) to rise, leading to inland flooding hazards via subsurface connections to the sea[10]. An improved understanding of the physical controls on the severity of the groundwater hazards caused by sea-level rise (as opposed to human-induced controls, such as pumping causing saltwater intrusion) is therefore urgently needed.

Compared with the impacts of direct marine inundation, the responses of groundwater to sea-level rise may lead to earlier, more severe or longer-term[11] hazards to terrestrial water resources[1,12,13], ecosystems[14,15] and infrastructure[10,16–18] and could contribute substantially to the projected hundreds of millions of people displaced by climate change over the next century[19,20]. Coastal water tables are dynamically connected to sea levels, with inland spatio-temporal responses dictated by the frequency and magnitude of forcing events[21,22]. Unconfined aquifers in hydraulic connection with rising seas experience shoaling of water tables as the higher sea level and the intrusion of denser marine water force water tables higher[10,23]. As water tables rise, groundwater discharge to receiving drainage networks may initiate or intensify[24].

Groundwater systems respond hydraulically to sea-level rise over a continuum between two primary modes[12,13,23]: (1) water tables rise the same amount as sea levels where thick, overlying unsaturated zones can accommodate additional groundwater storage, termed the flux-controlled or recharge-limited mode; and (2) water tables rise less than sea levels and instead discharge some of the original storage to existing or new drainage networks as saline intrusion displaces the fresh groundwater, termed the topography-limited or head-controlled mode. The hydrogeologic setting, which combines geology and climate, controls the hydraulic mode[13] and the vulnerability of the aquifer to seawater intrusion[12,25], the amount of fresh groundwater flowing through the aquifer, and the rate of submarine groundwater discharge and its role in transporting terrestrial chemicals to marine waters[26]. At the global scale, it is estimated that 16–78% of coastal groundwater systems could be topography limited (using one-dimensional analytical solutions with coarse topographic and geologic data)[13], but these estimates have not been refined at smaller scales. Many analyses of coastal groundwater with future sea-level rise adopt the flux-controlled mode[10,16,27,28], but selecting one mode to represent all groundwater can bias the analysis[29], and the implications of this assumption have not been extensively tested.

Here, we use a numerical modelling approach to test how groundwater beneath diverse coastal landscapes responds to rising sea levels. In this initial application to coastal California, the first large-scale, high-resolution analysis of the groundwater hazards resulting from sea-level rise is presented. The extent of future groundwater shoaling along California's coast is forecast, and the prevalence of flux-controlled and topography-limited conditions is then identified. Finally, the relevance of these conditions for future coastal management decisions is discussed. The focus is on the California coast, but the modelling approach is flexible and can be applied to coastal settings worldwide.

## Approach

Modelled forecasts for present-day and future equilibrium water-table depth conditions used both present-day local mean sea level (LMSL) and mean higher high water (MHHW) tidal datums as end members for the long-term position of the water table at the coast, with sea-level rise added to these datums for the analysed scenarios. Model hydrogeology was conceptualized in a simple manner, with uniform aquifer thickness along the coastline, a horizontal impermeable bottom at −50 m NAVD88 and homogeneous hydraulic conductivity ($K$). Given unknown aquifer properties, a different value of $K$ (0.1, 1 and 10 m d$^{-1}$) was used for each of the models run for each tidal datum, allowing the generation of a

[1]Department of Civil and Architectural Engineering, University of Wyoming, Laramie, WY, USA. [2]Department of Geosciences, University of Arkansas, Fayetteville, AR, USA. [3]Pacific Coastal and Marine Science Center, United States Geological Survey, Santa Cruz, CA, USA. [4]Water Mission Area, United States Geological Survey, Menlo Park, CA, USA. ✉e-mail: kmbefus@uark.edu

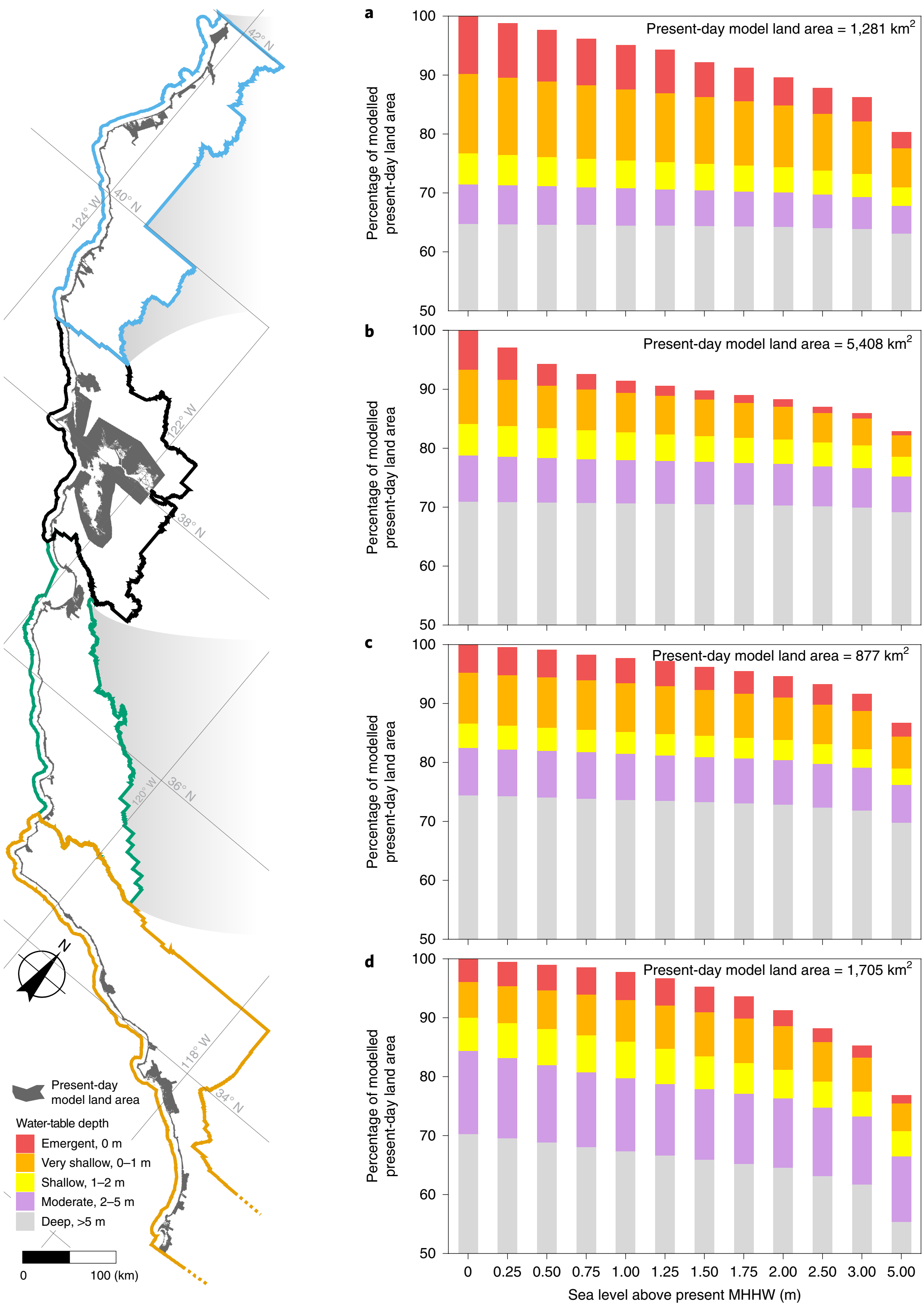



**Fig. 1 | California's loss of shallow water tables with sea-level rise. a–d**, Cumulative areal proportions of modelled water-table depths with higher sea levels for Northern California (**a**), the San Francisco Bay area (**b**), Central California (**c**) and Southern California (**d**). The regions are shown as merged county outlines around the much less extensive model land areas. The model results for $K = 1\,\mathrm{m\,d^{-1}}$ and the MHHW tidal datum are shown. The loss of total area is caused by overland inundation with higher sea levels.

range of forecasts (see Methods for more details). Two modelling approaches were used to separate groundwater responses following the flux-controlled and topography-limited modes. MODFLOW (ref. [30]), a numerical model of groundwater flow, calculated the equilibrium water-table position for specific sea-level-rise scenarios, in a groundwater flow system that is in steady state with respect to the water budget enforced by present topography, present climate and a particular sea level. The base MODFLOW models

**Table 1 | Percentages of populated areas exposed to shallow groundwater**

| | Areas exposed when using LMSL (%) | | | Areas exposed when using MHHW (%) | | |
|---|---|---|---|---|---|---|
| Sea-level rise (m) | $K = 0.1\,m\,d^{-1}$ | $K = 1\,m\,d^{-1}$ | $K = 10\,m\,d^{-1}$ | $K = 0.1\,m\,d^{-1}$ | $K = 1\,m\,d^{-1}$ | $K = 10\,m\,d^{-1}$ |
| MODFLOW | | | | | | |
| +0 | 43.9 | 25.0 | 13.8 | 43.7 | 25.4 | 15.3 |
| +1 | 45.1 | 27.3 | 17.5 | 44.8 | 27.7 | 18.8 |
| +2 | 46.2 | 29.5 | 20.9 | 45.6 | 29.4 | 21.5 |
| +3 | 46.9 | 31.1 | 23.4 | 46.2 | 31.0 | 23.9 |
| +5 | 48.2 | 34.5 | 28.2 | 47.7 | 34.5 | 28.8 |
| Flux controlled | | | | | | |
| +0 | 43.9 | 25.0 | 13.8 | 43.7 | 25.4 | 15.3 |
| +1 | 49.0 | 31.4 | 18.9 | 48.5 | 31.4 | 20.0 |
| +2 | 52.5 | 36.4 | 23.3 | 51.7 | 35.9 | 23.5 |
| +3 | 55.0 | 40.3 | 26.7 | 54.1 | 39.6 | 26.7 |
| +5 | 58.4 | 45.7 | 32.4 | 57.5 | 44.9 | 32.3 |

Percentages of present-day TIGER (ref. [31]) populated land areas in California exposed to emergent to shallow water tables (that is, 0–2 m depth) and flooding from below with sea-level rise within the model domains. Present-day populated land areas within the model domains varied by tidal datum (LMSL, 4,480 $km^2$; MHHW, 4,390 $km^2$).

were constructed independently of a groundwater response mode, thus allowing either mode to control the water-table position on the basis of the local hydrogeology. The second approach, referred to as the flux-controlled approach, strictly applied the flux-controlled mode by raising the MODFLOW water-table elevations modelled for present-day sea levels by a constant equalling the increase in sea level from the present day (Extended Data Fig. 1).

Seasonal, tidal and other high-frequency water-table fluctuations affect the annual and subannual coastal elevation patterns of water tables[21,22], but long-term groundwater-level responses are dominated by sea-level rise, climate change effects on recharge and human uses; steady-state analyses therefore provide a strong initial evaluation of these systems. In this analysis, the sea-level-rise-driven responses of groundwater were evaluated independently of other driving forces that may impact groundwater shoaling, such as future changes in recharge rates, ongoing human groundwater use (such as groundwater pumping) and replenishment operations. The approaches described here rely on a series of simplifying assumptions that estimate diagnostic ranges of groundwater shoaling and seawater intrusion. The differences between groundwater responses forecast by the two approaches indicate the local influences of coastal topography on the groundwater hazard resulting from sea-level rise, as only the MODFLOW simulations include the ability of groundwater to drain and adjust up-gradient water-table elevations.

## Water-table response

Rising sea levels cause pervasive water-table shoaling along coastal California. Limiting the analysis to areas within 1 km of the present-day coastline (that is, 1 km inland from LMSL (3,240 $km^2$) or MHHW (3,300 $km^2$)), shallow to emergent groundwater (that is, within 2 m of the ground surface; the definitions are in Fig. 1) already exists beneath 981–1,450 $km^2$ for all model scenarios of tidal datums and aquifer geologies (Supplementary Tables 2 and 3). Using 1,500 km as a representative length of California's coastline, shallow to emergent groundwater conditions would be expected to exist today from the coast to 650–970 m inland on average across all scenarios. With 1 m of sea-level rise, the flux-controlled models forecast the shoaling of 124–190 $km^2$ of moderate to deep water tables into shallow to emergent water tables, encroaching an additional 80–130 m inland. The MODFLOW models forecast 60–169 $km^2$ of new areas with shallow to emergent water tables (Supplementary Tables 2 and 3), equivalent to moving the subsurface flooding hazard 50–90 m inland. However, the inland extent of shallow to emergent groundwater was spatially variable, so the averages and equivalents for the whole California coastline could misrepresent a local hazard. For example, some locations would experience almost no inland migration with 1 m of sea-level rise, and in other areas, measuring the distances between the present-day coastline and shallow water tables forecast more inland areas exposed for the MODFLOW (170–250 m) and flux-controlled (20–350 m) models than evenly distributing the hazard along California's coast (Supplementary Table 4).

Focusing on locations along the California coast where people live, we find that 13.8–43.9% of the areas defined as "populated places" by the Topologically Integrated Geographic Encoding and Referencing (TIGER) database[31] within the modelling domain face the hazards associated with emergent to shallow groundwater conditions today (Table 1, Supplementary Fig. 6 and Supplementary Tables 5 and 6). These at-risk areas grow by 1.1–3.7% with 1 m of sea-level rise in the MODFLOW simulations and by 4.7–6.4% in the flux-controlled forecasts (Table 1). Water tables rising due to sea-level rise will threaten larger areas of communities that could be beginning to experience shallow groundwater hazards today. Constraining the properties of the unconfined aquifer (that is, $K$ and thickness) is critical for reducing the uncertainty of where these hazards will be the most severe.

Despite the net shoaling of water tables within the 1 km distance from the shoreline considered for this calculation, the modelled steady-state future water-table depths show a loss of areas with emergent to shallow coastal water tables (Fig. 1). This loss results from the inability of inland water tables to keep pace with sea-level rise across California (Supplementary Tables 7 and 8). This phenomenon is especially evident in the San Francisco Bay region (Fig. 1), where sea-level rise inundates low-lying areas with shallow water tables, and gentle topography with abundant topographic drainage features limits the rise of inland water tables that would create new shallow water tables. In Southern California, water tables shoal more consistently with sea-level rise, where water tables farther inland are more responsive and raise deep water tables to shallower categories, unlike in other regions (Fig. 1). Thus, areas with emergent to shallow groundwater today are the most sensitive to inundation with rising sea levels, as they occur most often in low-lying areas. In the MODFLOW forecasts, an additional ~10% of such areas along coastal California are lost to marine or tidal conditions with 1 m

**Table 2 | Loss of coastal area with emergent to shallow water tables within 1 km of the present-day shoreline for 1 m of sea-level rise**

| | Present day | MODFLOW + 1 m sea-level rise | | Flux controlled + 1 m sea-level rise | |
|---|---|---|---|---|---|
| Tidal datum | Total area (km²) | Area lost (km²) | Percentage lost (%) | Area lost (km²) | Percentage lost (%) |
| MHHW | 1,310–3,170 | 376–520 | 16.4–28.8 | 197–270 | 8.5–18.4 |
| LMSL | 1,467–3,467 | 229–384 | 11.1–15.6 | 24–119 | 1.6–3.4 |

The ranges show the results for the three $K$ scenarios.

higher seas compared with the flux-controlled results (Table 2). In fact, the flux-controlled scenarios indicate the growth of areas with emergent groundwater of up to 86% relative to present-day occurrence, but losses in shallow groundwater converting to emergent conditions and the inundation of low-lying emergent groundwater yield net losses of the combined areas (Supplementary Tables 7 and 8). Assuming flux-controlled water-table responses overpredicts the expansiveness of emergent water tables by not accounting for groundwater discharge to topographic lows, such as drainage networks (Extended Data Fig. 1).

The degrees to which unconfined coastal aquifer areas are forecast to be flux controlled or topography limited were calculated by comparing the MODFLOW-modelled water-table rise with the present-day water table increased by sea-level rise, which requires flux-controlled conditions (Fig. 2). First, areas with emergent groundwater in both modelling approaches were separated from the mode analysis, as water tables no longer respond to sea-level rise once they are emergent. Next, areas showing no notable difference (≤5%) between the two water-table responses were taken to represent where the flux-controlled mode was active, whereas greater differences identify increasingly topography-limited conditions. We find that <20% (15.0–19.2% with $K = 1\,\mathrm{m\,d^{-1}}$ for all sea levels and tidal datums) of the California groundwater systems within 1 km of the coastline operated in the flux-controlled mode, where the water table responded linearly to sea-level rise (Extended Data Figs. 2 and 3). If the value of $K$ for the California coastal aquifers was increased to $10\,\mathrm{m\,d^{-1}}$, at least an order of magnitude higher than most of the coastal bedrock[32], flux-controlled areas increased to ~40% (38.8–47.1% for all sea levels and tidal datums) of the land area for each sea level (Extended Data Fig. 2). Much more of California's coastal areas were topography limited, as was separately calculated in a binary groundwater response analysis finding that 97.8% of the California coastal unconfined aquifers are topography limited[13] (Extended Data Fig. 4 and Supplementary Table 9). In our analysis, topography-limited conditions ranged from 68.9 to 82.2% of the modelled land areas with $K = 1\,\mathrm{m\,d^{-1}}$ and 43.5 to 59.6% with $K = 10\,\mathrm{m\,d^{-1}}$ for all sea levels and tidal datums, following the expectation for higher-permeability aquifers to be more frequently flux controlled[13]. By assuming that groundwater responds to sea-level rise under the flux-controlled mode only, as is common practice[10,16,27,28], models will overpredict water-table rises for a majority of California's coastal regions.

## Saltwater intrusion

Water-table elevations represent the energy in an unconfined groundwater system, and higher water tables can provide a hydraulic defence against saline groundwater intrusion. By calculating the buoyancy of fresh groundwater overlying infiltrated seawater,

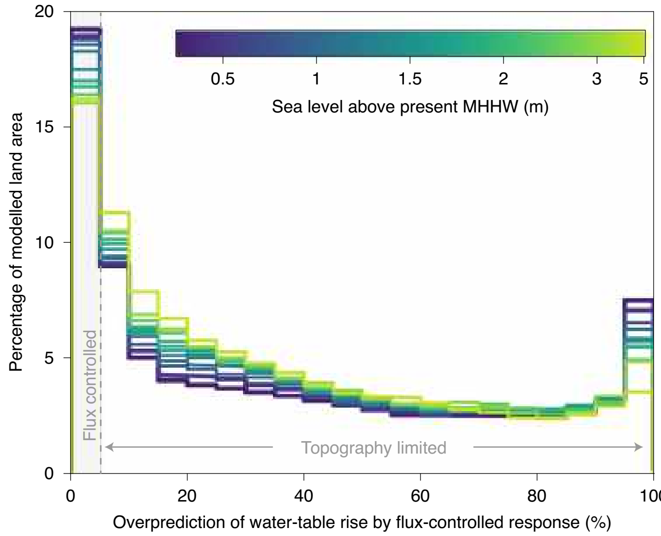



**Fig. 2 | Distribution of flux-controlled and topography-limited groundwater conditions along coastal California for higher sea levels.** The overprediction of the water-table rise by the flux-controlled response was calculated for the $K = 1\,\mathrm{m\,d^{-1}}$ MHHW datum model using equation (1) to 1 km inland from the present-day coastline. Additional model results are provided in Extended Data Figs. 2 and 3.

we predicted the evolution of the freshwater–saltwater interface with sea-level rise for coastal California (Methods). We define the saline groundwater wedge footprint as the inland area where the freshwater–saltwater interface exists at an elevation of −50 m NAVD88, at the base of the modelled portion of the geologic units in the coastal region (Extended Data Fig. 5). This gives a relative measure of the saltwater intrusion that can be expected as the footprint migrates inland. With 1 m of sea-level rise, saltwater intrusion in the flux-controlled models will expand the wedge footprint inland to underlie ~50 km² of new areas on average (7–142 km² with $10^{\pm1}$ $K$ and both datums, Supplementary Table 10), representing ~230–1,400 m of landward intrusion relative to the present-day wedge position. Allowing groundwater drainage at the land surface in the MODFLOW models resulted in 2.8–68 times more area of saltwater intrusion on average than the flux-controlled models predicted. In both models, the interface and footprint move inland, but the overall area of the footprint can shrink, as tidal and marine conditions may spatially outpace groundwater responses (Fig. 3b and Extended Data Fig. 6). The growth of the saline groundwater wedge footprint represents reductions in fresh groundwater storage, with topography-limited systems being the most vulnerable[13]. This analysis predicts conservative positions of the interface for the two tidal datums, as the groundwater flow models do not include the reduction in transmissivity created by a subsurface density interface that would push the interface farther seaward (Methods). Explicitly including the interface would lead to slightly higher water tables within the interface footprint and less saltwater intrusion, except where water tables are already forecast to be emergent, as water tables could not rise higher. In areas with emergent water tables, modelling the subsurface interface could result in more groundwater discharge to the coastal drainage network, raising the freshwater–saltwater interface and leading to more saltwater intrusion[33] and an even larger saline groundwater wedge footprint.

## Discussion

While prior work projects that climate-change-driven overland flooding over the next century could threaten over 600,000

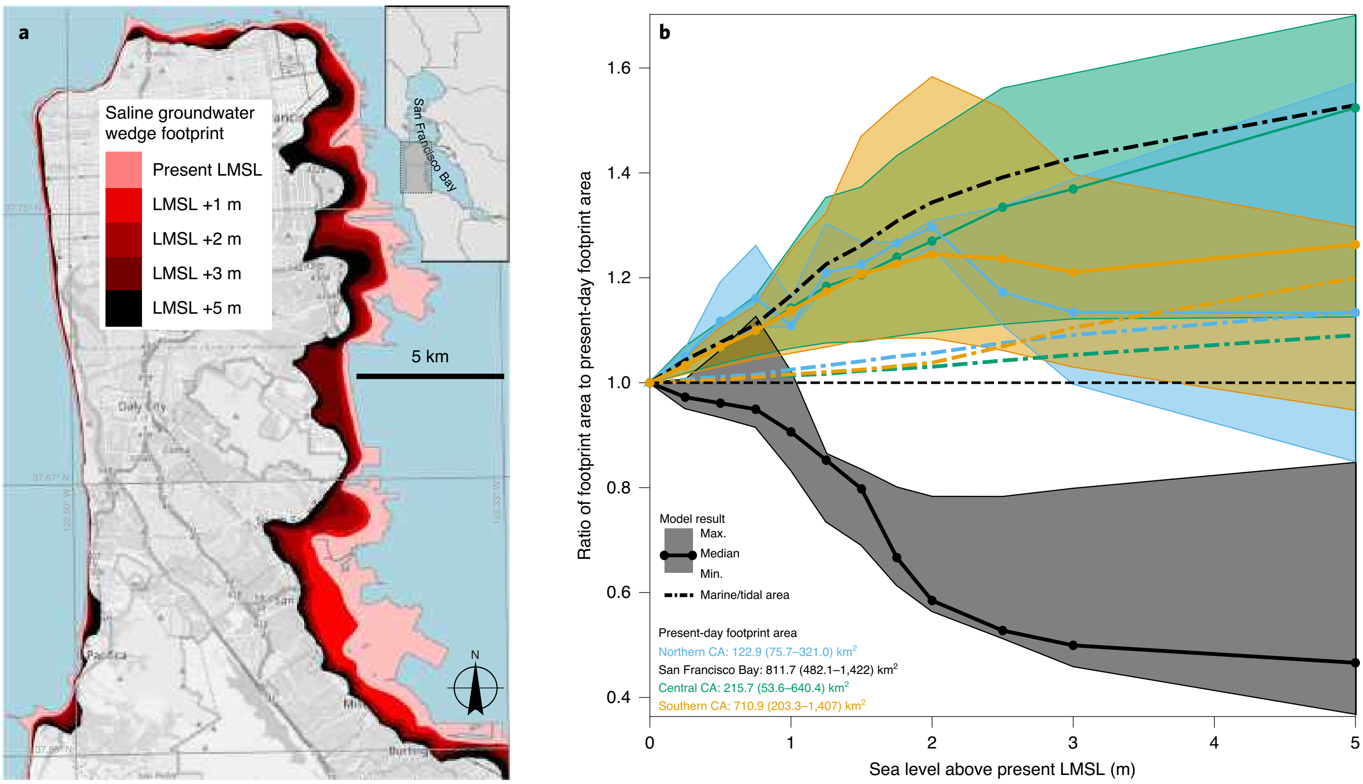



**Fig. 3 | Saline groundwater wedge footprint in shallow coastal California groundwater. a**, The groundwater saltwater–freshwater interface moves inland unevenly with water-table responses to sea-level rise in San Francisco and northern San Mateo counties. **b**, The growth of the saline groundwater wedge footprint across the coastal California regions (shown in Fig. 1) outpaces the growth of tidal and marine areas for all but the San Francisco Bay region until 3 m of sea-level rise. See Extended Data Fig. 6 for the MHHW datum and flux-controlled results. Credit for map in **a**: © OpenStreetMap contributors.

people and US$150 billion in infrastructure across the urbanized coast of California[9], our study focused on the complementary but as-yet unaccounted-for response of water tables to rising sea levels. Probabilistic predictions of median sea-level rise for California range from ~0.2 to 0.8 m by 2100 (66% likely range, 0.03 to 1.25 m across the state), with the variability driven primarily by tectonic setting and emission scenario, and with an extreme risk-aversion scenario (probability < 0.5%) of ~3 m (refs. [34–36]). While pervasive sea-level rise is expected for California, local areas of extreme tectonic uplift (such as Crescent City[36] and the Santa Ynez Mountains[37]) may lead to relative sea-level stability or a slight decrease by 2100. Therefore, our groundwater model projections in such areas would overpredict the rise of the water table. Nevertheless, ignoring vertical land motion, we project that >300 km$^2$ of land areas will be subjected to new groundwater emergence and on the order of 1 km of landward seawater intrusion (assuming 1 m of sea-level rise and aquifer geology represented by a $K$ of 1 m d$^{-1}$), which considerably expands the coastal hazards related to overland flooding alone.

Our findings suggest that, as water tables shoal with sea-level rise, overland inundation in low-lying areas reduces the overall extent of shallow and emergent water tables. In these areas, groundwater shoaling occurs ahead of the inland movement of overland inundation, such that flooding from below precedes inundation. While this inundation occurs progressively inland with higher sea levels, topography-limited conditions farther inland in some areas restrict the shoaling of water tables, leading to a loss of emergent conditions relative to today. Our models could overestimate the relative shoaling where the land surface is rising, because the topography used in the models was static and ignored the future effects of the physical and biological engines that created the present-day coastal lowlands as well as any future human activities or development. Erosion and deposition on land and in coastal waters, in combination with biologically driven wetland accretion, could drastically change the topographic profile of California's coast over the timescales represented in the water-table scenarios under sea-level rise[9,38–40]. However, creating space for these landscape evolution mechanisms that would accommodate shallower water tables may be difficult to achieve or undesirable along heavily urbanized coastlines.

The increasing occurrence of shallow and emergent groundwater tables inland with sea-level rise represents a substantial hazard to coastal infrastructure for the active tectonic and often high-relief setting of the California coast. Our results identify numerous locations with low-lying topography and poor surface drainage along the California coast that could face substantial local threats from groundwater hazards today or in the near future (such as the Port of Los Angeles, Santa Barbara and the San Francisco Airport). Increased roadway fatigue[41], reduced sewer and septic drainage[16,17], and the potential for mobilizing contaminants in soils currently above the water table will eventually be triggered farther inland as the water table rises with higher sea levels. Such hazards from groundwater shoaling may be most destructive where the flux-controlled groundwater mode is active and flooding from below is not a current threat to coastal infrastructure, mainly occurring in areas with steep coastal topography. Globally, present-day coastlines with gently sloping, low topography are more likely to experience daily marine and tidal flooding, with the groundwater hazard of saltwater intrusion presenting the main threat[13]. Oft-cited examples where groundwater hazards are a major, short-term threat include Honolulu, Hawaii[10,42], and Miami, Florida[43–45]. These areas are protected from overland flooding by coastal defences but are exposed to groundwater flooding today in locations characterized by low-lying topography and well-developed, high-$K$ subsurface drainage systems. Furthermore, while flood defences may be employed to protect many coastal communities from the projected overland flooding, groundwater emergence and shoaling will still threaten these low-lying areas with flooding from below, and alternative measures will need to be deployed (such as pumps and subsurface barriers).

Worldwide, the threat of groundwater hazards with sea-level rise is widely unknown, especially for developing nations and rural areas. Our simplified modelling approach can be extended to provide forecasts of groundwater hazards for coastal areas globally. Because of the importance of topography to how groundwater systems respond to sea-level rise, the reliability of such groundwater-hazard predictions will be limited by the spatial resolution of the available topographic data combined with the availability of accurate climatic and hydrogeologic information.

In unconfined coastal aquifers, rising sea levels will ultimately trigger some combination of the two hydrogeologic responses: groundwater shoaling and saltwater intrusion. Geology, climate and topography will then determine the mode by which the groundwater could present future hazards to coastal communities, requiring the development of new datasets to make accurate predictions of the groundwater hazards. Although the hazards created by aggravated overland coastal storm-driven flooding are more immediate and represent substantial socio-economic risk for the California coast[5,9], the groundwater hazards from sea-level rise pose eventual, geographically expansive risks to people by threatening coastal infrastructure[16] and agricultural activities[15], and the short-term risk may be far higher in some hydrogeologic settings. Human intervention through defensive or adaptive planning can shift the groundwater response towards either the topography-limited or the flux-controlled mode, but the alternate mode may then present new challenges. Therefore, by not addressing projections of groundwater shoaling and emergence, coastal communities around the world could overlook or exacerbate future hazards related to sea-level rise.

## Online content

Any methods, additional references, Nature Research reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at https://doi.org/10.1038/s41558-020-0874-1.

Received: 18 February 2020; Accepted: 10 July 2020;
Published online: 17 August 2020

## References

1. Nicholls, R. J. & Cazenave, A. Sea-level rise and its impact on coastal zones. *Science* **328**, 1517–1520 (2010).
2. Bamber, J. L., Oppenheimer, M., Kopp, R. E., Aspinall, W. P. & Cooke, R. M. Ice sheet contributions to future sea-level rise from structured expert judgment. *Proc. Natl Acad. Sci. USA* **166**, 11195–11200 (2019).
3. Spencer, T. et al. Global coastal wetland change under sea-level rise and related stresses: the DIVA wetland change model. *Glob. Planet. Change* **139**, 15–30 (2016).
4. Moftakhari, H. R. et al. Increased nuisance flooding due to sea-level rise: past and future. *Geophys. Res. Lett.* **42**, 9846–9852 (2015).
5. Vitousek, S. Doubling of coastal flooding frequency within decades due to sea-level rise. *Sci. Rep.* **7**, 1399 (2017).
6. Church, J. A. et al. in *Climate Change 2013: The Physical Science Basis* (eds Stocker, T. F. et al.) 1137–1216 (IPCC, Cambridge Univ. Press, 2013).
7. Neumann, B., Vafeidis, A. T., Zimmermann, J. & Nicholls, R. J. Future coastal population growth and exposure to sea-level rise and coastal flooding—a global assessment. *PLoS ONE* **10**, e0118571 (2015).
8. Diaz, D. B. Estimating global damages from sea level rise with the Coastal Impact and Adaptation Model (CIAM). *Clim. Change* **137**, 143–156 (2016).
9. Barnard, P. L. et al. Dynamic flood modeling essential to assess the coastal impacts of climate change. *Sci. Rep.* **9**, 4309 (2019).
10. Rotzoll, K. & Fletcher, C. H. Assessment of groundwater inundation as a consequence of sea-level rise. *Nat. Clim. Change* **3**, 477–481 (2013).
11. Webb, M. D. & Howard, K. W. F. Modeling the transient response of saline intrusion to rising sea-levels. *Ground Water* **49**, 560–569 (2011).
12. Werner, A. D. & Simmons, C. T. Impact of sea-level rise on sea water intrusion in coastal aquifers. *Ground Water* **47**, 197–204 (2009).
13. Michael, H. A., Russoniello, C. J. & Byron, L. A. Global assessment of vulnerability to sea-level rise in topography-limited and recharge-limited coastal groundwater systems. *Water Resour. Res.* **49**, 2228–2240 (2013).
14. Masterson, J. P. et al. Effects of sea-level rise on barrier island groundwater system dynamics—ecohydrological implications. *Ecohydrology* **7**, 1064–1071 (2014).
15. Kirwan, M. L. & Gedan, K. B. Sea-level driven land conversion and the formation of ghost forests. *Nat. Clim. Change* **9**, 450–457 (2019).
16. Hummel, M. A., Berry, M. S. & Stacey, M. T. Sea level rise impacts on wastewater treatment systems along the U.S. coasts. *Earth's Future* **6**, 622–633 (2018).
17. Liu, T., Su, X. & Prigiobbe, V. Groundwater–sewer interaction in urban coastal areas. *Water* **10**, 1774 (2018).
18. Knott, J. F., Daniel, J. S., Jacobs, J. M. & Kirshen, P. Adaptation planning to mitigate coastal-road pavement damage from groundwater rise caused by sea-level rise. *Transp. Res. Rec.* **2672**, 11–22 (2018).
19. Myers, N. Environmental refugees: a growing phenomenon of the 21st century. *Phil. Trans. R. Soc. Lond. B* **357**, 609–613 (2002).
20. Nicholls, R. J. et al. Sea-level rise and its possible impacts given a 'beyond 4 °C world' in the twenty-first century. *Phil. Trans. R. Soc. A* **369**, 161–181 (2011).
21. Abarca, E., Karam, H., Hemond, H. F. & Harvey, C. F. Transient groundwater dynamics in a coastal aquifer: the effects of tides, the lunar cycle and the beach profile. *Water Resour. Res.* **49**, 2473–2488 (2013).
22. Nielsen, P. Tidal dynamics of the water table in beaches. *Water Resour. Res.* **26**, 2127–2134 (1990).
23. Ketabchi, H., Mahmoodzadeh, D., Ataie-Ashtiani, B. & Simmons, C. T. Sea-level rise impacts on seawater intrusion in coastal aquifers: review and integration. *J. Hydrol.* **535**, 235–255 (2016).
24. Masterson, J. P. & Garabedian, S. P. Effects of sea-level rise on ground water flow in a coastal aquifer system. *Ground Water* **45**, 209–217 (2007).
25. Werner, A. D. et al. Vulnerability indicators of sea water intrusion. *Ground Water* **50**, 48–58 (2012).
26. Burnett, W. C., Bokuniewicz, H., Huettel, M., Moore, W. S. & Taniguchi, M. Groundwater and pore water inputs to the coastal zone. *Biogeochemistry* **66**, 3–33 (2003).
27. Hoover, D. J., Odigie, K. O., Swarzenski, P. W. & Barnard, P. Sea-level rise and coastal groundwater inundation and shoaling at select sites in California, USA. *J. Hydrol. Reg. Stud.* **11**, 234–249 (2017).
28. Plane, E., Hill, K. & May, C. A rapid assessment method to identify potential groundwater flooding hotspots as sea levels rise in coastal cities. *Water* **11**, 2228 (2019).
29. Lu, C., Werner, A. D. & Simmons, C. T. Threats to coastal aquifers. *Nat. Clim. Change* **3**, 605 (2013).
30. Harbaugh, A. W. *MODFLOW-2005: The U.S. Geological Survey Modular Ground-Water Model—the Ground-Water Flow Process* Techniques and Methods No. 6-A16 (US Geological Survey, 2005).
31. *Topologically Integrated Geographic Encoding and Referencing (TIGER) Database* (US Census Bureau, 2016).
32. Gleeson, T., Moosdorf, N., Hartmann, J. & van Beek, L. P. H. A glimpse beneath Earth's surface: GLobal HYdrogeology MaPS (GLHYMPS) of permeability and porosity. *Geophys. Res. Lett.* **41**, 3891–3898 (2014).
33. Glover, R. E. The pattern of fresh-water flow in a coastal aquifer. *J. Geophys. Res.* **64**, 457–459 (1959).
34. Kopp, R. E. et al. Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites. *Earth's Future* **2**, 383–406 (2014).
35. Sweet, W. V. et al. *Global and Regional Sea Level Rise Scenarios for the United States* Technical Report NOS CO-OPS (NOAA, 2017).
36. *State of California Sea-Level Rise Guidance—2018 Update* (California Ocean Protection Council, 2018).
37. Duvall, A., Kirby, E. & Burbank, D. Tectonic and lithologic controls on bedrock channel profiles and processes in coastal California. *J. Geophys. Res.* **109**, F03002 (2004).
38. Vitousek, S., Barnard, P. L., Limber, P., Erikson, L. & Cole, B. A model integrating longshore and cross-shore processes for predicting long-term shoreline response to climate change. *J. Geophys. Res. Earth Surf.* **122**, 782–806 (2017).
39. Erikson, L. H., O'Neill, A., Barnard, P. L., Vitousek, S. & Limber, P. Climate change-driven cliff and beach evolution at decadal to centennial time scales. In *Proc. Coastal Dynamics 2017* (eds Aagaard, T. et al.) 125–136 (2017).
40. Limber, P. W., Barnard, P. L., Vitousek, S. & Erikson, L. H. A model ensemble for projecting multidecadal coastal cliff retreat during the 21st century. *J. Geophys. Res. Earth Surf.* **123**, 1566–1589 (2018).
41. Knott, J. F., Elshaer, M., Daniel, J. S., Jacobs, J. M. & Kirshen, P. Assessing the effects of rising groundwater from sea level rise on the service life of pavements in coastal road infrastructure. *Transp. Res. Rec.* **2639**, 1–10 (2017).

42. Habel, S., Fletcher, C. H., Rotzoll, K. & El-Kadi, A. I. Development of a model to simulate groundwater inundation induced by sea-level rise and high tides in Honolulu, Hawaii. *Water Res.* **114**, 122–134 (2017).
43. Hughes, J. D. & White, J. T. *Hydrologic Conditions in Urban Miami-Dade County, Florida, and the Effect of Groundwater Pumpage and Increased Sea Level on Canal Leakage and Regional Groundwater Flow* Scientific Investigations Report No. 2014–5162 (US Geological Survey, 2014).
44. Guha, H. & Panday, S. Impact of sea level rise on groundwater salinity in a coastal community of South Florida. *J. Am. Water Resour. Assoc.* **48**, 510–529 (2012).
45. Sukop, M. C., Rogers, M., Guannel, G., Infanti, J. M. & Hagemann, K. High temporal resolution modeling of the impact of rain, tides, and sea level rise on water table flooding in the Arch Creek basin, Miami-Dade County Florida USA. *Sci. Total Environ.* **616–617**, 1668–1688 (2018).

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## Methods

**Groundwater model.** The equilibrium water-table responses to sea-level rise were modelled using the modular groundwater flow software MODFLOW (ref. [30]) controlled by the FloPy Python library[46]. The California coast was divided into 57 overlapping spatial domains for modelling groundwater flow in one-layer models, with the intention of combining the results into a continuous dataset. Each domain edge extended beyond a major surface-water drainage divide and overlapped the adjacent domain by 1–2 km. These smaller domains reduced the computational demand for the models and allowed the extremely fine model resolution of 10 m by 10 m, which was needed to represent details of the topography. Each model was run by solving the steady-state groundwater flow equation with spatially variable recharge rates prescribed by the annual average effective recharge for 2000–2013 (refs. [47,48]), where evapotranspirative fluxes were already removed from the recharge rate. A combined recharge-drain boundary condition was applied to the top of all terrestrial model cells. Using a high conductance value for the drain, this condition restricts the water table to levels at or below the land surface elevation (that is, exactly at the prescribed depth of the modelled drain), and the top of the cell serves as either a groundwater recharge or discharge feature for levels below or at the land surface, respectively. To isolate the hydrologic effects of changing sea level, we did not consider changes in recharge due to climate change, land-cover or land-use change, groundwater pumping, or managed recharge activities in surficial water-bearing units.

The three-dimensional hydrogeologic framework of coastal unconfined groundwater systems in California is poorly constrained. Calibrated groundwater flow models have been developed in a few populated regions[49–55], but the focus of these models has mainly been to determine the effects of pumping on deep, confined aquifers that supply the bulk of the water resources. Similarly, global hydrogeologic datasets on permeability and porosity describe the shallow bedrock geology[32,56,57] and do not currently have the vertical structure resolved for coastal California. Estimating unconsolidated coastal aquifer thicknesses with the assumption that coastal topography controls the basin thickness is most appropriate for passive tectonic margins and probably fails for much of coastal California[58]. Given the uncertainty in the coastal hydrogeologic framework, we used a range of values of $K$ (0.1, 1.0 and 10 m d$^{-1}$) to test the sensitivity of the sea-level-rise models to this parameter. These values span the more conductive end of permeability estimates for the study region[32,56,57] while also bounding the mean groundwater level measurements within the active model domains for the present-day mean conditions (Supplementary Discussion 1 and Supplementary Figs. 1–4). For simplicity due to the lack of consistent and comprehensive hydrogeologic data, the model bottom was set to a constant −50 m NAVD88 for all groundwater flow models (that is, a flat no-flow boundary), implying that groundwater flow is approximated to be horizontal at that elevation. The responsivity of the water table to sea-level rise would be set by integrating the thickness of the subsurface materials and $K$ (that is, transmissivity). The model thickness at the coast was 50 m plus the elevation of the tidal datum relative to NAVD88, but the aquifer thickness inland was determined by the local topography, leading to variable transmissivities depending on location. The values of $K$ set equivalent transmissivities that could also represent a three-order-of-magnitude change in model thickness rather than in $K$. By not keeping a constant aquifer thickness inland, the $K$ sensitivity testing did not directly test the model sensitivity to transmissivity.

Digital topography, tidal water levels and groundwater recharge rates, as described earlier, comprised the spatial data inputs for the groundwater models. Seamless topography–bathymetry models spanning the California coast[59–61] to elevations of at least 10 m NAVD88 set the primary inland extent of the groundwater models, but all models extended to at least 1 km inland from the present-day coastline. In the San Francisco Bay region, the elevation dataset extended much farther inland (Fig. 1), and the model domains were extended inland to encompass most watershed divides that would drain to the bay or the outer coast. These topographic datasets had a cell resolution of 2 m by 2 m and were optimized for modelling by filling closed depressions above mean sea level with TauDEM (ref. [62]). Closed depressions in the topography–bathymetry data were filled only on land to an elevation where no additional closed depressions existed for a clear path to the edge of the dataset. This filling allows water tables to rise in the closed depressions above the original surface elevations, forming groundwater-fed water features. The calculations of water-table depth used the original topography–bathymetry data, allowing groundwater levels to be above the land surface (that is, in the filled depressions). The topographic data were upscaled to the 10 m by 10 m groundwater model resolution using bilinear interpolation. Either the extent of the available topographic data or the approximate positions of surface hydrologic divides set the inland model boundary, which was conceptualized as a groundwater divide (that is, no-flow boundary conditions). Similarly, the shore-perpendicular edges of each groundwater model were also set as groundwater divides (that is, no flow). MHHW tide levels relative to NAVD88 were derived from the VDATUM vertical transformation database and software[63] for the open ocean at variable ~250–2,000 m point spacings and for San Francisco Bay at ~4,000 m point spacing[64,65]. The tidal datums data were assigned to marine and tidal groundwater model cells using nearest-neighbour interpolation. Coastal water depths were assigned using the MHHW (arithmetic mean, 1.71 m; minimum, 1.55 m; maximum, 2.31 m NAVD88) or LMSL (arithmetic mean, 0.888 m; minimum, 0.764 m; maximum, 1.29 m NAVD88) level added to the amount of sea-level rise in each model scenario, and these water levels were set as the tidal and marine boundary conditions as constant heads. A general head boundary with a freshwater equivalent conversion[66] based on local salinity data was tested in model development but led to unrealistic landward head gradients and negligibly higher water tables (<2 cm).

To merge the modelled groundwater heads from the 57 overlapping models for continuous predictions[67], the data farthest from the no-flow boundary of each model in the overlapping area were weighted the most in the blending algorithm. An error function based on the distance from the no-flow boundary defined the weights for linearly combining the results from each model, where 25% of the overlap area farthest from the no-flow boundary of a model was assigned values directly from that model. All merge operations were performed only on the groundwater head data, which are spatially smooth; the water-table depths were then calculated by subtracting the head from the unfilled land surface elevation. The merged model results were compiled to county boundaries for post-processing[67] and data publication[68,69].

The modelled hydraulic heads for present-day sea levels were validated against 3,775 mostly urban wells with unconfined water-table observations (Supplementary Fig. 1). The mean, minimum and maximum water-table positions were calculated for wells with more than one observation to constrain the range of recorded water-table variability (Supplementary Figs. 2–4). Because homogeneous $K$ values were used for the models, the aim of comparing the modelled and observed hydraulic heads was to test how well the $K$ scenarios encompassed the observations and not to adjust the $K$ values for specific regions, as is performed in the calibration of a model to observed data.

**Groundwater analyses.** In quantifying the degree to which coastal areas in California were topography limited or flux controlled, we compared the results of the numerical model, MODFLOW, with predictions of water-table responses under only flux-controlled conditions. The merged modelled water table for the present-day sea level using each model scenario (that is, each combination of tidal datum and $K$) separately for all of California served as the initial water tables for flux-controlled mode predictions. Thus, only the flux-controlled water tables for higher sea levels could be compared with the modelled water tables. At each higher sea level, the water table was raised by the same amount as the sea level, constant over the model domain (Extended Data Fig. 1), and areas where the water table exceeded the land surface were set as emergent (that is, water-table depth ≤ 0 m). Water-table depths increase as the water-table elevation lowers. The overprediction of the water-table rise by the flux-controlled mode was calculated for every active model cell as:

$$\text{Overprediction} = \frac{\text{Water-table depth}_{\text{MODFLOW}} - \text{Water-table depth}_{\text{flux-controlled}}}{\text{Sea level above present}} \times 100. \quad (1)$$

Model cells where the overprediction was ≤5% of the sea-level rise were assigned as flux controlled, and cells with an overprediction >5% were assigned as exhibiting some topography control. The choice of 5% as the boundary between the modes in the overprediction calculation allows very small differences (that is, ≤5%) in the modelled water-table depths in the numerator of equation (1) to be treated as representing a flux-controlled response. The uncertainty in water-table elevations introduced by the model convergence criterion set to be 0.01 m could lead to a maximum 8% overprediction in equation (1) for a sea-level rise of 0.25 m, reducing to 4% for 0.5 m. We therefore chose 5% instead of 0% as the overprediction threshold between flux-controlled and topography-limited conditions. Model cells with emergent groundwater no longer respond to sea-level rise until they become inundated and would yield an overprediction of 0%, suggesting flux-controlled conditions where water tables actually were limited by topography. Thus, all emergent groundwater cells were removed before calculating equation (1), as they would be erroneously considered flux controlled and can be interpreted alongside the two response modes (Extended Data Fig. 3). For Fig. 2, the areas of cells within each overprediction bin, representing 5% of the overprediction calculated in equation (1), were summed and represented as percentages of the total modelled land area, where the modelled land area decreases for models with higher sea levels as the tidal and marine areas grow.

For the saltwater intrusion analysis, the fresh–saline groundwater interface was calculated from the equilibrium groundwater models using the Ghyben–Herzberg relationship[70,71], whereby the interface depth, $z$, is:

$$z = \frac{h_f}{\delta} \quad (2)$$

where $h_f$ is the elevation of the water table above sea level, and $\delta$ is the dimensionless water-density-difference ratio between fresh, $\rho_f$, and saline, $\rho_s$, groundwater:

$$\delta = \frac{\rho_s - \rho_f}{\rho_f}. \quad (3)$$

This relationship arises by approximating the interface as a steady-state, sharp boundary between the two fluids, which neglects mixing at the interface due to both diffusion and dispersion. The groundwater modelling described earlier provided spatial predictions of $h_f$. Surface water salinity data were extracted from 10-m-depth salinity data gridded at a resolution of 0.25 decimal degrees (~28 km × 28 km) for the open ocean[64] and from observational data collected between 1968 and 2015 at 51 sites in San Francisco Bay[65]. The salinity was assigned to marine and tidal groundwater model cells using nearest-neighbour interpolation. The salinity of coastal waters was then converted to density using the Thermodynamic Equation of Seawater 2010 (ref. [72]). In our analysis, we approximate $z$ in equation (2) with the modelled $h_f$, a $\rho_f$ of 1,000 kg m$^{-3}$ and a $\rho_s$ based on the average density of coastal and marine waters from the salinities by county (1,008.1–1,025.2 kg m$^{-3}$; Supplementary Table 11). In equation (2), $h_f$ is the hydraulic head relative to sea level and not the NAVD88 datum, requiring the modelled heads to be converted to $h_f$ by accounting for the sea-level position on the basis of the average elevations of the respective tidal datums added to the amount of sea-level rise in each scenario. The interface slope and position in unconfined aquifers are controlled by the hydrogeology, climate and transient marine conditions[33,70,71,73,74]. The extent of the coastal area where a saline–fresh groundwater interface exists within this unconfined groundwater system is referred to as the saline groundwater wedge footprint and is limited to areas where $z$ is at or above −50 m NAVD88 (the lower boundary of the models). These footprints for specific sea levels overestimate the future encroachment of the saline–fresh interface with sea-level rise, as the steady-state assumption allows infinite time for inland migration of the interface. The true movement of the interface will depend on the rate of sea-level rise, and the degree to which the aquifer is confined or semiconfined will introduce additional time lags of years to decades[11]. Such relatively short transient effects will create impacts that will still manifest on management-decision timescales. Finally, the use of a homogeneous unconfined aquifer simplifies the location of the saline–fresh interface, as heterogeneity and anisotropy in $K$ will lead to more interface complexity[75–78] than can be accounted for in the homogeneous models.

## Data availability

Derived model outputs that were merged across overlapping model boundaries and compiled to county boundaries are available to download at https://doi.org/10.5066/P9H5PBXP. The available data include georeferenced rasters of hydraulic head (that is, water table elevation) and water table depth and georeferenced shapefiles of the water table depth categories. The saline groundwater wedge footprint shapefiles are available to download at https://doi.org/10.4211/hs.1c95059edcf041a0959e0b4a1f05478c. The other MODFLOW input, output and derived datasets are available upon request. All other input datasets are available from the original sources.

## Code availability

The relevant portions of the pre- and post-processing functions and scripts used to develop the figures and datasets in this study are available at https://doi.org/10.5281/zenodo.3897502. All other codes are available upon request at the discretion of the authors.

## References


46. Bakker, M. et al. Scripting MODFLOW model development using Python and FloPy. *Groundwater* **54**, 733–739 (2016).
47. Reitz, M., Sanford, W. E., Senay, G. B. & Cazenas, J. *Annual Estimates of Recharge, Quick-Flow Runoff, and ET for the Contiguous US Using Empirical Regression Equations, 2000–2013* (US Geological Survey, 2017).
48. Reitz, M., Sanford, W. E., Senay, G. B. & Cazenas, J. Annual estimates of recharge, quick-flow runoff, and evapotranspiration for the contiguous U.S. using empirical regression equations. *J. Am. Water Resour. Assoc.* **53**, 961–983 (2017).
49. Hanson, R. T., Martin, P. & Koczot, K. M. *Simulation of Ground-Water/Surface-Water Flow in the Santa Clara-Calleguas Ground-Water Basin, Ventura County, California* Water-Resources Investigations Report No. 2002-4136 (US Geological Survey, 2003).
50. Hanson, R. T., Schmid, W., Faunt, C. C., Lear, J. & Lockwood, B. *Integrated Hydrologic Model of Pajaro Valley, Santa Cruz and Monterey Counties, California* Scientific Investigations Report No. 2014-5111 (US Geological Survey, 2014).
51. Reichard, E. G. et al. *Geohydrology, Geochemistry, and Ground-Water Simulation-Optimization of the Central and West Coast Basins, Los Angeles County, California* Water-Resources Investigations Report No. 03-4065 (US Geological Survey, 2003).
52. Nishikawa, T. *A Simulation-Optimization Model for Water-Resources Management, Santa Barbara, California* Water-Resources Investigations Report No. 97-4246 (US Geological Survey, 1998).
53. Farrar, C. D., Metzger, L. F., Nishikawa, T., Koczot, K. M. & Reichard, E. G. *Geohydrological Characterization, Water-Chemistry, and Ground-Water Flow Simulation Model of the Sonoma Valley Area, Sonoma County, California* Scientific Investigations Report No. 2006-5092 (US Geological Survey, 2006).
54. Bright, D. J., Nash, D. B. & Martin, P. *Evaluation of Ground-Water Flow and Solute Transport in the Lompoc Area, Santa Barbara County, California* Water-Resources Investigations Report No. 97-4056 (US Geological Survey, 1997).
55. Knott, J. F., Jacobs, J. M., Daniel, J. S. & Kirshen, P. Modeling groundwater rise caused by sea-level rise in coastal New Hampshire. *J. Coast. Res.* **35**, 143–157 (2019).
56. Huscroft, J., Gleeson, T., Hartmann, J. & Börker, J. Compiling and mapping global permeability of the unconsolidated and consolidated Earth: GLobal HYdrogeology MaPS 2.0 (GLHYMPS 2.0). *Geophys. Res. Lett.* **45**, 1897–1904 (2018).
57. Gleeson, T. et al. Mapping permeability over the surface of the Earth. *Geophys. Res. Lett.* **38**, L02401 (2011).
58. Zamrsky, D., Oude Essink, G. H. P. & Bierkens, M. F. P. Estimating the thickness of unconsolidated coastal aquifers along the global coastline. *Earth Syst. Sci. Data* **10**, 1591–1603 (2018).
59. Tyler, D. J. & Danielson, J. J. *Topobathymetric Model for the Southern Coast of California and the Channel Islands, 1930 to 2014* (US Geological Survey, 2018).
60. Danielson, J. J. et al. Topobathymetric elevation model development using a new methodology: coastal national elevation. *Database J. Coast. Res.* **76**, 75–89 (2016).
61. Tyler, D. J., Danielson, J. J., Poppenga, S. K. & Gesch, D. B. *Topobathymetric Model for the Central Coast of California, 1929 to 2017* (US Geological Survey, 2018).
62. Tarboton, D. G. *Terrain Analysis Using Digital Elevation Models (TauDEM)* (Utah State Univ., 2005).
63. *Estimation of Vertical Uncertainties in VDatum* (National Oceanic and Atmospheric Administration, 2018).
64. *National Oceanic Data Center (Levitus) World Ocean Atlas* (National Oceanic and Atmospheric Administration, 1994).
65. Schraga, T. S. & Cloern, J. E. Water quality measurements in San Francisco Bay by the U.S. Geological Survey, 1969-2015. *Sci. Data* **4**, 170098 (2017).
66. Post, V., Kooi, H. & Simmons, C. Using hydraulic head measurements in variable-density ground water flow analyses. *Ground Water* **45**, 664–671 (2007).
67. Befus, K. M. kbefus/ca_gw_slr *Zenodo* https://doi.org/10.5281/zenodo.3897502 (2020).
68. Befus, K. M., Hoover, D., Barnard, P. L. & Erikson, L. H. *California Coastal Groundwater Projected Response with Sea-Level Rise* (US Geological Survey, 2020); https://doi.org/10.5066/P9H5PBXP
69. Befus, K. M., Barnard, P. L., Hoover, D. J., Finzi Hart, J. A. & Voss C. California saline groundwater wedge footprint model results. *HydroShare* https://doi.org/10.4211/hs.1c95059edcf041a0959e0b4a1f05478c (2020).
70. Badon Ghyben, W. Nota in Verband Met de Voorgenomen Putboring Nabil Amsterdam. *Tijdschr. K. Inst. Ing.* **9**, 8–22 (1888).
71. Herzberg, A. Die wasserversorgung einiger Nordseebader. *J. Gasbeleucht. Wasserversorg.* **44**, 815–819 (1901).
72. Feistel, R. A Gibbs function for seawater thermodynamics for −6 to 80 °C and salinity up to 120 g kg$^{-1}$. *Deep Sea Res. I* **55**, 1639–1671 (2008).
73. Kuan, W. K. et al. Tidal influence on seawater intrusion in unconfined coastal aquifers. *Water Resour. Res.* **48**, W02502 (2012).
74. Ataie-Ashtiani, B., Volker, R. E. & Lockington, D. A. Tidal effects on sea water intrusion in unconfined aquifers. *J. Hydrol.* **216**, 17–31 (1999).
75. Pool, M., Post, V. E. A. & Simmons, C. T. Effects of tidal fluctuations and spatial heterogeneity on mixing and spreading in spatially heterogeneous coastal aquifers. *Water Resour. Res.* **51**, 1570–1585 (2015).
76. Werner, A. D. et al. Seawater intrusion processes, investigation and management: recent advances and future challenges. *Adv. Water Res.* **51**, 3–26 (2013).
77. Yu, X. & Michael, H. A. Mechanisms, configuration typology, and vulnerability of pumping-induced seawater intrusion in heterogeneous aquifers. *Adv. Water Resour.* **128**, 117–128 (2019).
78. Strack, O. D. L. & Ausk, B. K. A formulation for vertically integrated groundwater flow in a stratified coastal aquifer. *Water Resour. Res.* **51**, 6756–6775 (2015).


## Acknowledgements

This project was funded by the California Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84), the Ocean Protection Council and the USGS Coastal and Marine Hazards and Resources Program. NODC_WOA94 salinity data were provided by the NOAA/OAR/ESRL PSD from www.esrl.noaa.gov/psd/. Any use of trade, firm or product names is for descriptive purposes only and does not imply endorsement by the US government.

## Author contributions

All authors participated in conceiving the study, developing the analyses and writing the paper. K.M.B. performed the modelling and analyses with input from all authors.

## Competing interests

The authors declare no competing interests.

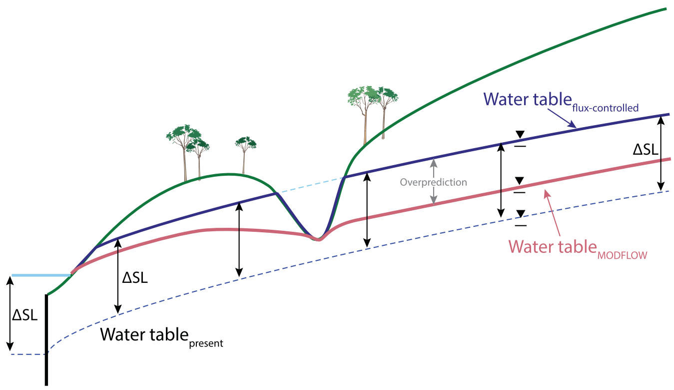
## Additional information

**Extended data** is available for this paper at https://doi.org/10.1038/s41558-020-0874-1.

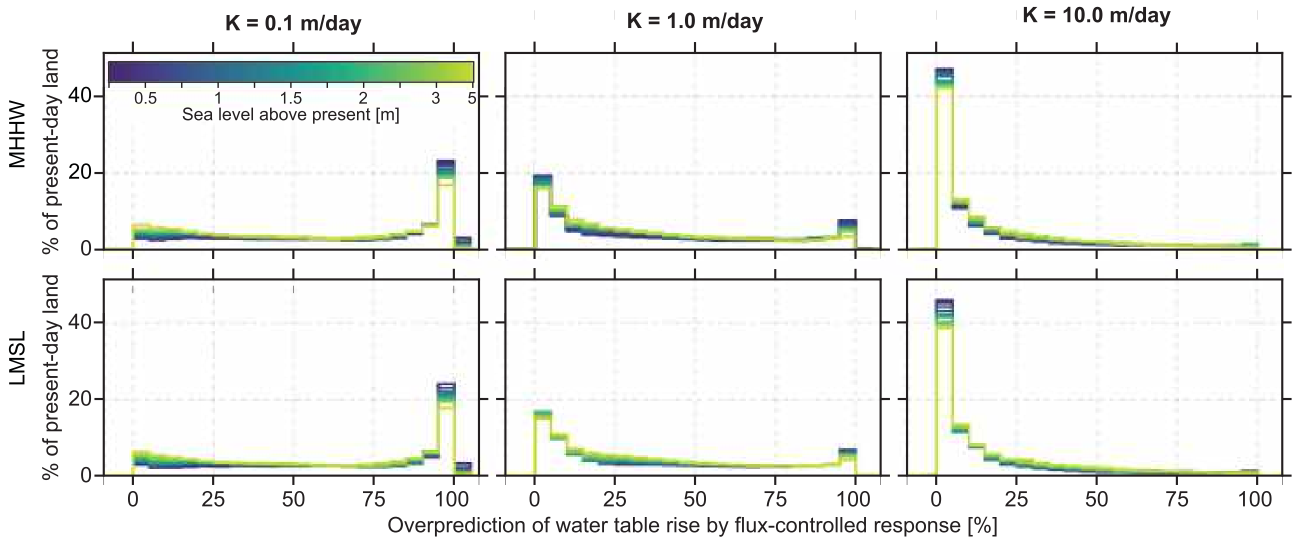
**Supplementary information** is available for this paper at https://doi.org/10.1038/s41558-020-0874-1.

**Correspondence and requests for materials** should be addressed to K.M.B.

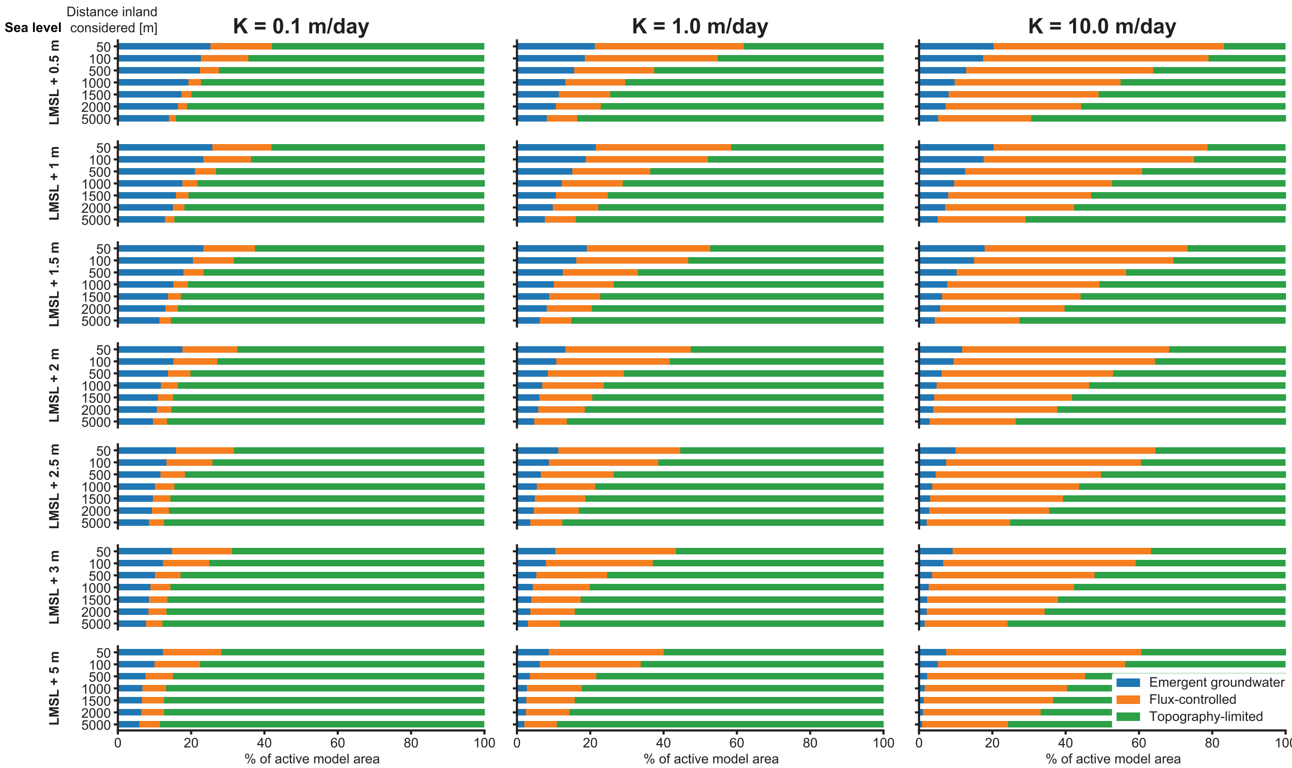
**Peer review information** *Nature Climate Change* thanks Chunhui Lu, Christine May and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.



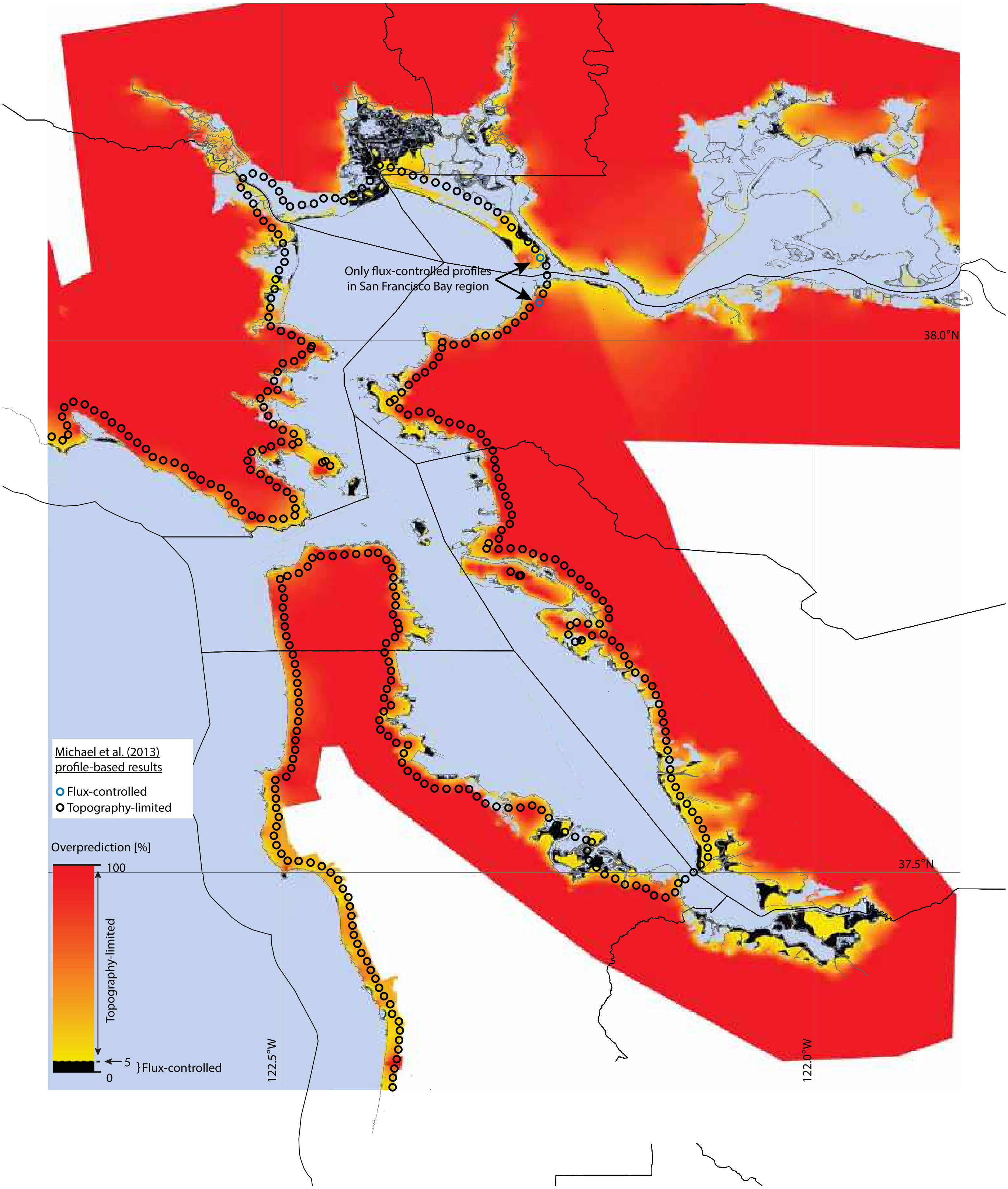

**Extended Data Fig. 1 | Difference in model water table response behavior.** Conceptual cross-section showing how the flux-controlled model can overpredict heads compared to the water tables that include the hydraulic conditions created by surface drains.



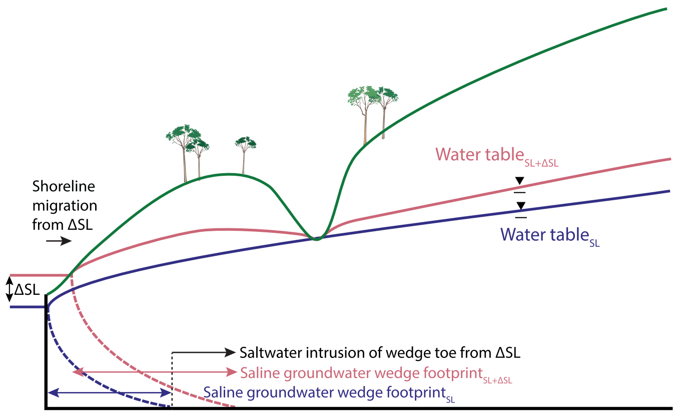

**Extended Data Fig. 2 | Distribution of flux-controlled (≤5%) and topography-limited (>5%) groundwater conditions along coastal California for higher sea levels.** The overprediction of the water table rise by the flux-controlled response was calculated for all K and tidal datum scenarios to 1km inland with Methods Eq. 1.



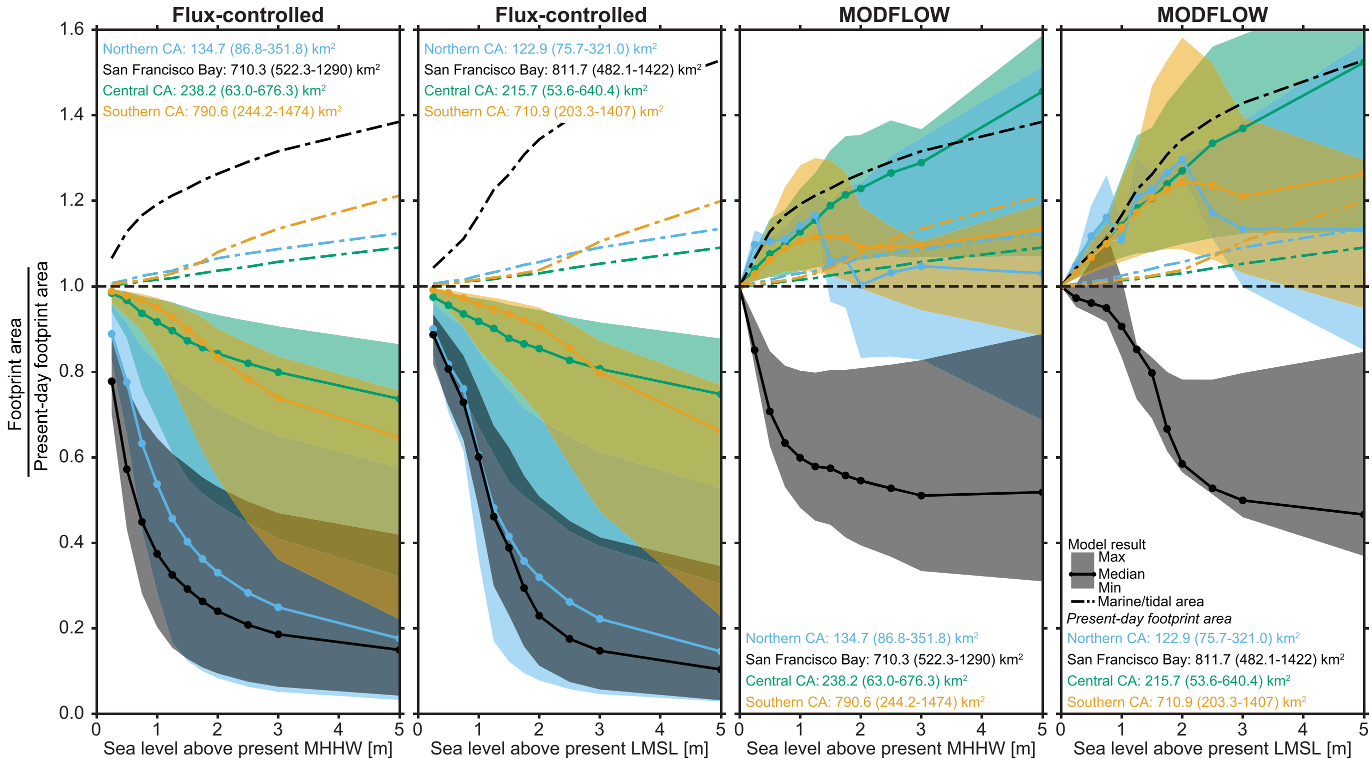

**Extended Data Fig. 3 | Distribution of emergent groundwater, flux-controlled, and topography-limited conditions with increasing sea levels and varying the distance inland used in the analysis for the LMSL tidal datum scenarios.** The MHHW distributions showed very similar distributions and were visually indistinguishable from the LMSL distributions in this figure. Note the irregular spacing on the vertical axes.




**Extended Data Fig. 4 | Profile-based comparison with current analysis.** Spatial comparison between the overprediction calculated in this study (Eq. 1; LMSL + 1 m, K = 1 m/d, MODFLOW forecast) and the delineation of flux-controlled (that is, recharge-limited) and topography-limited profiles from the "base case" of Michael et al.[13] for 1 m of sea-level rise.




**Extended Data Fig. 5 |** Graphical definition of the saline groundwater wedge footprint and saltwater intrusion.




**Extended Data Fig. 6 |** Growth of the saline groundwater wedge footprint across coastal California regions for the flux-controlled and MODFLOW model predictions.

Letter I1

**From:** Kristen L
**To:** Perata, Kyle T
**Subject:** Willow Village will be a sea level rise victim
**Date:** Sunday, April 10, 2022 3:17:22 PM

---

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

I1-1 I hope they will build whatever they want as long as they NEVER ask the city to pay for any climate change impact mitigation projects. The area is very low lying and very close to the water. Sea level rise will impact it. If there is any chance that Willow Village will ask for tax dollars to protect their project, nothing should ever be built. If they assume all the risk, I am all in favor.

Kyle Perata
Community Development Dept., City of Menlo Park
701 Laurel Street, Menlo Park, CA 94025

4/17/22

cc: Planning Commission
Housing Commission
City Council members
Chamber of Commerce
Signature Development

SUB: Willow Village Master Plan Project - EIR

This submittal is in support of the Willow Village project and the EIR process, which will improve the final project as planned.

I have reviewed the EIR executive summary and significant-impacts summary.

Comments:

The modernization of this underutilized commercial area is an important move forward for the City of Menlo Park, especially for the neighbors who are immediately adjacent.

I am pleased with the response by the developer to the extensive community feedback:

Project goals include to minimize traffic, improve Willow Road transportation infrastructure, place all parking underground, and include connections to the Belle Haven neighborhood.
I2-1 A very important benefit to our region is the addition of 1730 units of housing, with over 300 affordable units. Other benefits include delivering needed neighborhood services in the first phase of the development, the creation of a 4-acre community park, and the use of 'mass timber' construction which greatly reduces climate impacts.

I note that the project will include an Impacts mitigating, monitoring, and reporting program.

The development team significantly improved the project design based on community feedback, following almost 170 meetings over the past half dozen years. This development also fits in with the Connect Menlo General Plan Amendment, which also was a very public process.

I am especially pleased to note the sustainability aspects of the project: 100% electrical, extensive use of solar and recycled water, and sustainable building materials.

This project is establishing a model for future construction projects for the development industry worldwide: human-scaled, modern, sustainable, cost-effective construction techniques.

We are lucky that the Meta Platforms company has decided to make this outstanding investment in community amenities and services in the Belle Haven neighborhood.

Thank you, Menlo Park, for working through all the details of the EIR and responses.

*Clem Molony*

Clem Molony
1966 Menalto Ave.
Menlo Park, CA 94025

## Perata, Kyle T

| | |
|---|---|
| **From:** | Kristen L <leeping1@gmail.com> |
| **Sent:** | Tuesday, April 19, 2022 9:54 AM |
| **To:** | Perata, Kyle T |
| **Subject:** | Re: Willow Village will be a sea level rise victim |
| **Follow Up Flag:** | Follow up |
| **Flag Status:** | Completed |



I3-1 Thank you. Even if the first floor is 2 ft above the current first floor, I'm assuming, that there's a basement. Is that just designed to flood? And what about things that are stored there? Will everything be designed for occasional soaking? And how will people get in and out of the raised first floor if it's surrounded by water? Or will they be stuck in or out?

Thanks!

Sent from my iPhone

> On Apr 19, 2022, at 8:25 AM, Perata, Kyle T <ktperata@menlopark.org> wrote:
>
> Kristen,
>
> Thank you for your email. I want to acknowledge receipt of your email. We will include this as part of the record on the project and attach it to the staff report to be reviewed by the Planning Commission as part of the public hearing on the EIR and study session on the project (scheduled for April 25). We will also review the comments and respond in the response to comments on the draft EIR (in the Final EIR).
>
> The project does include design aspects to reduce the impact of sea level rise on the project, such as raised first floor levels 24 inches above the current base flood elevation. I am happy to discuss further if you have any questions.
>
> Thanks,
>
> Kyle

CITY OF MENLO PARK

**Kyle T. Perata**
Acting Planning Manager
City Hall - 1st Floor
701 Laurel St.
tel 650-330-6721
menlopark.org

**From:** Kristen L [mailto:leeping1@gmail.com]
**Sent:** Sunday, April 10, 2022 3:17 PM
**To:** Perata, Kyle T <ktperata@menlopark.org>
**Subject:** Willow Village will be a sea level rise victim

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

I3-2 I hope they will build whatever they want as long as they NEVER ask the city to pay for any climate change impact mitigation projects. The area is very low lying and very close to the water. Sea level rise will impact it. If there is any chance that Willow Village will ask for tax dollars to protect their project, nothing should ever be built. If they assume all the risk, I am all in favor.

**Perata, Kyle T**

**From:** Kimberly Baller <kimberlyballer@gmail.com>
**Sent:** Wednesday, April 20, 2022 12:47 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** I support Willow Village



Dear Planning Commissioners,

I4-1

I am writing to express my support for the Willow Village project. I urge you to advance the project through the EIR process and remaining steps toward approval.

I lived in East Palo Alto from 2015 - 2020 on Kavanaugh Dr. We loved being so close to Facebook, where I work, and our neighbors were wonderful. What was hard was not having a grocery store nearby, not having a nice park within walking distance, the sidewalks were awful (cracked, hard to walk with a stroller) and a closer movie theater would have been great. We had a dog and a toddler at the time and not having a park we felt safe enough to walk to was a real bummer.

I was so excited to hear about this project and cannot wait for it to get started. We ended up moving out of the neighborhood because it wasn't working for our family but we kept our property and rented it out. We would love to see this development continue as quickly as possible to improve the livability for future tenants.

Thank you for your consideration,
Kimberly Baller

**Perata, Kyle T**

**From:** Mark Baller <markballer@gmail.com>
**Sent:** Wednesday, April 20, 2022 12:56 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** Please move forward with Willow Village



Dear Planning Commissioners -

I5-1 I am writing to express my support for the Willow Village project. My wife Kimberly and I moved to East Palo Alto in 2014. Our son Jax was born in our home in 2016. We love the neighborhood in many ways, but community facilities, safe and aesthetic parks and commercial options are poor. Willow Village will provide both Menlo Park and East Palo Alto residents with what is missing from the area.

I urge you to advance the project through the EIR process and remaining steps toward approval.

Thanks for your time and consideration,

Mark Baller
1519 Kavanaugh Dr.
East Palo Alto, CA
94303

Letter I6

**Perata, Kyle T**

**From:** Federico Andrade-Garcia <federico@liquilan.com>
**Sent:** Thursday, April 21, 2022 12:50 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** I support Willow Village

**Follow Up Flag:** Follow up
**Flag Status:** Completed



Estimated Planning Commissioners,

I6-1 I am a resident of East Palo Alto, living relatively close to the Willow Village project. As a nearby resident, I would like to express my support for the Willow Village project. The area it intends to be at, is currently only used for buildings, and this project would include not only that, but shared areas for community entertainment and housing, which should take some of the FB workers (And some other residents) out of the road, which would help traffic overall. Also, having retail and groceries nearby, will help the whole area East of 101, and bring some more tax revenue to MP, so everybody wins.

I urge you to advance the project through the EIR process and remaining steps toward approval.

Regards,

-Federico Andrade-Garcia

## Perata, Kyle T

**From:** Vivian Wehner <veggieviv@gmail.com>
**Sent:** Thursday, April 21, 2022 5:21 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** I support Willow Village



I7-1 Dear Planning Commissioners, I am writing to express my strong support for the Willow Village project. I support the advancement of the project through the EIR process and the remaining steps toward approval. I live in east palo alto and this project would be transformational for my quality of life (in a positive way). I support doing due diligence, but am very excited for this project to move forward.

Vivian

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Brian Henry <bhenry456@yahoo.com> |
| **Sent:** | Sunday, April 24, 2022 10:44 AM |
| **To:** | _Planning Commission |
| **Cc:** | connect@willowvillage.com |
| **Subject:** | I support Willow Village |



I8-1 Dear Planning Commissioners, I am writing to express my support for the Willow Village project. I urge you to advance the project through the EIR process and remaining steps toward approval.

Letter I9

## Perata, Kyle T

| | |
|---|---|
| **From:** | Romain Tanière <rtaniere@yahoo.com> |
| **Sent:** | Sunday, April 24, 2022 3:32 PM |
| **To:** | PlanningDept; Perata, Kyle T; Chen, Kevin; _Planning Commission; Wolosin, Jen; Taylor, Cecilia |
| **Subject:** | [Sent to Planning ]F1 & G1 Draft Environmental Impact Report Willow Village - 25 Apr 2022 Menlo Park Planning Commission |
| **Follow Up Flag:** | Follow up |
| **Flag Status:** | Completed |



Dear Menlo Park planning commissioners,

Nearby Kavanaugh East Palo Alto residents will benefit but also be affected by the new Willow Village/Meta Campus and we thank you for the opportunity to provide some feedback on the EIR and latest development proposal.

I9-1 With Menlo Park's current city ordinance prohibiting nearby overnight parking and with the Willow Campus parking on the eastern side and the O'Brien/Willow connection next to the East Palo Alto Kavanaugh/Gloria neighborhood, residents have expressed concerns about increasing parking issues, speed/safety and nonresidential cut-through traffic between University, Willow and Bay corridors which need to be addressed now before construction begins. Therefore,

I9-2 A. Nearby East Palo Alto city streets (Kavanaugh, Gloria, University, etc…) must be included in all current/future studies and some of the impact fees should go towards the city of East Palo Alto for safety and traffic mitigation measures such as:

1. To implement 2 new stop signs on Kavanaugh Drive at Gloria Way and Clarence Court.

2. To install digital driver's speed limit radar displays on Kavanaugh Drive and Gloria Way on both side of the street.

3. To perform an asphalt street resurfacing/reconstruction on Kavanaugh Drive with larger concrete sidewalks and rebuilt ADA compliant crosswalks/curbs/ramps, bury all overhead utility lines and install more lamp posts on all the electrical poles on Kavanaugh Drive, Gloria Way and all adjacent streets and courts to increase safety (Kirkwood, Clarence, Gertrude, Hazelwood, Farrington, Emmett, Ursula, Grace).

4. To conduct an engineering evaluation and implement the most appropriate and effective street traffic/speed calming devices (e.g. speed bumps, traffic circles at intersections, etc…) on Kavanaugh Drive (between O'Brien Dr and University Ave) and on Gloria Way (between Bay Rd and Kavanaugh Dr).

5. To include Notre Dame Ave / Kavanaugh Dr as a bike lane in the Bicycle Transportation Master Plan which would be a bicycle improvement/alternative to the busy Bay Rd / Newbridge St bike route to Willow Road.

6. To install lighting on University Avenue between Kavanaugh Drive and Bay Road either on the street side that has the existing sidewalk or on the median, lighting both side of the road like on the rest of University Avenue to increase safety (currently the side of the road that has lighting on this street portion is the one where there is no sidewalk).

7. To implement an all-red traffic light interval at the University/Kavanaugh/Notre Dame traffic light intersections.

8. To strengthen control and enforcement of speed/traffic/parking regulations.

I9-3 B. To limit vehicle traffic, the Willow/O'Brien/University area should be redeveloped with pedestrian/bicycle traffic in mind. As such, sidewalks with ADA compliant crosswalks/curbs/ramps, which at present are mostly nonexistent, should be constructed on both sides all along O'Brien Drive (as a continuation and similarly to what has been done at 1035

O'Brien Drive for example when it was rebuilt) and Kavanaugh Way in Menlo Park to connect with existing sidewalks on Kavanaugh Drive and University Avenue in East Palo Alto. Better lighting should be installed and bicycle lanes should be also developed on O'Brien Drive.

I9-4 C. Paseos and streets in the Willow Campus should better connect to O'Brien Drive. As such, we would like the developer to work with other nearby landowners and specifically CSBio (1075 O'Brien/Kelly Court), 1105-1165 O'Brien Drive, 1005 O'Brien Drive and 1320 Willow Road, and 1350 Adams Court which are currently redeveloping their properties and finalizing their designs. This would allow the possibility of new connections with O'Brien and the new Willow campus street/paseo grid proposal (for example utilizing the current drainage channel between 1075 and 1105 O'Brien Drive and the previous fenced off connections between 20 Kelly Court and 960/1350 Hamilton) and between Adams Court and Hamilton Court.

I9-5 D. Other more direct bus/street connections from Willow/University to Willow Village should be considered to limit residential traffic and avoid O'Brien Drive/Kavanaugh Drive.

I9-6 E. Meta should also consider the integration/planning of a Multi-Modal Transit Hub by the SamTrans corridor and keep pushing for the Dumbarton Rail Corridor to be reactivated. The plan should allow options to include and connect a future Dumbarton transit/commuting center to the Willow Village Campus.

I9-7 F. The redevelopment of Hetch Hetchy right of way should be included in the project to increase greenery and connect the proposed south park crescent between Ivy/Willow and O'Brien Parks. The developer of this project should work with relevant parties such as the city, nearby other landowners, and the SFPUC, to increase park/playground options on Hetch Hetchy such as secured children/toddlers areas and tennis/basketball/football/soccer/bocce courts, etc... This would create an additional south paseo and increase community park amenities serving both future employees and local residents.

I9-8 G. Re-including the initial proposal for a Community Center on ground level near the Ivy/Willow public park would be greatly beneficial. The Ivy/Willow park/open space should not be limited as a sport's/multi use field which will be only used by 1 or 2 leagues but should be planned as a full amenity community park such as the "awesome spot playground" (Modesto) or the "magical bridge playground" (Palo Alto). Hopefully the elevated park by the SamTrans corridor can also incorporate many great designs/features from the High Line New York city public park.

I9-9 H. To mitigate traffic issues on the Willow Road/O'Brien Drive corridor, please also find down below some additional feedback/improvements (#1 to #11) that should be implemented as soon as possible in coordination with the appropriate agencies (Caltrans, AC Transit, etc…) in advance of the Willow Village/Meta campus:

1. No parking request in front of 965-985 O'Brien Drive, Menlo Park to ease the flow of vehicles to Willow Road. This would allow vehicles on O'Brien to be in 2 lines, up to the traffic light (right now the 2 lines, no parking zone is not even barely from 965 O'Brien to the light but just a few feet from the corner Willow/O'Brien intersection). Vehicles that are parked on the street around 965-985 O'Brien make the congestion even worse and the 2hr parking zone is not even enforced in this area. This should be very easy and fast to implement (just relocating the existing "no parking here to curb" further down the street and extending the painting strip to divide the lane further).

2. Installation of a new sign on the far right of the large overhang Newbridge traffic light mast arm coming from US101 towards O'Brien Drive with "lane ends - through traffic merge left" would ease the traffic for locals who make a right on Willow Road to Alberni Street and O'Brien Drive. At present, through traffic on Willow Road stay on the very right lane from US101 overpass to O'Brien Drive, blocking the lane for local traffic turning right. Having a "warning" early posted sign ahead of time will help vehicles merge ahead of time instead of seeing the signs too late and blocking the lanes where local residents need to exit/enter.

3. The Willow Road and side street traffic light synchronization needs to account and take place also East of US101 right away, not just West of US101. Vehicle counts and traffic patterns on O'Brien/Ivy/Hamilton should be done/included on the on-going synchronization (also on side streets such as Kavanaugh Way (Menlo Park) and Kavanaugh Drive (East Palo Alto) in anticipation of the FaceBook Willow Campus).

4. As a complement to #2, going East on CA 114 towards the Dumbarton bridge, the sign next to the sidewalk indicating that Willow through traffic must merge left near the intersection of Willow Road and O'Brien Drive is too close to the intersection/traffic light. It does not give cars enough distance to move to the left if going straight. This gives the impression that there are 3 lanes instead of 2 and at peak commute hour creates a bottle neck for people who want to turn right on O'Brien Drive. The "Through traffic must merge left" sign should be moved before Alberni Street EPA to give enough time for drivers to get off the right lane and not block it. Again, having a "warning" early posted sign ahead of time

will help vehicles merge ahead of time instead of seeing the signs too late and blocking the lanes where local residents need to exit/enter. Some additional “Right arrows” should also be painted just after Alberni Street EPA on the right lane to reinforce the message.

5. Similarly to #2, a new sign can be installed on the far right of the horizontal large overhang Newbridge traffic light mast arm coming from O'Brien Drive towards US101 "Right lane must turn right - US101 North SF only".

6. As a complement to #5, going West on CA 114 towards US 101, the new Willow configuration at/after Newbridge is a very nice improvement (except for the Dumbarton express bus stop footprint/location, see #7). However, the signs on the right side indicating that through traffic must merge left and that the right lane is for San Francisco US 101 are not really well placed and from a driver perspective cannot be seen very well (maybe OK if you see them from a pedestrian’s perspective or inspect the intersection on foot, but they are partially hidden by traffic light/trees if you see them from a driver’s perspective on the right or middle lane before the traffic light). May be the placement of the various sidewalk signs between Newbridge and US 101 can be revisited and also some “Right arrows” can be painted just before or after the “SF North” white road marking on the right lane.

7. Going West on CA 114 towards US 101, the Dumbarton Express bus stop on Willow Road, right at the corner of Newbridge MP is badly posted and very dangerous. Unlike the bus stop on the other Willow/Newbridge EPA side going East, and despite the new large sidewalk just been redone, no footprint/easement was accommodated for the bus to pull out of the "turn right 101 North Only" lane. Therefore, drivers following the bus on Willow and who are unaware of the bus stop corner location, get stuck in the middle of the Willow/Newbridge intersection until the bus moves out. Some drivers will then try to get out by partially moving in the middle lane by sharing lanes with cars currently on the middle lane and get into near accidents. At the same time there are also vehicles trying to make a right turn (on red) on Willow from Newbridge MP which makes the situation worse. The bus stop sign should be relocated in a more visible location and a pull out space should be accommodated on the large sidewalk to make a real bus stop aside from trough traffic. Relocating it before the Willow/Newbridge traffic light on the side of Mi Tierra Linda would be best. There is more space and it would be almost at the same location of the other bus stop on the opposite direction/side of the street. This is not simply a problem of responsible drivers but really a poor location of the current bus stop location.

8. In addition to the already difficult situation described on #7, and to avoid people coming from Newbridge MP from blocking Pierce Road and also creating accident situations with drivers coming from Newbridge EPA or Willow Road, there should be a “do not turn right on red” for the light at Newbridge MP. Cars should be forced to stop before Pierce Road and wait for the green light to turn right on Willow Road West.

9. Maintenance wise, several light bulbs are burned off at the O'Brien/Ivy traffic lights and many round shape light covers are missing at several location which makes some lights hard to see depending on the sun exposure. The "Do not block the intersection" sign facing O'Brien Drive at Willow Road fell of the middle traffic light and is now missing. Also the island traffic light to make a left on O'Brien from Willow has been missing and not replaced for several months.

10. Implementation of an all-red interval for vehicle clearance and traffic safety at all the Willow intersections traffic lights between US101 and Bayfront expressway (Newbridge, O'Brien, Ivy, Hamilton) to increase safety and prevent such dangerous/accident prone situations that happened previously on Kavanaugh/University and Willow/O'Brien (see examples here:

https://vimeo.com/231583589

https://vimeo.com/231583590

https://vimeo.com/231583682 )

11. Repainting of all missing/faded directional doted lines at all the Willow intersections between US101 and Bayfront expressway (Newbridge, O'Brien, Ivy, Hamilton) to guide the vehicles turning.

Overall, we are very excited about this mixed used project with public access and amenities east of US101. We are looking forward for the city of Menlo Park, the planning commission and the developer to working together with the relevant stakeholders (e.g. the city of East Palo Alto, SFPUC, Meta, CSBio, etc...) to incorporate and implement these improvements so that this live/work/play development transforms the O’Brien business park area in a more lively community district integrated in the surrounding city neighborhoods and ultimately benefits everyone.

Thank you very much for your consideration.

Romain Taniere

East Palo Alto, Kavanaugh neighborhood resident.

**Perata, Kyle T**

**From:** Bonnie Lam <bllam@ucla.edu>
**Sent:** Monday, April 25, 2022 12:05 PM
**To:** _Planning Commission
**Subject:** Planning Commision - Willow Village

**Follow Up Flag:** Follow up
**Flag Status:** Flagged



Dear Planning Commissioners,

I10-1 As a Belle Haven resident, I am writing to express my support for the Willow Village project. I've been actively following and attending meetings regarding Willow Village and have been very impressed with the openness to feedback. The plans presented have been changed multiple times in order to accomodate our community's request and concerns.

I urge you to advance the project through the EIR process and remaining steps toward approval. Willow Village delivers to our neighborhood much needed amenities such as a full-service grocery store, pharmacy services, cafes and restaurants, publicly accessible park space, and community gathering spaces such as a town square. I look forward to having spaces that my neighbors and I can walk to.

Willow Village also delivers more than 300 units of affordable housing, which will help prevent displacement from our community. Affordable housing is needed more than ever, especially with the rising housing and ren prices. I urge you to support Willow Village as I do. This is a huge investment into the Belle Haven and neighboring communities and will add to the vibrancy of our beautiful community.

Thank you,
Bonnie Lam

Letter I11

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Mack, Ed <emack@te.com> |
| **Sent:** | Monday, April 25, 2022 10:21 AM |
| **To:** | _Planning Commission |
| **Cc:** | connect@willowvillage.com |
| **Subject:** | I support Willow Village |

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

I11-1 Dear Planning Commissioners, I am writing to express my support for the Willow Village project. I urge you to advance the project through the EIR process and remaining steps toward approval. I feel that this project will be beneficial to East Menlo Park, as well as to East Palo Alto.

Thank You, Ed Mack

1483 Kavanaugh Drive

E. Palo Alto

650-704-3207

Letter I12

**Perata, Kyle T**

**From:** Robert Ott <getrobertott@gmail.com>
**Sent:** Monday, April 25, 2022 2:26 PM
**To:** _Planning Commission
**Cc:** connect@willowvillage.com
**Subject:** In support of Willow Village



Dear Planning Commissioners,

I12-1 As a Belle Haven resident, I am writing to express my support for the Willow Village project. I urge you to advance the project through the EIR process and remaining steps toward approval. Willow Village delivers to our neighborhood much needed amenities such as a full-service grocery store, pharmacy services, cafes and restaurants, publicly accessible park space, and community gathering spaces such as a town square. This is important so we do not have to cross the highway to shop for groceries or pick up a subscription. Willow Village also delivers more than 300 units of affordable housing, which will help prevent displacement from our community. I urge you to support Willow Village as I do.

Thank you,
Robert

Letter I13

## Perata, Kyle T

**From:** Luis Perez <luis.perez.live@gmail.com>
**Sent:** Monday, April 25, 2022 10:06 AM
**To:** _Planning Commission
**Cc:** Willow Village
**Subject:** I support Willow Village

**Follow Up Flag:** Follow up
**Flag Status:** Completed

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

I13-1 Dear Planning Commissioners, I am writing to express my support for the Willow Village project. I urge you to advance the project through the EIR process and remaining steps toward approval.

Letter I14

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Perata, Kyle T |
| **Sent:** | Monday, April 25, 2022 3:14 PM |
| **To:** | Perata, Kyle T |
| **Subject:** | FW: [Sent to Planning ]Willow Village |


CITY OF MENLO PARK

**Kyle T. Perata**
Acting Planning Manager
City Hall - 1st Floor
701 Laurel St.
tel 650-330-6721
menlopark.org


**From:** victoria robledo [mailto:vbetyavr@gmail.com]
**Sent:** Monday, April 25, 2022 2:45 PM
**To:** PlanningDept <PlanningDept@menlopark.org>
**Subject:** [Sent to Planning ]Willow Village



Good evening Planning Commission,

I14-1 I am writing as a concerned resident of Belle Haven and the impact of traffic and pollution that will affect the air quality and safety of our residents. In addition, the following items I'm in opposition of due to its great impact on this tiny community.

I14-2 **Opposition to: Additional Hotel when there are already two large Hotels both off 101 ( The Nia and Four Seasons).**

**Opposition to: Tearing down established trees**

**Opposition to : 1,900 units of housing to be reduced to 1,000 or less**
**Opposition to : Tearing down so many functioning buildings, trees and many other existing structures.**

I14-3 **PROOF in writing that there will NOT be an impact on quality of air due to increase in cars, dust, dirt, noise.**

I14-4 **I would also like to request that the Commission consider limiting all entries to these sites " NOT" be directly off of Willow as to prevent traffic jams and buckle up traffic.**

Thank you,

Victoria Robledo

Letter I15

# Perata, Kyle T

**From:** Perata, Kyle T
**Sent:** Monday, May 9, 2022 12:53 PM
**To:** Perata, Kyle T
**Subject:** FW: Willow Village Master Plan Project EIR Comments


CITY OF MENLO PARK

**Kyle T. Perata**
Acting Planning Manager
City Hall - 1st Floor
701 Laurel St.
tel 650-330-6721
menlopark.org


**From:** Romain Tanière [mailto:rtaniere@yahoo.com]
**Sent:** Thursday, April 28, 2022 6:17 PM
**To:** Perata, Kyle T <ktperata@menlopark.org>
**Subject:** Re: Willow Village Master Plan Project EIR Comments



Thank you Kyle.

I15-1 I forgot to add if a red/no-parking zone could be also painted on both side of Kavanaugh Drive/Way and on both city sides at the curve junction between EPA and MP (from the Polytec driveway to the East Palo Alto city sign and from the 1395 Kavanaugh driveway where there is a bus stop sign to the Menlo Park city sign). With cars at high speed/low visibility, this curve is very dangerous when two cars are coming heads on as people almost drive on the middle of the road to avoid cars parked on the sides and at high speed most of the time.
See example here: https://vimeo.com/704367839 (if you just examine the section on foot you do not see what the problem may be).

I15-2 It would also be great to add some botts' dots and/or rumble strips on the double divider lines to provide tactile and auditory feedback to alert drivers starting from the Polytec driveway to the 1396 driveway.

Romain Taniere

Letter I16

# Perata, Kyle T

**From:** Karen Grove <karenfgrove@gmail.com>
**Sent:** Wednesday, May 4, 2022 7:03 PM
**To:** _CCIN; Noce, Michael R; _Planning Commission
**Subject:** Willow Village, Parkline, and BMR Guidelines for future projects



Dear City Council, Planning Commission, Housing Commission, and City Staff,

When I joined the Housing Commission four years ago, I joined the BMR ad-hoc committee to update our Below Market Rate Housing Program guidelines and requirements. While we made some incremental progress, we have not yet made the leveraged changes needed to ensure that our BMR requirements serve the needs of our most impacted residents.

Today, we are experiencing the consequence of our inaction. So many large housing developments are getting through the approval process and meeting the terms of our BMR Program without meeting the needs of our community. We need to prioritize updating our requirements, and until we do, we need to be asking developers to exceed our requirements.

I16-1 For the Willow Village project, for example, I encourage the Housing Commission, Planning Commission and City Council to raise the bar for Below Market Rate Housing relative to what is being proposed. Specifically, our community needs more affordable homes, and deeper affordability, especially for people at the lowest incomes and most challenging circumstances (people with disabilities, with large families, extremely low income seniors, etc).

As a starting point for discussion, I encourage the city to ask the developer for:

- 15% inclusionary in the market rate developments
  - at a mix of Very Low, Low and Moderate Incomes, per our BMR guidelines.
  - *As a note for future BMR policy updates, a good example to follow is Redwood City, which uses a point system rather than an equivalent subsidy calculation to determine how many Very Low vs. Low vs. Moderate Income units are required.*
- In addition to the 15% inclusionary BMR homes, the developer of this nearly 70 acre property should donate 1-2 acres and partner with a nonprofit housing developer to produce 100% affordable homes on site (this should become part of our BMR policy going forward, for large-site projects, as a strategy to produce deeply affordable homes)
  - The population served could be seniors, or another high need group, such as large families, or people with disabilities.
  - Incomes served should align with other 100% affordable developments, and should include no income, acutely low income, extremely low income, very low income and low income (on a curious note, the

I16-1 cont.

current proposal sets a minimum income requirement of 25% AMI for the proposed senior housing, which is not a threshold used by the County to delineate income bands).

- The Willow Village developer should make a significant financial contribution to the 100% affordable project on behalf of Menlo Park in such a way that Menlo Park is able to apply our BMR preferences to a portion of the units in the development.

    - Financing for such a project will come from several sources, and each funder can apply conditions to their funding in terms of who qualifies to apply for the homes.
    - In the absence of significant Menlo Park financing of the project, preferences will be set by other funding sources and could fail to meet the needs of our most vulnerable Menlo Park households.
    - Note that this is a very large project, and the developer has access to vast resources. They can afford to invest in meeting the most urgent and costly needs in our community.

- Set rents for the inclusionary units at 30% of the mid-range income level. Mountain View does this, and we have found that it is necessary to address a structural problem with the Income Limits as defined by the State and County.

    - The problem is that households with incomes at the low end of the range do not qualify as earning enough to pay rents set at 30% of incomes set at the high end of the range.
    - In effect, our program, as designed, does not serve households with incomes in the lower range of the income bands.
    - Setting rents at 30% of the mid-range income could solve the problem.

- We should NOT eliminate our policy that BMR rents may never exceed 75% of market rate rents, as has been requested by the developer.

    - The 75% BMR rent cap policy has been effective! Without it, BMR rents would have exceeded market rate rents during COVID and at other times in the past.

Ideally, we will expeditiously create a BMR policy that meets the housing security needs of our city and region. Until that happens, we must negotiate with each developer of large projects in our city and ask them to step up to meet the dire need of our most deeply impacted residents.

I'm hopeful that we have the will and the ability to do so, because at the Planning Commission study session for SRI/Parkline, the Planning Commission significantly raised the bar for BMR housing, and the developer was amenable to their request. Let's apply that higher bar – a bar that actually acknowledges and seeks to address the dire need in our community – to the Willow Village project too. And let's update our BMR policy so that future projects that follow the public meeting constraints of SB330 better serve our housing needs.

Karen Grove (she/her)

resident of Menlo Park and former housing commissioner

Letter I17

**Perata, Kyle T**

**From:** Christopher Kao <christopherkao@icloud.com>
**Sent:** Tuesday, May 17, 2022 10:41 AM
**To:** Perata, Kyle T
**Subject:** Willow Village Draft EIR Comments

**Follow Up Flag:** Follow up
**Flag Status:** Flagged



Hi,

I would like to submit my public comments for the Willow Village Draft EIR below:

I17-1 My name is Chris Kao and I am a resident in East Palo Alto. I need to disclose that I am an employee at Meta, but my comments here are as a resident in East Palo Alto and do not consider that I am a Meta employee. I have read through the Willow Village Draft EIR and I am in support of this project. One of the things that I like the most about this project is that it connects the area that is the Willow Village campus to O'Brien Dr, hence creating a bike able pathway from East Palo Alto over to Belle Haven and the Bay Trail without having to take University Ave.

For context, I typically bike to work from the Ravenswood Business District to the Meta Menlo Park campus 5 days a week. I typically bike west along Bay Road and then north along University Avenue, then back southwest along the Bay Trail. This is an inefficient route because I am going further north and then biking back south. I had tried taking an alternative route north on University Ave, then west on O'Brien, but was disappointed to find that the former Prologis campus (where Willow Village is) is entirely separated from O'Brien Dr, so I ended up having to bike south west along O'Brien Dr and then back north east along Willow Road, which is an inefficient route.

I like how the Willow Village plan include bike lanes and I want to express support for bike lanes that would connect O'Brien Dr diagonally northwest up towards Willow Road.

Thanks,

Chris

**Perata, Kyle T**

**From:** Perata, Kyle T
**Sent:** Monday, May 23, 2022 12:45 PM
**To:** Perata, Kyle T
**Subject:** I support Willow Village - Belle Haven Resident

**Kyle T. Perata**
Acting Planning Manager
City Hall - 1st Floor
701 Laurel St.
tel 650-330-6721
menlopark.org

**From:** Chris Olesiewicz [mailto:colesiewicz@gmail.com]
**Sent:** Thursday, May 19, 2022 11:57 AM
**To:** _CCIN <city.council@menlopark.org>
**Cc:** Willow Village <connect@willowvillage.com>
**Subject:** I support Willow Village - Belle Haven Resident



I18-1 Dear Council Members, as a 7+ year resident of the Belle Haven neighborhood, I am writing to express my support for the Willow Village project. I urge you to advance the project's Community Amenities package and the remaining steps toward approval. This will bring much-needed retail stores, such as the grocery store and pharmacy, to the Belle Haven side of Menlo Park.

Best regards,
Chris Olesieiwcz

Letter I19

**Perata, Kyle T**

**Subject:** I support Willow Village

**From:** Arturo Arias [mailto:arturoarias7@aol.com]
**Sent:** Friday, May 20, 2022 12:28 PM
**To:** _CCIN <city.council@menlopark.org>
**Cc:** connect@willowvillage.com
**Subject:** I support Willow Village

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Dear Council Members,

I, Pastor Arias from Eternal Life Church in Menlo Park.
I19-1 I`m writing to express my support for the Willow Village project.
This project will help bring our community together.
Our community is ready to embrace this project. The amenities and benefits the project brings will provide a safe haven for us all.
We need Willow Village in our community and city!
us a community faith leader for over 33 year here in menlo park.
I, urge you,  to advance the project's Community Amenities package and remaining steps toward approval.

Kindest Regards!

- Pastor Arias
Eternal Life Church
Menlo Park

**Perata, Kyle T**

**From:** Patti Fry <pattilfry@gmail.com> on behalf of Patti Fry <Patti.L.Fry@gmail.com>
**Sent:** Sunday, May 22, 2022 1:58 AM
**To:** Perata, Kyle T
**Subject:** Willow Village Draft EIR comments



I20-1 The Draft EIR for the Willow Village and office park appears to assume a worker intensity of 217 sf per worker (reference page 3.13-15) in the offices calculated at 1.6 million square feet and 7354 workers. This assumption seems to underestimate greatly the potential new number of workers and associated impacts.
Facebook and other tech companies have used a range of 50-150 sf/ worker, which could yield 40%-400% more workers and corresponding additional needs for housing, water, and other infrastructure.
I20-2 Also The DEIR compares the project population and housing impacts to area projections separately rather than comparing its impact of worsening the jobs/ housing ratio with no need for mitigation. Even with its questionable intensity assumptions, the DEIR states the project adds 4,332 employees and 1,730 housing units. That is a jobs:housing ratio of 2.5, much worse than the ConnectMenlo projection for Menlo Park's future. This Project with its enormous office park would worsen the jobs:housing balance unless approved with less non-residential space (or allowed through a General Plan change to add significantly more housing). The DEIR seems to ignore this and any related impacts.
Patti Fry
Former Menlo Park Planning Commissioner
Sent from my iPhone...pls excuse typos

Letter I21

**Perata, Kyle T**

**From:** Patti Fry <pattilfry@gmail.com> on behalf of Patti Fry <Patti.L.Fry@gmail.com>
**Sent:** Sunday, May 22, 2022 2:06 AM
**To:** Perata, Kyle T
**Subject:** Willow Village Draft EIR comments - water



I21-1 The draft EIR seems to imply that the city has plans for water in dry years. That skirts the issue of the impact of this project that on the potential shortage and of its need to provide more water to support its impact on the need for water.

Patti Fry
Former Menlo Park Planning Commissioner
Sent from my iPhone...pls excuse typos

**Perata, Kyle T**

**From:** Lynne Bramlett <lynne.e.bramlett@gmail.com>
**Sent:** Monday, May 23, 2022 2:48 PM
**To:** Perata, Kyle T
**Cc:** Lynne Bramlett; Taylor, Cecilia
**Subject:** Input into Willows Village Draft EIR
**Attachments:** Bayfront_Development_Projects.docx.pdf; Kyle Perata_WVEIR_May_23_2022.docx.pdf; WV_EIR_Scoping_V3.pdf; CM_Overriding_Considerations.pdf



Hello Kyle,

I'm attaching my input into the Willows Village EIR, which is due today by 5 PM. I will next walk over to 701 Laurel Street with a packet that includes the attachments. If the City Offices are not open, I will mail the packet to you. However, I point out here that I have met your deadline.

Attachments:

1. Letter with specific input
2. Bayfront Cumulative Development Projects
3. EIR Scoping Questions (from Sep 22, 2019)
4. ConnectMenlo Statement of Overriding Considerations

Lynne Bramlett
650-380-3028

Lynne Bramlett
1410 Mills Court
Menlo Park, CA 94025

May 23, 2022

Kyle Perata, Acting Planning Manager
City of Menlo Park
701 Laurel St.
Menlo Park, CA 94025

**Subject: Willows Village Draft Environmental Impact Report**

Dear Mr. Perata:

I22-1 This letter is in response to the published 951-page Willows Village Draft Environmental Impact Report (EIR). I've been a civically engaged resident for almost 10 years and I submitted input into topics I wanted to see studied in the EIR. I wanted them recorded, read and responded to. My primary concerns pertain to the need to consider development in District 1 holistically, and to re-evaluate the ConnectMenlo Program Level EIR or Resolution 6356. My concerns were not addressed. I will attach my Sep 22, 2019 comments for the record.

I22-2 **The City should impose development phasing requirements or adopt a moratorium until the cumulative impacts can be studied.** The former City Attorney, Bill McClure, was quoted in a Nov 30, 2016 ("Menlo Park Adopts Big Changes to General Plan") *The Almanac* article as presenting this option (apparently to alleviate their concerns) to the then City Council.

I22-3 **The District 1 Development Cumulative Impacts Should be Considered.** The City lacks a long-range planning department and an in-house geologist. The proposed Willows Village is located in a flood zone. The District 1 construction needs a comprehensive review, which it is not getting. We especially need to prioritize the health and safety of the City of Menlo Park residents over development interests. What information exists varies. For example, your March 14, 2022 presentation (Bayfront Development Projects) to the Planning Commission varied in the information I found at the City's website and also from what I read in Table 3.0-1 in the Willows Village Draft EIR. To me, this illustrates the rapidly changing projects and the lack of the City's ability to keep up. The lack of including lot size is troubling as this is one way of evaluating density. Please see my attachment with my table of the projects.

I22-4 **The public lacks meaningful opportunities to be kept appraised and to raise concerns.** You told the Planning Commission, at their March 14, 2022 meeting, that your presentation was informational only. You clearly signaled that the meeting was not for the purpose of raising concerns about the pace of development. Instead, we need interactive forums where the public can ask questions and raise concerns. The City needs to provide a 3D model that depicts what District 1 will look like after construction of pipeline projects. Planning Commissioners, and others, have called for this model. A model should be on public display.

I22-5 **The ConnectMenlo program-level EIR (Resolution 6356) should be reviewed and updated.** The program-level EIR "green lights" individual District 1 projects because they can "tier-off" the program-level EIR. The program-level EIR also inadequately projected environmental impacts and the 2040 build-out phasing projections.

I22-6 **The Planning Commission's annual review of the City's Capital Improvement Projects <u>for consistency with the City's General Plan</u> represents inadequate oversight.** California State law (Government Code Section 65401) requires the City planning agency (Planning Commission) to review and determine that the projects are consistent with the City's General Plan. In the past, this reporting mechanism only included the CIPs that the City drives. However, it should include ALL development projects in District 1 allowed under ConnectMenlo. *After all, the City has positioned ConnectMenlo as its authentic General Plan Land Use Element*. Thus, all projects allowed due to ConnectMenlo should be on that report. The Planning Commission needs a complete list and the ability to meaningfully discuss the projects.

I22-7 **The City of Menlo Park should comply with legal requirements to annually report progress on ALL General Plan Elements, <u>not just the Housing Element</u>.** All California jurisdictions are required to provide the Governor's Office of Planning and Research (OPR)m and the Department of Housing and Community Development (HCD), with *separate* General Plan and Housing Element Annual Progress Reports (APRs) by April 1 each year, per Government Code Sections 65400 and 65700. The General Plan APR submitted to OPR should outline the status of the General Plan and progress in its implementation over the previous year's 12-month reporting period.

I22-8 **The ConnectMenlo Guiding Principles should be measured and reported.** The statements need revising into goals that can be measured. Then, they need metrics and an annual reporting. Right now, they are platitudes only.

I22-9 **The City's Environmental Justice Element should be completed *before* more District 1 development.** The District 1 development project pipeline pace has greatly accelerated. The City is working at cross purposes by aiming to prepare an Environmental Justice Element while also rapidly increasing development in District 1. Projects should be put on hold until the Environmental Justice Element is completed.

I22-10 **Other Recommendations:**

- **The City needs to provide training to residents on how to effectively respond to Environmental Impact Reports.** This training has been requested. The development should be slowed (or halted) until suitable training is provided. The pace should be slowed so that people have time to read the massive EIR reports and attend the meetings leading up to them (and after them).
- **The City should institute an annual report to the City Council for Developer Agreements**. The report should list each one, status of required mitigation, and the financial benefits. Council lacks adequate fiscal controls for developer agreements.
- **The City should post the Form 700s at a publicly accessible, and visible, section of its external website.** One can obtain a link, but one has to ask for the link. The Form 700s will show what gifts the City Staff, and the Council members, might be receiving from developers and other "special interests."

I22-11 **Broader changes, since the Willows Village project started, need to be considered.** Covid-19 led to a new model of working from home. This model reduces traffic and pollutants that increase global climate change. Employees like it and the proposed new office space may not be needed. Facebook, or Meta Platforms, has seen declining revenues due to the younger generation shifting to social media platforms other than Facebook. Facebook's existing massive footprint in Menlo Park is considerable already. The pace of global climate change has accelerated and rising seas includes rising ground water tables, which levees cannot stop. The project should reflect these changes.

I22-12 **Instead of Willows Village, consider a floodplain buyout.** According to the Cal OES My Hazards site, District 1 mostly lies in a flood plain and liquefaction zone. Flood buyouts can be funded by several federal programs. Buyouts reduce flood risk. A floodplain, in the form of a regional park, would be a nature-based solution to the increase in flooding risk due to global climate change and sea level rise.

Sincerely,

*Lynne Bramlett (electronically signed)*

Lynne Bramlett, District 3 Resident

ATTACHMENTS

1. Bayfront District 1 Cumulative Development Projects
2. May 22, 2019 Memo for topics studied in the Willows Village EIR
3. ConnectMenlo Statement of Overriding Considerations (from Resolution 6356)

# “Bayfront” District 1 Cumulative Development Projets

Primary Sources (these often contained discrepancies)

- March 14, 2022 presentation to the Planning Commission
- City of MP Current and Pending Development website
- Project descriptions at City’s Development website
- Constuction News Update (City of MP)
- Google research (lot size)
- Willows Village Draft Environmental Impact Review

## COMPLETED or MOSTLY COMPLETED PROJECTS

| Project Name | Address | Lot Size | Summary | Status | MP Planner |
|---|---|---|---|---|---|
| Facebook East Campus | 1 Hacker Way | 56.9-acres | 9 buildings (approximately 1,035,840 sq. feet). | Completed | |
| Facebook West Campus | 1 Facebook Way | 22 acres | 433,555 sq. foot building on top of surface parking | Completed | |
| Menlo Gateway<br><br>Bohannon Development Company | 100-190 Independence Drive & 101-155 Constitution Drive | 15.9 acres | Hotel (171,563 sq. feet and 230 rooms), café/restaurant, retail. 3 Office and R&D buildings (694,669 sq. feet). 3 parking structures | ? Willows Village draft EIR lists 105-155 Constitution as being “under construction” | |
| Tide High School | 150 Jefferson Drive | | Magnet high school for 9, 10, 11 grades initially | Willows Village Draft EIR lists this as “partially completed” | |
| 1430 O’Brien Avenue | 1430 O’Brien Avenue | About .25 acre | | Completed | |

## UNDER CONSTRUCTION

| Project Name | Address | Lot Size | Summary | Status | MP Planner |
|---|---|---|---|---|---|
| Facebook Campus Expansion | 301-309 Constitution Dr. | | 2 new office buildings (962,400 square feet) plus publicly-accessible open space and a new pedestrian/bicycle bridge over Bayfront Expressway. | Under construction | Kyle Perata |
| Menlo Park Community Campus | 100-110 Terminal Avenue | | Development of a new community campus in the Belle Haven neighborhood. The facility would replace the existing Onetta Harris Community Center, Menlo Park Senior Center, Menlo Park Youth Center and Pool, and would include the Belle Haven branch library.<br><br>The project would consist of a two-story building comprised of a gym, multi-purpose room, library flex space, as well as several outdoor terraces. | Under Construction | Theresa Avedian |

## UNDER CONSTRUCTION, cont.

| Project Name | Address | Lot Size | Summary | Status | MP Planner |
|---|---|---|---|---|---|
| Gateway Housing Project (100% affordable Housing)<br><br>(MidPen Housing | 1345 Willow Road | | 4-story apartment building. The proposed project would be comprised of a 140-unit, 100 percent Below Market Rate (BMR) multifamily affordable housing complex consisting of 66 one-bedroom, 50 two-bedroom, and 24 three-bedroom units. | Under Construction | Theresa Avedian<br>Eric Hinkley<br>Matt Pruter |
| Menlo Portal<br><br>(Greystar) | 115 Independence, 104/110 Constitution Drive | 3.20 acres | Redevelopment of three parcels with 335 multi-family dwelling rental units, 33,211 square feet of office, and 1,607 square feet of commercial space. Project would consist of a seven-story residential building and a three-story office building. | Under construction | Payal Bhagat |
| Menlo Uptown<br><br>Greystar | 141 Jefferson Drive & 180-186 Constitution Drive | 4.83 acres | Redevelopment of three parcels with 483 multi-family dwelling units comprised of 42 for-sale condominium units and 441 rental units on a 4.83-acre site.<br><br>The project would consist of two seven-story apartment buildings with rental units and six three-story buildings with townhome-style condominium units. | Under Construction | Tom Smith |

## PENDING CONSTRUCTION (APPROVED)

| Project Name & Developer | Address | Lot Size | Summary | Status | City of MP Project Manager |
|---|---|---|---|---|---|
| 111 Independence Drive<br><br>(SP Menlo/LLC) | 111 Independence Drive | 0.94 | Construction of a new eight-story residential apartment building with 105 dwelling units (95,371 square feet) and a community-serving retail space (713 square feet).<br><br>The project would include a total of 14 residential units (15%) as below market rate (BMR) units. | Pending Construction | Payal Bhagat, contract principal planner |
| Citizen M Hotel | 301 Constitution Drive (near Chilco Street and Bayfront Expressway) | | The approximately 90,868 square foot, five-story hotel consists of 240 hotel rooms, a restaurant, and hotel amenities. | Pending construction | Ori Paz |
| 1105-1165 O'Brien Drive<br><br>Tarlton Properties | 1105-1165 O'Brien Drive | Consists of Two parcels: 2.44 acres 1.68 acres | New 5-story R&D building (131,285 sq. feet in size), and surface parking lot. 2,760 sq. foot cafe | Pending Construction | |
| Sobrato Mixed Use (123 Independence Drive)<br><br>Sobrato Organization | 123 Independence Drive | 0.9490 acres | Construction of 432 dwelling units across four parcels. The project would consist of 316 apartment units within one apartment building and 116 townhomes. | Pending Construction | Payal Bhagat, Contract planner |

## PENDING CONSTRUCTION, cont.

| Project Name | Address | Lot Size | Summary | Status | MP Planner |
|---|---|---|---|---|---|
| 1350 Adams Court<br><br>Tarlton Properties | 1305 O'Brien Drive OR 1315 O'Brien Drive | 11.2 acres | New 5-story R&D building with an integrated parking structure. (Up to 260,000 sq. ft.in size.) Adjacent to Willow Village Project Site | Pending construction | Tom Smith |
| Commonwealth Building 3<br><br>Sobrato Organization | 162-164 Jefferson Drive | Two Parcels:<br>1.767 acres (164 Jefferson) and 12.1 acres (162 Jefferson | New 4-story 249,000 sq. ft. office building. New 5-story parking structure with approximately 1,276 spaces. Publicly accessible park space. Two existing 4-story office buildings to remain (each approximately 130,000 sq. feet). | Pending Construction | Tom Smith |
| CSBIO Phase 3 | 1075 O'Brien Drive & 20 Kelly Court | 0.7 acres | New 7-story office & R&D building. 10,000 sq. ft. ground floor restaurant space. Portion of 20 Kelly Court building to remain | Pending Construction | Tom Smith |

| Project Name | Address | Lot Size | Summary | Status | MP Planner |
|---|---|---|---|---|---|
| Hotel Moxy<br><br>FBG Development Group | 3723 Haven Avenue | 0.76 acres | 8-story 163-room hotel (58,000 sq. ft. in size). Coffee shop on first floor. Bar and restaurant areas/fourth floor. Publicly accessible outdoor rooftop garden. 3 stories podium parking. | Pending construction | Matt Pruter, Associate Planner \| mapruter @menlopark.org \| 650-330-6703 |
| Menlo Flats<br><br>Greystar | 165 Jefferson Drive | 1.38 acre | 8-story apartment complex. Community amenity: payment of $4,840,000 in in-lieu fee proposed | Pending Construction | Payal Bhagat, Contract planning |

## UNDER REVIEW, cont.

| Project Name & Developer | Address | Parcel Size | Summary | Status | City of MP Project Manager |
|---|---|---|---|---|---|
| 1005 O'Brien Drive & 1320 Willow Road<br><br>Tarlton Properties | 1005 O'Brien Drive & 1320 Willow Road | 4.22 acres | New 5-story R&D building (153,550 sq ft.), a new 4-story R&D building (73,500 sq. ft in size) and a parking structure with 505 spaces. | Under Review | Chris Turner |
| Willows Village<br><br>Signature Development Group | 1350-1390 Willow Road, 925-1098 Hamilton Avenue and 1005-1275 Hamilton Court | 59 Acres | • 1,730 dwelling units<br>• 1.6M sq feet office/accessory use<br>• 200,000 sq. ft. retail/non office commercial<br>• 193-room hotel]<br>• Elevated park across Willow Road<br>• Willow Road Tunnel<br>• Bike/ped path (paseo)<br>• Publicly accessible open space | Final EIR Comment Period ends May 23, 2022 @ 5 p.m. | Kyle Perata |

To: Planning Commission

From: Lynne Bramlett

Date Sent: Sep 22, 2019 (date added on May 23, 2022)

Re: Environmental Impact Report for Willows Village

I22-13 I will be traveling and so unable to attend your scoping session on October 7, 2019. Thus, I'm sending in my input as to what topics should be studied in the EIR. I will put background information at the end.

**EIR Scoping Questions**

I22-14 In the Willows Village EIR, I would like it scoped so that it provides answers to the following questions. The relatively new Senate Bill 1000, Planning for Healthy Communities, act requires Cities such as Menlo Park to incorporate environmental justice into its General Plan when concurrently updating two or more elements. The idea of environmental justice is also included in Council's Resolution No. 6493, passed on Earth Day (April 22) 2019. I hope the Planning Commission will consider Council Resolution No. 6493 when considering topics to include in the Willows Village EIR as I did not have the time to do so before my trip.

**ConnectMenlo Program-Level EIR (Resolution 6356) Related Questions**

I22-15
1) For the Resolution 6356 environmental impacts that could be (at least partially) mitigated, what is the current status of each? Who monitors and measures these, and how are they reported?

I22-16
2) The program-level EIR based its 2040 build-out assumptions partly on the Plan Bay Area 2040 Regional Transportation/Sustainable Community Strategy assumptions. The latter plan's assumptions were not correct. What now needs revising in the ConnectMenlo Program-level EIR?

I22-17
3) ConnectMenlo Resolution No. 6356 detailed multiple significant environmental impacts for the "Project" with the project being the zoning changes that led to the development in District 1. However, the Resolution asserted that overriding economic, environmental, and social benefits justified the impact. For each benefit listed on pages 57-59 of Resolution No. 6356, what is the status of each? If not met, what are the City's plans to achieve the benefit and by when?

I22-18
4) What are the City's plans to revise the ConnectMenlo ordinances in light of Council's recent discussion of a development moratorium? What measures will the City institute so that development requires tangible transportation improvements before approving more development?

I22-19
5) What will be the price tag for road infrastructure improvements needed to mitigate the increased traffic coming from regional and local development? Of the amount needed, what has Facebook funded? What will taxpayers need to pay? What does Facebook consider its responsibilities to mitigate traffic caused directly by its employees and construction projects?

**Other Relevant Questions**

I22-20
1) What does Facebook plan to do should the U.S. Justice Department break up the company into smaller companies? (This could be an outcome of the Justice Department's investigation into tech monopolies.) Should this happen, how will the breakup impact Willows Village? Menlo Park?

I22-21
2) What is the City's plan for emergency services in District 1, especially during commute hours?

I22-22
3) What is the City's plan for disaster preparation for a major disaster, such as a major earthquake that also causes fire and flooding in District 1?

I22-23
4) What is the status of Facebook's required mitigations for its other projects? What is the total of these and how are they tracked, measured and reported? What assurances do the public have that Facebook is honoring its agreements, and held accountable as necessary?

I22-24
5) What is the sum total of Facebook's annual financial contributions to the City's annual revenue? That would include property taxes and annual amounts coming in via development agreements.

**Willows Village EIR Specific Questions**

I22-25
1. What new and more stringent requirements exist for measuring the impacts of traffic, such as including reverse commutes and average daily traffic? How will these be reflected in the Willows Village EIR?

I22-26
2. The number of birds in the air has also drastically declined as noted in a recent article in *Science* and also local newspapers. I've y heard from avid birdwatchers that there are fewer total birds and types of birds in Menlo Park's Bedwell Bayfront Park than the amount seen in the nearby Palo Alto Baylands. What is the impact of development on birdlife in Menlo Park's Bayfront? What will help to increase birdlife in the Menlo Park's Bayfront? How specifically will Willows Village impact birdlife?

I22-27
3. Fewer birds will also impact beneficial insects, flower pollination and other aspects of nature. What is the overall impact of development in District 1 on broader aspects of nature that also impact aesthetics?

I22-28
4. What will be the impact to the current occupants of the buildings that Facebook proposes to demolish? Where will these businesses re-locate to? What will be the impact to their clientele? Where will these non-profits and local governmental services go?

I22-29
5. What will be the impact of Willows Village to Menlo Park's goals of combatting global Climate Change as detailed in Council Resolution No. 6493?

I22-30
6. What is the decision-making process currently being used for deciding the public amenities such as the proposed Community Facility and Public Park? How is the process consistent, or not, with the ConnectMenlo Program-level EIR promised benefit of delivering environmental justice to District 1?

I22-31
7. What retail is being planned for the area? Specifically, what grocery store is being considered? What impact will a new grocery store have on the two existing grocery stores in District 1? What restaurants are being considered? What will be the impact of these restaurants on the existing restaurants in District 1?

I22-32 8. What retail is being proposed, if any? How will Facebook help to ensure that this retail is successful?

I22-33 9. What is the dollar value put on the proposed 10,000 community space? What is currently being discussed between Facebook and City Staff for this particular property? Please include all possibilities. Please also include anything that has been explicitly ruled out.

I22-34 10. For the community space, instead of setting aside land in Willows Village for this purpose, could more housing be added and instead the dollar amount set aside for District 1 residents to decide how and where it will be spent? If not, why not? If yes, what will be the process to ensure that the District 1 community makes the decisions?

I22-35 11. Where will trees be planted in District 1 to help provide a tree canopy to mitigate the overall impacts of development, and the additional impacts of Willows Village?

I22-36 12. Into which landfills will the parts from the demolished buildings go? What will be the impact to these landfills? What efforts will be made to reuse parts of the demolished buildings?

I22-37 13. Willows Village is proposed for a flood zone expected to be "under water" in perhaps as soon as 2060 due to global climate change. What are the justifications for building this project in a known flood zone? If built, when the flood occurs, what will be the plans to protect life and property?

I22-38 14. The draft Willows Village master plan includes the evaluation of constructing an underground water reservoir beneath the proposed park/sports field on Willow Road. How will this water reservoir be protected should a major flood occur?

I22-39 15. If the zoning map is changed, to accommodate Willows Village proposed site connections to the surrounding roadway network, what additional development might this trigger by property owners nearby? In other words, will adjacent property owners also be allowed to develop their properties into office complexes?

**Question Pertaining to Regional, cumulative impacts**

I22-40 1) What is the current overall jobs/housing imbalance in Menlo Park, and in Santa Clara and San Mateo Counties? If all currently proposed regional development gets approved, how will this worsen the jobs/housing imbalance? What are the plans to increase housing, especially affordable housing?

I22-41 2) What regional efforts exist, if any, to halt office development projects that

I22-42 3) What is the cumulative environmental impact of the region's current and likely jobs/housing imbalance? This would include: noise, pollution, species decline, including birds.

**Additional comments – Regional Impact**

I22-43 Willows Village, if ultimately approved, will be the largest development project ever in Menlo Park. The proposal also joins two other proposed large development projects nearby:

1) Stanford's proposal for a 3.5 million square feet expansion and
2) Los Angeles developer Lowe Enterprises which the *Daily News* reported "wants to build 1.6 million square feet of office space, 175,000 square feet of retail space and 440 apartments across three parcels… the jobs-to-housing ratio for the entire project is 12 jobs to one home" (9/22/19).

These three projects alone will significantly worsen the area's jobs-to-housing imbalance.

I22-44 The cumulative impacts of regional development should be considered in the Willows Village EIR. Tech companies continue to expand in cities from Burlingame to San Jose. For example, Facebook recently opened a new office complex in Sunnyvale with "enough space for potentially 5,300 employees" (Mercury News, Sep 20, 2019). The same article pointed out that Amazon and Google have also leased space nearby. Google has bought properties in San Jose for the purposes of expansion.

U**sing Descriptive Names**

I22-45 A village is traditionally defined as "a settlement usually larger than a hamlet and smaller than a town." The name Willows Village suggests a small settlement of mostly housing. However, Willows Village is mostly office with a little housing, retail and public spaces.

It's important that the public be aware of just what is being proposed. Can the Planning Commission request that the City use more descriptive names when describing projects such as Willows Village. For this one, I suggest adding a descriptive tag line such as "Willows Village Office Park" when publishing EIR-related notice.

I22-46 Below is a verbatim post to NextDoor by a resident in Vintage Oaks. He was alerting residents to what he considered a misleading Facebook sponsored poll designed to get answers that would help Facebook to demonstrate public support for Willows Village. I have no reason to doubt the veracity of the post. The general ethics of push-pull or misleading polls is very troubling to me and I think they should have no place in our City, or used by developers who want to build in our City. Would the Planning Commission consider adopting a general development code of ethics that would prohibit misleading or deceptive business practices such as described below?

Lynne Bramlett

*************************************************************************************

**NextDoor Post – Facebook Poll (from a Resident in Vintage Oaks)**

Facebook and Signature Development Company are trying to get a huge development project built in Menlo Park, and it will impact public schools. It's estimated that the 1700+ housing units (and most certainly the 6000 jobs created, presumably mostly for Facebook), could increase the student body at Menlo Atherton High School alone by at least 300 students. This concern was raised by former Sequoia Union High School District Superintendent Mary Streshly In 2018 (see Almanac articles and references).

I'm posting, because I just got off the phone with a marketing company. They were obviously paid to do this 'neutral' questionnaire on behalf of the Willow Village (aka Facebook). It was a very vague, very biased, and very shady questionnaire. They'll probably be calling you on your mobile phone too!

I never talk to telemarketers, solicitors, etc., but I'm glad that I did tonight because now I smell something rotten growing off of Willow Road.

Does anybody else have information on this project? I haven't followed it, but noticed that this Willow Village Master Plan project is entering the environmental review phase this Wednesday, September 18, 2019. The City will release the notice of preparation (NOP) for the environmental impact report (EIR) for the approximately 59-acre mixed use Willow Village Master Plan project https://menlopark.org/CivicSend/ViewMessage/message/94238

They have a very convincing pitch focusing on the housing crisis, pulling obvious heart strings and alarms etc., but they offer no details, no real numbers, solid research or statistics on how they're going to impact Menlo Park schools, traffic, housing, or anything else for that matter. They do have some mighty pretty mockups though! Facebook is spending a lot of money to get this built!! https://www.willowvillage.com, do your homework, and please share what you learn!

# # #

# XII. STATEMENT OF OVERRIDING CONSIDERATIONS

As set forth above, the City has found that the Project will result in project and cumulative significant adverse environmental impacts related to air quality, greenhouse gas emissions, population and housing, and traffic and circulation that cannot be avoided following adoption, incorporation into the Project, and implementation of mitigation measures described in the EIR. In addition, there are no feasible project alternatives that would mitigate or avoid all of the Project's significant environmental impacts. Section 15093(b) of the State CEQA Guidelines provides that when the decision of the public agency results in the occurrence of significant impacts that are not avoided or substantially lessened, the agency must state in writing the reasons to support its actions. See also Public Resources Code Section 21081(b). Having balanced the economic, legal, social, technological or other benefits of the Project, including region-wide or statewide environmental benefits, against its significant and unavoidable environmental impacts, the City finds that the Project benefits outweigh its unavoidable adverse environmental effects, and that the adverse environmental effects are therefore acceptable.

The following statement identifies the reasons why, in the City's judgment, specific benefits of the Project outweigh the significant and unavoidable effects. The City finds that each of the Project benefits discussed below is a separate and independent basis for these findings. The reasons set forth below are based on the Final EIR and other information in the administrative record.

## ECONOMIC BENEFITS

1. The Project would promote a vibrant economy by supporting a diversity of business and employment opportunities.
2. The Project provides for the greatest and most balanced economic growth alternative by creating 2.3 million square feet of new employment-related land uses and allowing the City greater opportunities to remain a competitive and innovative business destination in the regional development environment, which would support increased property and sales tax revenues.
3. The Project plans for 400 additional hotel rooms that will generate transient occupancy tax revenue for the City.
4. The Project updates the Transportation Impact Fee (TIF) program to guarantee funding for bicycle and pedestrian facilities and roadway and infrastructure improvements that are necessary to mitigate impacts from future projects.

## ENVIRONMENTAL BENEFITS

1. The Project is environmentally superior to the existing General Plan, as discussed in Draft EIR Chapter 5 and summarized above in Section VII(A).
2. The Project recognizes the importance of linking land use and transportation planning.
3. The Project concentrates growth in existing urbanized areas and thereby results in fewer impacts from the construction of new infrastructure, maximizes use of existing impervious surfaces, provides multi-modal transportation opportunities, and reduces vehicle miles traveled, which translates into air quality and greenhouse gas emissions benefits and increases in resources and energy efficiency.
4. The Project largely concentrates growth at locations with existing uses and, as a result, potential future development would consist largely of either redevelopment of existing buildings and/or sites, and selective demolition of existing structures and replacement with new construction.
5. The Project includes policies that encourage conservation of water and energy resources in conformance with the City's sustainability goals.
6. The Project includes policies and mitigation measures, enforceable through the MMRP, that protect the Don Edwards Bay National Wildlife Refuge and other sensitive habitat areas.
7. The Project is in conformance with the principles of planning sustainable communities by meeting both the present and future housing needs of the City.
8. The Project is consistent with Plan Bay Area, which is the Bay Area's Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS), as well as SB 375, the Sustainable Communities and Climate Protection Act.

## SOCIAL BENEFITS

1. The Project plans for citywide equity by providing the greatest job and housing opportunities in the M-2 Area to support a greater balance of land uses in this area of the City.
2. The Project includes up to 5,500 new residential units of which 4,500 would be in the M-2 Area, which represent significant new housing opportunities and include built in incentives for affordable housing.
3. The Project would result in reduced environmental justice inequities by facilitating and promoting the abatement of incompatible land uses and providing an equitable distribution of public amenities.

4. The Project would encourage mixed-use development in the M-2 Area to help improve walkability and quality of life for Menlo Park residents and the region by providing the opportunity for a better jobs/housing balance.
5. The Project provides opportunities for increased building heights and makes additional building height and residential density increases contingent on future development projects in Menlo Park providing the City with community benefits through corporate contributions.
6. The Project plans for M-2 Area residents to receive community benefits through corporate contributions as a result of the live/work/play environment envisioned.
7. The Project maintains investment backed expectations for the community at large.
8. The Project includes goals, policies, and programs that encourage social (and health) benefits associated with improved multi-modal transportation enhancements.

## XII. ADOPTION OF THE MMRP

The City Council hereby adopts the mitigation measures set forth for the Project in the Final EIR and the MMRP attached hereto as Exhibit A and incorporated herein by this reference.

## VI. SEVERABILITY

If any term, provision, or portion of these findings or the application of these findings to a particular situation is held by a court to be invalid, void or unenforceable, the remaining provisions of these findings, or their application to other actions related to the Project, shall continue in full force and effect unless amended or modified by the City.

I, Pamela Aguilar, City Clerk of Menlo Park, do hereby certify that the above and foregoing Council Resolution was duly and regularly passed and adopted at a meeting by said Council on the 6th day of December, 2016, by the following votes:

AYES: Carlton, Keith, Ohtaki

NOES: None

ABSENT: Cline, Mueller

ABSTAIN: None

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Official Seal of said City on this 6th day of December, 2016.

__________________
Pamela Aguilar, CMC
City Clerk

Letter I23

**Perata, Kyle T**

| | |
|---|---|
| **From:** | Carole Hyde <carole.hyde@paloaltohumane.org> |
| **Sent:** | Monday, May 23, 2022 11:16 AM |
| **To:** | Perata, Kyle T |
| **Subject:** | Willow Village Draft EIR Comments |
| **Attachments:** | ATT00001.htm; Feral cat management comments on EIR.docx |

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Dear Kyle,

I would like to comment on the provision that deals with feral cat management. (My comments are also included as an attachment.)

I'm a founding member of the Stanford Cat Network and helped negotiate an agreement with Stanford University on managing feral cats on the university campus. I'm on staff at Palo Alto Humane Society, where we operate a major spay/neuter support program for pets and feral cats.

I23-1 1. I suggest that the agency receiving trapped cats should be identified specifically as Peninsula Humane Society (instead of the string of unspecified agencies and groups), thereby to avoid confusion on the disposition of trapped cats; and that

I23-2 2. Peninsula Humane Society should be required to notify Palo Alto Humane Society of cats trapped in the area and brought to its facility for possible re-claim.

These provisions above will minimize the chances of accidental euthanasia of a pet or supervised cat. There are pets in the area (and there will be more pets after completion of the residential units), and there are cats under the management of the staff at the neighboring UPS facility as well as under the supervision of volunteers affiliated with Palo Alto Humane Society. Tame cats caught in traps are often indistinguishable from feral cats in their panic at being trapped.

I23-3 *I am proposing the following as a (slight) re-write:*

"Feral Cat Management Program. The Project sponsor shall implement a feral cat management program, similar to the program developed in conjunction with the Peninsula Humane Society and the Society for the Prevention of Cruelty to Animals for the East Campus in 2013 *and with the Stanford Cat Network/Stanford University in 1989*. For one week every three months (i.e., each quarter), three live trap cages, designed to trap cats, shall be placed around the perimeter of the main Project Site in locations where feral cats could prey upon native wildlife species.

Each trap cage shall be monitored *daily* and maintained on a daily basis during the week when traps have been set to determine whether a feral cat has been caught and whether the trap has inadvertently captured a non-target species. If a feral cat is caught, a representative from the trapping company shall be dispatched to transport the trapped cat *on the same day to Peninsula Humane Society*. If an animal other than a feral cat is caught in one of the traps, it shall be released immediately at the trap location."

Thank you, Kyle. I am available for discussion if that is helpful to you. I'm a Menlo Park resident (675 Roble Avenue).

Carole (650-504-5898)

PALO ALTO HUMANE SOCIETY

Find us on Facebook

I23-4 From Carole Hyde: I would like to add to the provision that deals with feral cat management.

I'm a founding member of the Stanford Cat Network and negotiated an agreement with Stanford University on managing feral cats on the university campus.

1. I suggest that the agency receiving trapped cats should be identified specifically as Peninsula Humane Society (instead of the string of unspecified agencies and groups), thereby to avoid confusion on the disposition of trapped cats; and that

2. Peninsula Humane Society should be required to notify Palo Alto Humane Society of cats trapped in the area and brought to its facility for possible re-claim.

   These provisions will minimize the chances of accidental euthanasia of a pet or supervised cat. There are pets in the area (and there will be more pets after completion of the residential units), and there are cats under the management of the staff at the neighboring UPS facility as well as under the supervision of volunteers affiliated with Palo Alto Humane Society. Tame cats caught in traps are often indistinguishable from feral cats in their panic at being trapped.

*Suggested re-write:*

Feral Cat Management Program. The Project sponsor shall implement a feral cat management program, similar to the program developed in conjunction with the Peninsula Humane Society and the Society for the Prevention of Cruelty to Animals for the East Campus in 2013 and with the Stanford Cat Network/Stanford University in 1989. For one week every three months (i.e., each quarter), three live trap cages, designed to trap cats, shall be placed around the perimeter of the main Project Site in locations where feral cats could prey upon native wildlife species.

Each trap cage shall be monitored daily and maintained on a daily basis during the week when traps have been set to determine whether a feral cat has been caught and whether the trap has inadvertently captured a non-target species. If a feral cat is caught, a representative from the trapping company shall be dispatched to transport the trapped cat on the same day to Peninsula Humane Society. If an animal other than a feral cat is caught in one of the traps, it shall be released immediately at the trap location.

Letter I24

23 May 2022

RE: Willow Village Master Plan Project EIR

TO: Kyle Perata

FROM: Pam D Jones, Menlo Park resident

Here are my comments regarding Willow Village EIR:

I24-1
1. The Air Quality District is initiating an update to its current California Environment Quality Act Guidelines. *"There have been substantive changes to the data and assumptions underlying the analytical methodologies, thresholds, and mitigation strategies since the last update of the CEQA Guidelines in June 2010 (revised May 2017)."*

I24-2
2. There is has been no consistent monitoring or requirement to monitor air quality within the adjacent residential neighborhood of Belle Haven Menlo Park. Air quality monitoring be done on Willow Road and Hamilton Avenue MidPenisula School, Costano School, Willow Road and Ivy Drive

I24-3
3. Failure to ensure an environmental justice approach as outlined by the United States Environmental Protection Agency. Although this project is under the November 30, 2016 laws, SB 1000 was effective January 1, 2017.

I24-4
4. No publicly available count of the total number of Facebook and contract employees on their current fifteen (15) campuses in the Bayside area. Estimates run between 12,000 and 18,000 employees occupying over 3 million square feet of owned or leased property.

I24-5
5. No publicly available of the number of people who will be working in the 1.25 million square feet of office space. This number should be added to the probable 4,000 residents who will be living in the 1,730 housing units. The total number of employees and estimate residents must be used for the following:
    1. Traffic
    2. Air quality

I24-6
6. Failure to fully implement and assess current traffic congestion solutions for residents within District 1.

I24-7
7. Failure to conduct a current housing displacement study that includes property ownership and list of LLCs.

I24-8
8. Failure to conduct a current housing study that identifies number of apartments and homes unoccupied, reserved for Airbnb, reserved for corporations, or otherwise unavailable to the public.

I24-9
9. Failure to address remedy for displacement of neighboring residents. The companies used to prepare the reports for development in the M2 area have consistently minimized the effect for the past ten year.

I24-10
10. Failure to provide amenities other than what is part of the live/work/play as outlined in the General Plan. A town square and shopping district, dog park, elevated park, and other recreational areas are all part of the requirements to create a live/work/play "village."

Letter I25

**Perata, Kyle T**

**From:** victoria robledo <vbetyavr@gmail.com>
**Sent:** Monday, May 23, 2022 3:08 PM
**To:** Perata, Kyle T
**Subject:** Willow Village EIR Impact

**CAUTION: This email originated from outside of the organization. Unless you recognize the sender's email address and know the content is safe, DO NOT click links, open attachments or reply.**

Good afternoon Kyle,

I25-1 As a resident of Belle Haven I would like to endorse and highly support the letter sent to you by Lynne Bramlett. As a resident, I have first hand experienced the impact currently of traffic, poor air quality, noise pollution and constant traffic as a result of these 18 wheeler trucks driving on Willow and Bayfront road.

I25-2 One of my greatest concerns is the upcoming project of many projects that require tearing down older buildings and the possibility of lead and asbestos being released into the air. I'm also very concerned about the impact of our marsh lands and our native birds and animal habitats.

Willows Village EIR Specific Questions

I25-3 1. What new and more stringent requirements exist for measuring the impacts of traffic, such as including reverse commutes and average daily traffic? How will these be reflected in the Willows Village EIR?

I25-4 2. The number of birds in the air has also drastically declined as noted in a recent article in Science and also local newspapers. I've heard from avid birdwatchers that there are fewer total birds and types of birds in Menlo Park's Bedwell Bayfront Park than the amount seen in the nearby Palo Alto Baylands. What is the impact of development on birdlife in Menlo Park's Bayfront? What will help to increase birdlife in the Menlo Park's Bayfront? How specifically will Willows Village impact birdlife?

I25-5 3. Fewer birds will also impact beneficial insects, flower pollination and other aspects of nature. What is the overall impact of development in District 1 on broader aspects of nature that also impact aesthetics?

I25-6 4. What will be the impact to the current occupants of the buildings that Facebook proposes to demolish? Where will these businesses re-locate to? What will be the impact to their clientele? Where will these non-profits and local governmental services go?

I25-7 5. What will be the impact of Willows Village to Menlo Park's goals of combatting global Climate Change as detailed in Council Resolution No. 6493?

I25-8 6. What is the decision-making process currently being used for deciding the public amenities such as the proposed Community Facility and Public Park? How is the process consistent, or not, with the ConnectMenlo Program-level EIR promised benefit of delivering environmental justice to District 1?

I25-9 7. What retail is being planned for the area? Specifically, what grocery store is being considered? What impact will a new grocery store have on the two existing grocery stores in District 1? What restaurants are being considered? What will be the impact of these restaurants on the existing restaurants in District 1?

3

I25-10 8. What retail is being proposed, if any? How will Facebook help to ensure that this retail is successful?

I2511 9. What is the dollar value put on the proposed 10,000 community space? What is currently being discussed between Facebook and City Staff for this particular property? Please include all possibilities. Please also include anything that has been explicitly ruled out.

I25-12 10. For the community space, instead of setting aside land in Willows Village for this purpose, could more housing be added and instead the dollar amount set aside for District 1 residents to decide how and where it will be spent? If not, why not? If yes, what will be the process to ensure that the District 1 community makes the decisions?

I25-13 11. Where will trees be planted in District 1 to help provide a tree canopy to mitigate the overall impacts of development, and the additional impacts of Willows Village?

I25-14 12. Into which landfills will the parts from the demolished buildings go? What will be the impact to these landfills? What efforts will be made to reuse parts of the demolished buildings?

I25-15 13. Willows Village is proposed for a flood zone expected to be "under water" in perhaps as soon as 2060 due to global climate change. What are the justifications for building this project in a known flood zone? If built, when the flood occurs, what will be the plans to protect life and property?

I25-16 14. The draft Willows Village master plan includes the evaluation of constructing an underground water reservoir beneath the proposed park/sports field on Willow Road. How will this water reservoir be protected should a major flood occur?

I25-17 15. If the zoning map is changed, to accommodate Willows Village proposed site connections to the surrounding roadway network, what additional development might this trigger by property owners nearby? In other words, will adjacent property owners also be allowed to develop their properties into office complexes?

Question Pertaining to Regional, cumulative impacts

I25-18 1) What is the current overall jobs/housing imbalance in Menlo Park, and in Santa Clara and San Mateo Counties? If all currently proposed regional development gets approved, how will this worsen the jobs/housing imbalance? What are the plans to increase housing, especially affordable housing?

2) What regional efforts exist, if any, to halt office development projects that

3) What is the cumulative environmental impact of the region's current and likely jobs/housing imbalance? This would include: noise, pollution, species decline, including birds.

CITY OF MENLO PARK

PLANNING COMMISSION

CERTIFIED COPY

In re:

Meeting Agenda Item F1

_______________________________/

ENVIRONMENTAL IMPACT REPORT

PUBLIC HEARING

REPORTER'S TRANSCRIPT OF PROCEEDINGS

Monday, April 25, 2022

ATTENDEES

THE PLANNING COMMISSION:

Michael C. Doran - Chairperson
Henry Riggs
Michelle Tate
Chris DeCardy - Vice Chairperson
Andrew Barnes
Cynthia Harris
Camille Gonzalez Kennedy

SUPPORT STAFF:

Matt Pruter, Associate Planner
Kyle Perata, Acting Planning Manager

PROJECT PRESENTERS:

Claudia Garcia, ICF
Ollie Zhou, Hexagon
Heidi Mekkelson, ICF
Paul Nieto, Signature Development Group

---o0o---

BE IT REMEMBERED that, pursuant to Notice of the Meeting, and on April 25, 2022, via ZOOM Videoconference, before me, AMBER ABREU-PEIXOTO, CSR 13546, State of California, there commenced a Planning Commission meeting under the provisions of the City of Menlo Park.

---o0o---

MEETING AGENDA

Presentation by Mr. Perata

Project Presenters:

Ms. Garcia

Mr. Nieto

Public Comment

Kelli Fallon
Amy Buckmaster
Romain Taniere
Brittani Baxter
Ali Sapirman
Vince Rocha
Pam Jones
Isabella Chu
Karen Eshoo
Ken Chan
Adina Levin
Harry Bims
Colin
Fran Dehn
Karen Grove
Karen Rosenberg
Rick Solis
Sergio Ramirez

Commission Questions and Comments

--o0o--

P R O C E E D I N G S

CHAIR DORAN: We'll move next to the public hearing portion of tonight's meeting. Item F1 and G1 associated, with a single staff report.

The description -- the title of -- yeah -- the item is lengthy. And I've been informed by our -- by our City Attorney that I don't have to read the entire title verbatim. Given that it's over a page, that's good news. So I have an abbreviated version, which I'm going to read to introduce item F1, and then we'll go to City staff for a combined report.

Give me one moment. So item F1 is a Draft EIR Public Hearing to the Planning Commission to receive and provide comments on the analysis of the Draft Environmental Impact Report for the proposed Willow Village Master Plan Project. The proposed project is located at 1350-1390 Willow Road, 925 to 1098 Hamilton Avenue, 1005 to 1275 Hamilton Court. And the Applicant is Signature Development Group and the Peninsula Innovation Partners, LLC, on behalf of Meta Platforms, Inc.

The proposed project consists of up to 1,730 dwelling units, up to 200,000 square feet of retail, 193 hotel rooms, publicly-accessible open spaces and parks, and an approximately 1,600,000 square feet office campus for Meta, formerly Facebook, up to 1.25 million square feet of office space, with the balance, EG space, for accessory uses, including meeting and collaboration space, totaling 350,000 square feet, if the office square footage is maximized, in multiple buildings.

This portion of the meeting is a public hearing in the Draft EIR. And comments during this item should be focused on the Draft EIR.

Following the close of the Draft EIR public hearing, commission will hold a study session on the proposed project. More details on the proposed project and the Draft EIR are in the Agenda title and the Project Staff Report.

Mr. Perata, you have a staff report on -- for both F1 and G1. And I believe you have a proposed Agenda for us as well.

MR. PERATA: Yes. Thank you, Chair Doran.

Members of the commission, staff tonight has a very brief presentation. So we'll start that in a moment. Excuse me. And let me just get this up.

In the meantime, one quick update for the commission. Since the publication of the staff report, we have received approximately 14 additional items of correspondence. Those have all now been attached to the Agenda or previously were forwarded to the commissioners.

And there we go.

So with that, I'll move into the presentation.

CHAIR DORAN: Mr. Perata, do you want to share with us your proposal for the order?

MR. PERATA: One -- one step ahead of me. Here we go.

CHAIR DORAN: Sorry.

MR. PERATA: Thank you, Chair.

So for tonight's meeting, staff does have a recommended format. We do have two items on the Agenda tonight for the Willow Village project. It's a Draft EIR public hearing and a study session. And so we'll take them as two items. There is one comprehensive staff report that does address both components; the Draft EIR, as well as the study session on the project more generally.

For the first part of the item tonight, Draft EIR public hearing will start after this brief overview by staff, a presentation by the Applicant on the master plan. So this is going to be a little unique and different than other projects that the commission has seen recently with EIRs and study sessions.

We're actually going to have two Applicant presentations tonight -- or that's our recommendation -- the first being an overview of the Master Plan more generally. And then, during the study session, allowing the Applicant team to present again on their Phase 1 Architectural Control Plan. So a little more detail on the buildings that would follow, after the entitlements with the Architectural Control Application. And I'll explain a little bit more about that in my presentation here.

Following the first presentation by the Applicant, we do have our EIR consultant, ICF, International, here tonight, to present on the CEQA, broadly, as well as the Draft EIR and the findings of the Draft EIR.

Following that, we can move into the public comments, and then commissioner questions and comments on the Draft EIR. We would recommend -- unless they're clarifying questions -- to hold them until after all public comment, since the questions can often lead to discussion and comments as well.

So then, following the close of the public hearing, we would move into the study session. Once again, as I mentioned earlier, an opportunity for the Applicant team to present more details on their Phase 1 Architectural Control Plans, and then taking public comment, and then -- as well as commissioner questions.

So with that, I'll just do a really brief introduction. The Applicant's presentation will go into more detail on the project components and design and the master plan.

But just to get a little bit of context here, the project -- the project itself does include two sites, roughly. There's the main project site, which is kind of the main master plan, the 1350 to 1390 Willow Road, and the Hamilton Avenue and Hamilton Court parcels. That's the former Menlo Science and Technology Park.

To the west of Willow Road, there are two parcels. Hamilton Avenue -- or two sites. Hamilton Avenue Parcels North. There's two legal parcels within that site, and then Hamilton Avenue Parcel South. Those would be modified, as part of the project, through the realignment of Hamilton Avenue for the access to the site. So that would include, then, a reconstruction in a future phase of the Chevron station on Hamilton Avenue Parcels South, and then a potential for an addition of a couple thousand square feet -- about 6,000 -- 6,700 square feet of retail on Hamilton Avenue Parcel North, as well as some modifications for the elevated park's access point across Willow Road.

And the Applicant will talk more about the overall design of the project, but just to set the context here.

And then one more slide of the existing site plan and main project site shown in red, with the existing conditions. To the west of Willow Road, in the black hatched, is Hamilton Avenue Parcel North and South; the existing Chevron station, existing Belle Haven neighborhood shopping center.

And then, really briefly, here's the proposed site plan. Just for the commission's benefit, I won't re-read the land uses that are proposed, since the Chair did that during the introduction. But as part of the master plan that you see here, the entitlements that are being requested include the environmental review in this form and EIR, and Environmental Impact Report, certification of the Final EIR, as well as a General Plan circulation element and zoning map amendments to modify on-site circulation for the public rights of ways, and paseos through the site, a rezoning to allow for an X-zoning district, combining district, which would allow for a Conditional Development Permit to develop the site using the Master Plan-provisioned zoning ordinance, and then -- as well as a development agreement, a vesting tentative map, and then future architecture control reviews for individual buildings, as well as associated heritage tree removal permits. And then, the entitlements do include a below market rate housing agreement.

And so tonight's meeting purpose -- as I mentioned early on, we have two public meetings. The Environmental Impact Report public hearing. This is an opportunity to comment on the Draft EIR for members of the public and the Planning Commission. Following that, there will be the study session; opportunity, again, for clarifying questions on the Master Plan, the Architectural Control packages associated with Phase 1, among other things, the below market rate housing proposal, and then the zoning ordinance modifications. These are discussed in more detail in the report, as well as the overall site layout and design.

And then the Applicant team's presentation will focus more on the Master Plan design, as well as the architectural control packages for Phase 1.

No actions will be taken tonight. We are in the public comment period on the Draft EIR. That ends on May 23rd, at 5:00 p.m. It's Monday, May 23rd.

Following the close of the EIR public comment period, staff and the City's consultant will review and respond to all substantial comments in what's called the "Final EIR," or Response to Comments document.

But, ultimately, the Planning Commission, in its capacity for this project, is a recommending body to the City Council for most land use entitlements and the certification of the Final EIR. The Planning Commission will be the acting body on the Architecture Control Permits. So through the Conditional Development Permit, it would set up the overall development parameters, and then individual buildings would come through for future architectural controls. And the Planning Commission will be charged for reviewing those designs.

And so that concludes my presentation. I'm going to turn it over to the Applicant team, unless there are any clarifying questions of the process or meeting format for staff.

CHAIR DORAN: I think your format, your order, makes a lot of sense. And I'm happy with it.

I did want to ask members of the public, if they would like to comment on this project, to raise their hands now, so we get an idea of how many people we have. I'm expecting -- based on the e-mail -- the volume of e-mails we received, I expect to have a great number of people wanting to talk. And I want to make sure that we're fair to everyone, and give everyone a chance to talk. But we also have to budget our time.

So during the Applicant's presentation, if members of the public, who wish to speak during the public comment period, could raise their hands, so we can get a count, that would be greatly appreciated.

And with that, I'll turn it over to the Applicant.

MR. NIETO: Good evening. This is Paul Nieto. Hopefully you can hear me.

CHAIR DORAN: Yes, we can hear you.

MR. NEITO: Perfect. Thank you. I'm going to see if I can get this to full-screen mode. Let's see. There we go. Try it here as well. This would be a lot easier for all of us to see. Perfect. Let's go back up.

Well, there we go. Thank you, Planning Commissioners and members of the -- of the community, City staff. My name is Paul Nieto. I'm with Signature Development Group. And we're going to go through a presentation that the commissioners and some members of the audience have seen much of before.

But for those who haven't, we're going to present this because it was what the integral part of the Environmental Impact Report has dealt with. So if you can see the screen, here's the existing site, and it is -- I guess, if I click on it, it advances. Got ya.

The existing site is a 1960s, 1970s concrete tilt-up site. There's really only one access point, which is the existing Hamilton Avenue, of no real connection to the neighbors to the -- to the west, or even neighbors to the east. There's no real access around. So it's somewhat limited. From the buildings that are on the site right now, you see that they are concrete tilt-up. They're not sustainable. They're not -- they're not renewable. They're not welcoming. There's nothing that creates a sense of community or feel in the existing community.

So we just wanted to step back and take a look at the timeline of how we got here as a city and as a development sponsor. ConnectMenlo started in 2014, and brought a couple of years of hearings. And then Facebook, in 2017, got some community feedback and made a proposal, and got a lot of feedback from the community. They felt it was -- it needed some improvements, in terms of feeling -- people felt that it might be a bit walled off.

So we came on with Meta in 2018; got more feedback at a number of community meetings and revised the village, the Willow Village plan. And we went through a Planning Commission's scoping hearings, as well as City Council, and we got more community feedback on our plan. So we revised the plan a little, reduced some office, and continued to get feedback throughout this and had more community meetings. We had one-on-one meetings. Some people don't feel comfortable in the large meetings, so we had a number of one-on-one and small group meetings with our neighbors. Particularly -- I mean, throughout the city, but in particular, in the Belle Haven area.

And then, in 2022, we continued our community feedback, and we gave this Planning Commission a presentation in January. We revised our plan a little bit again, and here we are, having released the EIR and having this session and, hopefully, public hearings.

So with that, I just wanted to recap the feedback we got through all of those meetings, and we grouped them. And, obviously, traffic was a big concern. So we have incorporated some things into the plan to try to distribute traffic and reduce that.

People always said, "We wanted a connection to Belle Haven. We need to feel like this isn't separate from us. How can you do that? Can you include the jobs and housing balance?" And in particular, we initially started off with 1,500 units. We've increased that to 1,730 units, which has also increased our affordable housing. We originally proposed to the do a lot of the services in Phase 3, but the community said, "We'd like you to deliver those things faster. And can you provide us more open space?"

So in response to that, we've reduced the office capacity by 30 percent, thereby reducing what we had originally proposed of our traffic. By increasing the housing, we get a better jobs-housing balance, based on the number of employees, and increase the housing.

We've created a couple direct connections to Belle Haven, which we think is really neat. And we're looking forward to that. And hopefully they will enjoy this community because we're trying to do something that's never been done before. We've increased the affordable housing. We've once again, as I mentioned before, we're accelerated the grocery store to Phase 1.

Getting more open space, we took a previously-planned parking garage, and we're putting that underground so that we can have more open space, and in particular, improve the town square, and we've added more open space in the form of the elevated park and some other trails and gardens.

This is kind of how we started thinking about the project, is how can we do something that's really never been done before? Most tech campuses have been almost military bases to themselves. And, frankly, the Menlo Science and Technology Park was built along those same lines. So how can we meld a tech campus with some really cool mixed use and residential? And we came up with the idea of centering it around a main street and a town square. And how can, then, we add other connections to it?

So just on a big scale, we said, "How can we get more access into Willow Road, but also diffuse traffic up to the east, the south of 80, and up here?" And so that's how the project started to form in our minds and with our design team.

We then -- I'm trying to advance this. There we go. So we came up with the plan like this that has -- divides this into some key areas. And I don't know why the screen -- there we go.

Let me back up. One more up. There we go.

So we've got the office campus. One of the ways that Meta reduced the amount of people on campus is creating a meeting and collaboration space. And this is -- because this site sits in the middle of a number of Meta facilities. This is a way that they can gather their employees together, without going on surface streets. We're planning a tunnel that will handle bikes, pedestrians, and their inner-company trams that are currently on the surface. So that can be useful and yet not add any more traffic to the site.

I don't know why the town square is not in a highlighted color, but it is a really key element, as is the main street and this elevated park that we'll be showing you later. We're mixing a hotel use, and a residential use, and parks, in a way that hasn't been tried before. And we are hoping that you will see that this is something that can be done in a very positive way to not have a silo of tech people in the community, but be a place where we can gather -- we can all gather together.

So this is that same plan, colored out. I'm getting a delay on my advancing. So it's jumping two at a time at times.

The one other thing I wanted to point out, I pointed out in our last meeting, is in particular, the edge along Willow Road that we spent a lot of attention to. Right now, I showed you just the single access point that was up here with Hamilton. We're proposing, if we realign Hamilton and bring it right into what is our main street and our town square, to draw in our neighbors. We've created an elevated park, much like the High Line in New York City. Also another way to -- and some really cool ways to get up to that park. You can ride your bike up there. You can walk. You could stroll. It will be heavily landscaped, and there will be many opportunities for people to enjoy that park and various community things.

Along Willow Road -- Willow Road is, at times, a little bit unfriendly because of the traffic. So we wanted to really provide a softer arrival experience for those coming this way from Belle Haven. We have -- we think -- a good arrival experience from our neighbors who are going to come across on Hamilton.

But coming more, we want to show off a really nice park. We've taken pains to really lower the architecture along Willow and give a variety of building massing, so that it feels warm, welcoming, at a human scale that is neighborly and isn't just an abrupt change.

Right now, across the street, Mid-Pen is doing four-story buildings. And so we think this is going -- our design is very complimentary to that.

And then, of course, we've got a combination of office -- on the east side, but along main street of the offices is retail that will match the retail along main street and in our town square to provide a real continuity of people enjoying food and beverage, shopping, banking. Whatever they need to do. A grocery right as you enter the community is a hallmark for it, and I'll describe that in a little bit more detail. And the whole thing is to have a vibrant, pedestrian, welcoming -- you know, biking as well -- environment.

If you notice, we have a slightly different color of road along main street. That will be pavers. We want to keep that very pedestrian friendly, slow down any cars that are in there, so that it is -- truly feels like a village, at that level of scale and pace.

So what I'm going to do is take you a little bit on a walking tour, where we talk about place making. Part of that is how people access the site, but also how they will experience it, and how all of us, hopefully, will experience it. And these are some buildings that you will actually get in more detail a little bit later in the evening, but take you -- kind of on the seat scale of it, a little walking tour.

Starting off with our market. This is coming along the realigned Hamilton and walking up into -- into the Willow Village, towards the town square.

And just a couple of things to note is our color scheme, the orientation of the buildings, the level of the ground floor retail. And the glass, and the exposure there, is to be designed to not be -- to be welcoming, to draw people in, heavily landscaped. And one thing you'll notice, if you can see the scale here of people on the street, is that we've got to raise this site about five feet to plan for future sea level rise. That's a City ordinance. And so we -- that's why you'll see there's a gradual incline as people will go up main street.

So our main grocery entrance for pedestrians will be up here. We have an entrance off of Willow Road, from a garage, and another one from the other side. So you can drive up Hamilton and turn and get into the supermarket parking, or you could come off Willow or walk or ride your bike -- however. But we wanted this to be a real arrival experience that was welcoming and have our neighbors feel cool and relaxed, as they're coming up the street to do their shopping or go to work, or however they're enjoying it. This is the idea of -- when we say, "a full service grocer," it's vegetables. It's really well lit. We think about that whole experience. We want that to feel welcoming and stimulating, actually. Inspirational, at times.

Continuing our walk up the street, this is the corner that I showed you before from a distance. Our next block is some retail. And Meta will likely have a bank here, some food and beverage, some entertainment.

To the left is the hotel site. And then on the left, this building is a retail building in the town square that is, if you will, kitty-corner to the grocery store. And directly across here, providing more retail experience, because we're going to take a stroll into the town square right now.

So this is at the corner from where -- you're basically looking from the grocery store to the northeast. And the hotel is on our left, a small retail pavilion with some food and beverage, perhaps a flower store and the like. This is a single-story building, but with a little added architecture and plantings to continue to create that green vibrancy. And you can see the landscaping. And then the elevated park helps frame the north part of the town square, with the Meta meeting and collaboration space in the background.

We're next going to go inside this retail building and see how the town square looks as -- oops. I went, once again, too far. There it is.

And so this is -- there it is. So imagine you're having a sandwich, a coffee, or something looking out from that pavilion to the town square. There'll be a retail that you'll see in the next slide. On the right, the elevated park. Key element in the elevated park that will be able to be shown in a little bit more detail in the next slide is how we're getting people up to it in a variety of ways. But there's staircases and a high-speed elevator that can handle bikes and a number of people. And that's one last (inaudible). There we go.

And so this is looking -- you're looking to the east, and the elevated park is just to the left. And this is one of those high-speed elevators, as well as the really wide staircase to get people up.

Underneath the town square is parking. So people can easily come off of Willow or into one of our other street's parking. There's an elevator and stairs right here in that little retail pavilion or right next to the retail pavilion. There's this -- and this is -- by the way -- so we have retail on the front. The back are Meta office buildings. But the idea is that the general public will not feel excluded, or this is to be a welcoming experience, where all people mingle and gather and do what they do every day.

We're going to look back across this amazing town square to the hotel and see how it frames the town square, also providing another access point to the elevated park, with one of the elevators with that transparent glass that -- we feel good. And then the architecture for the trellis and the flowers and the plantings continues to the porte-cochere for the hotel to give it a pretty cool, lush continuity that, hopefully, makes people feel good.

Then we're going to go up to the elevated park and just give you -- give everyone an idea of -- at least right at this section, what it will likely feel like. So lots of trees, lots of lush planting, but a bike path. There's walking paths and a number of what I call "outdoor rooms." And we'll see that on main street as well, where people can gather and feel comfortable, and you can get larger groups or small groups or just individuals who want to -- who want to grab a coffee and read a book or, most likely, text on their phones.

We're going to head back to main street right now, and then walk down and experience that. So going back to this diagram where you see our food and beverage, our entertainment. The bank will likely be in this block. And here's what a plaza -- okay. Oh. Here is the offerings that -- we're just trying to get people to imagine the kind of offerings that we may have in there, and the feel and the vibe that we're looking for.

And here's the plaza and how it could look. We're creating in a number of spots -- really wide sidewalks, outdoor seating. Outdoor dining has really become a premium. We've got such great weather in Menlo Park that, throughout the year, we expect a number of people will want to enjoy that.

Next slide is really the other side of this building and plaza that you can see across main street. On the right-hand side, this is retail that lines the office buildings which we're going to go to next, but this was -- on the left-hand side is the other side of this block and its large plaza and wide sidewalks. This main street is particularly wide. We've kept the actual car lanes limited to two lanes, but we have a full dedicated bike path, as well as extra-wide sidewalks on both sides of the street. It's pavered, if you notice that -- so we want to keep cars -- we say, at Signature, a lot, "How can we make it so that cars feel uncomfortable here?" -- to keep the pedestrian feel to be the primary and also bikes, because we have a bike path there, but the primary mode of how we want people to experience this.  And you can see the proximity with the town square in the background.

Next, we're going to move to more of a panoramic view of what the office campus looks like from that retail plaza I just showed you out in front of that one parcel.

So this is one of the main entrances to the Meta office campus.  You'll notice the buildings are CLT timber.  That gives it a real nice feel.  But I also wanted to point out, on the left is the retail of the town square.  This is town square retail right here.  Main street retail that people will continue to enjoy and, yet, it's beautifully -- at least -- I'm a little biased -- but beautifully integrated into a welcoming arrival experience with these CLT timber buildings.  And "CLT" stands for cross-laminated timber, and it allows for a really terrific -- we think a great Northern California feel of the campus.  The architects, in the study session, will be going into much better detail than I can show you here.

Next, we're just going to continue to go down main street to show you the different orientations of the buildings, the emphasis on, you know, some outdoor retail and dining, but also little rooms.  Once again, as I talked about on the elevated park -- little gathering spots for people to, you know, hang out.

There's going to be folks riding their bikes and just different experiences of what we're trying to -- opportunities for experiences, I should say, that we're trying to create in this human scale, and then moving further south, down main street, to the other office buildings. These two have to be connected via a sky bridge as well, for that feel.

We're going to turn a corner now and get into more of the residential areas. Well, first of all, I should -- I take that back. I'm going to tell you about sustainability. It -- the cool thing about the CLT stuff and, actually, the entire campus, all the buildings will be LEED Gold. We're 100 percent electric everywhere, except for an occasional -- not a Meta restaurant. But occasionally we're planning that if there's a good, vibrant restaurant that needs something besides all-electric cooking -- whether it's gas, whether it's some kind of pizza ovens, or things like that, that the City's reach code allows the flexibility for that. But mostly it's all electric. There will be a significant amount of photovoltaics for energy generation, recycled water. It will be one of the first recycled office campus and residential campuses. And we're working with West Bay to make that happen.

And then, of course, throughout it all, we've got a real program for sustainable building materials, recycling the concrete buildings and the roadways, and to reuse as much as possible, to be as green and ecologically sensitive as possible.

Just an example of going to CLT timber, the construction of the buildings will use much less carbon and, actually, the timber itself embodies carbon. So as you know, the trees take CO2 out of the air. And so we're proud of being able to do that.

Now, this is where we're going to go into the thinking that was behind our residential street overview. And I'm just going to give you -- reorient you to where I'm going to be talking about in our land plan.

So the residential is on the west side of the campus, in these buildings and around this community corner. So from there, we started to look at, okay. We've got a number of buildings. How should we think about connections to the office, to the parks, to the town square, and hotel? And can we create a different feel in these locations and highlight the good stuff about that and have good architecture to do that? And how did -- how will it feel at our street level?

So here's one of the ideas, on our center street of our design of the building, that had all that entertainment in it and the like.  It's on a street that's heavily residential, that we call "center street" right now in the plan to, in parts of it, step back the buildings.  We got rid of a lane of traffic in our thinking so that we can widen the sidewalks, add planting, and add stoops so that you had a real different feel in certain aspects of this development.  You'll know that you're on a residential street, versus the combination of a retail street.

Here's another side of that building as it comes to what we call our "west street."  So you have stoops transitioning to some higher densities to get to our jobs-housing balance.  There are parts that we needed to densify and do it in a way that still feels good on a human scale.

This is our senior building and its unique architecture that we like, with balconies and different form, as well as a really good ground floor experience for our residents that will give them a porte-co that will shelter them from the elements.

As you can see here -- and it's a real -- a real nice indoor/outdoor environment for the seniors.  There will not be any -- unlike the example I just showed for here, we want our seniors to feel safe and not have any ground floor residences here.  They're going to have a programming and activated spaces on the ground floor, and then they'll enjoy the upstairs.

On our next slide, this is just down the street, across from the community park, along park -- what we call "Park Boulevard," another street entrance that we're creating in this community, another vision and expression of some ground floor stoops, as well as some higher density, to create a good -- once again, a really friendly, warm, human scale, with greenery and landscaping and sidewalks that are usable.

The next slide is of -- another one of our residential buildings that abuts the community park and has slightly varied architecture.  It -- on the left-hand side, we have another row of what we call "stoops" along Park Street.  And there will also be ground floor residences on Park on the right here.  So once again, you can sort of feel that we're -- we want to create great experiences that don't always -- that don't all look alike and look like they may have shown up over time, even though we will likely be building these pretty quickly.

Lastly, I'm going to talk about another -- and I'm going to end with a little gushing of trails and parks.  This is our loop road.  That's one of the multiuse paths in the project.  And this is on the eastern edge and the northern edge of the project.

We also thought long and hard about -- and we really worked with our neighbors at Tarlton to design this to also be another thing that's a separate and distinct experience. So lushly landscaped, a little bit of a meandering trail, but safe enough to ride bikes and people to walk and really feel like you're not in an office campus. So that's the feel we're going for. And we want all members of the community to be able to enjoy this Monday through Sunday, every week.

Next is our community park. It is still evolving as a gathering spot. In our community meetings, we have -- we had a number of polls that were done, one of which was on the community park and the various activities and uses. And so this is a combination of those uses. People wanted areas where they could picnic, they could enjoy some special landscaping, walking trails, and the like. We'll have some -- a kids' play area and gathering pavilions, and things like that. This is still taking shape. This is not a fully-baked plan at all, but it's presented here as a depiction for us to continue to refine and get feedback from the community.

One thing also to point out here is you'll see a bike lane on this side. It's not shown on the -- for some reason, on the west side of Willow. But working with

CalTrans and the City of Menlo Park and us, we will be creating dedicated bike lanes that run on both sides of Willow that will ultimately lead to the Bayfront Parkway. We are creating a tunnel that will tie into -- right by the town square, that will tie into the tunnel that goes underneath the 84 right now, for bikes to go along that Bayfront bike lane.

And I will -- I am going to conclude with this last slide that you've seen of main street. But the highlight here, that I just wanted to talk about, is this bike path. It connects all the way -- there's a spot where the loop road and this will connect in the south part and will continue up around the town square and underneath the elevated park into that tunnel to take you up to the bayfront and go to Bedwell Park, or whoever -- wherever you want to go as you're biking. So bikes are a key part of the plan. Wide sidewalks. The human scale is what we've been trying to achieve in this multiple-use of office, hotel, town square, elevated park area to bring people together. And that's the extent of the presentation.

CHAIR DORAN: Thank you.

I think we have a presentation by the EIR consultant next.

MR. NIETO: Do I need to relinquish the control of this or can the City take...

UNIDENTIFIED SPEAKER:  No, you do not need to.

MR. NIETO:  Okay.  Great.  Well, thank you.

CHAIR DORAN:  Thank you.

MS. GARCIA:  I think I just need to be granted control.  Thank you.

Good evening, Chair Doran, members of the commission, and members of the public.  Thank you for joining us tonight to discuss the Willow Village Master Plan Project Environmental Impact Report.  My name is Claudia Garcia, and I'm a Senior Environmental Planner at ICF.  ICF was the lead consultant for the EIR for this project.

Also with us here tonight is Heidi.  She's the principal and Project Director for the project.  And we also have Ollie, from Hexagon, who is the lead transportation consultant.

Our presentation tonight will provide an overview of the project, describe the environmental review process, and identify next steps for the contents of the EIR.  And I think I clicked a little too fast, and now we're a slide ahead from what I am sharing with you today.  So forgive me for that.

At the end of the presentation, we'll also explain how to submit public comment on the contents of the EIR.

So as noted previously, the overall intent of tonight's meeting is to receive public comment on the contents of the EIR, Environmental Impact Report, specifically on the environmental impacts evaluated in the EIR, and the adequacy of the document, pursuant to the California Environmental Quality Act. As part of our presentation, we will provide a summary of the proposed project, conclusions in the EIR, and identify next steps.

So we just heard from the project Applicant, who provided great detail on the vision of the overall development. This project is just meant to provide a brief overview. As noted on the slide, the project would redevelop the 59-acre main project site to include housing, retail uses, office and accessory uses, a 193-room hotel, and 20 acres of open space, including 8 acres of publicly-accessible parks.

The project also proposes to redevelop Hamilton Avenue Parcels North and South, to realign Hamilton Avenue, reconstruct the existing Chevron gas station, and enable up to 6,700 square feet of retail uses. Offsite transportation and utility improvements are also proposed to service the project.

So for the environmental review process, as provided in the CEQA guidelines, an EIR, or Environmental

Impact Report, is an informational document that is intended to inform public agency decision makers, like the Planning Commission tonight, and the general public, of the significant and environmental effects of a project, identify possible ways to avoid or substantially lessen the significant effects, and describe reasonable alternatives to the project.

The overall purpose of the EIR is to provide detailed information about the environmental effects that could result from implementing the proposed project. CEQA is a public disclosure statute. It's also a way to examine and identify methods for mitigating any adverse impacts and consider -- as I mentioned, consider feasible alternatives.

Here on this slide -- apologies for the tiny print -- but it's the overall review process to date. So the Notice of Preparation, that's when -- the first document that's released to notify the public, "Hi. We're preparing an Environmental Impact Report. This is the project. These are the types of topics we're going to be evaluating. Do you have any comments? Should we include anything else?" And so that was out for a period of 30 days.

And the City also conducted a scoping meeting. And the overall purpose was to receive comments on the scope of the EIR; the content, the topics we should evaluate.

The Draft EIR was released for a public review for a period of 45 days, on April 8th. And as Kyle noted earlier, that 45-day period closes on Monday, May 23rd, at 5:00 p.m.

And today we are at the public hearing to receive comments on the contents of the EIR.

The next steps in the process will be -- are grayed out here because we're not there yet. And we'll discuss that on a later slide.

So the content of the Environmental Impact Report, as noted in Chapter 1 of the EIR and tonight's staff report, the project's location and development parameters are consistent with the ConnectMenlo General Plan update and was considered in the growth pattern evaluated in the ConnectMenlo EIR.

In accordance with CEQA, this EIR tiers from the ConnectMenlo EIR. What does that mean exactly? Well, where appropriate, our environmental analysis for this project relies on the evaluation, conclusions, and mitigation measures included in that ConnectMenlo EIR. However, given the scale of the project and the interest in the project, this EIR also includes project-level analysis, where appropriate, including disclosing --

including those adequately-addressed in the ConnectMenlo EIR.

So Consistent with the CEQA guidelines, this EIR provides a detailed project description, environmental setting, environmental impacts, including cumulative impacts, mitigation measures, and also incorporates the ConnectMenlo mitigation measures, where appropriate. It includes alternatives to the proposed project, and it also includes variants to the proposed project.

So what exactly is a variant, if it's not an alternative? Well, a variant is a slightly different version of the project that could occur based upon the action or inaction of an agency other than the City or property owners outside of the project. Because the variants could increase or reduce environmental impacts, the EIR analyzes those separately, at a project level.

So, for example, in order to construct the Willow Road tunnel, there will be outside agencies that would need to permit and allow for that construction other than the City. And so for those reasons, we included the No Willow Road Tunnel Variant of the project, which basically means that the tunnel would not be constructed, and the Meta trams would continue to use the public street network, Bayfront Expressway, and Willow Road access to the proposed campus district.

Another alternative we evaluated is the increased residential density alternative, which would increase the number of residential units by 200. So instead of 1,730 units, we would have 1,930 units.

The No Hamilton Avenue Realignment is exactly that. Instead of realigning the Hamilton parcels, the roadway would not be realigned. It would be -- it would remain as is, and the Master Plan would be adjusted so that it connects perfectly to the existing roadway as it is. And those parcels would not be redeveloped.

The On-Site Recycled Water Variant would provide recycled water to the main project site through on-site treatment of wastewater.

So here on your screen, we have a list of all the topics that were evaluated in the EIR. This is consistent of Appendix G of the CEQA guidelines. However, as shown here, we did not evaluate impacts related to agriculture and forestry resources, mineral resources, and wildfire. That's because those topics were scoped out as part of the scoping period.

And so we do briefly touch on those, but it was determined that these specific topics would not result in significant impacts due to the location of the project. And that information is included in the EIR.

Impacts and mitigation measures: As noted, the

Draft EIR identifies and classifies environmental impacts as "potentially significant, significant, less than significant," or "no impact."

For each impact identified as "potentially significant" or "significant," the EIR provides a mitigation measure or measures to reduce, eliminate, or avoid adverse impacts. If the mitigation measure would successfully reduce the impact to a less-than-significant level, it is stated in the EIR. However, if it cannot be reduced to a less-than-significant level, this impact is considered significant and unavoidable.

Really exciting stuff, I know. Super dry. Wall of text.

So let's get into the significant and unavoidable impacts identified in this EIR. Oh. And I skipped one. So I'm going to go back, if I can. There we go.

Impact Air Quality-1. The proposed project would conflict with or obstruct implementation of an applicable air quality plan. What does that mean? The ConnectMenlo EIR determined that emissions of criteria pollutants and precursors associated with operation of new developments would generate a substantial net increase in emissions.

Here, the proposed project determined that operations would disrupt or hinder implementation of the Bay Area Air Quality Management District's 2017 Clean Air

Plan.  Specifically, operation of the project would exceed the threshold for reactive organic gases.  And that's really the threshold that we're exceeding.

And so even though the project would implement Mitigation Measure Air Quality 1.1, by using diesel-powered equipment during construction, to control construction-related emissions and also limit the types of architectural coatings, the -- so AQ-1.2 Mitigation Measure would require the use of super compliant architectural coatings during operation at all buildings. However, the reactive organic gas emissions primarily are coming -- are resulting from consumer products, which is difficult to control.  So even though the project would require these special, super-compliant coatings, that threshold would still be exceeded.

For noise impacts, Impact 1a is related to construction noise.  So as noted earlier, the Willow Road tunnel is a component of the project and is slightly offsite and would require nighttime construction.  And that would result in also excessive vibrations, due to pile-driving needed in order to construct the tunnel.

So there's a series of mitigation measures, as noted on the screen, that would be implemented, including a modified mitigation measure from the ConnectMenlo EIR. Those impacts would still exceed the municipal code because, specific to noise, the municipal code states that construction impacts should occur during the day. However, because of the nature of the tunnel and because roadways would need to be shut down, that type of construction needs to occur at night.

So Alternatives Considered: The EIR also evaluated three alternatives, in addition to the required No Project Alternative. Alternative 1 is the No Willow Road Tunnel Alternative. Just as it states, the Willow Road Tunnel would not be constructed as part of this alternative. If this alternative were to be selected, the total emissions from construction would decrease, due to the overall decreasing construction. And so those air quality and noise impacts would be reduced.

Similarly, for the Base Level Intensity Alternative, the proposed -- it would be similar to the proposed project, but developed to be consistent with the base-level development standard, as noted in the RMU and office zoning district. So the Base Level Alternative would reduce the amount of office and non-office and retail development that would be included as part of the project. And the residential units would actually be reduced to 519, instead of 1,730. This alternative would also reduce impacts related to air quality and noise because of the reduced development pattern.

For the Reduced Intensity Alternative, that would also reduce the amount of office, slightly, to 1,225,000, compared to 1.6 million. And it would reduce the non-office commercial to 87 -- a little over 87,000, compared to 200,000, for the proposed project. And the units would only be reduced to 1,530. So a 200 unit difference. And that would also reduce the overall impacts -- significant impacts related to air quality and noise because the overall development pattern would be reduced.

And as noted in the alternative section of the EIR, the reduced intensity -- the Base Level Intensity Alternative was found to be the environmentally-superior alternative.

So back to our environmental review process chart, if I don't skip it. Our next steps in the process are to receive public comment tonight and through May 23rd, and prepare the Final EIR. So that requires us to respond to all comments received on the contents of the EIR. And following that, that document will be provided to you, the decision makers, in order to take action on the project and separately on the EIR.

So How to Comment on the Draft EIR: Well, there are multiple ways. You can provide comment tonight, by raising your hand via Zoom, as Chair Doran mentioned earlier at the start of this hearing. You'll be notified when it's your turn to speak.

After tonight, you can submit written comments at the address provided below. This information is also included on the City's website. You can send your comment via USPS mail or via electronic mail to Kyle's e-mail, as noted on the screen. And the comment period will be open until 5:00 p.m., on Monday, May 23rd.

That concludes my presentation. Thank you for listening to all things CEQA, and we're eager to hear your comments.

CHAIR DORAN: Thank you.

So I do want to open it up to public comment on the EIR now. I would, as I mentioned earlier in tonight's program, like to get an idea of how many speakers we have. So if you're interested in speaking, please raise your hand and let Mr. Pruter get a count of hands before we proceed.

Mr. Pruter, how many hands do we have raised so far?

VICE CHAIR DECARDY: Chair Doran, I have a clarifying question.

CHAIR DORAN: Sure.

VICE CHAIR DECARDY: This is Commissioner DeCardy.

Are you asking for public comment interest solely on the EIR, or in both public comment periods tonight, as you're asking that question, just to clarify?

CHAIR DORAN: Yeah. That's a good question.

I suppose just on the EIR for now, because we're only taking comments on the EIR. We may have separate time limits for comments on the study session.

So if you're interested in commenting on the EIR, please raise your hand.

Mr. Pruter, can you give us an idea of how many speakers we have?

MR. PRUTER: Chair Doran, sure thing. We have, at the moment, 14 hands that are raised. That number has decreased slightly, following your announcement of the EIR-specific comments. So that may be related to that, but we have 14 right now.

CHAIR DORAN: Okay. That is kind of consistent with what I was expecting. There's a number of comments -- a large number of comments. And we are going to have a separate public comment period for the study session. I'm sure there's going to be a lot of questions from the commission as well.

So I want to limit the speaking time on EIR comments to two minutes per person, so we can get to everyone that wants to speak on this tonight, both on this

section and on the study session section.
So with that, Mr. Pruter, if you could set the clock for two minutes for each speaker, I would like to get started with the first one.
MR. PRUTER: Sure thing, Chair Doran. Pardon me for setting that up. We'll have that up shortly. But to clarify, we have, at the moment now 12 attendees -- quick clarification. So I will begin now.
First commenter I see on my screen is someone by the name of Kelli Fallon. And I'm going to allow you to speak at this time. You can un-mute yourself. And if you could please state your name and your jurisdiction as well, when you begin your comment.
You have two minutes. Thank you.

PH-1

KELLI FALLON: Hi. My name is Kelli Fallon. I'm a Senior Policy Manager at the Bay Area Council, which is a public policy organization representing over 350 members of the Bay Area business community. And I'm calling in support of the proposed Willow Village development, which will build over 17 -- 1,730 new homes, which is nearly 60 percent of Menlo Park's Sixth Cycle RHNA obligation.
This project is a unique opportunity to not only build much-needed housing in Menlo Park, but to also provide significant economic and community development in a city, through the $75 million in amenities Facebook has

PH-1 cont.

committed to invest in Menlo Park and surrounding communities.

As I'm sure you know, this is far beyond what housing developers are typically able to contribute to a project, as this is an opportunity that should not be missed, on top of all of the great sustainability efforts that have been mentioned tonight.

So I just want to say, this site is an excellent candidate for dense, mixed-use development directly adjacent to transit to grow the supply of housing and reduce dependence on cars, and it's a clear example of sustainable and inclusive growth for future generations.

And I encourage you to support it.

Thank you for your time and consideration.

CHAIR DORAN: Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter has the name, "Chamber of San Mateo County." If you could please state your name and your jurisdiction.

You'll have two minutes to speak, starting now. You may un-mute yourself.

PH-2

AMY BUCKMASTER: Thank you. My name is Amy Buckmaster, Chamber of San Mateo County. Good evening, Chair Doran -- Doran [pronouncing]. Excuse me.

Members of the Planning Commission. I'm the CEO

PH-2 cont.

of Chamber of San Mateo County. Our members include over 1,500 businesses and organizations, including 60 nonprofit organizations and 40 educational institutions, representing 85,000-plus employees countywide.

I'm here tonight to speak on the Willow Village EIR study session. Chamber of San Mateo County Board of Directors is proud to be endorsing the Willow Village project. Silicon Valley headquarters and campuses can now expand responsibly and in a community-focused way. Willow Village exemplifies this by working closely with the community and putting them at the center of the plans.

Through the pandemic and the economic recovery, we saw firsthand the needs of the community, especially our small, first generation-owned, family business, hanging on day by day. This project will help support those small businesses with recovery, future growth, and entrepreneurship. It will deliver badly-needed amenities and services to the Belle Haven, such as a grocery store, pharmacy services, cafes, and restaurants. And on top, local businesses will be prioritized for retail and dining.

And, lastly, but critical to our organization, it will deliver more than 300 affordable homes, including badly-needed very low income units for our seniors.

Thank you for your time.

MR. PRUTER: Thank you for much.

Our next speaker has the name of Romain Taniere. Sorry for mispronunciation.

You have two minutes to speak. If you could please provide your name and jurisdiction at the beginning of your comment.

You may now un-mute yourself. Thank you.

PH-3

ROMAIN TANIERE: Hi. Good evening, Commissioners. My name is Romain Taniere. I'm an East Palo Alto resident. I've actually sent a more-detailed e-mail to the commission, but in two minutes, I just wanted to point out a couple of key points.

Basically, with Menlo Park's current City ordinance, prohibiting nearby overnight parking, residents have expressed concern about increasing parking issues, speed, traffic, and nonresidential cut-through traffic between University, Willow, and Bay corridors, which need to be addressed, in parallel with construction planning. Therefore, traffic and parking, on nearby EPA Kavanaugh neighborhood, must be included in mitigation measures.

And some of the impact project fees should go towards the City of East Palo Alto for safety and traffic mitigation measures, such as implementing street traffic speed scanning devices and installing digital radars, speed limit signs on Kavanaugh and Gloria, stop signs on

PH-3 cont.

Clarence and Gloria, implementing an all-red traffic light interval at the University/Kavanaugh/Notre Dame and Willow/O'Brien traffic light intersections, strengthening control and enforcement of speed/traffic/parking regulations.

Meta should consider the integration planning of a multi-modal transit hub by the central corridors, and keep pushing for the Dumbarton rail corridor to be reactivated.

Meta should work with the SFPUC on nearby owners' project to redevelop the Hetch Hetchy right of way and connect the proposed Ivy/Willow and O'Brien parks to increase park playground and green community amenities on Hetch Hetchy, also re-including the initial proposal for a community center on ground level, near Ivy/Willow public park would be greatly beneficial.

Overall, we are very excited about this mixed-use project, with public access and amenities east of US-101, and hope groundbreaking will start soon.

Thank you very much for your consideration.

MR. PRUTER: Thank you for your comment.

Our next commenter is someone named Brittani Baxter. Brittani, you'll be able to un-mute yourself now and can you please provide your name and jurisdiction as you beginning of your comment.

PH-4

You'll have two minutes. Thank you very much.

BRITTANI BAXTER: Hello. I'm Brittani Baxter, a District 3 resident. And I'll comment just on the EIR portions right now.

Really love how beautiful the project is. It was great to see how there is a focus of pedestrian and bike infrastructure, over car infrastructure and looking at, you know, some of the circulation impacts in the EIR -- really, just anything that we can do to help, you know, incentivize people to get out of cars and into transit or walking or biking would be extra fantastic.

And then, I also noticed, like was mentioned a little bit earlier, that there is a variant available that would have 200 additional units of affordable housing, if the project were to kind of max out its density bonus. And so I'm not quite sure exactly how that would work, but if it's possible to study those units tonight as well, that would be extra fantastic.

Thank you so much.

MR. PRUTER: Thank you for your comment.

We now have someone named Ali Sapirman. Ali, I'm going to let you un-mute yourself. If you could please provide your name and your jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-5

ALI SAPIRMAN: Hi. Good evening, Planning Commissioners. My name is Ali Sapirman, and I'm here on behalf of the Housing Action Coalition, a member-supported non-profit that advocates for creating more housing for residents of all income levels to help alleviate the Bay Area and California's housing shortage, displacement, and affordability crisis.

I am here to speak tonight in support of the Willow Village project, which the Housing Action Coalition enthusiastically endorsed. I've e-mailed the entire Planning Commission our formal letter of endorsement and forward you all letters of support from Menlo Park residents and housing advocates.

I'll now expand on three key elements on why the Willow Village project deserves your support. One, it transforms a space into a place for affordable homes. This project replaces 1970s, outdated office space, over 59 acres, with a mixed-use project that includes 1,730 homes. Approximately 18 percent will be subsidized affordable, which is more than 300 affordable homes. Of these, 120 homes will be reserved for seniors.

Two, it creates a community of resources. Willow Village will provide community amenities and benefits, such as a grocery store, pharmacy services, up to 200,000 square feet of retail space, significant public open

PH-5 cont.

space, and a town square.

Three, built using environmentally-friendly practices. This project is built to be LEED Gold certification, meaning the buildings will be equipped with 100 percent electric power and use recycled water, sustainable materials, and increase photovoltaics.

Please vote tonight in support of the Willow Village project.

Thank you so much.

MR. PRUTER: Thank you for your comment.

Our next commenter is someone with the name of Jorge S21 Ultra. I'm going to let you un-mute yourself at this time. If you could please provide your name and your jurisdiction at the beginning of your comment.

You'll have two minutes. Thank you.

I apologize. Chair Doran, I'm not sure if this person is available at the moment, but I will proceed with another commenter, if that is acceptable.

CHAIR DORAN: Yes, please.

MR. PRUTER: We'll move on. Okay. We'll move on to the commenter by the name of Vince Rocha.

I'm going to allow you to speak at this time. If you can please un-mute yourself and provide your name and jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-6

VINCE ROCHA: Good evening Planning Commissioners. My name is Vince Rocha. I'm the Vice President of Housing and Community Development with the Silicon Valley Leadership Group, representing over 350 of the regions' largest employers and universities. We're calling in support of this project.

Our members have endorsed this project because it meets our needs for both housing, jobs, and environmental sustainability. For the purposes of the EIR, it has really mitigated the traffic impacts, creating open space and shopping, not just for the folks who will live and work there, but for the surrounding communities as well, really creating an environment of live, work, play.

We believe this meets or exceeds all of the environmental standards of the city, and we look forward to seeing this project come to fruition. Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter has the name of Pam Jones. I'm going to let you un-mute yourself at this time. If you could please provide your name and jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-7

PAM JONES: Good evening, housing commissioners, Chair and Vice Chair, and staff. Pamela Jones, resident of the Belle Haven neighborhood of Menlo Park.

PH-7 cont.

In regards to the EIR, I continually do not understand the criteria of collecting data. The air quality, according to the report, is negligible. And yet, if you look at the California State EnviroScreen 4.0, it identifies Belle Haven and East Palo Alto as being significantly affected by air quality.

PH-8

The second piece is on the housing studies, which are done by the same company that has done the General Plan. So I expect them not to find anything other than no impact or minimal impact.

But let me give you some data on the Belle Haven neighborhood and the impact there. If the 2020 census is correct, we have lost 488 residents between 2020 and 2010. That's in the Belle Haven neighborhood alone. The high-density apartments were not in the 2010 census because they were not built. The high-density apartments have 991 residents.

So consider that there's been significant impact on the residents that were living here long before Meta came to town, long before the high rise, long before the General Plan.

Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter is someone with the Isabella Chu.

Isabella, I'm going to let you be able to un-mute yourself. If you could please provide your name and jurisdiction at the start of your comment.

You have two minutes. Thank you.

PH-9

ISABELLA CHU: Good evening, Planning Commission. My name is Isabella Chu. I live in Redwood City, and I work in Palo Alto. So I have to bike or take a train or a bus through Menlo Park, every time I go to work. So housing in Menlo Park and safe bike and walk infrastructure is of immediate practical interest to me.

Moreover, in my professional life, I study the interaction between land use policy and health. And when we're talking about the EIR, I think it's important to remember that the number one source of greenhouse gas emissions, air and noise pollution in cities, is cars. And the key driver of traffic in the Bay Area is people having to live far away and commute by car into jobs.

And so anything which reduces vehicle miles traveled is a powerful and important measure against climate change, against pollution, against morbidity and mortality. Cars happened to be -- car crashes happen to be the number one cause of death for people under the age of 22. So vehicle miles traveled have a lot of externalities.

But when we're talking about environment,

PH-9 cont.

anything we can do to reduce vehicle miles' traveled is of central importance. And so building dense, walkable, bikeable communities near jobs is the most powerful thing we can do to reduce VMT and, frankly, give people access to opportunities.

So, you know, I want to speak in support of this project. The more you can reduce sort of the convenience of drivers and provide space for people on foot and bike, the better the project will be for the environment and for human health and prosperity.

Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter is someone names Karen Eshoo.

Karen, I am going to let you be able to un-mute yourself. If you could please provide your name and jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-10

KAREN ESHOO: Hi. Thanks for the time. I appreciate it.

I am the Head of School at Mid-Peninsula High School, which is adjacent to the -- to what will be the public park. I'm also a resident of the Willows. And I wanted to come tonight and first applaud the City for holding this hearing, and let you know how impressed we are at Mid-Pen with the EIR.

PH-10 cont.

We appreciate all the mitigation efforts that are being made, especially because I know that, obviously, as construction gets started, we're certainly going to hear it. That's for sure. But we also know that it's worth it because of the outcome of this project.

Mid-Pen is a big supporter of the Willow Village project. And, in fact, I think it's just going to do amazing things for the Belle Haven neighborhood. You've already heard that from others in the neighborhood as well. We're proud to be a neighbor of Meta. We have been, I think, you know, obviously, for quite some time now.

And in particular, I am really happy to say that we have a wonderful relationship with the folks that are designing this project. They've been responsive to us. Whenever we've had questions or suggestions, they've reached right out to us and have been really willing to talk about how this project can also benefit Mid-Pen and make sure that our school continues to be able to thrive, as it always has.

So we are, once again, here to throw our support behind this project and those leading it. And appreciate your time tonight.

Thank you very much.

MR. PRUTER: Thank you for your comment.

Our next commenter has the name of Ken Chan.

Ken, I'm going to let you be able to un-mute yourself. If you could please provide your name and jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

KEN CHAN: Hello. Can everyone hear me?

MR. PRUTER: We can hear you.

PH-11

KEN CHAN: Oh, I'm sorry. I didn't see -- well, hello members of the Menlo Park Planning Commission. My name is Ken Chan, and I'm an organizer with the Housing Leadership Council of San Mateo County. We work with our communities and their leaders to produce and preserve all the affordable homes, which is what has brought me to this moment.

I'd like to thank staff. I'd first like to thank staff for all of their hard work in putting together the report, and for their presentation tonight.

On behalf of HLC, I'd like to express our support for the Willow Village proposal under discussion tonight. Over 300 of these homes are proposed to be affordable, with 120 set at the very low, extremely low income levels for seniors. This means that as folks begin to transition into the next phase of their lives, at least 120 of the city's most vulnerable senior community members will have a safe and stable place to call home.

Thanks so much.

MR. PRUTER: Thank you for your comment.

Our next commenter is named Adina Levin.

Adina, I will give you the ability to un-mute yourself. Please state your name and your jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-12

ADINA LEVIN: There we go. Now successfully un-muted. Thank you very much.

My name is Adina Levin. I am a Menlo Park resident, and I'm a part of a group from Menlo Together that submitted a letter to the Planning Commission and will do some more detailed comments, probably, about the EIR.

And I, first of all, wanted to support the comments of some of the other speakers, in terms of having homes near jobs, and services is something that helps reduce vehicle miles traveled and which is the biggest source of greenhouse gas emissions. So that is an overall -- a good thing.

In terms of more comments relating to transportation, the proposal does have many features, that help reduce driving, associated with the project. And in order to maximize that, we would like to see very significant attention posed particularly to the crossings

PH-12 cont.

of Willow at Hamilton, and also Park and Ivy and O'Brien; all of the intersections that need to be optimized for pedestrian safety, as well as the -- there's great bicycle trails on the project, but bicycle access to the project also needs to be very safe, to help people not drive.

With regard to the trip caps and the amount of vehicle parking, which are really correlated to how much driving and VMT, we would like to see some analysis, based on goals from mode share, what number of people are expected to be driving, versus using other modes. This is a method that Mountain View used and can help to reduce the amount of driving and vehicle miles traveled.

Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter is names Harry Bims.

Harry, I am going to let you be able to un-mute yourself. And if you could please provide your name and jurisdiction at the start of your comment.

You'll have two minutes. And I believe -- yes. Sorry. The stopwatch is coming back up. You'll have two minutes, please. Thank you.

PH-13

HARRY BIMS: Hello. This is Harry Bims, District 1 resident. I'm here to speak in favor of the project and would like to say that this project is far from perfect, as I think we've seen some comments about that earlier

PH-13
cont.

tonight. Nonetheless, I think, given the complexity of the project, that it strikes the right balance in addressing the broad range of issues that concern this project.

And I would also, you know, mention that this project is yet another District 1 project that leads the way throughout Menlo Park, in terms of providing affordable housing options, providing high-density residential uses as well, which is why District 1 has more high-density housing than any other district in Menlo Park by far.

So I'm speaking in favor of this project, and hopefully this project will incentivize other districts to follow suit, with similar projects that address the need for affordable housing in the Bay Area, and also deliver a project with the kind of quality materials and attention to detail that this project exemplifies.

Thank you.

MR. PRUTER: Thank you for your comment.

Our next commenter is named "Colin."

Colin, if you could please provide your name -- full name and jurisdiction at the beginning. You'll be able to un-mute yourself at this time. If you could please provide those items.

You'll have two minutes to speak. Thank you.

PH-14

COLIN: Hi, Menlo Park City Council. I'm a resident living in the Kavanaugh neighborhood in East Palo Alto.

Meta and the Willow Village team really listened and worked with the local residents on their community feedback. The affordable housing is much needed for many low income East Palo Alto residents facing rent hikes.

The retail space and prioritization of local businesses is going to open so many opportunities for many East Palo Alto and Willow businesses that started during COVID, such as the many Mom and Pop restaurants currently operating with much success out of East Palo Alto and Willow residential homes.

Continually, East Palo Alto residents have asked for a local dog park and a full-service grocery store. It was Meta and this Willow Village development that delivered on those. The community -- this development will be the first in the Bay that is fully inclusive of workers and residents, with an open campus that invites all members of the community to take advantage.

The use of union labor is going to enrich many locals, tradespeople, and the LEED status will help reduce environmental impact.

Delaying this further will cause harm to local residents by delaying the great benefits of this

PH-14 cont.

development from being realized.

Thank you for your time.

MR. PRUTER: Thank you for your comment. Our next commenter is named Fran Dehn.

Fran, I'll be letting you un-mute yourself. If you could please provide your name and your jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

FRAN DEHN: Thank you very much.

PH-15

Good evening, Commissioners. Fran Dehn, Menlo Park Chamber of Commerce. And on behalf of the Chamber of Commerce, thanks for the opportunity to comment this evening in support of the Willow Village Master Plan.

The project is a model of corporate citizenship and community-based planning. The developers have truly listened to the community and delivered, in response to the input. They have engaged in an open community process for years; public outreach unprecedented.

Several substantive project modifications are a direct result, including moving the grocery store and other services to first phase, reducing office footprint, increasing the amount of housing, in particular, affordable housing, also providing parks, trails, open space for the community, retail spaces for local business to proliferate. And to reiterate, much needed housing.

PH-15 cont.

The project would not look like it does today without Willow Village's team listening to and integrating the community's feedback into the project design.  Meta is and has always been a receptive, responsive neighbor in Menlo Park.

They've invested 10s of millions into the community, such as the community campus, Belle Haven Community Campus, which is under construction; support for Menlo Park small businesses, local food subsidy programs, and on and on and on.

In summary, Willow Village, which is before you tonight, is a model for community-based planning, delivering unprecedented community amenities and benefits to the neighborhood and to the city as a whole, while still meeting Meta's long-term goals:  Remain, contribute, and flourish in Menlo Park.

Every project that comes forward to the Planning Commission has merit and certainly, in particular, merit to the Applicant.  However, with Willow Village, the community is also a primary beneficiary.

Thank you very much for your review, consideration this evening, and thank you to Meta and to Signature Development for a forward-thinking, community-based plan.

MR. PRUTER:  Thank you for your comment.

What appears to be our final commenter is a person by the name of Karen Grove.

Karen, I'm going to allow you to un-mute yourself at this time. Can you please provide your name and jurisdiction.

You'll have two minutes to speak. Thank you.

PH-16

KAREN GROVE: Thank you. I'm Karen Grove. I'm a Menlo Park resident. I serve on the Housing Commission, but I'm speaking for myself.

And, ironically, the first thing I'm going to talk about is circulation. As a member of Menlo Together, I wanted to add to Adina's comment that the EIR identifies that the project will put pressure on the intersections of Willow and Bayfront, and Willow and University. And so we were wondering if it would be feasible to add a third entrance or exit to Bayfront from what is currently being proposed as the "loop road." That would create a stronger grid, so to speak, with multiple options to enter and exit the area and relieve pressure on the two other intersections.

PH-17

I also wanted to comment on the variation of adding another 200 units, which is, I understand, not being proposed by the developer, but has been studied in the EIR. And we would like to propose that if those additional units get built, they be designed to be

PH-17
cont.

affordable for extremely low, very low, and low income households.

Menlo Park has a multi-year debt to the region, in terms of deeply affordable housing to meet the need of the jobs that we have added to our community. And the debt has been felt most strongly and continues to be felt most strongly in Belle Haven and East Palo Alto through eviction, homelessness, displacement, overcrowding, and extreme housing cost burden.

The impacted demographic is 50 percent black and Hispanic, and has a median income of 50 to $60,000 a year.

In addition, Belle Haven and East Palo Alto have carried the disproportionate impact of our city's growth. So that is why we would propose that if we add the extra 200 houses, which is a great idea, that we meet -- make them meet the needs of those most impacted in the nearby communities.

Thank you.

MR. PRUTER: Thank you for your comment.

If I may, through the Chair --

CHAIR DORAN: Yes.

MR. PRUTER: I believe that is all of our commenters, in terms of hands raised, just to clarify. But we did have a member of the public who had their hand raised and is no longer raising their hand. I wasn't sure if we wanted to give another opportunity for them.  They were unable to speak earlier, when I had given them the opportunity.

CHAIR DORAN:  Sure.  We can leave the public comment open for a little bit, to see if they want to come back, or if there are any other people who wish to comment.

MR. PRUTER:  Okay.  Thank you.

I do see another hand raised at the moment. Someone else.  A person -- I can let them speak, if you'd like, Chair Doran.

CHAIR DORAN:  Yes, please.

MR. PRUTER:  Okay.  Thank you.

We have an additional commenter named Karen Rosenberg.

Karen, I'm going to allow you to speak.  And if you can please state your full name and your jurisdiction at the beginning of your comment.

You'll have two minutes to speak.  Thank you.

KAREN ROSENBERG:  Hi.  I'm so sorry.  I first just wanted to clarify whether or not this is for just the EIR, or if I can comment just on the Willow Village development in general.

CHAIR DORAN:  This is intended to be the EIR, but since there's considerable overlap, I'd say, go ahead.

KAREN ROSENBERG: Okay. Wonderful.

PH-18

Hello. My name is Karen Rosenberg, and I am a Resilience Associate at Greenbelt Alliance.

For those of you who are unfamiliar with Greenbelt, we are an environmental nonprofit, working to educate, advocate, and collaborate to ensure the Bay Area's lands and communities are resilient to a change in climate.

We are pleased to endorse Willow Village that would bring over 1,700 homes to the city of Menlo Park. As a mixed-use development, Willow Village would bring housing and jobs and neighborhood-serving retail, not to mention significant open space, as well as other amenities to help create an inclusive Menlo Park for all residents to enjoy.

One of the many benefits of this project is that the addition of such amenities to the area would reduce the number and length of automobile retail trips for existing residents and employees.

Additionally, Willow Village is located within half a mile of Facebook's major employment center, with bike, pedestrian, and shuttle routes available, so that employees do not have to drive.

Every city in the Bay Area must play their part to increase their housing stock to make sure the local

PH-18 cont.

workforce can afford to live close to jobs, schools, and services. This project serves to help the City of Menlo Park make significant progress towards its Regional Housing Needs Assessment goals and allows its residents more time with family and friends, and less time in traffic congestion, improving the social fabric of our communities and reducing the climate-damaging greenhouse gas emissions produced by driving.

We urge the Planning Commission to approve Willow Village, and we hope its approval will resinate with other Bay Area cities and encourage them to redouble their efforts to grow smartly.

Thank you.

MR. PRUTER: Thank you for your comment.

We do now have two additional commenters. So I'll proceed.

The next person is names Rick Solis.

Rick, I'll let you be able to un-mute yourself at this time. If you can please state your full name and jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

RICK SOLIS: Hello. Can you hear me?

MR. PRUTER: Yes, we can.

RICK SOLIS: Hi. Thank you.

PH-19

Hi. My name is Rick Solis. I'm a Field

PH-19 cont.

Representative with Carpenters Local 217, based in Foster City, but we represent about 2,500 members in San Mateo County.

But I would like to express my support for the Willow Village project. And I don't want to waste your -- any further of your time with explaining on how this is going to -- you know, regarding how many units and how many square feet of everything. But the thing that we're happy with is, the Carpenters Union has always had a great relationship with Facebook, who is now Meta, and are partnering with Signature Development on the construction of this project.

And to let you know, I mean, just the thousands of construction -- and I'm not just saying regular construction jobs, but the union construction jobs that this project will generate is going to be a great thing for the area. So since the pandemic, there's been a big slow-down in people getting back to work, and a lot of construction workers are suffering.

But like I mentioned, this is -- these are union jobs that provide family-sustaining benefits for retirement, for health care, the wages that they will pay, and just everything that's going to help construction workers in the area and help -- help build the middle class construction work force.

PH-19 cont.

So, again, I would like to urge you to please move this project forward to passage.

Thank you very much.

CHAIR DORAN: Thank you. I realize that it's hard to segregate comments on the EIR, from comments on the project generally. But I would like to ask the remaining speaker to confine their comments to the EIR. That's the portion of the Agenda that we're on right now.

And if they don't have comments on the EIR, to save their comments for the study session.

MR. PRUTER: Okay. Thank you, Chair Doran. Sorry.

To clarify, we have one more commenter. And I believe they're keeping their hand up. Another one has lowered their hand. So I believe they do have an EIR comment.

This person is named Sergio Ramirez. You will be able to speak at this time. And if you can please provide your name and your jurisdiction at the start of your comment.

You'll have two minutes. Thank you.

PH-20

SERGIO RAMIREZ: Hi. Good evening, Commissioners. Thank you for the chance to speak tonight.

My name is Sergio Ramirez Herrera. I've been a Menlo Park resident for the past 13 years. So I am also

PH-20
cont.

an 8-year apprentice carpenter with Carpenters Local 217.

In addition, I am a job-trained graduate from the training center here in Menlo Park. My four-year career has afforded me the opportunity to continue to live here and allow me to work close to home and spend more time with my family. With the benefits I earn through my work, I am also looking forward to a respectable retirement, when the time comes.

This developer has committed to using a union signatory general contractor on this project, which, in turn, allows others in my situation to utilize these benefits and earn a liveable wage that they deserve.

This project also includes more than 300 affordable homes, which -- with the desperate opportunities to better themselves and our community.

I fully support this project and look forward to seeing it through completion, and urge you all to do the same.

Thank you again for the opportunity to speak.

CHAIR DORAN: Okay. I'd like to remind the speakers that we're on the EIR report now. If we have comments on the EIR report, this is the appropriate time.

Comments on the project in general should be saved for the study session.

MR. PRUTER: Thank you, Chair Doran.

At this time, I do not see any other hands raised. So I think, if you'd like --

CHAIR DORAN: Okay. I'm going to close public comment and bring the conversation back to the Commission for commissioner questions and comments. And I'm sure there are a lot of those...

Well, if no one wants to speak, Commissioner DeCardy -- Vice Chair DeCardy?

VICE CHAIR DECARDY: I'm also happy to defer to Commissioner Riggs.

But, first of all, thank you. Thank you to the members of the public who have come and for your comments. They are enormously helpful, and for your commitment to providing feedback. Overall, it's a great project. I'm really looking forward to this project coming to fruition. So thank you to the team for the presentations.

To the staff, I thought the staff report was excellent. The materials, there are a ton. I thought the staff report did a nice job walking us through. Thank you for that.

And, Ms. Garcia, thank you to you and your team for the EIR, and for your really clear presentation.

I have three quick things, in addition to some of the comments we've heard already from -- really well said from the public. The first one is a question. It might be for you, Ms. Garcia, or for staff.

PH-21

If we have an EIR -- and I really appreciate having the EIR look at 200 additional units of housing. If we decided that we wanted to do 400 more units of housing, would that mean we'd have to reopen the EIR?

Or does that not limit us, as a community, as this project continues?

MS. GARCIA: Thank you, Commissioner. I think that's a great question.

As noted in the Variance chapter of the EIR, we did have to evaluate that particular variant in detail. And Ramboll, who did the air quality technical reports, did provide additional modeling information for air quality impacts.

And so increasing the units from 200 to 400 would likely require additional evaluation that, depending on what the results would be, could be included as an errata to the EIR, or an additional memo.

But if it would worsen impacts, then we would have to think about recirculation, if it gets to that point.

VICE CHAIR DECARDY: Yes.

PH-22

If I could ask the same question through the Chair to Mr. Perata.

Just how much longer would that take, as staff,

PH-22
cont'd.

and what would that do for cost?

MR. PERATA: Thank you. So I don't have good answers for either of those on the fly this evening.

We certainly would have to look into the cost more and -- in terms of what the scope and budget would be to modify the EIR, and whether or not it's a -- an errata in the Final EIR, where there potentially doesn't need to be recirculation, versus recirculation of the Draft EIR.

So when you're asking about the schedule, you know, Final EIR could potentially be accommodated within the overall project schedule.

Recirculation would require recirculating the Draft EIR for a new 45-day minimum public comment period. Either way, you're looking at additional time for the analysis, not factoring in items, like, whether or not it needs to be recirculated.

So I just don't have a good answer right now. I do see our City Attorney here to maybe bail me out a little bit.

MS. SHIMKO: Hi. I'm Anna Shimko.

And, Kyle, you don't need bailing out. I think you said it absolutely correctly. And you're right. It depends on the outcome.

If we did have to recirculate the EIR, of course, we would have not only the 45-day review period, but the time to respond to comments on that recirculated EIR.

VICE CHAIR DECARDY: All right. Thank you to each of you.

In that case, I just applaud the -- at least the addition of the 200 units in that mix, and I think it's good for everybody to know, if we wanted to go higher, what those impacts might be.

So thank you.

PH-23

My second one, I hope is simple, which is, you know, the potential EIR and the impacts of the diesel generator for emergency energy use. This is more just a request to the Applicant.

You all, I think, did a fabulous job in finding an alternative to a diesel generator at the Community Center and would really support and love finding that alternative in this instance, so we don't have to have diesel generator as backup. It's not an extraordinary greenhouse gas emissions' problem, but it seems a real shame for a project, that you're rightly touting for the other environmental and climate benefits, to have that pimple on it.

So that's the second comment.

PH-24

And then the third one is -- actually, I have some questions around. And this is to the great points that were raised by numerous commenters, including

PH-24
cont'd.

Mr. Taniere, Ms. Jones, Ms. Chu, and others, around air quality and transportation.

So you mentioned, Ms. Garcia, in your presentation, that the reactive organic gases are essentially -- there's nothing we can do about it; there's no mitigation.

So I think reactive organic gases are non-methane hydrocarbons.

So what are the consumer products we're talking about, that nobody has any control over?

MS. GARCIA: That's a great question. And I can do my part and find that specific list of consumer products, but I don't have it off the top of my head at the moment.

Heidi, do you happen --

MS. MEKKELSON: Yeah. I can -- I can try to respond to that. This is Heidi Mekkelson, from ICF, from the people in charge of the project.

Consumer projects are -- or consumer products are stationary source emissions. So not to be cheeky, but Axe body spray would be an example. Spray paint -- anything that consumers are using on a daily basis that emit reactive organic gases.

This particular threshold, from the Air Quality Management District, which is a pounds-per-day threshold,

PH-25

is typically exceeded by large projects. It's just a difficult one to be under, if your project is of a certain size.

And moreover, because it is related to the actions of future project users, it's a difficult one to mitigate because you can only do so much to curb people from using aerosols, for example.

VICE CHAIR DECARDY: Okay. So -- yeah. Those are -- my question is, so there's nothing related to transportation or to traffic or to parking or to automobile use, or do those reactive organic gases actually end up intermingling with other stuff, and that's what gives you the air quality problems, like ground level ozone, and that kind of thing?

I'm not a scientist. So I'm not trying to -- I'm not trying to catch anybody out here. I truly am interested in this moment, trying to figure that out.

MS. MEKKELSON: Yeah. Yeah. That's a really good question. We looked at all of those things in the analysis.

So there are different criteria air pollutants that are measured in the analysis, including particulate matter; NOx, which Nox is primarily due to -- that's nitrogen oxide. Those are primarily related to vehicle traffic; ROGs, ozone, and methane for the greenhouse gas analysis.

So each of those pollutants comes primarily from a different source. But we look at stationary sources, and we look at mobile source emissions.

And for the criteria, air pollutant operational impact, the threshold that is being tripped -- there's definitely, you know, impacts happening from all of these different emission sources, but the one that is tripping the threshold established by the Air Quality Management District is the consumer products.

PH-26

VICE CHAIR DECARDY: Perfect. Thank you.

So my -- with that understanding, my question gets specifically to the alternatives proposed, and the traffic and air quality issues in that mix.

And so can -- I believe what you are looking at is a threshold that is around 6,000 trips -- car trips, ends up being what you were looking at for needing to avoid going over that level.

Can you just remind us, why 6,000 car trips? What's magic about that?

MS. MEKKELSON: That one, I will have to take a look at, or perhaps Ollie can weigh in on that one.

The 6,000 car trips threshold is not ringing a bell for me at the moment.

VICE CHAIR DECARDY: Mr. Perata came on. He's kind of used to me on this.

MR. PERATA:  I'll defer to Ollie, from Hexagon, the transportation sub-consultant under ICF.  And then happy to follow up, but I think Ollie has it.

MR. ZHOU:  Hi.  This is Ollie Zhou, from Hexagon Transportation Consultants.

Vice Chair DeCardy, we -- in terms of transportation mitigation, we are talking about requiring the project to do TDM reductions.  And those are expressed in percentages.  I'm not -- you know, I haven't done the calculation myself and, you know, maybe you're right. That's the way you put it to the 6,000 trips' limit.  I do not recall citing specifically anything about 6,000, but, you know, if you find it in the EIR, maybe, if you could point me to that, that would be great.

But the project is required to do TDM mitigations to reduce its residential VMT impact.  And, you know, it's 32 percent off of IT -- 32 or 36 percent off of the IT-generation rates.

PH-27

VICE CHAIR DECARDY:  Yeah.  It's the mitigation factor that I think you all identified as Mitigation TRA2. And you just said it was the equivalent of 6,000 trips. So that's what I was referring to.  So I appreciate the answer on that.

So what I'm wrestling with is if we have a

PH-27
cont'd.

request that we're going to look at later on this evening, from the Applicant, to actually ease the transportation demand management. But I believe the only mitigation that we really have is transportation demand management. And so how are we supposed to, as a community, as the Planning Commission, as the City Council, and as residents, understand these different impacts?

It is hard for me to wrestle with what you all have in the EIR and these impacts, off of what is the current transportation demand management. I guess regime or expectation off of what is the requested variants, and how are we supposed to understand that and the potential air quality impacts and other environmental impacts?

And whoever can best answer that.

MR. PERATA: So through the Chair, if I can start from a staff perspective, and then we can turn it over to another expert on the meeting tonight.

For the Environmental Impact Report, we did study the Applicant's requested adjustment to the City's standard practice for the transportation demand management. So our ordinance does include a requirement of 20 percent reduction for TDM, transportation demand management, in terms of trips.

We have historically taken that off of the net trips, after factoring into account the project site's land uses, mixture of land uses, complimentary land uses in the vicinity of the project. That includes some internalization for trips, passthrough capture trips that would have passed the site already.

The Applicant's request, through the Conditional Development Permit, is to that number off the gross trips. And so that was factored into the analysis. So what the Planning Commission and the community is reviewing in the EIR is based on the Applicant's request.

So there isn't a change from the analysis in the EIR to the Applicant's request. But there is a component of the project that includes that change from net trips to gross trips, factoring into account this project's significant internalization, compared to other, more stand-alone uses.

VICE CHAIR DECARDY: Yes. Super helpful. That's exactly what I wanted to know. So I appreciate that.

PH-28

So I will just say that, for me, I was really -- appreciated the alternatives. I get frustrated with EIRs that don't give a reasonable set so that it gives some sunshine for the community to be able to see the differences. But there is not one that has a massive reduction in parking and the potential opportunities on the massive reduction in parking. I just simply think we have to look at that, at all of these projects. I won't

PH-28 cont'd.

certify it as adequate without that. I realize I'm only one vote, so it doesn't particularly matter. But it's why I think it's that important. I think it is that important so that our community has sunshine in this.

Half of the comments we just had were related to circulation and traffic in some dimension. And without getting the incentive to actually build on the incredible work that Meta has led, on TDM and to keep on pressing -- and I really appreciated the comment in the presentation that Mr. Neito made about -- you know, we're trying to send the incentives to have fewer cars, he said. Something like that. I think that's terrific.

But the only incentive to do that is to either get rid of parking or else to increase the cost. And we need to more honestly look at that, and I wish that was included in the EIR.

So, thanks. Those are my comments on the EIR this evening.

CHAIR DORAN: Thank you.

Commissioner Riggs?

PH-29

COMMISSIONER RIGGS: Yes. Thank you. And thank you to my fellow commissioner for raising those four points.

I would like to ask a question similar to Mr. DeCardy's first question. And that has to do with, if

PH-29 cont'd.

we had an alternative project, which we don't, because we scoped this in 2019, I think, before we started pressing more firmly for it.

If we had an alternative that involved a reduced parking option, both for residential and for office, would this require a revisit to the EIR?

And I have a similar question to follow that.

MS. GARCIA: Thank you, Commissioner Riggs. I think that's an excellent question.

Primarily the alternatives to the proposed project are identified and put forth in order to identify ways to reduce the significant impacts identified in the EIR. As noted in our presentation, the significant and avoidable impacts were related to air quality and noise.

Parking, unfortunately, is no longer considered an impact, under CEQA. So for those reasons, it wasn't identified as significant.

And in connection to that, that's one of the reasons why we didn't evaluate an alternative to the project that would reduce the parking.

PH-30

COMMISSIONER RIGGS: Understood. But I raise parking as an indicator of VMT because, frankly, if you don't have a parking space when you go to work, then you don't drive, as anyone in San Francisco or Manhattan can tell you.

PH-30
cont'd.

So under those conditions -- I realize that this is presumably in the positive direction. But does it in any way effect the EIR, if, for example, Meta decided, during the process of the building permit two years from now, maybe they're going to reduce the scope of their parking structures?

Would this in any way have any sort of kickback to the EIR, or because it would logically reduce VMT, would this be a nonissue?

MS. GARCIA: Thank you.

Heidi, correct me if I'm wrong, but an overall reduction or a reduction in the type of development that was evaluated in the EIR would, for the most part, reduce the overall significant impacts that were identified.

So it's unlikely that by reducing the number of parking spaces included in the parking garages that it would require recirculation of the EIR or identify additional significant impacts that were not identified previously.

COMMISSIONER RIGGS: All right. Thank you

MS. SHIMKO: And just to piggyback, if you don't mind, on what Claudia has said. I want to make sure that you know we did know that this would be an area of concern. And we seriously discussed whether it made sense to build into the alternatives' analysis an option that had less parking.

And maybe Ollie is the best to opine on this topic, but because the transportation impacts are judged on the basis of vehicle miles traveled, and there's no correlation, in my understanding, between forecasting the vehicle miles traveled associated with the project and the parking that's provided, we would have no basis at this point to conclude that providing less parking really would reduce the vehicle miles traveled.

I mean, I understand your argument, and it may be correct.  But based on the way that the technical analyses are accomplished, parking just doesn't figure into that calculus.  So we concluded that it did not make sense at this point to include reduced parking ratios into one of the alternatives.  I believe that we do have a mention of that in the alternatives' analysis, at some point.

But like Claudia said, if -- if, down the road, so to speak, the Applicant decided that less parking was needed, I'm confident that that could be accommodated.

And I don't see that there would be additional CEQA impacts as a result of that.

Ollie, do you want to say something?

MR. ZHOU:  Yeah.  I just want to concur, Anna, that I -- it's highly unlikely that, you know, additional EIR, environmental review, will be needed.

A reduction in parking will only be able to be captured in the VMT analysis if it is tied to an -- increasing the TDM measures' effect or a reduction in the trip cap that is being proposed by the project.

So, you know, if it can be tied that way, then it will only lead to a reduction in the VMT impacts, not an increase.

COMMISSIONER RIGGS: All right. That makes sense, and I appreciate all of your comments.

PH-31

So the next question is perhaps a little more challenging.

If there were an additional connection between this campus and the expressway, a short connection between the north loop road, for example, and the expressway, would -- I expect that would alter the City's request for studies of level of service impact, at the least.

Although it may improve it, and that would certainly be the goal, is -- would an alteration to the traffic pattern require any revisit under CEQA, or is that similarly a small enough item and a potentially positive item that we wouldn't need to -- that it would not complicate the process?

MS. GARCIA: That would depend on the type of alteration -- if it's just re-striping lanes, adding bike ped, things like that.

PH-31 cont.

COMMISSIONER RIGGS:  No.  It would be a connection. It would be -- call it a "driveway."

MS. GARCIA:  It would be an actual -- yeah.

That may require additional study.  I'm not sure that it would rise to the level of identifying an additional significant impact, but it would be something that we would need to look at, in terms of air quality, in addition to transportation, circulation, because it would require ground-disturbing activity, and that's really what we're interested in, what we're -- the project, how it's modifying the existing conditions around.  And so we would need to take a look at that.

MR. ZHOU:  I also want to add on, in terms of VMT, which is the transportation CEQA threshold, I believe it will have a negligible effect on vehicle miles traveled because it's not looking at -- opening a new connection would, you know, lead to very minor changes in trip lines.

However, I do want to say that because this will be a new transportation facility, under CEQA, I believe this would also qualify as a transportation project, which would require its own CEQA clearance because you're building new roadway to the existing roadway network.

But, you know, Claudia or Heidi, feel free to correct me on that.

PH-32

COMMISSIONER RIGGS:  Could this be handled as a

PH-32
cont'd.

modification of the existing one, or do we actually have to open a new file?

Is that your implication? A new file, Mr. Zhou?

MR. ZHOU: I'm not sure how exactly this should be handled, from a CEQA prospective. You know, maybe Heidi --

MS. MEKKELSON: If it's part of the -- oh, sorry, Ollie.

If it's part of the project, then it can be included as a project -- as a component of the project, as other roadway facility improvements are already included as part of this project. It might require permits from other agencies, like CalTrans.

But an additional roadway or driveway, you know, could be theoretically added to this project and not be a separate project under CEQA.

What we would need to look at would be potential construction -- changes to construction, air quality and noise impacts, as Claudia mentioned, and also any potential changes to roadway hazards and safety. That is still something that we need to look at under CEQA, under transportation impacts.

So, you know, we would want to make sure that the driveway is located in an area that is safe and is not related -- is not resulting in conflicts with pedestrians or bicycles, or things like that. So it really depends on what the proposal is, and what types of impacts it might result in.

If it results in new LOS impacts, that's not a trigger for recirculation under CEQA. But we would still need to look at these other things. And depending on what the change and the impact is, it's, you know, something that could be added to the Final EIR, without recirculating.

Or if it results in new impacts or impacts increased severity or, you know, is large enough to be considered substantial new information to the public, then that could trigger recirculation.

PH-33

COMMISSIONER RIGGS: Pardon me for pushing back a little bit here, but if it's designed according to transportation standards, you're telling me that CEQA would want to re-examine it based as a safety issue, even if it's designed based on transportation standards?

MS. MIKKELSON: It's something we have to look at. It's something that we have to look at, no matter what.

If it's designed according to standards, then that's a good case that there's a less-than-significant safety impact, but it's definitely something that we need to look at.

COMMISSIONER RIGGS: Okay. Thank you very much. That's my questions.

CHAIR DORAN: Thank you. Other commissioners? Commissioner Harris?

COMMISSIONER HARRIS: Commission -- or Chair Doran, I think you called on me before my hand was even up. That's pretty good.

CHAIR DORAN: You were in the top left position. So I can read your mind.

PH-34

COMMISSIONER HARRIS: Okay. I really applaud both my fellow commissioners on discussing how we might take a look at a massive reduction in parking. And as we look at this in terms of reducing VMT, it's hard for me to understand that those two things are not connected. So -- but I do like the answer that later, an overall reduction in parking should not trigger a recirculation of the EIR.

A couple things were brought up by some of our -- residents were talking about a different way to look at trip caps. And I noticed that the analysis is always done based on the ITE methodology, which is -- my understanding is assumed to be an extremely car centric suburban area, which this is not. I mean, we're supposed to be a live, work, play development, with a large senior population. So it seems trips should be severely curtailed, both for office and residential. So -- and I was just surprised at

PH-34
cont'd.

how large they were.

Now I see that it's partly because we're looking at the gross, versus the net, and only taking a reduction of 20 percent. So if you take a pretty high average of trips, and then you reduce it by 20 percent, you're still kind of at a -- pretty high, for what I think we're trying to accomplish here.

And I'm just wondering. Ms. Levin talked about doing -- looking at this in modal share. And I'm just wondering why we don't utilize that analysis, versus looking -- versus the way we do it with the trip caps and looking at the ITE.

Would -- I'm not sure who could answer that question best.

MR. ZHOU: Yeah. I can answer that question.

IT trip generation are traditionally how us transportation engineers are -- it's the best resource that we have to estimate trip generation for any type of, I'll just say, project.

The mode share for Meta relates -- you know, would only relate to the Meta portion of the trip generation. And I believe that it is somewhat captured by the trip cap that they're proposing for their -- for their Meta van use specifically.

For other uses, you know, we can do it that way.

We -- it will be based on very shaky grounds. We have to make several other assumptions, in terms of, you know, vehicle occupancy, auto ownership -- you know, trip rates, on a person level.

So, you know, it will be a completely new study. And I just want to say that IT trip generation is, you know, the best resource that transportation engineers have, in terms of modeling trip generation.

PH-35

COMMISSIONER HARRIS: Okay. Thank you.

I -- like some of our residents, I'm having trouble deciding which items are purely EIR, and which items have to do with the general project. So I think -- I -- actually, I guess one more thing in this reducing of VMT.

I'd like to thank Ms. Chu for her comment and reminding us that the number one source of pollution is -- in air quality is cars. So the extent we can reduce them.

I'd like to thank Meta and Signature for all of the separated bike lanes and wide walkways and walking trails within the village, but, also, as Ms. Levin mentioned, it's just difficult to get to the village. So I'm interested in seeing how -- if we can work a little harder on the TDM, and we can also work on some of these intersections, which are pretty concerning.

And, also, on a circulation issue, again, I would

PH-35 cont'd.

really urge that this project go to Complete Streets Commission. They're really equipped with helping us try to, you know, improve some of these areas so that it's -- you know, so that it's a good place for the surrounding community, who is going to be the most impacted.

So I think those are all my questions and comments for now, on the EIR.

Thanks.

CHAIR DORAN: Thank you. I believe Commissioner Tate, you have your hand raised.

PH-36

COMMISSIONER TATE: I do. Thank you, Chair Doran.

So I'm not sure whether -- but I believe that putting a new road in would fall under this section and not the study session. And I would really like to see that evaluated, in putting a new road in to take out to Bayfront Expressway. I think that that would take a lot of the burden off of Willow Road and University, and just improve circulation as a whole, with getting out of the Willow Village community.

So what does it take for that to really be evaluated at this point? I know someone in the public mentioned it, a public commenter. And I actually have mentioned this before, in just other meetings, just in conversation and with Tarlton, actually, when his project

PH-36 cont'd.

was up, and hoping that maybe there can be some sort of a collaboration between the two major land owners -- or the two only land owners, I should say, within that park, that area over there, to study this and to actually put in a road that would relieve, again, the pressure.

And I know that it does consist of working with other agencies, but I'm sure that there is some sort of way to make it happen because I know that there's already relationship forming with CalTrans. And, of course, relationship with the two cities.

So is that something that we can make sure that it happens, to at least study it? That's a question.

MS. GARCIA: Commissioner Tate, I'm not sure -- I don't want to speak out of turn, but as the EIR consultant, we're tasked to impartially review the project as proposed. And so if there -- if the Applicant or the City wants to modify the plan to include another intersection, we're happy to evaluate it in the document, but we can't propose that alteration.

COMMISSIONER TATE: Okay. So, then, this goes on record as a comment and a request, then.

CHAIR DORAN: Commissioner Tate, did you have any other questions or comments?

COMMISSIONER TATE: No. No. I'm done.

CHAIR DORAN: Okay. Thank you.

COMMISSIONER TATE: Thank you.

CHAIR DORAN: Do we have anyone else that would like to speak?

Okay. I'm not seeing anything else from the Commission. So I will -- well, I guess I should ask Mr. Perata, before I close this matter, do you have the input you need on the EIR?

MR. PERATA: Thank you, Chair Doran.

Yes. This is -- thank you for the discussion this evening; the comments. I believe we have everything we need.

If there are no further commissioner comments or questions, we can certainly close the Draft EIR public hearing and move on to the study session.

CHAIR DORAN: Okay. So I will close the public hearing portion of tonight's meeting now.

(Whereupon, Agenda F1 ended.)

---o0o---

CERTIFICATE OF REPORTER

I, AMBER ABREU-PEIXOTO, hereby certify that said proceedings were taken in shorthand by me, a Certified Shorthand Reporter of the State of California, and was thereafter transcribed into typewriting, and that the foregoing transcript constitutes a full, true, and correct report of said proceedings which took place;

That I am a disinterested person to the said action.

IN WITNESS WHEREOF, I have hereunto set my hand this 6th day of May, 2022.

Amber Abreu-Peixoto

AMBER ABREU-PEIXOTO, CSR No. 13546

## D

Appendix 2

# Stormwater Management Compliance Memorandum

# WILLOW VILLAGE PROJECT

# STORMWATER MANAGEMENT

# COMPLIANCE MEMORANDUM

**March 9, 2021**

**Prepared by:**

SHERWOOD DESIGN ENGINEERS

2548 Mission Street
San Francisco, CA 94110
415.677.7300

## SECTION 1: Overview

Willow Village is a mixed development site located in Menlo Park, California. The project is being developed by Peninsula Innovation Properties with site plans currently in the Schematic Design phase of development.

The project is a 59.36-acre site located within the City of Menlo Park. The project is bounded by Willow Road to the west, the SFPUC's Hetch Hetchy parcel to the south, Life Sciences District to the east, and the inactive Dumbarton Rail Corridor along the north. The existing site is made up of 18 parcels that include approximately 1 million square feet of existing industrial, office, and warehouse land uses with surface parking.

The existing project site is a developed "office park" with 87% of the area covered with buildings and paved surfaces, the remaining 13% consists of scattered pockets of landscape. There are currently no stormwater management facilities in place. In general, the site slopes from the southeast towards the north at approximately a 0.5% slope. The existing storm infrastructure drains west and discharges to an existing 66-inch storm drain at the Hamilton Avenue and Willow Road intersection. The 66-inch storm drain travels north, increases in size to 78-inch, and ultimately outfalls to Ravenswood Slough via a Caltrans owned and operated pump station. Refer to Exhibit A for Willow Village existing conditions.

The drainage basin for this site is the San Francisco Bay which was identified from the storm drain system maps provided by the City of Menlo Park. Refer to Exhibit B for a compiled version of the provided maps.

Based on historic groundwater data from the California Geologic Survey, the geotechnical report (prepared by Cornerstone Earth Group, 2017) recommends the project use the historic high groundwater elevation 4' (NAVD88). Past industrial activities on the site have led to underlying shallow groundwater contamination that may require certain BMPs to be lined with impermeable materials. Based on preliminary results from additional infiltration testing, the site is underlaid with predominantly clayey deposits with infiltration rates ranging from 0.08 to 0.17 inches per hour. Due to this low in filtration rate, all stormwater treatment facilities are likely to be underdrained.

## SECTION 2: Proposed Site

The Proposed Project has been designed as a master plan to implement the guiding principles and policies adopted as part of ConnectMenlo, such as including new affordable and market-rate housing units, providing opportunities for future transit connections, and constructing a grocery store. The Proposed Project would develop the site with new infrastructure, housing, sustainability features, circulation elements, open spaces, office uses, commercial (retail, dining, entertainment, and hotel) uses, and bicycle and pedestrian infrastructure. The new housing and community-serving retail would include public spaces of various scales, restaurants, public gathering spaces. In addition, the Proposed Project would include a community-serving space adjacent to the approximately 4-acre publicly accessible park. The Proposed Project would also include a Town Square including ground floor retail, public gathering space, a visitors center, and 193 room hotel.

Specifically, the Project Sponsor would demolish the existing onsite buildings at the Project Site and construct a Residential/Shopping District, a Town Square District, and a Campus District. The Proposed Project would increase the area for commercial uses (excluding the hotel) by approximately 1 million sf, for a total of approximately 2 million sf of nonresidential uses at the Project Site. In addition, the Proposed Project would include up to 1,735 housing units, a limited-service hotel with up to 193 rooms, an approximate 5,000 sf community-serving space which may use used initially to accommodate a small general store, and approximately 24.8 acres of open space, of which approximately 11.6 acres would be publicly accessible. The proposed site plan would aggregate approximately 4.0 acres of the publicly accessible open space in a public park located at the southwestern corner of the Project Site. In total, the Proposed Project would construct approximately 3.5 million sf of uses at the Project Site. Refer to Exhibit C for the Proposed Parcel Map.

All proposed buildings will have a finished floor elevation (FFE) of at least 13' which will ensure that the site is above the base flood elevation of 11' per the current effective FEMA map dated 4/5/2019. The City of Menlo Park also requires that all new construction within the flood zone that is located in zones R-MU, LS, and O shall have an FFE 24" above base flood elevation to mitigate for sea level rise. The proposed project is located within both O and R-MU zones. The proposed minimum FFE of elevation 13' meets both requirements.

**Methodology**

The stormwater treatment volume was sized per the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) C.3 volume-based method. This method resulted in approximately 93,000 sf of green infrastructure (GI) required for stormwater treatment for the entire site (parcels and rights of way). See Appendix 1 for sizing sheet using the C.3 volume-base method.

All drainage management areas (DMAs) for the proposed site parcels are estimated to be between 80% and 95% impervious. The only exceptions are the community parks (Parcel A & B) which have an estimated impervious area of 15% each and the parcel E-A with an estimated impervious area of 60%. The DMAs on private and public right of ways are estimated to be between 75% and 100% impervious. The proposed project is a C.3 Regulated Project because it will replace more than 10,000 sq ft of impervious surface and is therefore required to comply with the Municipal Regional Stormwater Permit C.3 Provisions. See Exhibit D for the proposed DMAs in public roads, private roads and site parcels.

For this analysis, all landscape areas on site are considered to be self-treating. Stormwater GIs are required to treat runoff from all buildings and site hardscape.

Green infrastructure areas within parcels and streets were determined using the 4% rule of the contributing impervious area. The DMAs within street ROWs were provided with slightly larger areas to take into account into the potential variability of these spaces due to street trees, lighting, fire hydrants and utility crossings. See Table 1 for the summarized pre- versus post-construction imperviousness and Table 2 for the approximate required treatment areas for each DMA.

**Treatment Strategies**

Because the design project is still in progress, detailed stormwater BMP design has not yet been developed. Instead, the purpose of this report is to show intent and feasibility to meet the C.3 Provisions utilizing green stormwater infrastructure standard details as provided in the June 2019 City of Menlo Park Green Infrastructure Plan. The treatment measures are anticipated to vary depending on parcel designation and ultimate design approach.

Treatment strategies for office and mixed use parcels may include bioretention areas, flow-through planters, pervious paving, proprietary treatment systems such as Silva Cells and green roofs. Rainwater harvesting will not be considered on site as the Non-Potable Water Ordinance will require significant recycled water supplies which can only be met via municipally provided recycled water or on-site treatment of wastewater.

Publicly owned streets have been conceptually designed to treat road runoff using evenly spaced bioretention basins, bioretention planters, proprietary treatment systems such as Silva Cells or connected tree wells located at the back of curb. See Exhibit E for the street design concept, and Exhibits F & G for standard details. Planter widths vary per street, depending on the in-progress street section. These planters shall not limit pedestrian walkways or step-out zones for proposed parallel parking. Stormwater treatment will be located at low points within the proposed grading scheme to facilitate surface drainage and minimize required storm drain piping.

When managing stormwater runoff on private roads, the roads must be graded to maintain all private stormwater flows within the private DMAs. Private streets will utilize the same strategies as public streets for stormwater treatment.

## Tables/Supporting Data:

### Table 1: Summary of existing and proposed total pervious and impervious area on site

| EXISTING (SQFT) | | PROPOSED (SQFT) | |
|---|---|---|---|
| **PERVIOUS AREA** | **IMPERVIOUS AREA** | **PERVIOUS AREA** | **IMPERVIOUS AREA** |
| 332,597 | 2,253,195 | 430,818 | 2,154,974 |

### Table 2A: Approximate biotreatment sizing summary table for proposed drainage management areas in parcels

| DMA ID | Area (SQFT) | % Of Imperviousness | Impervious Area (SQFT) | % Of Impervious Area Required For BTA Area | Treatment Area Required (SQFT) |
|---|---|---|---|---|---|
| P1-A | 71,588 | 95% | 68,009 | 4% | 2,720 |
| P1-B | 54,622 | 95% | 51,891 | 4% | 2,076 |
| P1-C | 59,688 | 80% | 47,750 | 4% | 1,910 |
| P1-D | 56,927 | 80% | 45,542 | 4% | 1,822 |
| P1-E | 45,024 | 80% | 36,019 | 4% | 1,441 |
| P1-F | 67,027 | 80% | 53,622 | 4% | 2,145 |
| P1-G | 70,195 | 80% | 56,156 | 4% | 2,246 |
| P1-H | 57,542 | 80% | 46,034 | 4% | 1,841 |
| P1-I | 67,806 | 80% | 54,245 | 4% | 2,170 |
| P1-J | 47,844 | 95% | 45,452 | 4% | 1,818 |
| P1-K | 38,379 | 95% | 36,460 | 4% | 1,458 |
| P1-L | 108,119 | 80% | 86,495 | 4% | 3,460 |
| P1-M | 61,081 | 80% | 48,865 | 4% | 1,955 |
| P1-N | 55,343 | 80% | 44,274 | 4% | 1,771 |
| P1-O | 110,139 | 80% | 88,111 | 4% | 3,524 |
| P1-P | 52,768 | 95% | 50,130 | 4% | 2,005 |
| P1-Q | 85,614 | 80% | 68,491 | 4% | 2,740 |
| P1-R | 22,880 | 80% | 18,304 | 4% | 732 |
| P1-S | 59,103 | 95% | 56,148 | 4% | 2,246 |
| P1-T | 38,394 | 95% | 36,474 | 4% | 1,459 |
| P1-U | 61,857 | 80% | 49,486 | 4% | 1,979 |
| P2-A | 72,712 | 95% | 69,076 | 4% | 2,763 |
| P2-B | 68,857 | 95% | 65,414 | 4% | 2,617 |
| P3-A | 52,663 | 95% | 50,030 | 4% | 2,001 |
| P3-B | 72,661 | 95% | 69,028 | 4% | 2,761 |
| P4-A | 57,805 | 95% | 54,915 | 4% | 2,197 |
| P4-B | 57,865 | 95% | 54,972 | 4% | 2,199 |
| P5-A | 37,761 | 95% | 35,873 | 4% | 1,435 |

| | | | | | |
|---|---|---|---|---|---|
| P5-B | 33,109 | 95% | 31,454 | 4% | 1,258 |
| P6 | 64,434 | 95% | 61,212 | 4% | 2,448 |
| P7 | 31,857 | 95% | 30,264 | 4% | 1,211 |
| A | 154,491 | 15% | 23,174 | 4% | 927 |
| B | 11,404 | 15% | 1,711 | 4% | 68 |
| E-A | 47,980 | 60% | 28,788 | 4% | 1,152 |
| | | | | Total | 66,555 |

**Table 2B: Approximate biotreatment sizing summary table for proposed drainage management areas in streets**

| Street | DMA ID | Area (SQFT) | % Of Imperviousness | Impervious Area (SQFT) | % Of Impervious Area Required For BTA Area | Treatment Area Required (SQFT) | Treatment Area Given (SQFT) |
|---|---|---|---|---|---|---|---|
| Center Street | CS-1 | 16,117 | 95% | 15311 | 4% | 612 | 806 |
| | CS-2 | 14,520 | 95% | 13794 | 4% | 552 | 720 |
| | CS-3 | 13,344 | 95% | 12677 | 4% | 507 | 682 |
| East Loop Road | ELR-1 | 20,731 | 95% | 19694 | 4% | 788 | 996 |
| | ELR-2 | 21,728 | 95% | 20642 | 4% | 826 | 1056 |
| | ELR-3 | 17,011 | 95% | 16160 | 4% | 646 | 827 |
| | ELR-4 | 23,627 | 95% | 22446 | 4% | 898 | 1150 |
| | ELR-5 | 34,129 | 75% | 25597 | 4% | 1024 | 1666 |
| East Street | ES-1 | 14,156 | 95% | 13448 | 4% | 538 | 710 |
| Hamilton Avenue | HA-1 | 31,101 | 95% | 29546 | 4% | 1182 | 1567 |
| Main Street | MS-1 | 14,966 | 95% | 14218 | 4% | 569 | 746 |
| | MS-2 | 15,807 | 100% | 15807 | 4% | 632 | 831 |
| | MS-3 | 19,070 | 100% | 19070 | 4% | 763 | 937 |
| | MS-4 | 13,869 | 95% | 13176 | 4% | 527 | 703 |
| | MS-5 | 11,255 | 95% | 10692 | 4% | 428 | 575 |
| | MS-6 | 23,132 | 95% | 21975 | 4% | 879 | 1288 |
| North Loop Road | NLR-1 | 32,712 | 95% | 31076 | 4% | 1243 | 1575 |
| | NLR-2 | 37,760 | 75% | 28320 | 4% | 1133 | 1896 |
| Park Street | PS-1 | 21,492 | 95% | 20417 | 4% | 817 | 1025 |
| | PS-2 | 26,501 | 95% | 25176 | 4% | 1007 | 1270 |
| | PS-3 | 17,496 | 95% | 16621 | 4% | 665 | 897 |
| | PS-4 | 21,689 | 95% | 20605 | 4% | 824 | 1095 |
| | PS-5 | 14,596 | 95% | 13866 | 4% | 555 | 742 |
| West Street | WS-1 | 21,201 | 95% | 20141 | 4% | 806 | 1040 |
| | WS-2 | 17,902 | 95% | 17007 | 4% | 680 | 917 |
| | WS-3 | 14,347 | 95% | 13630 | 4% | 545 | 703 |
| | | | | | Total | 19644 | 26420 |

# EXHIBITS


## LEGEND

PROPERTY LINE

PATH USED FOR CALCULATING TIME OF CONCENTRATION FOR PIPE FLOW

LAWN (C =0.39)

DENSE BUSH OR VEGETATION (C =0.35)

ASPHALT PAVEMENT (C = 0.88)

ROOFTOP (C = 0.90)

| Runoff coefficent | | | | | |
|---|---|---|---|---|---|
| Type of Surface | C | Area (ft2) | Area (Acre) | % Area | C*A |
| Lawn | 0.39 | 214,143 | 4.92 | 8.30% | 83,516 |
| Dense Brush or Vegetation | 0.35 | 118,454 | 2.72 | 4.60% | 41,459 |
| Asphalt pavements | 0.88 | 1,354,217 | 31.09 | 52.40% | 1,191,711 |
| Rooftops | 0.90 | 898,978 | 20.64 | 34.80% | 809,080 |
| **TOTAL** | | **2,585,792** | **59.36** | **100%** | **2,125,766** |

SHERWOOD
DESIGN ENGINEERS
2548 Mission Street
San Francisco, CA 94110
www.sherwoodengineers.com

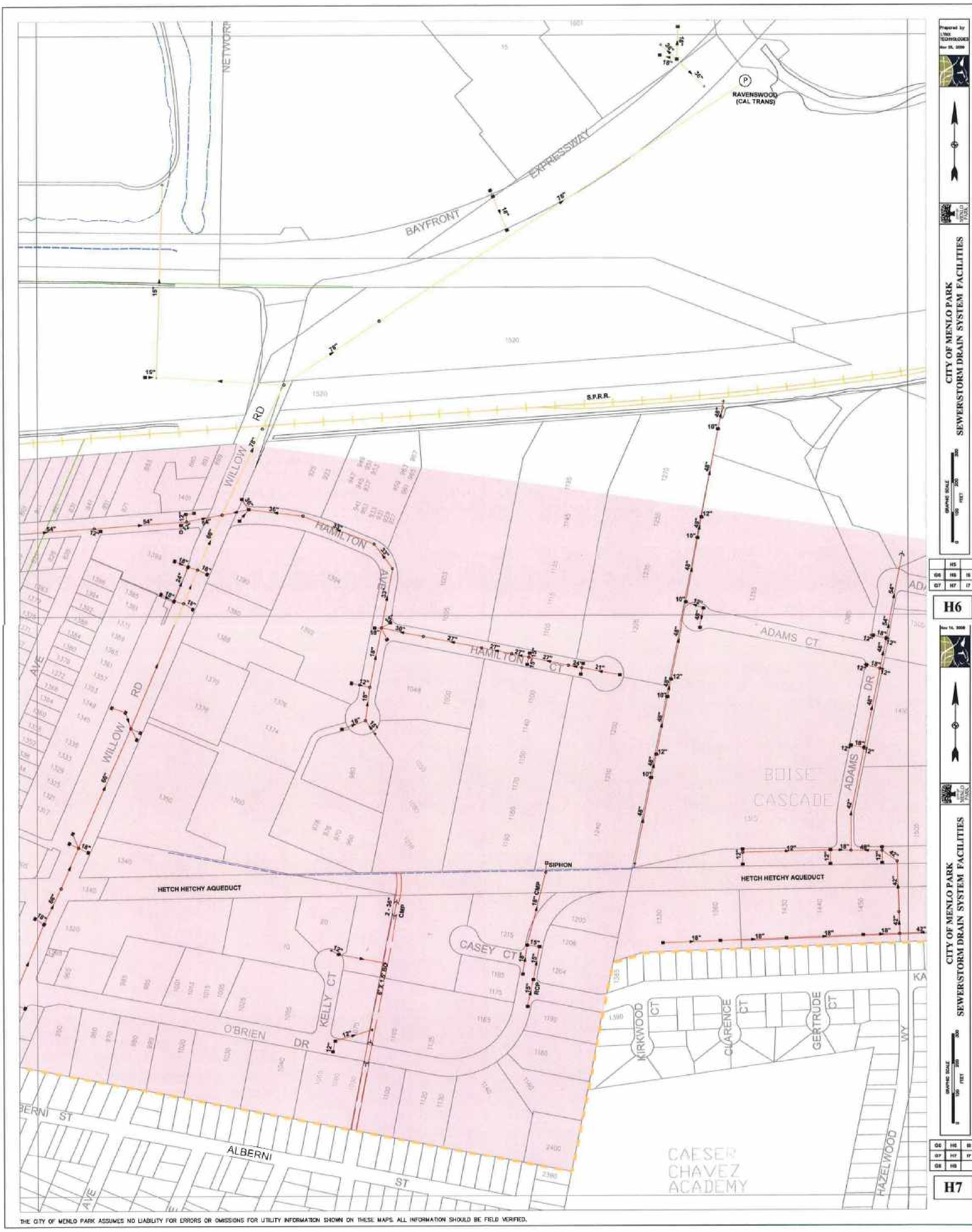
# EXHIBIT A - EXISTING CONDITIONS

WILLOW VILLAGE
MENLO PARK, CA

NORTH

0 50' 100' 200'

March 5, 2021




# CITY OF MENLO PARK

## STORM DRAIN SYSTEM

### LEGEND

CITY PIPE
PIPE MAINTAINED BY OTHERS
CULVERT
DRY DITCH
PVT DRY DITCH
OPEN CHANNEL
ABANDONED PIPE
RIDGELINE
CITY LIMIT
RAILROAD

PUMP STATION
MANHOLE (ACCESS)
INLET / CATCH BASIN
BUBBLER BOX
BUBBLER BOX MAINTAINED BY OTHERS
HEADWALL
OUTFALL TO CHANNEL
FLAP GATE

DIRECTION OF SURFACE FLOW
DIRECTION OF STREET FLOW
DIRECTION OF PIPE FLOW
OPEN-ENDED PIPE / OUTFALL TO NEIGHBORING JURISDICTION

SWEEP ROUTES
1
2
3
4
5
6
7
8
9
10
11
12

**EXHIBIT B**
**STORM DRAIN SYSTEM MAP**
**CITY OF MENLO PARK**


# EXHIBIT C - PROPOSED PARCEL MAP

WILLOW VILLAGE
MENLO PARK, CA

NORTH 0 50' 100' 200'

March 5, 2021

SHERWOOD
DESIGN ENGINEERS
2548 Mission Street
San Francisco, CA 94110
www.sherwoodengineers.com

LEGEND

PARCEL DMA

STREET DMA


SHERWOOD DESIGN ENGINEERS

2548 Mission Street
San Francisco, CA 94110
www.sherwoodengineers.com

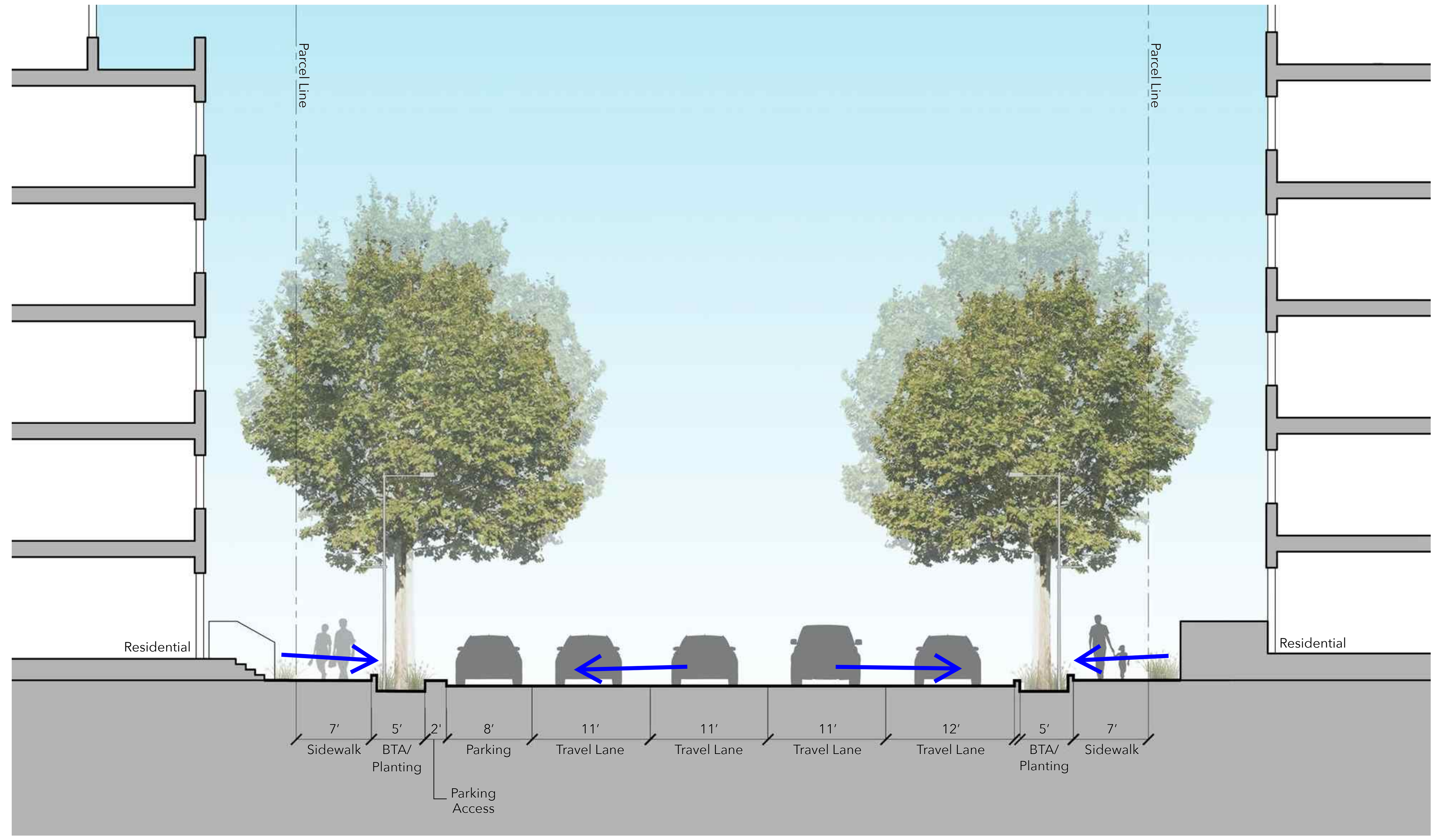
# EXHIBIT D - PROPOSED DRAINAGE MANAGEMENT AREAS

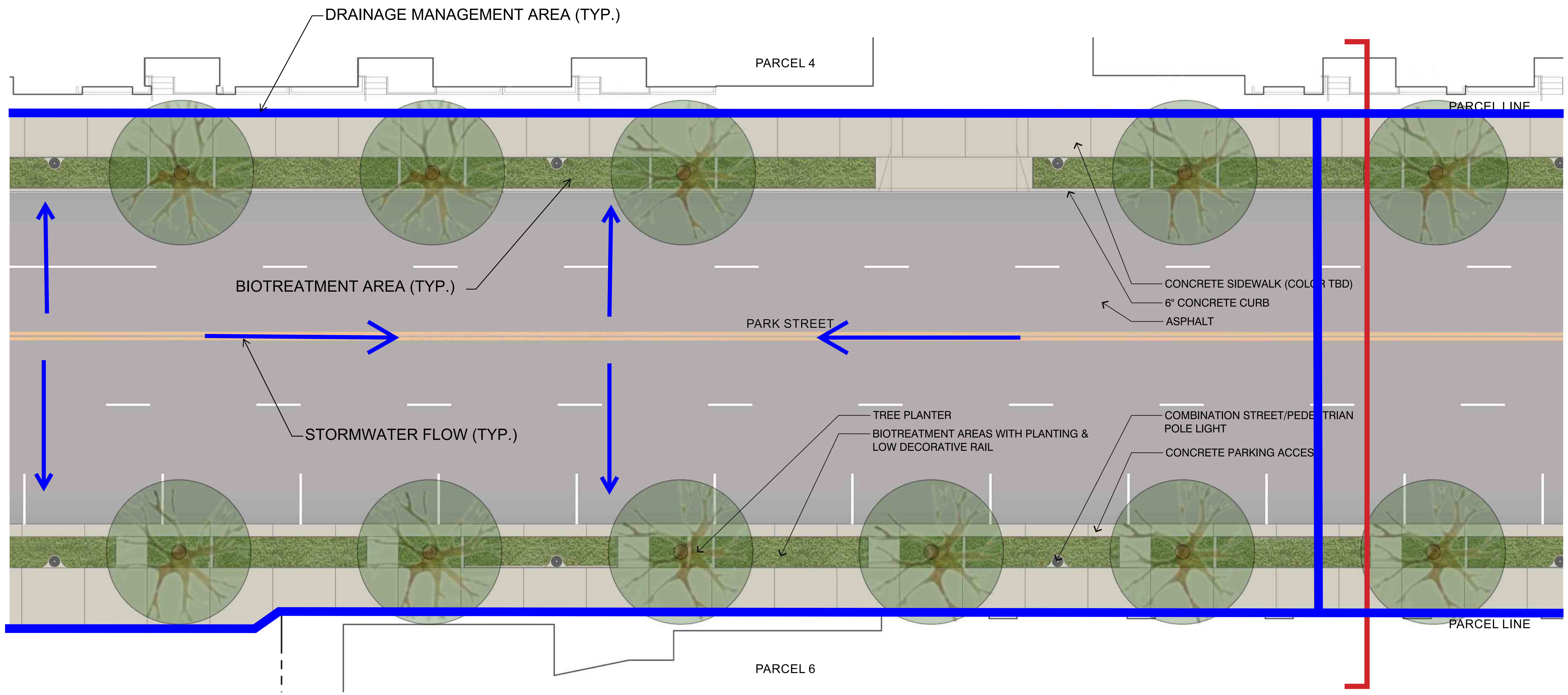
WILLOW VILLAGE
MENLO PARK, CA

NORTH

0 50' 100' 200'

March 5, 2021




# EXHIBIT E - TYPICAL TREATMENT FOR RIGHT OF WAY

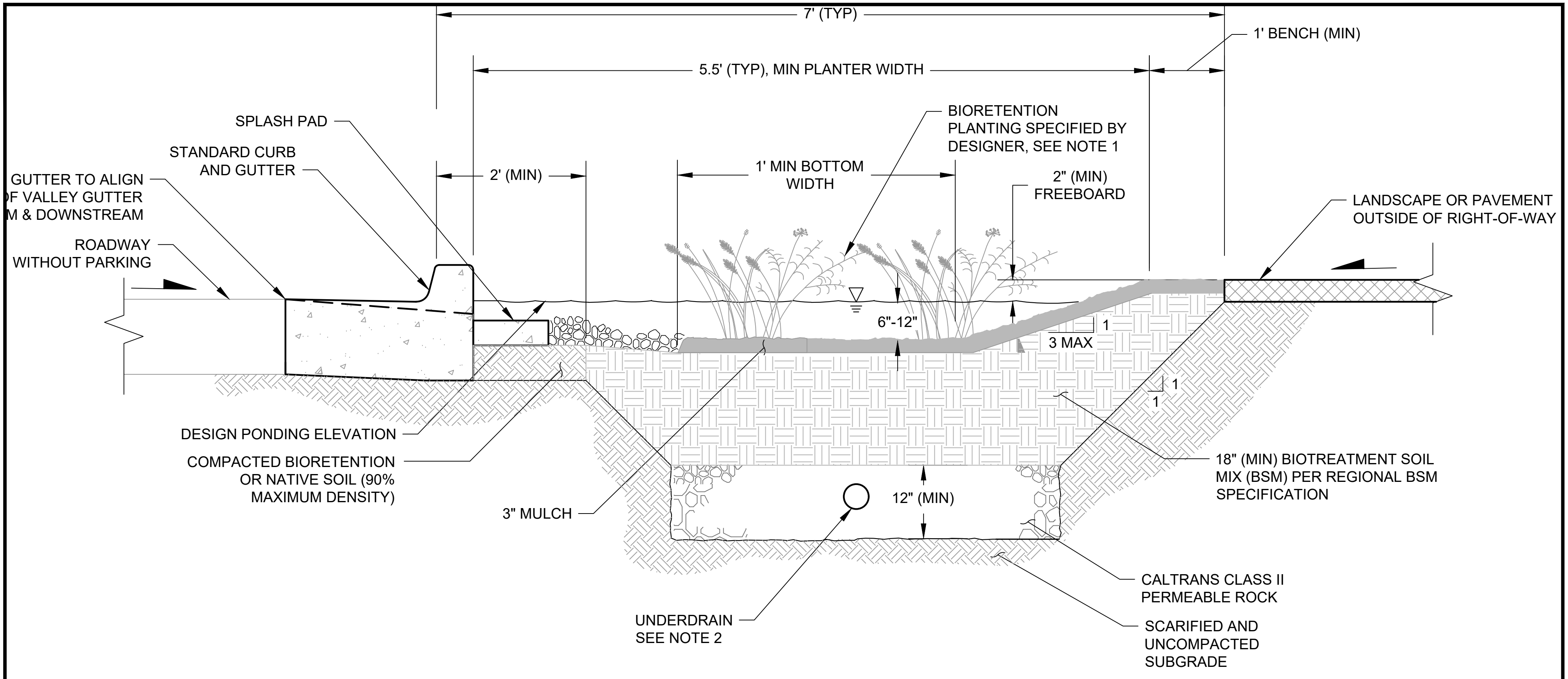
WILLOW VILLAGE
MENLO PARK, CA

March 5, 2021

SHERWOOD
DESIGN ENGINEERS
2548 Mission Street
San Francisco, CA 94110
www.sherwoodengineers.com

# Exhibit F

*"City of Menlo Park Green Infrastructure Standard Details"*




SECTION A (A)

## CONSTRUCTION NOTES:

1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW BASIN.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIORETENTION SOIL MATERIALS.
3. COMPACT BIORETENTION SOIL IMMEDIATELY BEHIND CURB TO 90% OF MAXIMUM DENSITY PER STANDARD PROCTOR TEST (ASTM D698).
4. UNDERDRAIN REQUIRED FOR ALL FACILITIES WITH IMPERMEABLE LINER.
5. PROVIDE ONE CLEANOUT PER PLANTER (MIN) FOR FACILITIES WITH UNDERDRAINS.
6. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT SFPUC ASSET PROTECTION STANDARDS. COORDINATE WITH ENGINEER IN THE EVENT OF UTILITY CROSSING AND UTILITY CONFLICTS.
7. GEOTECHNICAL OR HYDRAULOGIST ENGINEER TO DETERMINE IF LINER SHALL BE USED.
8. ANGLE OF REPOSE MAY VARY BASED ON GEOTECHNICAL ENGINEER RECOMMENDATIONS.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

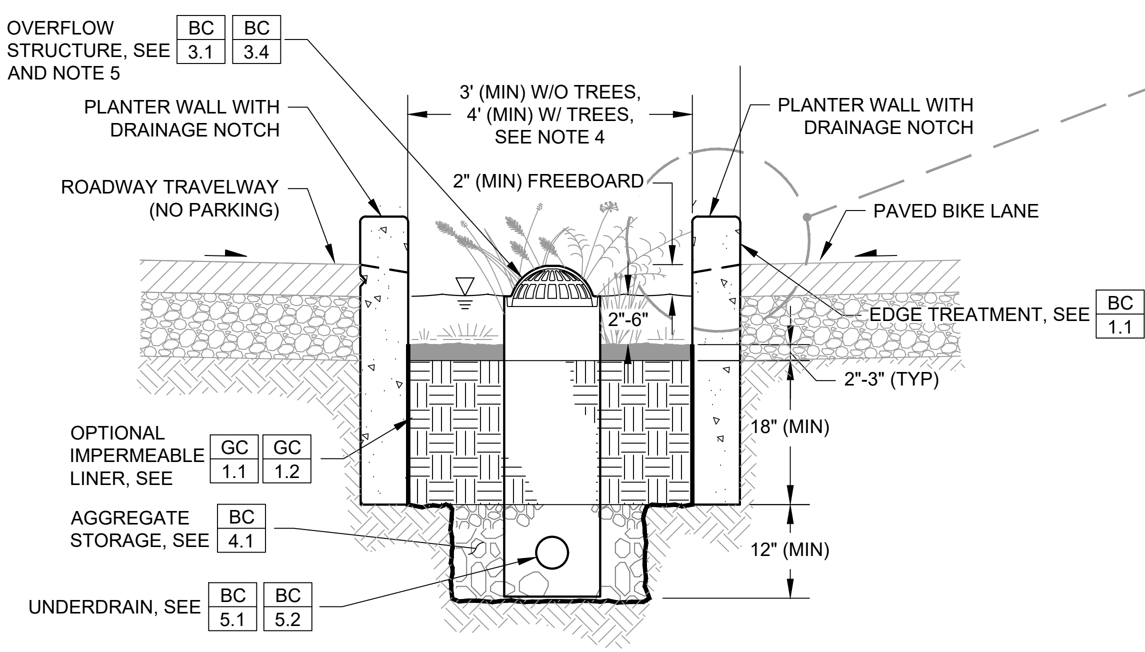
CITY OF MENLO PARK

GREEN INFRASTRUCTURE
TYPICAL DETAILS
CITY OF MENLO PARK

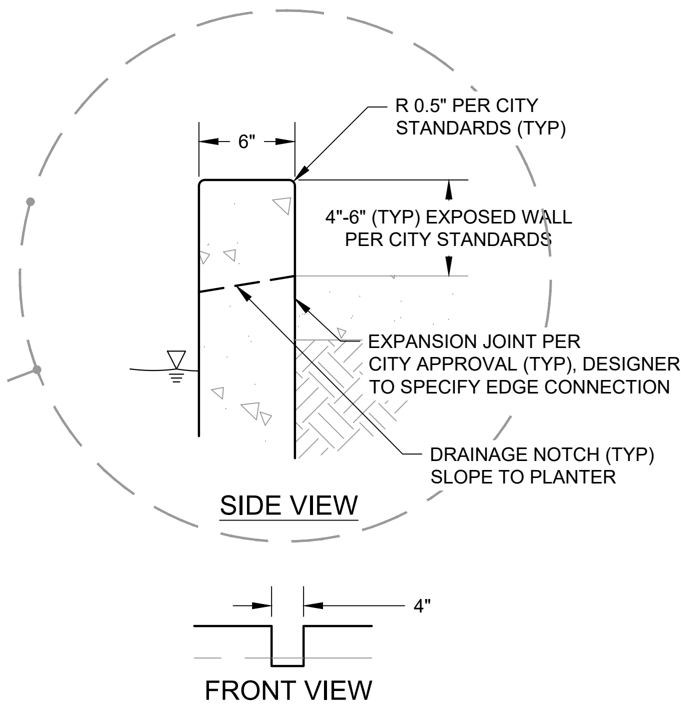
| | |
|---|---|
| DATE | APRIL 2019 |
| VERSION | 1.0 |
| REVISED | |

BIORETENTION BASIN
ROADSIDE SECTION TYPE 3

DWG NO. BB 2.4




STORMWATER BARRIER PLANTER FOR CLASS 4 BIKEWAY (A)



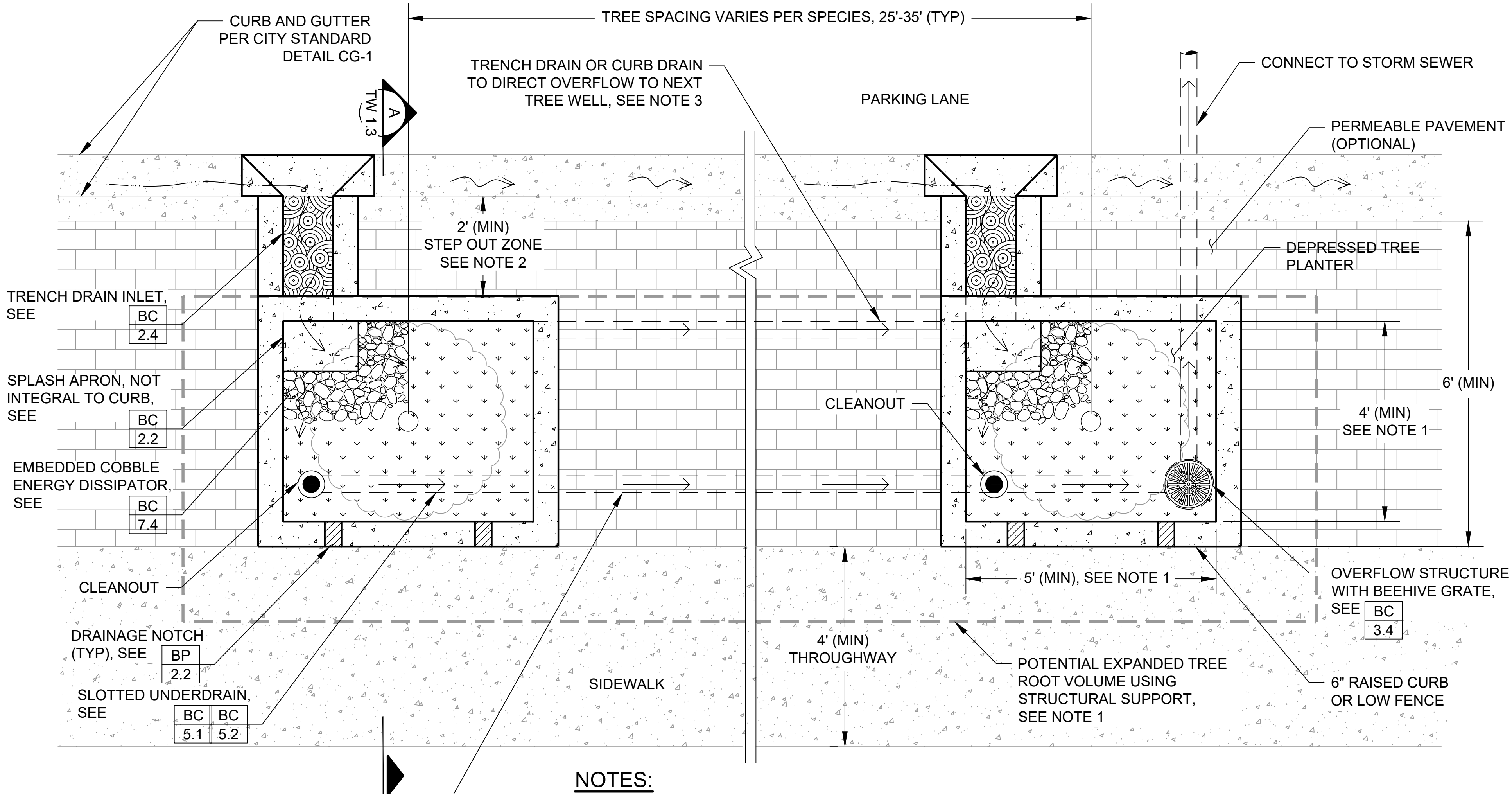

TYPICAL DRAINAGE NOTCH DETAIL

## NOTES:

1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW PLANTER DURING CONSTRUCTION.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIORETENTION SOIL MATERIAL.
3. MAXIMUM DROP FROM TOP OF CURB TO TOP OF BIOTREATMENT SOIL SHALL INCLUDE CONSIDERATIONS FOR BIOTREATMENT SOIL SETTLEMENT.
4. DESIGNER TO SPECIFY PLANTER WIDTH AND IF TREES ARE DESIRED, PROVIDE ADDITIONAL TREE ROOT VOLUME USING STRUCTURAL SOIL OR SILVA CELLS UNDER ADJACENT BIKEWAY PAVEMENT.
5. OVERFLOW STRUCTURE TO HAVE SQUARE OR ATRIUM GRATE PER PROJECT DESIGN AND THE DISCRETION OF THE PUBLIC WORKS DEPARTMENT.



| | | | | |
|---|---|---|---|---|
| CITY OF MENLO PARK | GREEN INFRASTRUCTURE TYPICAL DETAILS<br>CITY OF MENLO PARK | DATE APRIL 2019<br>VERSION 1.0<br>REVISED | BIORETENTION PLANTER<br>STORMWATER BARRIER PLANTER<br>CLASS 4 BIKEWAY – SECTION | DWG NO.<br>BP<br>3.4 |

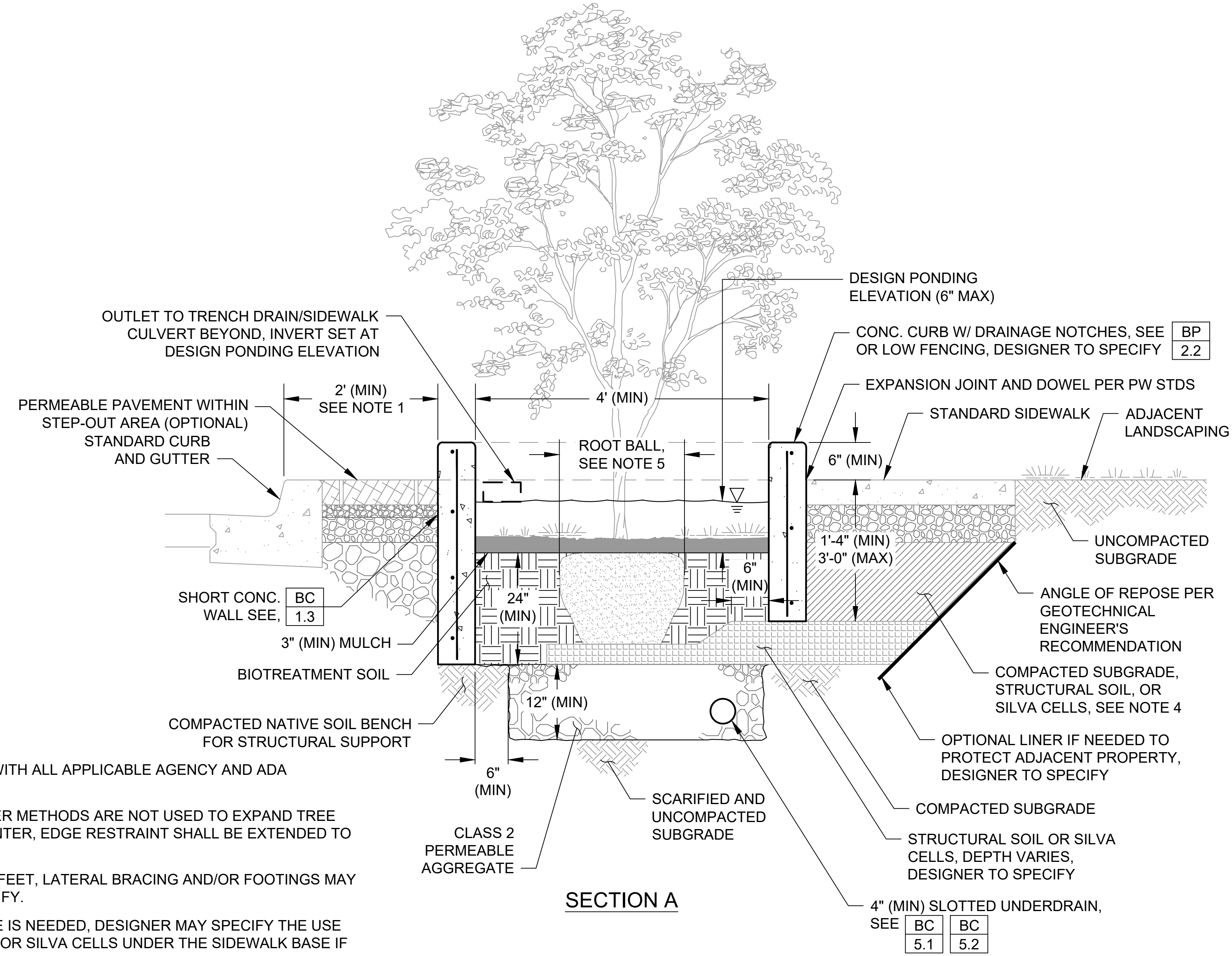



## NOTES:

1. PREFERRED TREE WELL SIZE IS 6 FEET BY 6 FEET, BUT CONSTRAINED SITES CAN REDUCE WIDTH TO 4 FEET PROVIDED THEY CAN ACCOMMODATE MINIMUM REQUIRED TREE ROOT VOLUME BY INCREASING LENGTH AND/OR USING STRUCTURAL SOIL, PERMEABLE PAVEMENT, AND/OR SILVA CELLS UNDER ADJACENT SIDEWALK.
2. DESIGNER TO SPECIFY MINIMUM SIDEWALK WIDTH BEHIND AND STEP-OUT ZONE IN FRONT OF TREE WELL THAT COMPLIES WITH ALL APPLICABLE AGENCY AND ADA REQUIREMENTS. STEP-OUT ZONE CAN BE ELIMINATED IF PARKING IS PROHIBITED ALONG CURB. SEE DESIGNER NOTES.
3. IF CURB DRAIN, I.E. SHALLOW PIPES, ARE USED TO CONVEY SURFACE WATER BETWEEN TREE WELLS, 3 INCH CAST IRON PIPES SHALL BE INSTALLED AND A MINIMUM COVER OF 1-1/2 INCHES OF CONCRETE OVER PIPES SHALL BE PROVIDED. IF TRENCH DRAIN IS USED, THE GRATE SHALL BE ADA COMPLIANT AND HAVE A NON-SLIP SURFACE.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

| | | | | |
|---|---|---|---|---|
| CITY OF MENLO PARK | GREEN INFRASTRUCTURE TYPICAL DETAILS<br>CITY OF MENLO PARK | DATE APRIL 2019<br>VERSION 1.0<br>REVISED | TREE WELL<br>CONNECTED TREE WELLS WITH PARKING – PLAN | DWG NO. TW 1.2 |




SECTION A

NOTES:

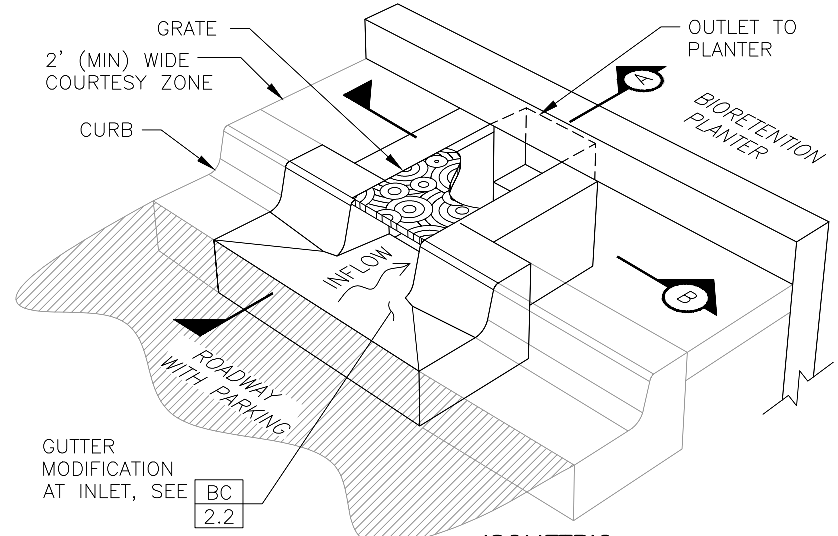
1. STEP-OUT WIDTH SHALL COMPLY WITH ALL APPLICABLE AGENCY AND ADA STANDARDS.
2. IF STRUCTURAL SOIL AND/OR OTHER METHODS ARE NOT USED TO EXPAND TREE ROOT VOLUME BEYOND TREE PLANTER, EDGE RESTRAINT SHALL BE EXTENDED TO BOTTOM OF BIOTREATMENT SOIL.
3. IF TREE WELL LENGTH EXCEEDS 6 FEET, LATERAL BRACING AND/OR FOOTINGS MAY BE REQUIRED. DESIGNER TO SPECIFY.
4. IF ADDITIONAL TREE ROOT VOLUME IS NEEDED, DESIGNER MAY SPECIFY THE USE OF ADDITIONAL STRUCTURAL SOIL OR SILVA CELLS UNDER THE SIDEWALK BASE IF ALLOWED BY PUBLIC WORKS.
5. ROOT BALL SIZE TO BE SPECIFIED BY THE DESIGNER AND APPROVED BY THE CITY ARBORIST IF WITHIN PUBLIC RIGHT-OF-WAY.
6. REFER TO DESIGNER NOTES FOR ADDITIONAL DESIGN GUIDANCE.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

| | | | | |
|---|---|---|---|---|
| CITY OF MENLO PARK | GREEN INFRASTRUCTURE TYPICAL DETAILS<br>CITY OF MENLO PARK | DATE APRIL 2019<br>VERSION 1.0<br>REVISED | TREE WELL<br>CONNECTED TREE WELLS WITH PARKING – SECTION | DWG NO. TW 1.3 |

# Exhibit G

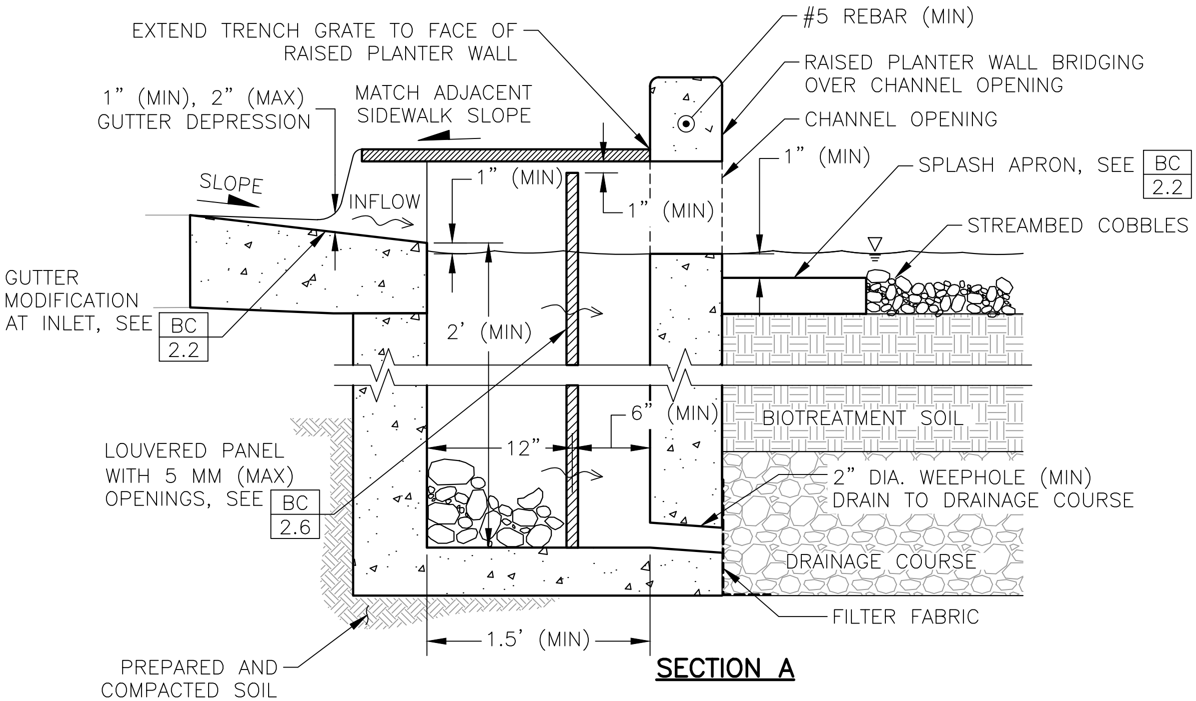
*"City of San Mateo Green Infrastructure Standard Details"*



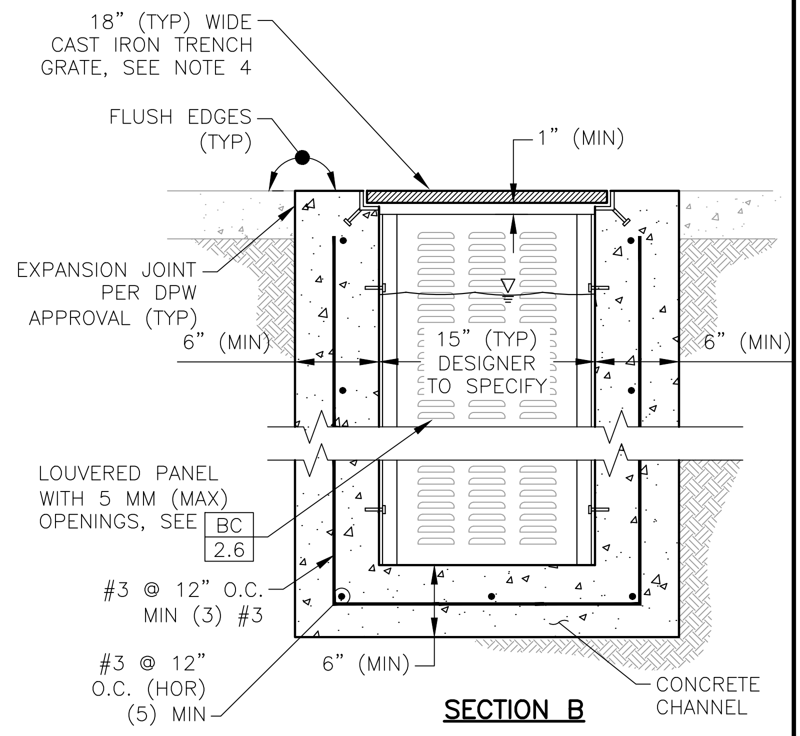

ISOMETRIC

## NOTES:

1. THIS DETAIL SHOWS ONE EXAMPLE OF A NON-PROPRIETARY TRASH CAPTURE DEVICE THAT CAN BE PROVIDED ON THE INLET SIDE OF ROADSIDE BIORETENTION PLANTERS TO MEET THE FULL TRASH CAPTURE SYSTEM REQUIREMENTS MANDATED BY THE STATE WATER BOARD. TRASH CAPTURE CAN ALSO BE PROVIDED AT THE OVERFLOW OR BYPASS OUTLET STRUCTURE BY TRAPPING PARTICLES 5 MM OR GREATER DURING THE DESIGN STORM EVENT. SEE THE STATE WATER BOARD SITE FOR MORE INFORMATION.
2. ALL MATERIAL AND WORKMANSHIP FOR TRENCH DRAIN AND TRASH CAPTURE ASSEMBLY SHALL CONFORM TO CITY OF SAN MATEO STANDARD SPECIFICATIONS AND APPLICABLE PUBLIC WORKS CODES.
3. PROVIDE AT LEAST 1 INCH DROP BETWEEN INLET ELEVATION AT GUTTER AND PONDING ELEVATION.
4. ALL TRENCH GRATES/TRASH CAPTURE STRUCTURE LIDS SHALL BE REMOVABLE, RATED PER THE ANTICIPATED LOADING (H-20 LOADING WITHIN PUBLIC STREETS), AND BOLTED IN PLACE OR OUTFITTED WITH APPROVED TAMPER-RESISTANT LOCKING MECHANISM, FLUSH OR RECESSED IN GRATE.
5. BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.
6. HORIZONTAL CONTROL JOINTS SHALL BE PROVIDED EVERY 10 LINEAR FEET, OR PER MANUFACTURER'S RECOMMENDATIONS.
7. APPLY EPOXY BONDING AGENT AT ALL TRENCH DRAIN CONSTRUCTION COLD JOINTS.




SECTION A




SECTION B

INLET – TRENCH DRAIN WITH TRASH CAPTURE (1)

NOT FOR CONSTRUCTION - REFER TO USER GUIDE

| | | | |
|---|---|---|---|
| **GREEN INFRASTRUCTURE TYPICAL DETAILS**<br>CITY OF SAN MATEO | DATE JUNE 2019<br>VERSION 1.0<br>REVISED | **BIORETENTION COMPONENTS**<br>**INLET WITH TRASH CAPTURE**<br>**CURB CUT WITH TRENCH DRAINS (1 OF 2)** | DWG NO. **BC 2.5** |

# Appendix 1

*"SMCWPPP C3. Worksheet for Calculating the Water Quality Design Volume (80 percent capture method)"*

SAN MATEO COUNTYWIDE Water Pollution Prevention Program
Clean Water. Healthy Community.

# Worksheet for Calculating the Water Quality Design Volume (80 percent capture method)

*Instructions: After completing Section 1, make as many copies of this Excel file as needed to fill out the worksheet for each Drainage Management Area of the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.*

## 1.0 Project Information

| | | |
|---|---|---|
| 1-1 | Project Name: | **Willow Village** |
| 1-2 | City application ID: | |
| 1-3 | Site Address or APN: | **900-910 Hamilton Ave** |
| 1-4 | Tract or Parcel Map No: | |
| 1-5 | Rainfall Region | **4** |
| 1-6 | Region Mean Annual Precipitation (MAP) | **14.60** |
| 1-7 | SiteMean Annual Precipitation (MAP) | **17** |

The calculations presented here are based on the 80% capture method of sizing **volume-based treatment measures** provided in the Countywide Program's C.3 Technical Guidance, v. 5.0 (2016) The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.13**

*(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, shown in Table 5-3, below.)*
*Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.*

## 2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **Site**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

| | Type of Surface | Area of surface type within DMA (Sq. Ft) | Adjust Pervious Surface | Effective Impervious Area |
|---|---|---|---|---|
| 2-2 | Impervious surface | **2,154,974** | **1.0** | **2,154,974** |
| 2-3 | Pervious service | **430,818** | **0.1** | **43,082** |
| | ***Total DMA Area (square feet) =*** | **2,585,792** | | |

2-4 ***Total Effective Impervious Area (EIA)*** **2,198,056** **Square feet**

## 3.0 Calculate Unit Basin Storage Volume in Inches

**Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient**

| Region | Station, and Mean Annual Precipitation (Inches) | Runoff Coefficient of 1.0 |
|---|---|---|
| 1 | Boulder Creek, 55.9" | 2.04" |
| 2 | La Honda, 24.4" | 0.86" |
| 3 | Half Moon Bay, 25.92" | 0.82" |
| 4 | Palo Alto, 14.6" | 0.64" |
| 5 | San Francisco, 21.0" | 0.73" |
| 6 | San Francisco airport, 20.1" | 0.85" |
| 7 | San Francisco Oceanside, 19.3" | 0.72" |

3-1 ***Unit basin storage volume from Table 5.2:*** **0.64** **Inches**
*(The coefficient for this method is 1.00, due to the conversion of any landscaping to effective impervious area)*

3-2 ***Adjusted unit basin storage volume:*** **0.72** **Inches**
*(The unit basin storage volume is adjusted by applying the MAP adjustment factor.)*

3-3 ***Required Capture Volume (in cubic feet):*** **132,486** **Cubic feet**
*(The adjusted unit basin sizing volume [inches] is multiplied by the size of the DMA and converted to feet)*

3-4 ***To size an infiltration trench, enter the surface area available:*** **92,973** **Square feet**

3-5 ***Required depth of infiltration trench, given the surface area available (in 3-4):*** **4.07** **Feet**
*(Assumes 35% void space in rectangular trench with vertical sides.)*
*(Note: Infiltration trench depths are typically between 3 and 8 feet.)*

Appendix 3

# Transportation Impact Assessment with Appendices

Hexagon Transportation Consultants, Inc.

# Willow Village Master Plan

## Draft Transportation Impact Analysis

Prepared for:

ICF

August 16, 2022

**Hexagon Transportation Consultants, Inc.**
Hexagon Office: 100 Century Center Court, Suite 501
San Jose, CA 95112
Hexagon Job Number: 18GB38
Phone: 408.971.6100
Client Name: ICF

# Table of Contents



## Appendices



## List of Tables

## List of Figures

# Executive Summary

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed Willow Village Master Plan Project in Menlo Park, California. The Proposed Project would redevelop an approximately 59-acre industrial site plus two parcels north of Willow Road[1] (collectively, the Project Site) as a mixed-use development. The Proposed Project would demolish all existing onsite buildings and landscaping on the 59-acre portion of the Project Site and construct new buildings, provide open space areas, and install infrastructure within a new Residential/Shopping District, Town Square District, and Campus District. In addition, the Proposed Project would alter two parcels (Hamilton Avenue Parcels North and South[2]) to accommodate realignment of Hamilton Avenue at Willow Road for Project Site access.

The Proposed Project would provide up to 1.6 million sf of space for office and accessory use (consisting of up to 1.25 million sf of office uses and the balance (350,000 square if office use is maximized) of accessory uses[3]) and up to 200,000 sf of commercial/retail space. The Proposed Project would also include up to 1,730 multi-family housing units, an up to 193-room hotel, and open spaces, including publicly accessible parks (e.g. 3.5 acre publicly accessible park, elevated linear park, town square, and dog park).

The Project Site would be bisected by a new north–south street (Main Street) and an east–west street, which would provide access to all three districts. It would include a circulation network for vehicles, bicycles, and pedestrians, inclusive of both public rights-of-way and private streets, that would be generally aligned to an east-to-west and a north-to-south grid. The Proposed Project would also alter parcels north of the industrial site, across Willow Road, on both the east and west sides of Hamilton Avenue (Hamilton Avenue Parcels North and South) to support realignment of the Hamilton Avenue right-of-way and provide access to the new elevated park. This would require demolition and reconstruction of an existing service station (Chevron gas station) and potentially an increase in 1,000 sf on Hamilton Avenue Parcel South and enable the potential addition of up to 6,700 sf of retail uses at the existing neighborhood shopping center on the Hamilton Avenue Parcel North. A total of 7,700 sf could be added to the Hamilton Avenue Parcels.

[1] For transportation analysis, "North/South" is aligned to be parallel to US 101. Hence, Willow Road and University Avenue are considered east-west streets, whereas Hamilton Road and Bayfront Expressway are considered north-south streets.
[2] Hamilton Avenue Parcels North and South consider Hamilton Avenue an east to west street, which differs from the compass directions used for the transportation analysis discussion.
[3] Accessory uses could include the following types of spaces: meeting/collaboration space, orientation space, training space, event space, incubator space, a business partner center, an event building (including pre-function space, collaboration areas, and meeting/event rooms), a visitor center, product demonstration areas, film studio, gathering terraces and private gardens, and space for other Meta accessory uses. Accessory uses could occur in spaces located anywhere throughout the Campus District

## CEQA Vehicle-Miles Travelled Analysis

The most readily available long-range forecast year is the year-2040 conditions, which assumes the buildout of the City of Menlo Park General Plan and any pending General Plan Amendments, the buildout of the pending developments in the City of East Palo Alto (as of December 2020), and regional growth projected by the Association of Bay Area Governments (ABAG), modified by VTA/C/CAG for model land use inputs. Therefore, the project's VMT analysis was conducted under year-2040 conditions.

### Office VMT

According to the City's VMT guidelines, office land use is evaluated based on a daily VMT per employee metric. Using the model, this metric is calculated only for home-based work trips, per OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA. Based on the latest citywide travel demand model, the regional average office VMT is 15.9 per employee. Therefore, City's office VMT impact threshold, at 15% below regional average, would be 13.6 daily VMT per employee. Office land use was evaluated using the model under the year 2040 plus project scenario. For the Campus District, the applicant proposed a daily trip cap of 18,237 trips, which would be 20% below the standard ITE trip generation estimate. The model was adjusted to account for the proposed trip cap. As shown in Table ES-1 below, the project's Campus District land use would generate VMT at the City's VMT impact threshold and would thus not have a VMT impact.

### Residential VMT

According to City VMT guidelines, the evaluation of residential land use is based on a daily VMT per capita metric. Using the model, this metric is calculated only for home-based trips, per OPR's technical advisory. Based on the latest citywide travel demand model, regional average residential VMT is 13.1 per capita. Therefore, the City's residential VMT impact threshold, at 15% below regional average, would be 11.2 daily VMT per capita.

For the residential land use, trip generation was adjusted to account for the Project's expected 2.03 people per unit compared to the ITE average of 2.46 people per unit. The VMT analysis also accounted for the applicant proposed TDM Plan for the mixed-use district. The TDM Plan proposed a 20% trip reduction from gross ITE trip generation through a combination of passive TDM measures and active TDM measures. Passive TDM measures include the project's proximity to complementary land uses, proximity to alternative transportation infrastructure, and the project's mixed-use nature. As discussed in Chapter 3 below, it is estimated that the passive TDM measures would achieve a 17% trip reduction from the gross ITE trip generation. Active TDM measures include TDM programs to be implemented to further promote alternative modes of travel. These TDM measures generally include providing transit, biking, and carpooling information to residents, assisting in ride-matching programs for residents, and could also include transit subsidies and other measures. To represent the applicant proposed 20% trip reduction goal and given that passive TDM measures are assumed to achieve a 17% trip reduction, the balance of 3% (20%-17%) trip reduction due to active TDM measures was assumed for the VMT analysis.

The Project's residential land use would require a 16% reduction in VMT to mitigate the significant VMT impact. The VMT analysis, as discussed above, already assumed 3% trip reduction due to active TDM measures. Therefore, mitigation of the VMT impact would require implementing a TDM Plan for the residential component that achieves at least 19% (3% + 16%) trip reduction via active TDM measures (see Figure 10 in Chapter 3 below) or increases the effectiveness of passive TDM measures. According to the Project's proposed TDM Plan dated July 2021 and attached in Appendix G, the proposed active TDM measures for the residential component could achieve at least a 19% reduction in trips, with an estimated reduction between between 11% and 36% [4]. This range represents the potential low to high range of effectiveness of the proposed TDM measures, as calculated by research data from the California Air Pollution Control Officers Association (CAPCOA). This range depends on how each TDM measure is eventually implemented. Therefore, it is feasible for the Project to mitigate its residential VMT impact by implementing its proposed TDM Plan.

**IMPACT (TRA-2 in Transportation Chapter)**: As shown in Table ES-1 below, the Proposed Project's residential land use VMT is estimated to be 13.3 daily miles per capita, which would exceed the VMT threshold and result in a VMT impact. The mitigation measure TRA-2 identified below would fully mitigate this impact.

**MITIGATION MEASURE (TRA 2 in Transportation Chapter)**: The residential land use of the Project Site will be required to implement a TDM Plan achieving a 36% reduction from gross ITE trip generation rates (for the Project, this reduction equals 6,023 daily trips). Should a different number of residential units be built, the total daily trips will be adjusted accordingly. The required residential TDM Plan will include annual monitoring and reporting requirements on the effectiveness of the TDM program. The Project applicant submitted a draft residential TDM Plan, which contained specific measures that would meet this trip reduction requirement. The draft TDM Plan is subject to City review and approval. If the annual monitoring finds that the TDM reduction is not met , the TDM coordinator will be required to work with City staff to detail next steps to achieve the TDM reduction. With the implementation of the required residential TDM Plan, the residential VMT impact would be **less than significant with mitigation (LTS/M)**.

**Table ES- 1**
**Office and Residential VMT Evaluation**

| Land Use | Regional Average | VMT Threshold | Project VMT | VMT Impact | Additional TDM Mitigation needed to eliminate VMT impact |
|---|---|---|---|---|---|
| Office [1] | 15.9 | 13.6 | 13.6 | No | - |
| Residential [2] | 13.1 | 11.2 | 13.3 | Yes | 16% |

Notes:
** All data referenced the latest Menlo Park citywide travel demand forecast model.*
1. VMT for office land use is reported in VMT per employee.
2. VMT for residential land use is reported in VMT per capita.

4 Willow Village TDM Plan. Prepared for Peninsula Innovation Partners. Fehr & Peers, Inc. July 2021

## Hotel VMT

Based on consultation with the City and applicant, the hotel is expected to have a service area of approximately three (3) miles in radius. This means that most of the destinations of hotel patrons are expected to be within three miles of the hotel. While some trips are expected to be longer than three miles, the majority of the change in VMT is expected to occur within this three-mile radius. The evaluated daily VMT includes the entire length of the trip even when it extends beyond the three-mile radius.

The total daily VMT generated by land uses within a three-mile radius was compared under the "no hotel" and "with project" scenarios. As shown in Table ES-2, the proposed hotel component of the project was shown to slightly reduce the total daily VMT generated by land uses within a three-mile radius of the Project Site. Since the proposed hotel would be located within very close proximity to major employment in the Bayfront area, hotel patrons would enjoy shorter travel distances to their business destinations. It's location within a mixed-use project, including complementary retail space, also would allow hotel patrons to shop/dine within walking distance.

Because the proposed hotel component of the Project would not cause an increase in total VMT generated within the analysis area, it is concluded that the proposed hotel component of the Project would have a less than significant impact on vehicle miles travelled.

**Table ES- 2**
**Hotel VMT Evaluation**

| | 3-Mile Radius Area of Project Site | | |
|---|---|---|---|
| | No Hotel Conditions [2] | With Project Conditions [2] | % Change |
| Total Daily VMT [1] | 6,656,914 | 6,629,443 | -0.4% |

Notes:
1. Total daily VMT includes VMT generated by all trips having at least one trip-end in the analysis area, as estimated by the citywide travel demand model.
2. "No hotel conditions" represent conditions with the Proposed Project except the hotel component. "With project conditions" represent conditions with the Proposed Project including the hotel component.

## Retail VMT

The project has two areas of retail development. The main Project Site includes up to 200,000 s.f. of retail space within a mixed use development. North of Willow Road, as a result of the proposed Hamilton Avenue realignment, the two retail parcels adjacent to Hamilton Avenue at the intersection with Willow Road ("Hamilton Avenue Parcels") would be reconfigured. The Project proposes to increase the total retail square footage at the Hamilton Avenue parcels by up to 7,700 s.f. to approximately 23,400 s.f. Because the retail at the Hamilton Avenue Parcels will require a separate use permit and would be operated as a separate retail use from the retail uses at the main Project Site, the Hamilton Avenue Parcels retail is evaluated separately from the retail component of the main Project Site. According to the City's VMT policy, local serving retail (defined as having total square footage less than 50,000 s.f.) would be exempt from a VMT analysis. The Project's proposed net 7,700 s.f. of potential retail development at the Hamilton Avenue Parcels would thus be exempt from VMT analysis. The discussion below is focused on the 200,000 s.f. of retail space at the main Project Site.

Based on the types of retail being proposed as well as nearby comparable retail stores, it is expected that the proposed retail would have a service area of approximately five (5) miles in radius. The 5-mile radius service area was selected based on engineering judgement, as it would cover most of Menlo Park, Palo Alto, as well as downtown Redwood City, and would include a mix of retail shops and restaurants comparable to the three cities. Assuming equal services, it is expected that people would patronize the closer store or restaurant. The five-mile radius service area also means that most of the destinations of the Project's retail patrons are expected to be within five miles of the project. While some trips are expected to be longer than five miles, the majority of the change in VMT is expected to occur within this five-mile radius.

The total daily VMT generated by land uses within a five-mile radius was compared under the "no retail" and "with project" scenarios. As shown in Table ES-3, the proposed retail component of the project was shown to slightly reduce the total daily VMT generated by land uses within a five-mile radius of the Project Site. Since the proposed retail space would be located in close proximity to the Belle Haven neighborhood, a large number of offices and life sciences buildings in the Bayfront area, as well as the project's proposed residential land uses, the proposed retail component would provide retail stores closer to homes for nearby residents and closer to jobs for nearby workers.

Because the proposed retail component of the Project would not cause an increase in total VMT generated by the analysis area, it is concluded that the proposed retail component of the Project would have a less than significant impact on vehicle miles travelled.

**Table ES- 3**
**Retail VMT Evaluation**

| | 5-Mile Radius Area of Project Site | | |
|---|---|---|---|
| | No Retail Conditions [2] | With Project Conditions [2] | % Change |
| Total Daily VMT [1] | 14,360,590 | 14,334,067 | -0.2% |

Notes:
1. Total daily VMT includes VMT generated by all trips having at least one trip-end in the analysis area, as estimated by the citywide travel demand model.
2. "No retail conditions" represent with the Proposed Project except the retail component. "With project conditions" represent with the Proposed Project including the retail component.

## Non-CEQA Levels of Service Transportation Analysis

Until July 1, 2020, the City's TIA Guidelines used roadway congestion, commonly referred to as level of service (LOS), as the primary study metric for evaluating transportation impacts under CEQA. LOS is no longer a CEQA threshold of significance; however, the City's TIA Guidelines require that the TIA also analyze LOS for planning purposes (per General Plan Program Circ-3.A Transportation Impact Metrics):

> Supplement Vehicle Miles Traveled (VMT) and greenhouse gas emissions per service population (or other efficiency metric) metrics with Level of Service (LOS) in the transportation impact review process, and utilize LOS for identification of potential operational improvements, such as traffic signal upgrades and coordination, as part of the Transportation Master Plan.

The LOS analysis would determine whether the project traffic would cause an intersection LOS to exceed the City's LOS thresholds or cause either the average delay or average critical delay to exceed the City's intersection delay thresholds under near term and cumulative conditions. The LOS and delay thresholds vary depending on the street classifications as well as whether the intersection is on a State route or not.

The City's TIA Guidelines further require an analysis of the Proposed Project in relation to relevant policies of the Circulation Element and consideration of specific measures to address noncompliance with local policies which may occur as a result of the addition of project traffic. The TIA identifies measures that could be applied as conditions of approval that would bring operations back to pre-Project levels. Although not included in the TIA for purposes of this EIR, an analysis may be prepared separately to determine if there are potential measures that could bring the Proposed Project into conformance with the LOS goals of Circulation Policy 3.4. Implementation of any such measures would require review and approval by City decision makers.

Intersection level of service non-compliance caused by the proposed project under near-term (2025[5]) with project, cumulative (2040) with project, and cumulative (2040) with Dumbarton rail with project conditions were analyzed. Both near-term (year 2025) with project, and cumulative (year 2040) with project scenario forecasts of intersection turning movements were completed using the latest Menlo Park travel demand forecast model. The base model structure was refined for application within Menlo Park to add more detail to the zone structure and transportation network.

The cumulative with Dumbarton Rail scenario assumed that the Dumbarton Rail would be built and there would be a shift in vehicular trips to transit trips near the Project Site[6] as well as along the Dumbarton Rail corridor. Cumulative plus project conditions with Dumbarton Rail were evaluated relative to cumulative conditions with the Dumbarton Rail. This analysis is speculative since there is no current approved plan or financing to provide any Dumbarton transit service and is provided for informational purposes in the transportation analysis.

[5] 2025 is the earliest year for expected occupancy when this analysis started.

[6] *Dumbarton Rail Corridor Update Public Meeting*, Prepared by Facebook for the San Mateo County Transit District. March 15, 2021

The following intersections were adversely affected under either near term plus project or cumulative plus project scenarios during at least one peak hour (see Table ES-4 and ES-5):

*City of Menlo Park:*

1. Marsh Road and Bayfront Expressway [CMP]
5. Marsh Road and Bohannon Drive/Florence Street
13. Chilco Street and Hamilton Avenue
16. Willow Road and Bayfront Expressway [CMP]
17. Willow Road and Hamilton Avenue
18. Willow Road and Park Street
19. Willow Road and Ivy Drive
21. Willow Road and Newbridge Street
24. Willow Road and Bay Road
25. Willow Road and Hospital Plaza/Durham Street
30. O'Brien Drive and Kavanaugh Drive
32. Adam's Drive and O'Brien Drive

*City of East Palo Alto:*

39. University Avenue and Bay Road
42. University Avenue and Donohoe Street
44. Cooley Avenue and Donohoe Street
46. University Avenue and Woodland Avenue
47. E. Bayshore Road and Donohoe Street
49. Saratoga Avenue and Newbridge Street
50. East Bayshore Road and Euclid Avenue

*Caltrans:*

23. Willow Road and US 101 Southbound Ramps (AM peak hour)
43. US 101 Northbound Off-Ramp and Donohoe Street (AM and PM peak hours)
45. University Avenue and US 101 Southbound Ramps (AM peak hour)

Since the Cumulative with Dumbarton Rail scenario was analyzed for information only, analysis summary is presented only in Chapter 3.

## Table ES- 4
## Intersection Level of Service Summary (City of Menlo Park)

| | | | | | Existing Conditions | | Near-Term (2025) Conditions | | | | | | | | | Cumulative (2040) Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | No Project | | Project Conditions | | | | With Improvement | | | General Plan Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Count Date | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 1 | Marsh Road & Bayfront Expressway* | AM | 4/16/2019 | Signal | 50.5 | D | 52.0 | D | 56.2 | E | 4.2 | 5.4 | 50.2 | D | - | 68.7 | E | 65.6 | E | <4 | <0.8 | | | |
| | Haven Avenue Southbound | AM | | | 75.0 | E | 71.2 | E | 70.6 | E | <4 | <0.8 | | | | 71.2 | E | 73.4 | E | <4 | <0.8 | | | |
| | | PM | 4/16/2019 | Signal | 31.6 | C | 34.9 | C | 38.7 | D | <4 | 4.7 | 38.9 | D | - | 65.0 | E | 77.9 | E | 12.9 | 12.5 | | | |
| | Haven Avenue Southbound | PM | | | 69.0 | E | 66.9 | E | 65.6 | E | <4 | <0.8 | | | | 67.7 | E | 67.7 | E | <4 | <0.8 | | | |
| 2 | Marsh Road & US 101 Northbound Off-Ramp | AM | 4/16/2019 | Signal | 15.8 | B | 23.1 | C | 39.0 | D | 15.9 | 25.1 | | | | 60.9 | E | 62.2 | E | <4 | 1.5 | | | |
| | | PM | 4/16/2019 | | 13.3 | B | 15.8 | B | 16.8 | B | <4 | 1.6 | | | | 22.9 | C | 22.8 | C | <4 | <0.8 | | | |
| 3 | Marsh Road & US 101 Southbound Off-Ramp | AM | 4/16/2019 | Signal | 19.0 | B | 20.7 | C | 20.7 | C | <4 | <0.8 | | | | 22.8 | C | 24.4 | C | <4 | 2.0 | | | |
| | | PM | 4/16/2019 | | 17.0 | B | 17.6 | B | 17.6 | B | <4 | <0.8 | | | | 19.2 | B | 18.8 | B | <4 | <0.8 | | | |
| 4 | Marsh Road & Scott Drive | AM | 4/16/2019 | Signal | 18.5 | B | 20.3 | C | 20.5 | C | <4 | <0.8 | | | | 31.9 | C | 31.8 | C | <4 | <0.8 | | | |
| | | PM | 4/16/2019 | | 15.3 | B | 15.9 | B | 15.9 | B | <4 | <0.8 | | | | 17.9 | B | 18.1 | B | <4 | <0.8 | | | |
| 5 | Marsh Road & Bohannon Drive/Florence Street | AM | 3/21/2019 | Signal | 35.3 | D | 40.0 | D | 41.6 | D | <4 | 2.3 | | | | 58.0 | E | 60.4 | E | <4 | 4.9 | 56.7 | E | <0.8 |
| | | PM | 3/21/2019 | | 34.6 | C | 36.3 | D | 37.3 | D | <4 | 2.2 | | | | 52.5 | D | 53.6 | D | <4 | 1.6 | 48.3 | D | <0.8 |
| 6 | Marsh Road & Bay Road | AM | 3/21/2019 | Signal | 19.7 | B | 23.6 | C | 25.2 | C | <4 | 2.8 | | | | 64.2 | E | 64.8 | E | <4 | <0.8 | | | |
| | | PM | 3/21/2019 | | 18.6 | B | 18.7 | B | 19.1 | B | <4 | <0.8 | | | | 47.6 | D | 54.9 | D | 7.3 | 14.4 | | | |
| 7 | Chrysler Drive & Bayfront Expressway | AM | 4/16/2019 | Signal | 8.4 | A | 9.1 | A | 9.4 | A | <4 | <0.8 | | | | 13.1 | B | 12.8 | B | <4 | 6.4 | | | |
| | | PM | 4/16/2019 | | 13.1 | B | 17.3 | B | 18.3 | B | <4 | 1.5 | | | | 39.5 | D | 36.3 | D | <4 | <0.8 | | | |
| 8 | Chilco Street & Bayfront Expressway | AM | 4/16/2019 | Signal | 10.9 | B | 23.7 | C | 25.6 | C | <4 | 5.3 | | | | 44.5 | D | 49.2 | D | 4.7 | 13.5 | | | |
| | Chilco Street Eastbound | AM | | | 19.0 | B | 48.7 | D | 56.8 | E | 8.1 | 12.6 | | | | 112.4 | F | 108.9 | F | <4 | <0.8 | | | |
| | | PM | 4/16/2019 | | 13.1 | B | 34.1 | C | 35.9 | D | <4 | 4.5 | | | | 69.6 | E | 66.9 | E | <4 | <0.8 | | | |
| | Chilco Street Eastbound | PM | | | 22.4 | C | 107.8 | F | 116.2 | F | 8.4 | 15.2 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| 9 | MPK 21 Driveway & Bayfront Expressway | AM | 4/25/2019 | Signal | 7.9 | A | 7.3 | A | 7.4 | A | <4 | <0.8 | | | | 5.7 | A | 5.6 | A | <4 | <0.8 | | | |
| | | PM | 4/25/2019 | | 10.2 | B | 13.7 | B | 15.0 | B | <4 | 1.4 | | | | 36.3 | D | 36.1 | D | <4 | <0.8 | | | |
| 10 | MPK 20 Driveway (east) & Bayfront Expressway | AM | 4/25/2019 | Signal | 10.0 | A | 7.3 | A | 7.5 | A | <4 | <0.8 | | | | 10.0 | B | 9.9 | A | <4 | <0.8 | | | |
| | | PM | 4/25/2019 | | 8.2 | A | 9.7 | A | 9.4 | A | <4 | <0.8 | | | | 18.7 | B | 18.8 | B | <4 | <0.8 | | | |
| 11 | Chrysler Drive & Constitution Drive | AM | 3/21/2019 | Signal | 50.6 | D | 59.8 | E | 55.1 | E | <4 | <0.8 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | | PM | 3/21/2019 | | 28.0 | C | 28.5 | C | 30.4 | C | <4 | 1.6 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| 12 | Chilco Street & Constitution Drive/MPK 22 Driveway[4] | AM | 3/21/2019 | AWSC/Signal[3] | 32.1 | D | 24.8 | C | 24.6 | C | <4 | <0.8 | | | | 52.9 | D | 51.1 | D | <4 | <0.8 | | | |
| | | PM | 3/21/2019 | | 32.5 | D | 42.9 | D | 54.3 | D | 11.4 | 11.5 | | | | 113.5 | F | 101.8 | F | <4 | <0.8 | | | |
| 13 | Chilco Street & Hamilton Avenue | AM | 1/0/1900 | AWSC | 9.2 | A | 10.5 | B | 10.8 | B | <4 | <0.8 | Traffic signal potentially feasible | | | 24.5 | C | 27.1 | D | <4 | 2.6 | Traffic signal potentially feasible | | |
| | | PM | 1/0/1900 | | 16.8 | C | 19.0 | C | 38.0 | E | 19.0 | 19.0 | | | | >120 | F | >120 | F | 24.7 | 24.7 | | | |
| 14 | Ravenswood Avenue & Middlefield Road | AM | 3/19/2019 | Signal | 36.1 | D | 43.1 | D | 44.9 | D | <4 | 3.0 | | | | 49.7 | D | 49.7 | D | <4 | <0.8 | | | |
| | | PM | 3/19/2019 | | 16.1 | B | 17.6 | B | 17.9 | B | <4 | <0.8 | | | | 20.2 | C | 19.5 | B | <4 | <0.8 | | | |
| 15 | Ringwood Avenue & Middlefield Road | AM | 3/19/2019 | Signal | 12.5 | B | 13.2 | B | 13.7 | B | <4 | <0.8 | | | | 13.2 | B | 13.2 | B | <4 | <0.8 | | | |
| | | PM | 3/19/2019 | | 13.7 | B | 15.2 | B | 15.4 | B | <4 | <0.8 | | | | 21.0 | C | 21.1 | C | <4 | <0.8 | | | |
| 16 | Willow Road & Bayfront Expressway*[1] | AM | 4/23/2019 | Signal | >120 | F | OVERSAT | F | OVERSAT | F | 14.0 | 6.7 | No feasible Improvement | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | 4/23/2019 | | >120 | F | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 17 | Willow Road & Hamilton Avenue[1][2] | AM | 3/21/2019 | Signal | 73.3 | E | OVERSAT | F | OVERSAT | F | 44.1 | 54.0 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | Hamilton Avenue Southbound | AM | | | 64.7 | E | 64.9 | E | >120 | F | 117.9 | <0.8 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | Main Street Northbound | AM | | | 82.0 | F | 83.3 | F | 113.7 | F | 30.4 | >120 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | | PM | 3/21/2019 | Signal | >120 | F | OVERSAT | F | OVERSAT | F | >120 | >120 | No feasible Improvement | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | Hamilton Avenue Southbound | PM | | | 94.3 | F | >120 | F | >120 | F | >120 | <0.8 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | Main Street Northbound | PM | | | >120 | F | >120 | F | >120 | F | <4 | >120 | | | | >120 | F | >120 | F | <4 | >120 | | | |
| 18 | Willow Road & Park Street (future intersection)[1] | AM | -- | Signal | Project | | Project | | OVERSAT | F | 36.8 | 53.0 | No feasible Improvement | | | Project | | OVERSAT | F | 34.2 | 49.1 | No feasible Improvement | | |
| | | PM | -- | | Intersection | | Intersection | | OVERSAT | F | 17.5 | 23.1 | | | | Intersection | | OVERSAT | F | 17.2 | 23.1 | | | |
| 19 | Willow Road & Ivy Drive[1] | AM | 3/21/2019 | Signal | 75.2 | E | OVERSAT | F | OVERSAT | F | 20.9 | 46.6 | | | | OVERSAT | F | OVERSAT | F | 46.2 | 98.7 | OVERSAT | F | |
| | Ivy Drive Southbound | AM | | | 88.2 | F | 88.2 | F | 75.0 | E | <4 | <0.8 | | | | 70.9 | E | 69.6 | E | <4 | <0.8 | 61.2 | E | <0.8 |
| | | PM | 3/21/2019 | Signal | 39.5 | D | OVERSAT | F | OVERSAT | F | 50.1 | 70.9 | | | | OVERSAT | F | OVERSAT | F | 80.8 | 102.4 | OVERSAT | F | |
| | Ivy Drive Southbound | PM | | | 69.7 | E | 68.4 | E | 66.1 | E | <4 | <0.8 | | | | 68.1 | E | 71.7 | E | <4 | 3.6 | 49.0 | D | <0.8 |
| 20 | Willow Road & O'Brien Drive[1] | AM | 3/21/2019 | Signal | 58.9 | E | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | O'Brien Drive Northbound | AM | | | 66.4 | E | 72.6 | E | 66.4 | E | <4 | <0.8 | | | | >120 | F | 80.4 | F | <4 | <0.8 | | | |
| | | PM | 3/21/2019 | Signal | >120 | F | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | O'Brien Drive Northbound | PM | | | >120 | F | >120 | F | >120 | F | <4 | <0.8 | | | | >120 | F | >120 | F | <4 | <0.8 | | | |
| 21 | Willow Road & Newbridge Street[1] | AM | 3/21/2019 | Signal | 93.4 | F | OVERSAT | F | OVERSAT | F | 40.3 | 49.7 | OVERSAT | F | | OVERSAT | F | OVERSAT | F | 25.9 | 74.2 | OVERSAT | F | |
| | Newbridge Street Southbound | AM | | | 62.9 | E | 69.3 | E | 104.2 | F | 34.9 | 43.0 | 79.6 | F | 9.0 | >120 | F | 108.8 | F | <4 | <0.8 | >120 | F | 67.3 |
| | Newbridge Street Northbound | AM | | | >120 | F | >120 | F | >120 | F | 4.4 | 64.0 | 42.1 | D | <0.8 | >120 | F | >120 | F | 101.4 | >120 | 73.5 | E | <0.8 |
| | | PM | 3/21/2019 | Signal | >120 | F | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | |
| | Newbridge Street Southbound | PM | | | 62.8 | E | 60.8 | E | 59.1 | E | <4 | 1.5 | 74.5 | E | 26.0 | 84.3 | F | >120 | F | 47.1 | 74.2 | >120 | F | >120 |
| | Newbridge Street Northbound | PM | | | >120 | F | >120 | F | >120 | F | <4 | <0.8 | 51.3 | D | <0.8 | >120 | F | >120 | F | <4 | <0.8 | 50.7 | D | <0.8 |
| 22 | Willow Road & US 101 Northbound Ramps[1] | AM | 3/13/2019 | Signal | 92.8 | F | OVERSAT | F | OVERSAT | F | <4 | 11.5 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | 3/13/2019 | | 83.9 | F | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 23 | Willow Road & US 101 Southbound Ramps[1] | AM | 3/13/2019 | Signal | 38.5 | D | OVERSAT | F | OVERSAT | F | 18.3 | <0.8 | No feasible Improvement | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | 3/13/2019 | | 98.9 | F | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |

## Table ES-4 (Continued)
## Intersection Level of Service Summary (City of Menlo Park)

| # | Intersection | Peak Hour | Count Date | Traffic Control | Existing Conditions | | Near-Term (2025) Conditions | | | | | | | | | Cumulative (2040) Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | No Project | | Project Conditions | | | | With Improvement | | | General Plan Conditions | | Project Conditions | | | | With Improvement | | |
| | | | | | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 24 | Willow Road & Bay Road[1] | AM | 4/23/2019 | Signal | 45.3 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **38.3** | **OVERSAT** | **F** | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **5.4** | **OVERSAT** | **F** | |
| | *Bay Road Southbound* | *AM* | | | ***60.1*** | ***E*** | ***104.3*** | ***F*** | ***>120*** | ***F*** | ***31.7*** | ***31.7*** | *27.0* | *C* | ***<0.8*** | ***>120*** | ***F*** | ***>120*** | ***F*** | ***30.3*** | ***30.3*** | *27.8* | *C* | *<0.8* |
| | | PM | 4/23/2019 | Signal | **113.5** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **6.6** | **6.7** | **OVERSAT** | **F** | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | **OVERSAT** | **F** | |
| | *Bay Road Southbound* | *PM* | | | *29.0* | *C* | *49.2* | *D* | *53.5* | *D* | ***4.3*** | ***4.3*** | *23.9* | *C* | ***<0.8*** | ***75.6*** | ***E*** | ***82.7*** | ***F*** | ***7.0*** | ***7.0*** | *26.5* | *C* | *<0.8* |
| 25 | Willow Road & Hospital Plaza/Durham Street[1] | AM | 4/16/2019 | Signal | 43.6 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **11.0** | **OVERSAT** | **F** | |
| | *VA Medical Center Southbound* | *AM* | | | ***65.5*** | ***E*** | ***73.2*** | ***E*** | ***69.5*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***74.8*** | ***E*** | ***74.7*** | ***E*** | ***<4*** | ***<0.8*** | ***74.7*** | ***E*** | ***<0.8*** |
| | *Durham Street Northbound* | *AM* | | | ***73.9*** | ***E*** | ***93.6*** | ***F*** | ***79.6*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***6.0*** | ***5.4*** | ***>120*** | ***F*** | ***<0.8*** |
| | | PM | 4/16/2019 | Signal | **>120** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **1.3** | **OVERSAT** | **F** | |
| | *VA Medical Center Southbound* | *PM* | | | ***67.6*** | ***E*** | ***72.2*** | ***E*** | ***70.2*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***74.2*** | ***E*** | ***74.5*** | ***E*** | ***<4*** | ***<0.8*** | ***69.4*** | ***E*** | ***<0.8*** |
| | *Durham Street Northbound* | *PM* | | | ***73.5*** | ***E*** | ***84.6*** | ***F*** | ***79.8*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***88.1*** | ***F*** | ***90.3*** | ***F*** | ***<4*** | ***2.8*** | ***59.9*** | ***E*** | ***<0.8*** |
| 26 | Willow Road & Coleman Avenue | AM | 3/19/2019 | Signal | 18.6 | B | 25.1 | C | 23.9 | C | <4 | <0.8 | | | | 34.9 | C | 34.3 | C | <4 | <0.8 | | | |
| | | PM | 3/19/2019 | | 9.2 | A | 11.0 | B | 10.8 | B | <4 | <0.8 | | | | 13.1 | B | 13.2 | B | <4 | <0.8 | | | |
| 27 | Willow Road & Gilbert Avenue | AM | 3/19/2019 | Signal | 19.7 | B | 20.0 | C | 19.9 | B | <4 | <0.8 | | | | 24.4 | C | 23.9 | C | <4 | <0.8 | | | |
| | | PM | 3/19/2019 | | 10.3 | B | 13.0 | B | 12.4 | B | <4 | <0.8 | | | | 14.2 | B | 14.1 | B | <4 | <0.8 | | | |
| 28 | Willow Road & Middlefield Road | AM | 3/19/2019 | Signal | **61.6** | **E** | **62.3** | **E** | **62.5** | **E** | **<4** | **<0.8** | | | | **64.5** | **E** | **65.0** | **E** | **<4** | **<0.8** | | | |
| | *Middlefield Road Southbound* | *AM* | | | ***67.9*** | ***E*** | ***69.8*** | ***E*** | ***70.1*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***69.9*** | ***E*** | ***70.4*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Middlefield Road Northbound* | *AM* | | | ***67.3*** | ***E*** | ***67.7*** | ***E*** | ***67.7*** | ***E*** | ***<4*** | ***<0.8*** | | | | ***67.4*** | ***E*** | ***67.2*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | 3/19/2019 | Signal | 31.5 | C | 34.5 | C | 34.7 | C | <4 | <0.8 | | | | 42.5 | D | 42.4 | D | <4 | <0.8 | | | |
| | *Middlefield Road Southbound* | *PM* | | | *31.7* | *C* | *34.5* | *C* | *34.7* | *C* | *<4* | *<0.8* | | | | *42.1* | *D* | *42.2* | *D* | *<4* | *<0.8* | | | |
| | *Middlefield Road Northbound* | *PM* | | | *31.2* | *C* | *34.3* | *C* | *34.7* | *C* | *<4* | *<0.8* | | | | *40.6* | *D* | *40.8* | *D* | *<4* | *<0.8* | | | |
| 29 | O'Brien Drive/Loop Road & Main Street/O'Brien Drive (future intersection) | AM | -- | Roundabout | Project | | Project | | 7.4 | A | 7.4 | 7.4 | | | | Project | | 8.8 | A | 8.8 | 8.8 | | | |
| | | PM | -- | | Intersection | | Intersection | | 9.2 | A | 9.2 | 9.2 | | | | Intersection | | 11.0 | B | 11.0 | 11.0 | | | |
| 30 | O'Brien Drive & Kavanaugh Drive | AM | 4/25/2019 | AWSC | 11.8 | B | 12.7 | B | **107.7** | **F** | **95.0** | **95.0** | *Traffic signal potentially* | | | **>120** | **F** | **>120** | **F** | **105.8** | **105.8** | *Traffic signal potentially* | | |
| | | PM | 4/25/2019 | | 15.2 | C | 29.6 | D | **73.7** | **F** | **44.1** | **44.1** | *feasible* | | | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | *feasible* | | |
| 31 | Adams Drive & Adams Court | AM | 4/25/2019 | TWSC | 11.5 | B | 11.5 | B | 11.6 | B | <4 | <0.8 | | | | 20.1 | C | 17.8 | C | <4 | <0.8 | | | |
| | | PM | 4/25/2019 | | 11.9 | B | 11.9 | B | 11.9 | B | <4 | <0.8 | | | | 16.4 | C | 12.7 | B | <4 | <0.8 | | | |
| 32 | Adams Drive & O'Brien Drive | AM | 4/25/2019 | TWSC | 17.3 | C | 17.6 | C | **62.5** | **F** | **44.9** | **44.9** | *Traffic signal potentially* | | | **62.4** | **F** | **>120** | **F** | **>120** | **>120** | *Traffic signal potentially* | | |
| | | PM | 4/25/2019 | | **27.6** | **D** | 34.0 | D | **>120** | **F** | **>120** | **>120** | *feasible* | | | **>120** | **F** | **>120** | **F** | **>120** | **>120** | *feasible* | | |
| 33 | University Avenue & Bayfront Expressway* | AM | 4/25/2019 | Signal | 11.4 | B | 13.9 | B | 12.1 | B | <4 | <0.8 | | | | 14.8 | B | 13.3 | B | <4 | <0.8 | | | |
| | | PM | 4/25/2019 | | **94.1** | **F** | **105.8** | **F** | **108.7** | **F** | **<4** | **2.9** | | | | **>120** | **F** | **>120** | **F** | **<4** | **3.1** | | | |

Notes:
* Denotes CMP Intersection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[1]Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in average delay and critical delay calculated using Vistro.
[2]The intersection is not considered as non-compliant under cumulative plus project conditions because the critical movement of the local approach shifts with the addition of project traffic.
[3]Intersection operates as an AWSC under existing conditions. It would operate as signalized under background conditions.
[4]The intersection is not considered as non-compliant under background plus project and cumulative plus project conditions because the critical movement of the local approach shifts with the addition of project traffic.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates noncompliance. The project exceeds thresholds in the City of Menlo Park's TIA Guidelines.

## Table ES- 5
## Intersection Level of Service Summary (City of East Palo Alto)

| # | Intersection | Peak Hour | Count Date | Traffic Control | Existing Conditions Avg. Delay (sec)[1] | Existing Conditions LOS | Near-Term (2025) No Project Avg. Delay (sec) | Near-Term (2025) No Project LOS | Near-Term (2025) with Project Avg. Delay (sec)* | Near-Term (2025) with Project LOS | Near-Term (2025) with Project Incr. in Avg/Crit Delay (sec) | Near-Term (2025) with Project Incr. in Critical V/C | Near-Term (2025) With Improvement Avg. Delay (sec) | Near-Term (2025) With Improvement LOS | Cumulative (2040) General Plan Conditions Avg. Delay (sec) | Cumulative (2040) General Plan Conditions LOS | Cumulative (2040) with Project Avg. Delay (sec) | Cumulative (2040) with Project LOS | Cumulative (2040) with Project Incr. in Critical Delay (sec) | Cumulative (2040) with Project Incr. in Critical V/C | Cumulative (2040) With Improvement Avg. Delay (sec) | Cumulative (2040) With Improvement LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | University Avenue & Purdue Avenue | AM | 6/5/2019 | TWSC/ | 16.5 | C | 19.7 | C | 29 | D | 0.9 | 0.118 | | | 25.9 | C | 28.0 | C | 0.8 | 0.017 | | |
| | | PM | 6/5/2019 | Signalized[2] | **47.0** | **E** | **>120** | **F** | **>120** | **F** | **3.8** | **-0.033** | | | 37.1 | D | 40.8 | D | 4.2 | 0.031 | | |
| 35 | University Avenue & Adams Drive | AM | 4/25/2019 | TWSC | **88.1** | **F** | **91.5** | **F** | **>120** | **F** | **0.4** | **0.084** | | | **>120** | **F** | **>120** | **F** | **1.4** | **0.253** | | |
| | | PM | 4/25/2019 | | **>120** | **F** | **>120** | **F** | **>120** | **F** | **-2.8** | **-0.070** | | | **>120** | **F** | **>120** | **F** | **-7.3** | **-0.13** | | |
| 36 | University Avenue & O'Brien Drive | AM | 4/23/2019 | Signalized | 9.6 | A | 9.5 | A | 28.9 | C | 26.1 | 0.261 | | | 21.1 | C | 43.1 | D | 29.3 | 0.245 | | |
| | | PM | 4/23/2019 | | 15.3 | B | 15.4 | B | 30.5 | C | 16.7 | 0.275 | | | 21.3 | C | 32.6 | C | 14.1 | 0.175 | | |
| 37 | University Avenue & Notre Dame Avenue | AM | 3/4/2020 | Signalized | 4.1 | A | 4.1 | A | 7.8 | A | 5.0 | 0.093 | | | 8.0 | A | 10.6 | B | 3.1 | 0.07 | | |
| | | PM | 3/4/2020 | | 9.3 | A | 9.4 | A | 10.2 | B | 1.4 | 0.012 | | | 12.2 | B | 15.6 | B | 4.1 | 0.038 | | |
| 38 | University Avenue & Kavanaugh Drive | AM | 4/25/2019 | Signalized | 6.3 | A | 6.9 | A | 7.9 | A | 1.3 | 0.014 | | | 26.8 | C | 17.5 | B | -12.1 | -0.11 | | |
| | | PM | 4/25/2019 | | 12.0 | B | 15.1 | B | 16.5 | B | 1.6 | 0.015 | | | 23.1 | C | 24.8 | C | 0.8 | 0.009 | | |
| 39 | University Avenue & Bay Road | AM | 4/25/2019 | Signalized | 40.4 | D | 52.4 | D | 54.7 | D | 6.7 | 0.046 | 40.4 | D | 48.8 | D | 53.5 | D | 8.9 | 0.054 | | |
| | | PM | 4/25/2019 | | 49.9 | D | **60.9** | **E** | **70.6** | **E** | **18.6** | **0.063** | **57.0** | **E** | **68.3** | **E** | **69.0** | **E** | **-1.9** | **-0.008** | | |
| 40 | University Avenue & Runnymede Street | AM | 4/25/2019 | Signalized | 6.1 | A | 6.4 | A | 6.6 | A | 1.5 | 0.053 | | | 9.7 | A | 11.7 | B | 11 | 0.075 | | |
| | | PM | 4/25/2019 | | 8.7 | A | 8.8 | A | 8.8 | A | -0.1 | -0.009 | | | 8.9 | A | 8.9 | A | 3.6 | 0.102 | | |
| 41 | University Avenue & Bell Street | AM | 4/25/2019 | Signalized | 11.3 | B | 11.7 | B | 11.6 | B | 0.0 | 0.006 | | | 14.9 | B | 16.2 | B | 2 | 0.067 | | |
| | | PM | 4/25/2019 | | 16.8 | B | 18.3 | B | 18.8 | B | 1.1 | 0.038 | | | 26.4 | C | 34.8 | C | 13.4 | 0.069 | | |
| 42 | University Avenue & Donohoe Street* | AM | 5/1/2019 | Signalized | **107.1** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **7.1** | **0.017** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-1.4** | **-0.002** | *Corridor* | |
| | | PM | 5/1/2019 | | **75.2** | **E** | **OVERSAT** | **F** | **OVERSAT** | **F** | **3.0** | **0.008** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-4.9** | **-0.009** | *Improvement* | |
| 43 | US 101 Northbound Off-Ramp & Donohoe Street* | AM | 4/25/2019 | Signalized | 49.8 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **71.7** | **0.171** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **77.2** | **0.158** | *Corridor* | |
| | | PM | 4/25/2019 | | **>120** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **56.4** | **0.130** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **46.5** | **0.102** | *Improvement* | |
| 44 | Cooley Avenue & Donohoe Street* | AM | 6/5/2019 | Signalized | 32.9 | C | **OVERSAT** | **F** | **OVERSAT** | **F** | **8.7** | **0.091** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **29.3** | **0.091** | *Corridor* | |
| | | PM | 6/5/2019 | | 36.7 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **18.8** | **0.074** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **63.7** | **0.143** | *Improvement* | |
| 45 | University Avenue & US 101 Southbound Ramps* | AM | 4/25/2019 | Signalized | **98.9** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **7.8** | **0.019** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.0** | **-0.004** | *Corridor* | |
| | | PM | 4/25/2019 | | **87.1** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **1.6** | **0.004** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **6.7** | **0.016** | *Improvement* | |
| 46 | University Avenue & Woodland Avenue* | AM | 4/25/2019 | Signalized | **67.1** | **E** | **OVERSAT** | **F** | **OVERSAT** | **F** | **0.1** | **0.000** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **14.1** | **0.04** | *Corridor* | |
| | | PM | 4/25/2019 | | **>120** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **-7.8** | **-0.018** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **19.1** | **0.045** | *Improvement* | |
| 47 | E. Bayshore Road & Donahoe Street* | AM | 5/21/2019 | Signalized | 32.6 | C | **OVERSAT** | **F** | **OVERSAT** | **F** | **5.7** | **0.013** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-22.4** | **-0.048** | *Corridor* | |
| | | PM | 5/21/2019 | | 38.5 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **5.8** | **0.015** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-5.3** | **-0.011** | *Improvement* | |
| 48 | E. Bayshore Road & Holland Street | AM | 6/5/2019 | TWSC | 8.8 | A | 8.8 | A | 8.8 | A | 0.0 | 0.000 | | | 8.8 | A | 8.8 | A | 0.0 | 0.000 | | |
| | | PM | 6/5/2019 | | 10.0 | A | 10 | A | 10 | A | 0.0 | 0.000 | | | 10 | A | 10.0 | A | 0.0 | 0.000 | | |
| 49 | Saratoga Avenue & Newbridge Street | AM | 6/5/2019 | TWSC | 13.3 | B | 17.9 | C | 18.2 | C | 0.9 | 0.074 | | | **>120** | **F** | **>120** | **F** | **9.8** | **0.061** | ***No Feasible*** | |
| | | PM | 6/5/2019 | | 15.6 | C | 22.0 | C | 21.0 | C | 0.0 | -0.024 | | | **40.0** | **E** | 28.6 | D | **-2.2** | **-0.12** | ***Improvement*** | |
| 50 | E. Bayshore Road & Euclid Avenue* | AM | 5/21/2019 | AWSC | **52.4** | **F** | **OVERSAT** | **F** | **OVERSAT** | **F** | **3.6** | **0.028** | *Corridor* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **53.8** | **0.057** | *Corridor* | |
| | | PM | 5/21/2019 | | 32.6 | D | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.5** | **-0.016** | *Improvement* | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.7** | **-0.009** | *Improvement* | |
| 51 | Clarke Avenue & E. Bayshore Road | AM | 9/25/2018 | Signalized | 13.9 | B | 13.9 | B | 14 | B | 0.2 | 0.008 | | | 14.1 | B | 14.2 | B | 0.2 | 0.014 | | |
| | | PM | 9/25/2018 | | 10.7 | B | 10.7 | B | 12.5 | B | 1.7 | 0.031 | | | 13.9 | B | 14.0 | B | 0.2 | 0.007 | | |
| 52 | Pulgas Avenue & E. Bayshore Road | AM | 6/5/2019 | Signalized | 20.4 | C | 20.9 | C | 21.7 | C | 1.7 | 0.042 | | | 25.4 | C | 26.5 | C | 1.4 | 0.017 | | |
| | | PM | 6/25/2019 | | 19.9 | B | 33.1 | C | 37.6 | D | 5.7 | 0.034 | | | 48.1 | D | 47.3 | D | -0.4 | -0.002 | | |

Note:
* Denotes a CMP interesection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported.
[2] Intersection is signalized under cumulative conditions.
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
* Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in critical delay and v/c calculated using Traffix.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates adverse effect

## Adverse Effects and Recommended Improvements

Improvement options were studied for each intersection that were found to be non-compliant under the near term plus project conditions, and cumulative plus project conditions, were compared to near term no project, and cumulative no project conditions, respectively. Potential improvement strategies are shown in Table ES-6.

**Table ES- 6**
**Recommended Improvements**

| # | Intersection | Potential Improvement | Notes |
|---|---|---|---|
| 1 | Marsh Road & Bayfront Expressway | Modify the southbound approach to include a shared left-through lane, shared through-right lane, and a right turn only lane. | This improvement is in Menlo Park's traffic impact fee (TIF) program. With implementation of these intersection modifications, the intersection would be in compliance with the TIA Guidelines and address the Proposed Project's share of the non- compliant operation. |
| 5 | Marsh Road & Bohannon Drive/Florence Street | Physical improvements at this intersection are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel. | The City's TIF program includes multi-modal improvements along the Marsh Road corridor such as Class II buffered bike lanes along Marsh Road from Bay Road to Scott Road, and installing sidewalks along the north-side of Marsh Road between Page Street and Bohannon Drive/Florence Street. Implementing recommended multi-modal facilities along the corridor (from the City's TIF program) could shift some motor vehicle traffic to alternative modes of travel and reduce congestion. With implementation of these multi-modal improvements, the intersection deficiencies could be further reduced and partially address the Proposed Project's share of the non-compliant operations at this intersection. |
| 13 | Chilco Street & Hamilton Avenue | A traffic signal is not recommended until signal warrants conducted with a future year's actual counts have been met | The recommended improvement includes conducting a signal warrant analyses for a period of five years after full Project completion to determine if a signal would be warranted and if warranted, install a new signal. This improvement is included in the City's TIF program. With implementation of the intersection modifications, the intersection would be in compliance with the TIA Guidelines which would address the Proposed Project's share of the non- compliant operation. |
| 16<br>17<br>18<br>23 | Willow Road & Bayfront Expressway;<br>Willow Road & Hamilton Avenue;<br>Willow Road & Park Street;<br>Willow Road & US 101 southbound ramps | Physical improvements at thes intersection are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel. | The TIF program also proposes multimodal improvements along this section of Willow Road. Implementing recommended multi-modal facilities along the corridor (from the City's TIF program) could shift some motor vehicle traffic to alternative modes of travel and reduce congestion. With implementation of these multi-modal improvements, the intersection deficiencies could be further reduced and partially address the Proposed Project's share of the non- compliant operations along Willow Road. |
| 19 | Willow Road & Ivy Drive | The Menlo Park TIF proposes to install a right-turn overlap phase on southbound Ivy Drive and restrict eastbound Willow Road U-turns. | This would improve the critical movement delay of the local approach to better than cumulative no project conditions. The Project is required to pay traffic impact fees according to the City's current TIF schedule. |

## Table ES-6 (Continued)
## Recommended Improvements

| # | Intersection | Potential Improvement | Notes |
|---|---|---|---|
| 21 | Willow Road & Newbridge Street | The TIF program proposes to modify the signal timing to a protected left-turn phasing operation on Newbridge Street, provide a leading left-turn phase on the southbound movement and a lagging left-turn phase on the northbound movement, and optimize signal timing. | With implementation of these intersection modifications under project conditions, the critical movement delay would be reduced for the northbound movement to lower than no project conditions. However, the improvement would not address the southbound deficiency. Further improvements to address the southbound deficiency are not feasible. |
| 24 | Willow Road & Bay Road | The TIF program proposes to modify the southbound approach at this intersection to two left-turn lanes and one right-turn lane and to modify the westbound approach to add a right-turn lane. With these improvements under project conditions, the critical movement delay at the local approach would be reduced to lower than no project conditions. | This improvement would address the adverse effect on the intersection due to Project traffic. With implementation of these intersection modifications, the Willow Road and Bay Road intersection would be in compliance with the TIA Guidelines which would address the Proposed Project's share of the non- compliant operation. With implementation of the recommended improvements from the TIF program for the Willow Road and Bay Road intersection the deficiency attributable to the Proposed Project would be addressed. |
| 25 | Willow Road & Hospital Plaza/Durham Street | The recommended improvement measure for this intersection is restriping northbound Durham Street as a shared left-through lane and right-turn lane, and adding a northbound right turn overlap phase. | With this improvement, the critical movement delay of the local approach would improve to better than cumulative no project conditions in the AM peak hour. The PM peak hour would continue to be non-compliant. If this recommended improvement measure is implemented, the Project should contribute its fair share (25%) towards the improvement. Fair share is calculated as the percentage of net project traffic generated of the overall cumulative traffic growth at this intersection. |
| 30 | O'Brien Drive & Kavanaugh Drive | The recommended improvement to bring this intersection back to pre-Project conditions is the installation of the new traffic signal and appropriate pedestrian and bicycle accommodation. Alternatively, traffic calming measures could be installed to discourage the use of Kavanaugh Drive, which is a residential street, and encourage vehicles to use O'Brien Drive and Adam's Drive instead. Other measures such as peak period turning movement restrictions could be considered to discourage traffic from using Kavanaugh Drive and improve intersection operations. | Monitoring of traffic operations at this intersection for a period of five years after full Project completion should be conducted to determine if signalization or alternative improvements are needed. If warranted, implementation of the new traffic signal would address the Proposed Project's share of the non-compliant operation and bring the intersection into compliance with the TIA Guidelines. If the alternative measures are implemented, the intersection may or may not be brought into compliance with the TIA Guidelines and address the Proposed Project's share of the non-compliant operation. |
| 32 | Adams Drive & O'Brien Drive | The recommended improvement to bring this intersection back to pre-Project conditions is the installation of the new traffic signal and appropriate pedestrian and bicycle accommodations at this intersection and within the vicinity.<br><br>The expected intersection operational issues would be due to the increased through traffic on O'Brien Drive between the Project Site and University Avenue. Menlo Park's TIF program identifies an improvement to signalize the nearby intersection at University Avenue and Adams Drive in East Palo Alto. This improvement may provide an alternative route for Project vehicles to access the Project Site via University Avenue. | Monitoring of traffic operations at this intersection for a period of five years after full Project completion should be conducted to determine if signalization or alternative improvements are needed. If warranted, implementation of the new traffic signal would address the Proposed Project's share of the non-compliant operation and bring the intersection into compliance with the TIA Guidelines. If the alternative measures are implemented, the intersection may or may not be brought into compliance with the TIA Guidelines and address the Proposed Project's share of the non-compliant operation. |

**Table ES-6 (Continued)**
**Recommended Improvements**

| # | Intersection | Potential Improvement | Notes |
|---|---|---|---|
| 39 | University Avenue & Bay Road | Potential modification to bring the intersection to pre-Project conditions would be to add an exclusive eastbound right-turn lane and a second eastbound left-turn lane on University Avenue, add a second northbound left-turn lane on Bay Road, add a second westbound left-turn lane on University Avenue, and modify signal phasing. | Since this intersection is located within the City of East Palo Alto, the recommended measure to bring the intersection back to pre-Project conditions and address the Project's share of the non-compliant operation would be to make a fair share (34%) contribution towards this improvement. Fair share is calculated as the percentage of net project traffic generated divided by the overall cumulative traffic growth at this intersection. The Menlo Park TIF includes improvements at the University Avenue and Bay Road intersection, but not sufficient improvements to bring the intersection back to pre-Project conditions, as described above. However, the Project's fair share contribution towards this intersection would be calculated considering credit from its TIF payment. |
| 42<br>43<br>44<br>45<br>46<br>47<br>50 | University Avenue & Donohoe Street;<br>US 101 Northbound Off-ramp & Donohoe Street;<br>Cooley Avenue & Donohoe Street;<br>University Avenue & US 101 Southbound Ramps;<br>University Avenue & Woodland Avenue;<br>E. Bayshore Road & Donohoe Street;<br>Donohoe Street & Euclid Avenue | East Palo Alto plans to widen the northbound approach on Donohoe Street at the US 101 northbound off-ramp to accommodate four through lanes to improve the vehicular throughput at this intersection. This improvement will require median modifications and narrowing the southbound Donohoe Street approach to Cooley Avenue to include two through lanes and a full length left-turn lane. In addition, the traffic signals will be coordinated with adjacent traffic signals on Donohoe Street.<br><br>East Palo Alto also plans to install a new traffic signal at the US 101 northbound on-ramp and Donohoe Street and Bayshore Road and Euclid Avenue to coordinate with other closely spaced traffic signals along Donohoe Street. Along with new traffic signals, appropriate pedestrian and bicycle accommodation will be provided. This includes pedestrian countdown timers, Americans with Disabilities Act (ADA) compliant curbs, and bicycle detection loops. In order to align with the proposed driveway for the University Plaza Phase II site on the north side of Donohoe Street, the US 101 on-ramp will be shifted approximately 30 feet to the south. In addition, the northbound approach on Donohoe Street will be restriped to accommodate a short exclusive left-turn pocket (approximately 60 feet in length), a shared left-through lane, and a shared through-right lane. These improvements would require widening of the US 101 northbound on-ramp to accommodate two lanes that taper down to a single lane before this ramp connects with the loop on-ramp from eastbound University Avenue. A northbound right turn only will also be added to Bayshore Road and Euclid Avenue. | Because the improvements in this corridor are all interconnected and dependent on each other to work, the recommended improvement measure would be for the Project sponsor to contribute its fair share to improvements at all six intersections in this corridor. Fair share is calculated as the percentage of net project traffic generated of the overall cumulative traffic growth at this intersection.<br>• Donohoe Street & Cooley Avenue: 10% fair share<br>• Donohoe Street & US 101 Northbound Off-Ramp: 24% fair share<br>• Donohoe Street & University Avenue: 31% fair share<br>• Donohoe Street & US 101 Northbound On-Ramp: 8% fair share<br>• Donohoe Street/Bayshore Road & Euclid Avenue: 2% fair share<br>• US 101 Southbound Ramps & University Avenue: 33% fair share<br><br>The Menlo Park TIF includes improvements at the University Avenue and Donohoe Street and University Avenue and US 101 southbound ramps intersections, which funding would go toward the planned coordinated system of intersections. The Project's fair share contribution towards these two intersections would be calculated considering credit from its TIF payment. |
| 49 | Saratoga Avenue & Newbridge Street | Physical improvements at this intersection are considered infeasible due to proximity to Willow Road. | |

## Intersection Queuing Analysis

The analysis of intersection levels of service was supplemented with a vehicle queuing analysis for intersection left-turning movements where the proposed project would add significant trips per lane in the vicinity of the Project Site and affect intersection operations. Locations where the estimated 95th percentile queues would exceed the available storage capacity for the movement are discussed below. Queuing issues are operational issues resulting from signal timing and queue storage provisions. Queuing issues are not considered a CEQA issue related to hazards.

**Eastbound Left-turn at Willow Road and Bayfront Expressway (#16)**

Under near-term conditions, the 95th percentile queue would exceed the storage length of the turn pocket by 15 vehicles during the AM peak hour and four vehicles during the PM peak hour. The Proposed Project would add three vehicles to the 95th percentile queue during the AM peak hour and PM peak hour. There is no room to extend the left turn pocket due to the emergency vehicle only lane cut in the median.

**Eastbound Left-turn at Willow Road and Ivy Drive (#19)**

Under near-term conditions, the 95th percentile queue exceeds the storage length of the turn pocket by three vehicles during the AM peak hour. The Proposed Project would add one vehicle to the 95th percentile queue during the AM peak hour and one vehicle during the PM peak hour. There is no room to further extend this left-turn.

**Southbound Left-turn at Willow Road and Bay Road (#24)**

Under near-term conditions, the 95th percentile queue exceeds the storage length of the turn pocket by 13 vehicles during the AM peak hour and one vehicle during the PM peak hour. The Proposed Project would add six vehicles to the 95th percentile queue during the AM peak hour and three vehicles during the PM peak hour. Menlo Park's TIF has a project to add a second left-turn lane to this intersection, which would add additional storage for left-turning vehicles. The exact length of the addition will be determined during the design phase for the intersection improvement. Construction of the recommended improvement would reduce the queuing deficiency created by the Proposed Project.

**Eastbound Left-turn and Southbound left-turn at University Avenue and O'Brien Drive (#36)**

The existing vehicle storage for the eastbound left turn pocket on University Avenue at O'Brien Drive is 125 feet, which provides enough spaces for about 5 vehicles. Under existing conditions, the 95th percentile queue exceeds the storage length of the turn pocket by 3 vehicles during the AM peak hour. The Proposed Project would add 22 vehicles to the 95th percentile queue during the AM peak hour. There is no room to lengthen the eastbound left turn pocket.

The existing vehicle storage for the southbound left turn pocket on O'Brien Drive at University Avenue is 60 feet, which provides enough spaces for 2 vehicles. Under existing conditions, the 95th percentile queue exceeds the storage length of the turn pocket by one vehicle during the AM peak hour and 11 vehicles during the PM peak hour. The Project would add one vehicle to the 95th percentile queue during the AM peak hour. There would be no increase to the 95th percentile queue length during the PM peak hour. There is room to extend the left turn pocket to accommodate the estimated 95$^{th}$ percentile queue of 325 feet.

Menlo Park's Traffic Impact Fee (TIF) program identifies an improvement to signalize the nearby intersection at University Avenue and Adams Drive in East Palo Alto. This improvement may provide an alternative route for Project vehicles to access the Project Site via University Avenue, and alleviate potential queuing issues at this intersection.

## Freeway Facilities Analysis

To determine the Proposed Project's potential freeway adverse effects, a select-zone analysis within the Menlo Park model was performed to estimate the increase in project traffic volume between existing conditions and near term with project conditions. Freeway segments that would experience a freeway adverse effect generated by the Proposed Project are identified below.

**San Mateo County**

The proposed project would add traffic greater than 1% capacity to the following study freeway segments operating below its LOS standard:

- SR 84 – from Willow Road to Alameda County Line – PM Peak Hour
- SR 84 – from Alameda County Line to Willow Road – AM Peak Hour
- US 101 – between Santa Clara County Line and Whipple Avenue – AM & PM Peak Hours
- US 101 – from Whipple Avenue to SR 92 – PM Peak Hour
- US 101 – from SR 92 to Whipple Avenue – AM Peak Hour

**Santa Clara County**

The proposed project would add traffic greater than 1% capacity to the following mixed-flow freeway segments operating below its LOS standard:

- US 101 – from SR 85 to Embarcadero Road – AM & PM Peak Hours
- US 101 – from Embarcadero Road to SR 85 – PM Peak hour

The proposed project would add traffic greater than 1% capacity to the following HOV freeway segment operating below its LOS standard:

- US 101 – from Oregon Expressway to Embarcadero Road – AM Peak Hour

## Freeway Improvements

It should be noted that the near term plus project conditions model run assumed the US 101 express lane project in San Mateo County. Improvements to eliminate the adverse freeway effects on US 101 and on SR 84 within San Mateo County would require additional capacity improvements and/or additional TDM measures that would reduce peak-hour vehicle trip-making by more than 70%. San Mateo County currently has no plans to further improve US 101 beyond the identified express lane projects. There are also no identified plans to improve the Bayfront Expressway (SR 84) corridor. Such an aggressive TDM plan would also not be feasible.

Within Santa Clara County, Valley Transportation Authority's Valley Transportation Plan 2040 identifies freeway express lane projects along US 101 that would convert the existing HOV lanes to express lanes and add a second express lane in each direction. This improvement would increase the capacity of the freeway and would adequately address the freeway impacts.

The potential Dumbarton Rail corridor would slightly reduce the Project contribution to the identified adverse effects but would not eliminate any. Therefore, the Project's adverse effects on US 101 and on SR 84 freeway segments in San Mateo County would remain.

## Freeway Ramp Analysis

A freeway ramp analysis is conducted under near term plus project conditions to determine whether freeway ramps would continue to have sufficient capacity to serve the forecasted traffic demand. Under near term plus project conditions, all study freeway ramps would continue to have sufficient capacity to serve the anticipated demand.

## Roadway ADT Analysis

The roadway ADT analysis was conducted under cumulative with project conditions. To determine net Project added traffic, a select zone analysis was conducted using the Menlo Park model under cumulative with project conditions and existing conditions. The proposed project would generate non-compliance at the following roadway segments:

- Willow Road, east of Durham Street
- Willow Road, east of Blackburn Avenue
- Middlefield Road, south of Willow Road
- Marsh Road, east of Bohannon Drive
- O'Brien Drive, south of Willow Road
- O'Brien Drive, north of University Avenue
- Bay Road, north of Willow Road

## Internal Site Access, Circulation, and Parking

Appendix H includes the analysis of the main Willow Village site as well as the Hamilton parcels. The site plan review evaluated the internal site's intersection operations, potential queuing issues, and general site access and circulation for the proposed seven new internal streets, 14 parking garage driveways, and 20 new intersections. The results of the level of service analysis show that the intersection of Driveway B & East Loop Road would operate at LOS D during the AM peak hour. Vehicles turning left out of Driveway B would be expected to experience an average delay of 31 seconds while waiting for a sufficient opening on East Loop Road. During the AM peak hour, approximately 101 vehicles (16 heading eastbound and 85 heading westbound) would be expected to exit the garage, which would be one to two vehicles per minute. Therefore, although exiting drivers would experience some wait time, operations at Driveway B are expected to be adequate. The results of the queuing analysis show that the intersection of Hamilton Avenue/Main Street & Willow Road is expected to have insufficient turn lane storage to accommodate the anticipated traffic volumes under near-term plus project conditions. However, it is assumed that vehicles would choose to instead enter the project site via Park Street. Hexagon recommends the following regarding the internal project circulation:

**Circulation Related Recommendations**

- To prevent southbound queues from spilling back onto Willow Road on Park Street and Main Street, Hexagon recommends coordinating the adjacent signals.

**Sight Distance Related Recommendations**

- As discussed under Mitigation Measure TRA-2 (see Transportation Chapter of the draft EIR), prior to issuance of the building permit for the North Garage, the applicant shall revise the access design to provide adequate sight distance for the eastern driveway or other design solutions to reduce hazards to a less than significant level, to the satisfaction of the Public Works Director. Potential solutions that would reduce hazards to a less than significant level include restricting the eastern driveway to inbound vehicles only or prohibiting exiting left turns, modifying landscaping or relocating the driveway to the west to allow for adequate sight distance for exiting vehicles, or installing an all-way stop or signal. If driveway A were restricted to inbound vehicles only, all outbound vehicles would use Driveway B, which would provide adequate sight distance for vehicles exiting the north office garage. Driveway B might need multiple exiting lanes to limit queuing inside the garage for exiting vehicles. Alternatively, Driveway A could be moved farther west on East Loop Road so that adequate sight distance could be provided.

- Prior to final design, the project applicant should ensure that landscaping and vegetation would not obstruct visibility at the parking garage driveways.
- Hexagon recommends including 30 feet of red curb on both sides of all garage driveways to prevent vehicles from parking and obstructing the vision of exiting drivers.
- If vehicles exiting the garages cannot see oncoming pedestrians on the sidewalk, Hexagon recommends installing warning signs to alert pedestrians when vehicles are exiting the garages.
- If any driveways are moved from their position on the current site plan, sight distance should be reevaluated.

**Parking Garage Circulation Related Recommendations**

- Prior to final design, it is recommended that all driveway widths meet the City's requirements.
- At garage driveways where gates and garage doors are proposed, Hexagon recommends conducting an operational analysis to ensure that gate opening and closing times would not create queuing issues or cause vehicles to spill onto the roadway network.
- Prior to final design, the residential parking on level P1 of building RS2 should be shown to be gated and separated from the retail parking on levels 1 and 2. In addition, the roll-up gate in building RS3 should be clearly shown to separate the retail parking in level B1 and the residential parking in level B2.
- It is recommended that all drive aisle and parking stall widths meet the City's requirements.
- It is recommended that adequate turnaround space is provided at all dead-end drive aisles.

**Parking Related Recommendations**

- If individual vehicles are not able to be retrieved in the tandem puzzle parking, the tandem spaces should be assigned to one residential unit.
- Prior to final design, Hexagon recommends that the required number of ADA and EV parking spaces be provided in all parking garages.

**Pedestrian Related Recommendations**

- Hexagon recommends that a crosswalk is provided at the intersection of Center Street & East Street and that midblock crosswalks are provided on Center Street and Park Street to reduce block size and improve pedestrian convenience.

**Hamilton Parcels Recommendations**

- The Hamilton Avenue Parcels are located within the C-2-S zoning district, which per Menlo Park Municipal Code Section 16.37(7), will have parking requirements established by the planning commission for each development. The Hamilton Avenue Parcel North proposes total potential development up to 22,402 square feet and 93 spaces. The Hamilton Avenue Parcel South proposes total development of 5,760 s.f. and 13 spaces. It is recommended that the project applicant confirm that sufficient parking is provided for the proposed total development as part of future architectural control and use permit applications with the City.

# 1. Introduction

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed Willow Village Master Plan Project in Menlo Park, California. Proposed Project would redevelop an approximately 59-acre industrial site plus two parcels north of Willow Road[7] (collectively, the Project Site) as a mixed-use development (Figure 1). The Proposed Project would demolish all existing onsite buildings and landscaping on the 59-acre portion of the Project Site and construct new buildings, provide open space areas, and install infrastructure within a new Residential/Shopping District, Town Square District, and Campus District. In addition, the Proposed Project would alter two parcels (Hamilton Avenue Parcels North and South[8]) to accommodate realignment of Hamilton Avenue at Willow Road for Project Site access.

The Proposed Project would provide up to 1.6 million sf of space for office and accessory use (consisting of up to 1.25 million sf of office uses and the balance (350,000 square if office use is maximized) of accessory uses[9]) and up to 200,000 sf of commercial/retail space. The Proposed Project would also include up to 1,730 multi-family housing units, an up to 193-room hotel, and open spaces, including publicly accessible parks (e.g. 3.5 acre publicly accessible park, elevated linear park, town square, and dog park).

The Project Site would be bisected by a new north–south street (Main Street) and an east–west street, which would provide access to all three districts. It would include a circulation network for vehicles, bicycles, and pedestrians, inclusive of both public rights-of-way and private streets, that would be generally aligned to an east-to-west and a north-to-south grid (Figure 2). The Proposed Project would also alter parcels north of the industrial site, across Willow Road, on both the east and west sides of Hamilton Avenue (Hamilton Avenue Parcels North and South) to support realignment of the Hamilton Avenue right-of-way and provide access to the new elevated park. This would require demolition and reconstruction of an existing service station (Chevron gas station) and potentially an increase in 1,000 sf on Hamilton Avenue Parcel South and enable the potential addition of up to 6,700 sf of retail uses at the existing neighborhood shopping center on the Hamilton Avenue Parcel North. A total of 7,700 sf could be added to the Hamilton Avenue Parcels (Figure 3).

---

[7] For transportation analysis, "North/South" is aligned to be parallel to US 101. Hence, Willow Road and University Avenue are considered east-west streets, whereas Hamilton Avenue and Bayfront Expressway are considered north-south streets.

[8] Hamilton Avenue Parcels North and South consider Hamilton Avenue an east to west street, which differs from the compass directions used for the transportation analysis discussion.

[9] Accessory uses could include the following types of spaces: meeting/collaboration space, orientation space, training space, event space, incubator space, a business partner center, an event building (including pre-function space, collaboration areas, and meeting/event rooms), a visitor center, product demonstration areas, film studio, gathering terraces and private gardens, and space for other Meta accessory uses. Accessory uses could occur in spaces located anywhere throughout the Campus District

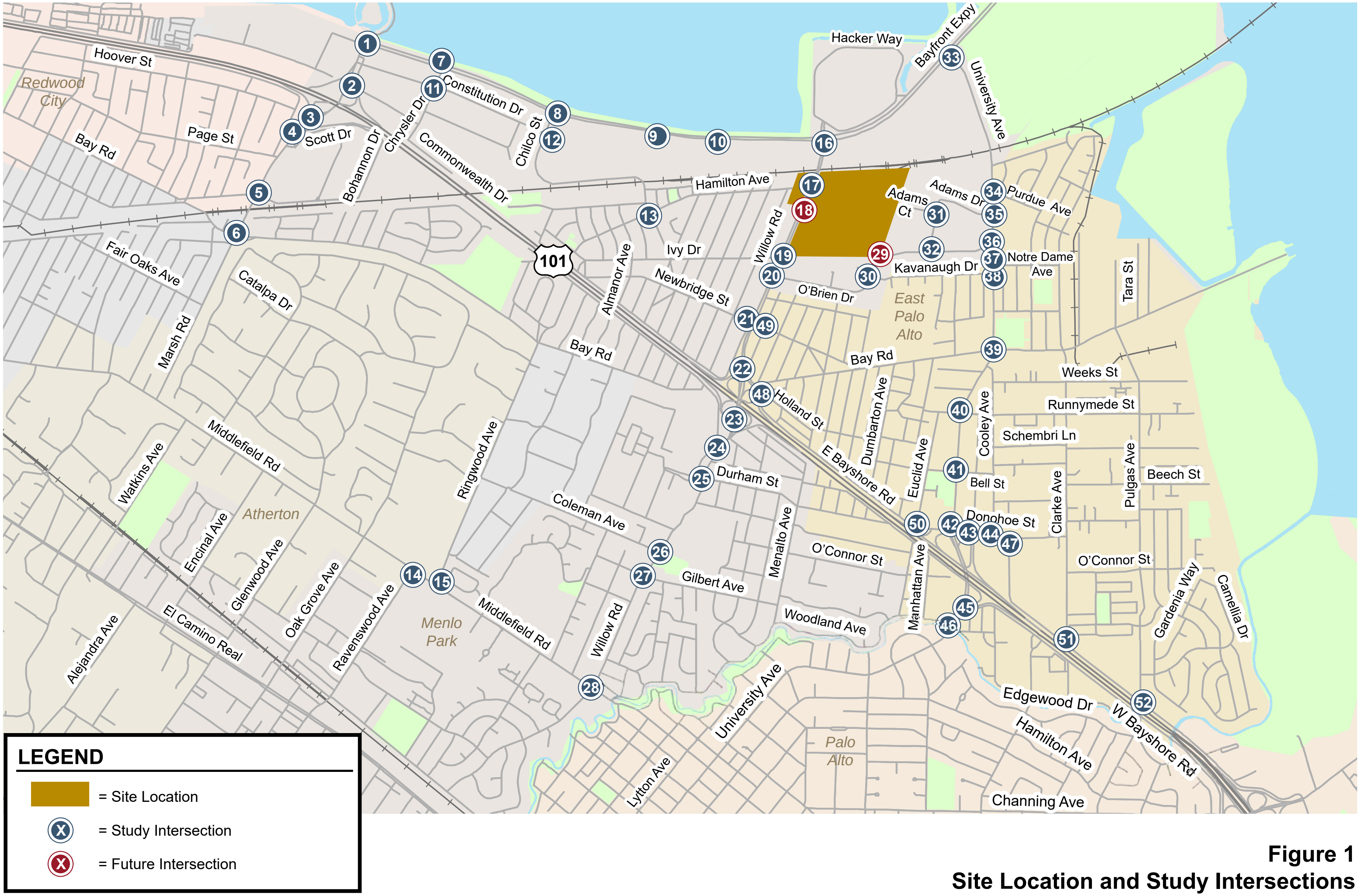



**Figure 1**
**Site Location and Study Intersections**


| LEGEND | |
|---|---|
| 1 | Town Square |
| 2 | Grocery Store on Ground Level |
| 3 | Publicly Accessible Park |
| 4 | Publicly Accessible Dog Park |
| 5 | Elevated Park Access (Elevator and Stairs) |
| 6 | Elevated Park |
| 7 | Hotel |
| 8 | Mixed-Use Block |
| 9 | Residential Block |
| 10a | Office Campus |
| 10b | Meeting & Collaboration Space |
| 11 | Parking Garage with Transit Hub on Ground Level |
| 12 | Proposed Multi-use Pathway |
| 13 | Willow Road Tunnel |
| 14 | Realigned Hamilton Avenue |

**Figure 2**
**Site Plan**

HEXAGON

NORTH
Not to Scale


**Figure 3**
**Hamilton Avenue Parcels Site Plan**

## Scope of Study

The purpose of the transportation study is to identify any transportation operational issues in accordance with City of Menlo Park standards and procedures. This report includes a CEQA VMT analysis, non-CEQA level of service (LOS) analysis (or roadway congestion analysis) and on-site access and circulation review to inform local planning efforts per the City's TIA Guidelines.

## CEQA VMT Analysis

Per the City of Menlo Park VMT guidelines adopted in July 2020 and updated in January 2022, mixed-use projects will have each component analyzed independently against the appropriate thresholds. The Project proposes office, residential, hotel and retail land uses. OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA* recommends that VMT analysis for a mixed-use project should account for internal capture. Internal capture is defined as walking, bicycling, and tram trips between the various types of land use within the Project. By reducing external vehicle trips, internal capture reduces VMT for a mixed-use project in comparison to single-use developments. The project proposes office, residential, hotel and retail land uses. Each of the Project's land uses' VMT threshold of significance is listed below:

- An office project is considered to have a significant impact on VMT if the project's VMT exceeds a threshold of 15 percent below the regional average VMT per employee.
- A residential project is considered to have a significant impact on VMT if the project's VMT exceeds a threshold of 15 percent below the regional average VMT per capita.
- Hotel and retail projects are considered to have a significant impact on VMT if the project results in a net increase in total City VMT.

It should be noted that the City's VMT guidelines exempt local serving retail projects (defined as 50,000 square feet or less) from carrying out a VMT analysis. However, this project exceeds that size.[10]

## Non-CEQA Level of Service (Roadway Congestion Analysis)

An LOS analysis was conducted to identify whether the proposed project would comply with local policies.

The traffic analysis is based on the AM and PM peak-hour level of service for 42 signalized intersections and 10 unsignalized intersections in the vicinity of the Project Site as illustrated in Figure 1. Traffic conditions at the study intersections were analyzed for the weekday AM and PM peak hours of adjacent street traffic. The AM peak hour is expected to occur between 7:00 AM and 10:00 AM, and the PM peak hour between 4:00 PM and 7:00 PM on a typical weekday. These are the hours during which most traffic congestion occurs on the roadways. Intersections within the City of East Palo Alto are also studied due to Menlo Park's settlement agreement with the City of East Palo Alto.

The proposed project would generate greater than 100 peak-hour trips. The San Mateo County City/County Association of Governments (C/CAG) administers the CMP. Therefore, an analysis in accordance with the C/CAG CMP guidelines is included.

[10] The VMT for the main Project Site was evaluated. The reconstruction of the service station would not increase VMT, and the modest increase in retail square footage at Hamilton Avenue Parcel North would be operated as a separate project and would be substantially below the City's threshold. Therefore, VMT was not studied for the reconstruction of the service station and the potential increase in square footage at Hamilton Parcel North.

## Study Intersections

1. Marsh Road and Bayfront Expressway [Menlo Park]*
2. Marsh Road and US 101 Northbound Off-Ramp [Caltrans]
3. Marsh Road and US 101 Southbound Off-Ramp [Caltrans]
4. Marsh Road and Scott Drive [Menlo Park]
5. Marsh Road and Bohannon Drive/Florence Street [Menlo Park]
6. Marsh Road and Bay Road [Menlo Park]
7. Chrysler Drive and Bayfront Expressway [Menlo Park]
8. Chilco Street and Bayfront Expressway [Menlo Park]
9. MPK 21 Driveway and Bayfront Expressway [Menlo Park]
10. MPK 20 Driveway and Bayfront Expressway [Menlo Park]
11. Chrysler Drive and Constitution Drive [Menlo Park]
12. Chilco Street and Constitution Drive/MPK 22 Driveway (unsignalized) [Menlo Park]
13. Chilco Street and Hamilton Avenue (unsignalized) [Menlo Park]
14. Ravenswood Avenue and Middlefield Road [Menlo Park]
15. Ringwood Avenue and Middlefield Road [Menlo Park]
16. Willow Road and Bayfront Expressway [Menlo Park]*
17. Willow Road and Hamilton Avenue [Menlo Park]
18. Willow Road and Park Street (future intersection) [Menlo Park]
19. Willow Road and Ivy Drive [Menlo Park]
20. Willow Road and O’Brien Drive [Menlo Park]
21. Willow Road and Newbridge Street [Menlo Park]
22. Willow Road and US 101 Northbound Ramps [Caltrans]
23. Willow Road and US 101 Southbound Ramps [Caltrans]
24. Willow Road and Bay Road [Menlo Park]
25. Willow Road and Hospital Plaza/Durham Street [Menlo Park]
26. Willow Road and Coleman Avenue [Menlo Park]
27. Willow Road and Gilbert Avenue [Menlo Park]
28. Willow Road and Middlefield Road [Menlo Park]
29. O’Brien Drive/Loop Road and Main Street/O’Brien Drive (future intersection) [Menlo Park]
30. O’Brien Drive and Kavanaugh Drive (unsignalized) [Menlo Park]
31. Adams Drive and Adams Court (unsignalized) [Menlo Park]
32. Adams Drive and O’Brien Drive (unsignalized) [Menlo Park]
33. University Avenue and Bayfront Expressway [Menlo Park]*
34. University Avenue and Purdue Avenue (unsignalized) [East Palo Alto]
35. University Avenue and Adams Drive (unsignalized) [East Palo Alto]
36. University Avenue and O’Brien Drive [East Palo Alto]
37. University Avenue and Notre Dame Avenue [East Palo Alto]
38. University Avenue and Kavanaugh Drive [East Palo Alto]
39. University Avenue and Bay Road [East Palo Alto]
40. University Avenue and Runnymede Street [East Palo Alto]
41. University Avenue and Bell Street [East Palo Alto]
42. University Avenue and Donohoe Street [East Palo Alto]
43. US 101 Northbound Off-Ramp and Donohoe Street [Caltrans]
44. Cooley Avenue and Donohoe Street [East Palo Alto]
45. University Avenue and US 101 Southbound Ramps [Caltrans]
46. University Avenue and Woodland Avenue [East Palo Alto]
47. East Bayshore Road and Donohoe Street [East Palo Alto]
48. East Bayshore Road and Holland Street (unsignalized) [East Palo Alto]
49. Saratoga Avenue and Newbridge Street (unsignalized) [East Palo Alto]

50. East Bayshore Road and Euclid Avenue (unsignalized) [East Palo Alto]
51. Clarke Avenue and East Bayshore Road [East Palo Alto]
52. Puglas Avenue and East Bayshore Road [East Palo Alto]

*Denotes CMP facilities

## Freeway Segments

**San Mateo County**

- SR 84 – between US 101 and Alameda County Line
- US 101 – between Santa Clara County Line and SR 92
- SR 109 (University Avenue) – between Kavanaugh Drive and SR 84
- SR 114 (Willow Road) – between US 101 and SR 84

**Santa Clara County**

- US 101 – between SR 85 and Embarcadero Road

**Alameda County**

- SR 84 – between San Mateo County Line and I-880

## Freeway Ramps

**US 101 & Marsh Road Interchange**

- Southbound off-ramp to Marsh Road
- Northbound on-ramp from westbound Marsh Road

**US 101 & Willow Road Interchange**

- Northbound off-ramp to Willow Road
- Northbound on-ramp from westbound Willow Road
- Southbound on-ramp from westbound Willow Road
- Southbound off-ramp to Willow Road

**US 101 & University Avenue Interchange**

- Northbound off-ramp to Donohoe Street
- Southbound on-ramp from University Avenue

Traffic conditions were evaluated for the following scenarios:

**Scenario 1:** *Existing Conditions.* Existing traffic volumes at the study intersections are based on traffic counts obtained from the City of Menlo Park and/or previous studies for other nearby developments.

**Scenario 2:** *Near-term (2025) Conditions.* The near-term scenario assumed a year 2025 horizon[11] and was analyzed using the model. Traffic volumes were obtained from the Menlo Park Travel Demand Model and adjusted based on existing counts and model results. In addition, traffic and roadway improvements associated with the approved developments were assumed as directed by City Staff.

[11] 2025 is the earliest year for expected occupancy when this analysis started.

**Scenario 3:** *Near-term (2025) plus Project Conditions.* The near term plus project scenario was analyzed using the model. Traffic volumes were obtained from the Menlo Park Travel Demand Model and adjusted based on existing counts and model results. The near-term plus project scenario was evaluated relative to the near-term scenario.

**Scenario 4:** *Cumulative (2040) Conditions.* The cumulative scenario assumed a year 2040 horizon and represented the buildout of the adopted General Plan for the City of Menlo Park, including a pending General Plan Amendment for 123 Independence Drive. This scenario was analyzed using the model. Traffic volumes were obtained from the Menlo Park Travel Demand Model and adjusted based on existing counts and model results. In addition, traffic and roadway improvements associated with the approved developments were assumed as directed by City Staff.

**Scenario 5:** *Cumulative (2040) Plus Project Conditions.* The cumulative plus project scenario was analyzed using the model. Traffic volumes were obtained from the Menlo Park Travel Demand Model and adjusted based on existing counts and model results. The cumulative plus project scenario was evaluated relative to the cumulative scenario.

**Scenario 6:** *Cumulative (2040) with Dumbarton Rail.* The cumulative with Dumbarton Rail scenario assumed that the Dumbarton Rail would be built and there would be a shift in vehicular trips to transit trips near the Project Site[12] as well as along the Dumbarton Rail corridor. Cumulative plus project conditions with Dumbarton Rail were evaluated relative to cumulative conditions with the Dumbarton Rail. This analysis is speculative since there is no current approved plan or financing to provide any Dumbarton transit service and is provided for informational purposes in the transportation analysis.

## Methodology

This section presents the methods used to determine the traffic conditions at study intersections for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards and criteria used to determine if a project is compliant with local policies.

### Data Requirements

The data required for the analysis were obtained from the City of Menlo Park, field observations, and previous studies. The following data were obtained from these sources:

- existing peak-hour intersection turning-movement volumes,
- existing lane configurations,
- signal timing and phasing, and
- list of approved projects.

Existing counts and field observations were conducted prior to the COVID19 pandemic. No adjustments to the data were made based on pandemic conditions.

[12] *Dumbarton Rail Corridor Update Public Meeting*, Prepared by Facebook for the San Mateo County Transit District. March 15, 2021

## Intersection Level of Service Methodologies

Traffic conditions were evaluated using level of service (LOS). Level of service is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or forced-flow conditions with extreme delays.

As stated above, LOS is no longer a CEQA threshold. However, the General Plan and City's TIA Guidelines require that the TIA also analyze LOS for local planning purposes (per General Plan Program Circ-3.A Transportation Impact Metrics):

> Supplement Vehicle Miles Traveled (VMT) and greenhouse gas emissions per service population (or other efficiency metric) metrics with Level of Service (LOS) in the transportation impact review process, and utilize LOS for identification of potential operational improvements, such as traffic signal upgrades and coordination, as part of the Transportation Master Plan.

The LOS analysis would determine whether the project traffic would cause an intersection LOS to exceed the City's LOS thresholds or cause either the average delay or average critical delay to exceed the City's intersection delay thresholds under near term and cumulative conditions. The LOS and delay thresholds vary depending on the street classifications as well as whether the intersection is on a State route or not.

The City's TIA Guidelines further require an analysis of the Proposed Project in relation to relevant policies of the Circulation Element and consideration of specific measures to address noncompliance with local policies which may occur as a result of the addition of project traffic. The TIA identifies measures that could be applied as conditions of approval that would bring operations back to pre-Project levels. Although not included in the TIA for purposes of this EIR, an analysis may be prepared separately to determine if there are potential measures that could bring the Proposed Project into conformance with the LOS goals of Circulation Policy 3.4. Implementation of any such measures would require review and approval by City decision makers.

The level of service standard for the City of East Palo Alto at the study intersections is LOS D or better.

## Microscopic Simulation of Study Intersections

Due to the close proximity of selected study intersections, six study intersections in the vicinity of the US 101/University Avenue interchange, and ten intersections along Willow Road, were analyzed using the Synchro/SimTraffic 9 software. Unlike macroscopic models of isolated intersection operations such as the Highway Capacity Manual methodology, SimTraffic is a microscopic model that measures the full impact of queuing and blocking of intersections. This software also provides a visual animation of the traffic operations. Simulated delay values were correlated to the level of service definitions set forth in the 2000 Highway Capacity Manual (HCM) methodology.

## Macroscopic Analysis of Signalized Intersections

Traffic operations at the signalized study intersections in the City of Menlo Park were evaluated using the VISTRO software based on the level of service method described in the Highway Capacity Manual (HCM) 6th Edition. The study intersections in the City of East Palo Alto and the City of Palo Alto were evaluated using the TRAFFIX software based on the 2000 HCM methodology. The study intersections in Atherton were evaluated using the SYNCHRO software based on the HCM 6th Edition methodology. The 2000 HCM and HCM 6th Edition evaluate signalized intersection operations on the basis of average control delay time for all vehicles at the intersection. Table 1 shows the level of service definitions for signalized intersections.

**Unsignalized Intersections**

Peak-hour levels of motor vehicle delay at the unsignalized study intersections in the City of Menlo Park were evaluated using the VISTRO software based on the HCM 6th Edition. The study intersections in the City of East Palo Alto were evaluated using the TRAFFIX software based on the 2000 HCM methodology. With these methods, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. At side-street controlled intersections (two-way or one-way stop control), the control delay (and LOS) is reported for the approach with the highest delay. For all-way stop-controlled intersections, the average delay (and LOS) for all movements is reported. Table 2 summarizes the relationship between average control delay per vehicle and LOS for unsignalized intersections.

**Table 1**
**Signalized Intersection Level of Service Definitions Based on Control Delay**

| Level of Service | Description | Average Control Delay Per Vehicle (sec.) |
|---|---|---|
| A | Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay. | 10.0 or less |
| B | Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay. | 10.1 to 20.0 |
| C | Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though some vehicles may still pass through the intersection without stopping. | 20.1 to 35.0 |
| D | The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.1 to 55.0 |
| E | This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently. | 55.1 to 80.0 |
| F | This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes of such delay levels. | greater than 80.0 |

Source: Transportation Research Board, *Highway Capacity Manual 6th Edition* (Washington, D.C., 2016), p.16-19.

**Table 2**
**Unsignalized Intersection Level of Service Definition Based on Average Delay**

| Level of Service | Description | Average Delay Per Vehicle (Sec.) |
|---|---|---|
| A | Little or no traffic delay | 10.0 or less |
| B | Short traffic delays | 10.1 to 15.0 |
| C | Average traffic delays | 15.1 to 25.0 |
| D | Long traffic delays | 25.1 to 35.0 |
| E | Very long traffic delays | 35.1 to 50.0 |
| F | Extreme traffic delays | greater than 50.0 |
| Source: Transportation Research Board, *Highway Capacity Manual 6th Edition* (Washington D.C., 2016). | | |

## Freeway Segments

Freeway segments within the County of San Mateo are evaluated by using the volume-to-capacity (V/C) ratio method according to the City/County Association of Governments (C/CAG) CMP guidelines. The CMP specifies varying capacities be used based on the number of lanes and the free-flow travel speed. The County of San Mateo freeway segment V/C ratio is correlated to level of service as shown in Table 3.

Within Santa Clara County, freeway segments are analyzed as prescribed in the Santa Clara County CMP technical guidelines. The level of service for freeway segments is estimated based on vehicle density. Vehicle density on a segment is correlated to level of service as shown in Table 3. The CMP requires that mixed-flow lanes and auxiliary lanes be analyzed separately from high-occupancy vehicle (HOV) lanes. The CMP specifies that a capacity of 2,300 vehicles per hour per lane (vphpl) be used for segments three lanes or wider in one direction, and a capacity of 2,200 vphpl be used for segments two lanes wide in one direction. HOV lanes are specified as having a capacity of 1,650 vphpl.

Freeway segments within Alameda County are evaluated by using V/C ratios according to the Alameda County Transportation Commission (ACTC) guidelines. The CMP specifies that a capacity of 2,000 vehicles per hour per lane (vphpl) be used for all freeway segments. The Alameda County freeway segment V/C ratio is correlated to level of service as shown in Table 3.

## Freeway Ramps

A freeway ramp analysis was performed in order to verify that the freeway ramps would have sufficient capacity to serve the expected traffic volumes with and without the project. This analysis consisted of a volume-to-capacity ratio evaluation of the freeway ramps at the study interchanges. The ramp capacities were obtained from the *Highway Capacity Manual 2000,* and considered the free-flow speed, number of lanes on the ramp, and ramp metering.

**Table 3**
**Freeway Segment Level of Service Definition**

| Level of Service | Description | San Mateo County[1] Maximum V/C Ratio | Santa Clara County[2] Density (vehicles/mile/lane) | Alameda County[3] Maximum V/C Ratio |
|---|---|---|---|---|
| A | Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. | 0.28 | 11.0 or less | 0.35 |
| B | Speeds at the free-flow speed are generally maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. | 0.46 | 11.0 to 18.0 | 0.58 |
| C | Speeds at or near the free-flow speed of the freeway prevail. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the part of the driver. | 0.67 | 18.0 to 26.0 | 0.75 |
| D | Speeds begin to decline slightly with increased flows at this level. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. | 0.85 | 26.0 to 46.0 | 0.90 |
| E | At this level, the freeway operates at or near capacity. Operations in this level are volatile, because there are virtually no usable gaps in the traffic stream, leaving little room to maneuver within the traffic stream. | 1 | 46.0 to 58.0 | 1 |
| F | Vehicular flow breakdowns occurs. Large queues form behind breakdown points. | greater than 1 | greater than 58.0 | greater than 1 |

Source:

1. City/County Association of Governments of San Mateo County, Final San Mateo County Congestion Management Program 2019, Table B-1 (65 mph free-flow speed).
2. Santa Clara County Valley Transportation Authority, Transportation Impact Analysis Guidelines, Updated October 2014.
3. Alameda Cunty Congestion Management Agency, *2020 Multimodal Monitoring Report*, Table A-1.

## Level of Service Standards and Adverse Effect Criteria

**City of Menlo Park Definition of Adverse Effect**

The following thresholds are from the City of Menlo Park's TIA Guidelines and the proposed project's compliance with local policies was evaluated based on these thresholds.

- A project is considered potentially noncompliant with local policies if the addition of project traffic causes an intersection on a collector street operating at LOS "A" through "C" to operate at an unacceptable level (LOS "D," "E" or "F") or have an increase of 23 seconds or greater in average vehicle delay, whichever comes first. Potential noncompliance shall also include a project that causes an intersection on arterial streets or local approaches to State controlled signalized intersections operating at LOS "A" through "D" to operate at an unacceptable level (LOS "E" or "F") or have an increase of 23 seconds or greater in average vehicle delay, whichever comes first.
- A project is also considered potentially noncompliant if the addition of project traffic causes an increase of more than 0.8 seconds of average delay to vehicles on all critical movements for intersections operating at a near-term LOS "D" through "F" for collector streets and at a near-term LOS "E" or "F" for arterial streets. For local approaches to State controlled signalized intersections, a project is considered to be potentially noncompliant if the addition of project traffic causes an increase of more than 0.8 seconds of delay to vehicles on the most critical movements for intersections operating at a near-term LOS "E" or "F."

**State (Caltrans) Controlled Intersections Definition of Adverse Effect**

For signalized intersections involving two state routes, the proposed project is considered potentially non-compliant with local policies if for any peak hour:

- The level of service degrades from an acceptable LOS D or better under existing conditions to an unacceptable LOS E or F under existing plus project conditions, and the average delay per vehicle increases by four seconds or more, or
- The level of service is an unacceptable LOS E or F under existing conditions and the addition of project trips causes an increase in the average control delay at the intersection by four seconds or more.

**City of East Palo Alto Definition of Adverse Effect**

The following thresholds are used in East Palo Alto, and the proposed project's compliance with local policies was evaluated based on these thresholds:

At a signalized intersection, the project is considered to have an adverse effect if it:

- Causes operations to degrade from LOS D (or better) to LOS E or F; or
- Exacerbates LOS E or F conditions by both increasing critical movement delay by four or more seconds and increasing volume-to-capacity ratio (V/C ratio) by 0.01 at an intersection evaluated using the TRAFFIX software; or
- Increases the V/C ratio by > 0.01 at an intersection that exhibits unacceptable operations, even if the calculated LOS is acceptable; or
- Causes planned future intersections to operate at LOS E or F.

At an unsignalized intersection, the proposed project is considered to have an adverse effect if it:

- Causes operations to degrade from LOS D or better to LOS E or F; or
- Exacerbates LOS E or F conditions by increasing control delay by five or more seconds; and
- Causes volumes under project conditions to exceed the Caltrans Peak-Hour Volume Warrant Criteria.

## Intersection Vehicle Queuing Analysis

For selected high-demand movements at the study intersections, the estimated maximum vehicle queues were compared to the existing or planned storage capacity. The queuing analysis is used to determine the appropriate storage lengths for the high-demand turn lanes where the proposed project would add a substantial number of trips to these movements. Vehicle queues were estimated using Vistro or Synchro for intersections analyzed with this software and a Poisson probability distribution for intersections analyzed in Traffix. Poisson probability distribution estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$\text{Probability } (X=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:

Probability (X=n) = probability of "n" vehicles in queue per lane

n = number of vehicles in the queue per lane

$\lambda =$ Average number of vehicles in queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution, Vistro, or Synchro is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement.

For signalized intersections, the 95th percentile queue length value indicates that during the peak hour, a queue of this length or less would occur on 95 percent of the signal cycles. In other words, a queue length larger than the 95th percentile queue would only occur on five percent of the signal cycles (about three cycles during the peak hour for a signal with a 60-second cycle length). Therefore, left-turn storage pocket designs based on the 95th percentile queue length would ensure that storage space would be exceeded only five percent of the time. The 95th percentile queue length is also known as the "design queue length."

# 2. CEQA VMT Analysis

Project VMT is defined as the total distance traveled by vehicles traveling to and from the Proposed Project over a typical day. In order to estimate VMT for the various land use components, the citywide travel demand forecast model was used. The citywide model is the best available model to represent travel within the City of Menlo Park, and serves as the primary forecasting tool for the City. The model is a mathematical representation of travel within the nine Bay Area counties, as well as the Santa Cruz, San Benito, Monterey and San Joaquin counties. The base model structure was developed by the Metropolitan Transportation Commission (MTC) and further refined by the City/County Association of Governments and Santa Clara Valley Transportation Authority for use within San Mateo County and Santa Clara County. The City further refined this model for application with Menlo Park to add more detail to the zone structure and transportation network. The model has a base year of year 2019 (see Appendix E, Transportation/Traffic, of this EIR for the model's calibration and validation memo).

There are four main components of the model: 1) trip generation, 2) trip distribution, 3) mode choice, and 4) trip assignment. The model uses socioeconomic inputs (i.e., population, income, employment) aggregated into geographic areas, called transportation analysis zones (TAZ) to estimate travel within the model area. There are 80 TAZs within the model to represent the City of Menlo Park. The model was used to estimate the Proposed Project's effect on VMT in accordance with the City's VMT guidelines.

## VMT Evaluation

The most readily available long-range forecast year is the year-2040 conditions, which assumes the buildout of the City of Menlo Park General Plan and any pending General Plan Amendments, the buildout of the pending developments in the City of East Palo Alto (as of December 2020), and regional growth projected by the Association of Bay Area Governments (ABAG), modified by VTA/C/CAG for model land use inputs. Therefore, the project's VMT analysis was conducted under year-2040 conditions.

### Office and Residential Land Uses

According to the City's VMT guidelines, office land use is evaluated based on a daily VMT per employee metric. Using the model, this metric is calculated only for home-based work trips, per OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA. Based on the latest citywide travel demand model, the regional average office VMT is 15.9 per employee. Therefore, City's office VMT impact threshold, at 15% below regional average, would be 13.6 daily VMT per employee.

According to City VMT guidelines, the evaluation of residential land use is based on a daily VMT per capita metric. Using the model, this metric is calculated only for home-based trips, per OPR's technical advisory. Based on the latest citywide travel demand model, regional average residential VMT is 13.1

per capita. Therefore, the City's residential VMT impact threshold, at 15% below regional average, would be 11.2 daily VMT per capita.

Office and residential land uses were evaluated using the model under the year-2040 plus project scenario. For the Campus District, the applicant proposed a daily trip cap of 18,237 trips, which would be 20% below the standard ITE trip generation estimate. The model was adjusted to account for the proposed trip cap. As shown in Table 4 below, the project's Campus District land use would generate VMT at the City's VMT impact threshold and would thus not have a VMT impact.

For the residential land use, trip generation was adjusted to account for the Project's expected 2.03 people per unit compared to the ITE average of 2.46 people per unit. The VMT analysis also accounted for the applicant proposed TDM Plan for the mixed-use district. The TDM Plan proposed a 20% trip reduction from gross ITE trip generation through a combination of passive TDM measures and active TDM measures. Passive TDM measures include the project's proximity to complementary land uses, proximity to alternative transportation infrastructure, and the project's mixed-use nature. As discussed in Chapter 3 below, it is estimated that the passive TDM measures would achieve a 17% trip reduction from the gross ITE trip generation. Active TDM measures include TDM programs to be implemented to further promote alternative modes of travel. These TDM measures generally include providing transit, biking, and carpooling information to residents, assisting in ride-matching programs for residents, and could also include transit subsidies and other measures. To represent the applicant proposed 20% trip reduction goal and given that passive TDM measures are assumed to achieve a 17% trip reduction, the balance of 3% (20%-17%) trip reduction due to active TDM measures was assumed for the VMT analysis.

The Project's residential land use would require a 16% reduction in VMT to mitigate the significant VMT impact. The VMT analysis, as discussed above, already assumed 3% trip reduction due to active TDM measures. Therefore, mitigation of the VMT impact would require implementing a TDM Plan for the residential component that achieves at least 19% (3% + 16%) trip reduction via active TDM measures (see Figure 10 below in Chapter 3) or increases the effectiveness of passive TDM measures. According to the Project's proposed TDM Plan dated July 2021 and attached in Appendix G, the proposed active TDM measures for the residential component could achieve at least a 19% reduction in trips, with an estimated reduction between between 11% and 36% [13]. This range represents the potential low to high range of effectiveness of the proposed TDM measures, as calculated by research data from the California Air Pollution Control Officers Association (CAPCOA). This range depends on how each TDM measure is eventually implemented. Therefore, it is feasible for the Project to mitigate its residential VMT impact by implementing its proposed TDM Plan.

**Table 4**
**Office and Residential VMT Evaluation**

| Land Use | Regional Average | VMT Threshold | Project VMT | VMT Impact | Additional TDM Mitigation needed to eliminate VMT impact |
|---|---|---|---|---|---|
| Office [1] | 15.9 | 13.6 | 13.6 | No | - |
| Residential [2] | 13.1 | 11.2 | 13.3 | Yes | 16% |

Notes:
** All data referenced the latest Menlo Park citywide travel demand forecast model.*
1. VMT for office land use is reported in VMT per employee.
2. VMT for residential land use is reported in VMT per capita.

13 Willow Village TDM Plan. Prepared for Peninsula Innovation Partners. Fehr & Peers, Inc. July 2021

**IMPACT (TRA-2 in Transportation Chapter)**: As shown in Table 4 above, the Proposed Project's residential land use VMT is estimated to be 13.3 daily miles per capita, which would exceed the VMT threshold and result in a VMT impact. The mitigation measure TRA-2 identified below would fully mitigate this impact.

**MITIGATION MEASURE (TRA 2 in Transportation Chapter)**: The residential land use of the Project Site will be required to implement a TDM Plan achieving a 36% reduction from gross ITE trip generation rates (for the Proposed Project, this reduction equals 6,023 daily trips). Should a different number of residential units be built, the total daily trips will be adjusted accordingly. The required residential TDM Plan will include annual monitoring and reporting requirements on the effectiveness of the TDM program. The Project applicant submitted a draft residential TDM Plan, which contained specific measures that would meet this trip reduction requirement. The draft TDM Plan is subject to City review and approval . If the annual monitoring finds that the TDM reduction is not met, the TDM coordinator will be required to work with City staff to detail next steps to achieve the TDM reduction. With the implementation of the required residential TDM Plan, the residential VMT impact would be **less than significant with mitigation (LTS/M)**.

## Hotel

Hotel land uses are not explicitly represented in the model. Therefore, the hotel rooms and jobs expected for the Proposed Project are accounted for separately. Hotel employees are represented in the model by service employees. To reflect trips by hotel patrons, residential land use was used as a proxy, as it most closely resembles the behavior pattern of a hotel guest. Trip making characteristics for these proxy residential land uses were restricted to offices and restaurants/shops to mimic patron activities at a typical business hotel (home-based work and home-based shopping trips). Other types of trip-making typical to an actual home such as school trips generally are not applicable to hotel guests. Given the model would only explicitly represent hotel employee VMT without this adjustment, this proxy evaluation provides a conservative analysis as it attributes more VMT (hotel guest VMT) to the Proposed Project. This methodology is undertaken only for VMT purposes.

### Project Study Area

Based on consultation with the City and applicant, the hotel is expected to have a service area of approximately three (3) miles in radius. This means that most of the destinations of hotel patrons are expected to be within three miles of the hotel. While some trips are expected to be longer than three miles, the majority of the change in VMT is expected to occur within this three-mile radius. The evaluated daily VMT includes the entire length of the trip even when it extends beyond the three-mile radius.

### Scenario Evaluation

The hotel VMT analysis was conducted using the City's transportation model. To evaluate the effect of the hotel component on total daily VMT, the analysis compared two scenarios: 1) with project, and 2) with project without the hotel component (or the "no hotel" scenario).

It was assumed that new hotels would not increase trips overall but would reorient existing trips. Therefore, when hotel trips were added in one zone, they must be subtracted from other zones. This process was represented in the model by redistribution of the hotel attractions from nearby existing hotels. Eleven comparable hotels were found within the area for this redistribution effort (see Figure 4). The proposed hotel would be located within very close proximity to major employment in the Bayfront area, such that hotel patrons may enjoy shorter travel distances to their business destinations. Its location within a mixed-use project, including complementary retail space, also would allow hotel patrons to shop/dine within walking distance.

Service employees were coded in the model under “no hotel” conditions for the zones representing the eleven existing hotels. Under the “with-project” model run, service employees at these zones were shifted to the project zone. According to the project applicant, the hotel would have 210 employees. Thus, approximately 19 service employees were shifted from each of the existing zones to the project zone under the “with-project” model run.

The zones representing the eleven existing hotels do not include any residential land use as a proxy for hotel patrons under the “no hotel” scenario. Thus, residential dwelling units were first added to these zones under the “no hotel” model run, so that under the “with-project” model run, shifting these residential land uses to the project zone would still maintain the same model-wide total land uses. Approximately 270 households were needed at the project zone in addition to the 210 service employees under the “with-project” model run for the model to compute trip generation roughly equivalent to the daily trip generation estimated for the hotel component based on ITE rates. Therefore, under the “no hotel” model run, 270 households were evenly distributed to the eleven zones with existing hotels. It should be noted that the project’s proposed TDM plan is accounted for in the daily trip generation estimates.

**VMT Evaluation**

The total daily VMT generated by land uses within a three-mile radius was compared under the “no hotel” and “with project” scenarios. As shown in Table 5, the proposed hotel component of the project was shown to slightly reduce the total daily VMT generated by land uses within a three-mile radius of the Project Site. Since the proposed hotel would be located within very close proximity to major employment in the Bayfront area, hotel patrons would enjoy shorter travel distances to their business destinations. It’s location within a mixed-use project, including complementary retail space, also would allow hotel patrons to shop/dine within walking distance.

Because the proposed hotel component of the Project would not cause an increase in total VMT generated within the analysis area, it is concluded that the proposed hotel component of the Project would have a less than significant impact on vehicle miles travelled.

**Table 5**
**Hotel VMT Evaluation**

| | 3-Mile Radius Area of Project Site | | |
|---|---|---|---|
| | No Hotel Conditions [2] | With Project Conditions [2] | % Change |
| Total Daily VMT [1] | 6,656,914 | 6,629,443 | -0.4% |

Notes:
1. Total daily VMT includes VMT generated by all trips having at least one trip-end in the analysis area, as estimated by the citywide travel demand model.
2. "No hotel conditions" represent conditions with the Proposed Project except the hotel component. "With project conditions" represent conditions with the Proposed Project including the hotel component.

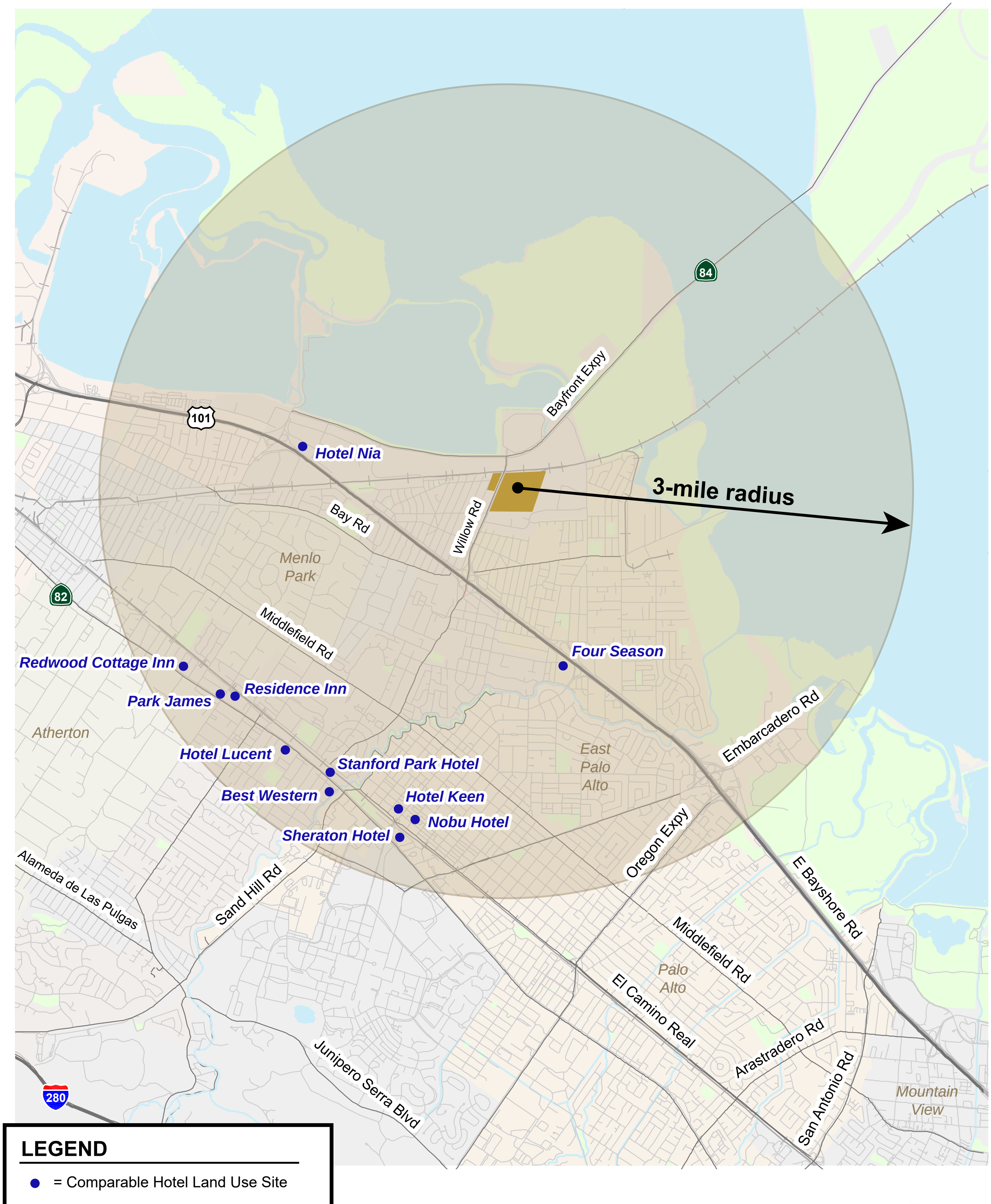



**Figure 4**
**Locations of Comparable Hotel Land Use**

## Retail

The project has two areas of retail development. The main Project Site includes up to 200,000 s.f. of retail space within a mixed use development. North of Willow Road, as a result of the proposed Hamilton Avenue realignment, the two retail parcels adjacent to Hamilton Avenue at the intersection with Willow Road ("Hamilton Avenue Parcels") would be reconfigured. The Project proposes to increase the total retail square footage at the Hamilton Avenue parcels by up to 7,700 s.f. to approximately 23,400 s.f. Because the retail at the Hamilton Avenue Parcels will require a separate use permit and would be operated as a separate retail use from the retail uses at the main Project Site, the Hamilton Avenue Parcels retail is evaluated separately from the retail component of the main Project Site. According to the City's VMT policy, local serving retail (defined as having total square footage less than 50,000 s.f.) would be exempt from a VMT analysis. The Project's proposed net 7,700 s.f. of potential retail development at the Hamilton Avenue Parcels would thus be exempt from VMT analysis. The discussion below is focused on the 200,000 s.f. of retail space at the main Project Site.

**Project Study Area**

Based on the types of retail being proposed as well as nearby comparable retail stores, it is expected that the proposed retail would have a service area of approximately five (5) miles in radius. The 5-mile radius service area was selected based on engineering judgement, as it would cover most of Menlo Park, Palo Alto, as well as downtown Redwood City, and would include a mix of retail shops and restaurants comparable to the three cities. Assuming equal services, it is expected that people would patronize the closer store or restaurant. The five-mile radius service area also means that most of the destinations of the Project's retail patrons are expected to be within five miles of the project. While some trips are expected to be longer than five miles, the majority of the change in VMT is expected to occur within this five-mile radius.

**Scenario Evaluation**

The retail VMT analysis was conducted using the City's transportation model. To evaluate the effect of the retail component on total daily VMT, the analysis compared two scenarios: 1) with project, and 2) with project without the retail component (or the "no retail" scenario).

Similar to the hotel evaluation methodology discussed above, retail employees were redistributed from existing retail locations for the purpose of the VMT analysis. Six (6) comparable retail sites were found within the area for this redistribution effort (see Figure 5).

Retail employees were coded in the model under "no retail" conditions for the zones representing the six existing retail sites. Under the "with-project" model run, retail employees at these zones were shifted to the project zone. The retail land use is expected to generate 571 employees based on the City's default retail employees-per-square-foot conversion rate (1 employee per 350 square feet). Retail employees were shifted from each of the existing zones to the project zone under the "with-project" model run. The number of retail employees shifted from each existing zone was proportionally based on each zone's existing retail employment size (see Figure 6).

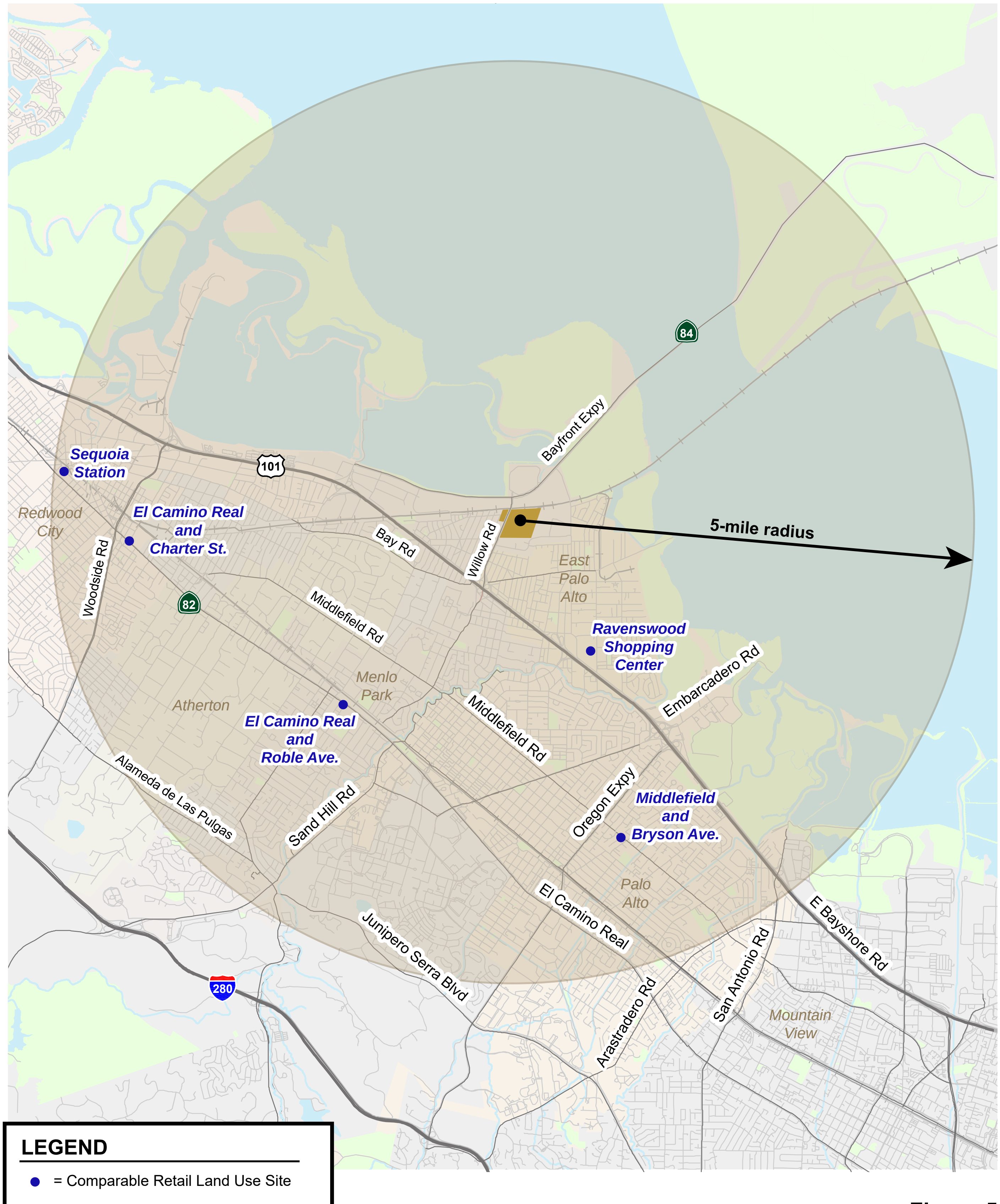



**Figure 5**
**Locations of Comparable Retail Land Use**

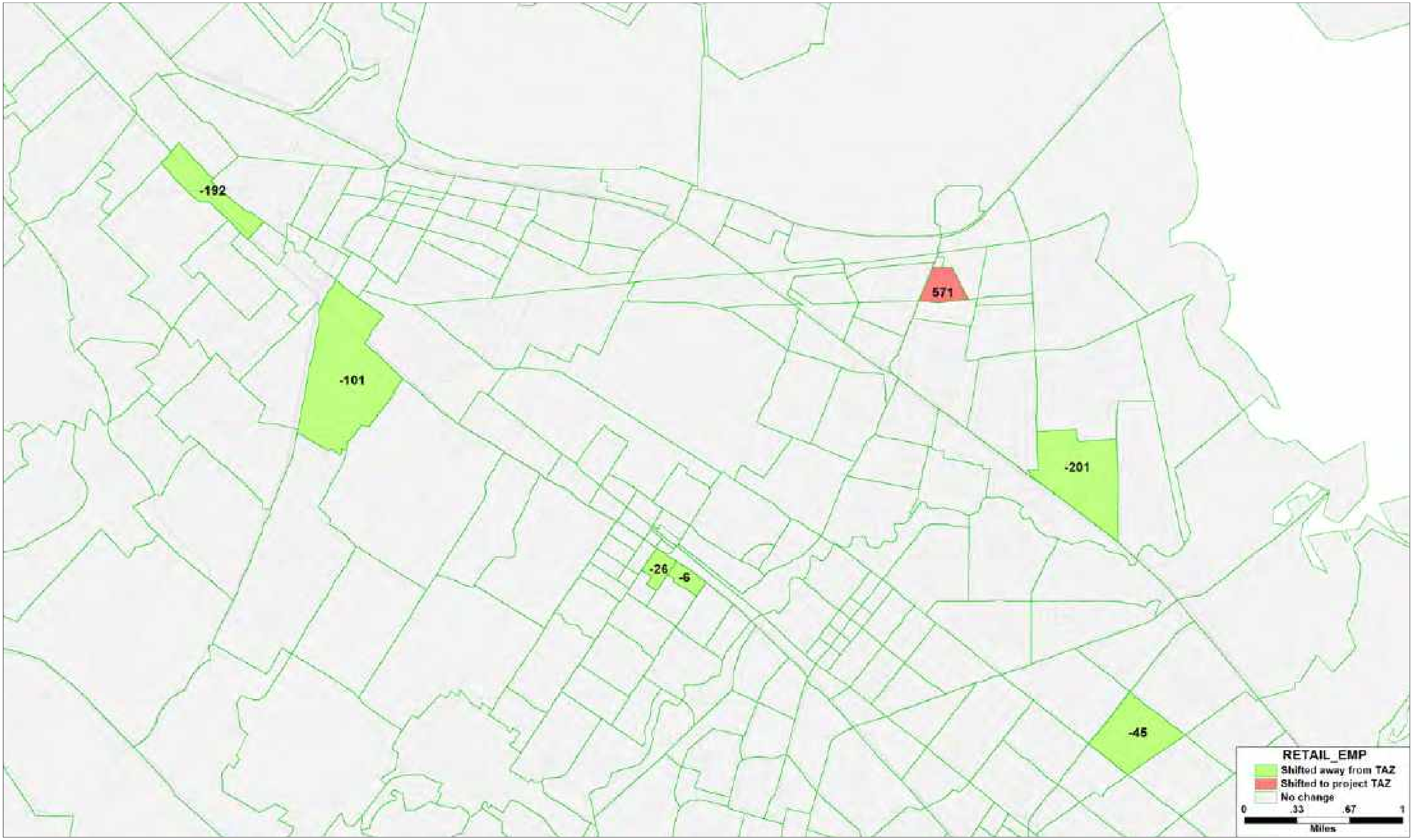



**Figure 6**
**Retail Employment Shifts for VMT Analysis**

**VMT Evaluation**

The total daily VMT generated by land uses within a five-mile radius was compared under the “no retail” and “with project” scenarios. As shown in Table 6, the proposed retail component of the project was shown to slightly reduce the total daily VMT generated by land uses within a five-mile radius of the Project Site. Since the proposed retail space would be located in close proximity to the Belle Haven neighborhood, a large number of offices and life sciences buildings in the Bayfront area, as well as the project’s proposed residential land uses, the proposed retail component would provide retail stores closer to homes for nearby residents and closer to jobs for nearby workers.

Because the proposed retail component of the Project would not cause an increase in total VMT generated by the analysis area, it is concluded that the proposed retail component of the Project would have a less than significant impact on vehicle miles travelled.

**Table 6**
**Retail VMT Evaluation**

| | 5-Mile Radius Area of Project Site | | |
|---|---|---|---|
| | No Retail Conditions [2] | With Project Conditions [2] | % Change |
| Total Daily VMT [1] | 14,360,590 | 14,334,067 | -0.2% |

Notes:
1. Total daily VMT includes VMT generated by all trips having at least one trip-end in the analysis area, as estimated by the citywide travel demand model.
2. "No retail conditions" represent with the Proposed Project except the retail component. "With project conditions" represent with the Proposed Project including the retail component.

## Event VMT

The Campus District would consist of up to 1.6 million square feet of space for office and accessory uses, consisting of up to 1.25 million sf of office uses and the balance (350,000 sf if office uses were maximized) of accessory uses[14]. In addition to serving as a gathering space for the surrounding campuses, the applicant proposes to host approximately 55 events per year, that would attract majority non-Menlo Park Meta workers and/or guests. Ten of these events are envisioned as large-sized events with attendance varying between 2,500 and 5,000 people. 15 of these events are envisioned as medium-sized events with attendance varying between 1,000 and 2,500 people. The remaining 30 events would be small-sized events with attendance lower than 1,000 people. It is anticipated that the small-sized events would generate a minimal number of trips that would not exceed the proposed Campus District trip cap. The Project is proposing an allowance of up to 25 exceptions to the trip cap for days when there are medium-size or large-size events. Due to the limited number of events that would exceed the proposed trip cap, it is deemed that such events are not typical conditions and do not require a VMT analysis for CEQA purposes. This impact would be ***less than significant***.

While some of these events could potentially generate substantial traffic that could affect intersection operations in the Project area, specific event details are not known. While congestion is not a CEQA impact, the Project would be required, as a condition of Project approval, to submit event traffic plans

[14] Accessory uses could include the following types of spaces: meeting/collaboration space, orientation space, training space, event space, incubator space, a business partner center, an event building (including pre-function space, collaboration areas, and meeting/event rooms), a visitor center, product demonstration areas, film studio, gathering terraces and private gardens, and space for other Meta accessory uses. Accessory uses could occur in spaces located anywhere throughout the Campus District.

for large events for City approval to demonstrate measures that would be taken to minimize the events' effect on roadway traffic conditions.

## Impacts on Pedestrian, Bicycle and Transit Facilities

The project is consistent with all applicable pedestrian, bicycle and transit related plans, ordinances and policies, as listed below:

- City of Menlo Park Circulation Element of the General Plan
- City of Menlo Park Municipal Code, Sections 16.43.100 and 16.45.090
- City of Menlo Park Transportation Master Plan
- City of Menlo Park Transportation Impact Fee

### Pedestrian and Bicycle Facilities

The Proposed Project would include multiple pedestrian and bicycle connections between the Project Site and the surrounding roadway network and within the Project Site. The planned bicycle and pedestrian facilities within the Project Site are discussed in Appendix H.

The proposed pedestrian connections to the surrounding roadway network include crosswalks at the proposed signalized intersections on Willow Road at Main Street and Park Street that would connect the Project Site to the Belle Haven neighborhood. The proposed bicycle connections include connections to the existing class II bike lane along Willow Road via Park Street and Main Street. In addition, the Proposed Project includes an elevated park that would provide grade separated pedestrian and bicycle access between the Project site and the Belle Haven neighborhood.

Menlo Park's TIF program also proposes the following bicycle and pedestrian facilities in the immediate vicinity of the Project Site which would improve connections between the Project Site and the surrounding neighborhoods:

- Bicycle signals, cross-bike markings, high visibility crosswalks, and pedestrian improvements at the eastbound right-turn channelizing island at Willow Road and Bayfront Expressway
- Class III bike routes, wider sidewalks, and narrower median on Ivy Drive
- Wider median on the west leg of Willow Road and Ivy Drive, increased pedestrian crossing time, and high visibility crosswalks at the intersection
- Curb ramps, high visibility crosswalks, increased pedestrian crossing times, and bulbouts on the southeast and southwest corners at Willow Road and O'Brien Drive
- Sidewalks and class II bike lanes on both sides of Adams Drive between O'Brien Drive and University Avenue
- Sidewalks and class II bike lanes on both sides of O'Brien Drive between Willow Road and University Avenue
- Install class IV protected bike lanes along Willow Road

The Proposed Project also includes a subgrade pedestrian, bicycle, and tram connection between the main Project Site and the Meta West Campus. This connection would be known as the Willow Road Tunnel. The Willow Road Tunnel would extend between Facebook Way in the Meta West Campus and North Loop Road in the Willow Village Campus underneath Willow Road. The proposed design of the tunnel includes a sidewalk along the eastern edge, a two-way class I bike path which would connect the Bay Trail to the Project Site, and a two-way tram connection between the West Campus and the Project Site. The tunnel would not allow vehicular traffic other than the trams and the bicycle and pedestrian access would be open to the public similar to the existing tunnel between the East and West Campuses.

**Pedestrian and Bicycle Access to Schools**

Schools in the immediate vicinity of the Project Site include Mid-Peninsula High School, Open Mind School, Cesar Chavez Ravenswood Middle School, San Francisco 49ers Academy, Creative Montessori learning, Belle Haven School, TIDE Academy, and Costano Elementary School. Bicycle and pedestrian access to each school is described below:

- **Mid-Peninsula High School.** This school is located immediately west of the Project Site. Pedestrian and bicycle access from the Project Site to the school would be via Willow Road, which has continuous sidewalks along the south side, and existing Class II bicycle facilities on both sides of the road.
- **Open Mind School.** This school is located immediately west of the Project Site on O'Brien Drive. There are currently no sidewalks or bicycle facilities on O'Brien Drive between the school and the Project Site. The Project proposes a sidewalk that would connect the Project Site with the school's driveway, as part of the Project proposed roundabout at the East Loop Road/O'Brien Drive location.
- **Cesar Chavez Ravenswood Middle School,** San Francisco 49ers Academy, Creative Montessori Learning. These schools are located on Bay Road between Willow Road and University Avenue. Pedestrian and bicycle access from the Project Site to these schools would be via Willow Road to Alberni Street and Ralmar Avenue. These streets have sidewalks along both sides. These are also residential streets with low vehicular speeds and volumes and therefore, bicycle friendly. Access to the San Francisco 49ers Academy and Creative Montessori is directly from Bay Road, which has sidewalks along both sides. Also, Bay Road has dedicated bicycle lanes.
- **Belle Haven School.** This school is located approximately 0.4 miles north of the Project Site. Pedestrian and bicycle access from the Project Site to this school would be via Ivy Drive or Hamilton Avenue. Pedestrian amenities include crosswalks and pedestrian push buttons at the intersections of Willow Road and Ivy Drive and Willow Road and Hamilton Avenue, a continuous sidewalk along the south side of Willow Road, a continuous sidewalk along both sides of Ivy Drive and Hamilton Avenue between the school and the Project Site, and bulbouts on Hamilton Avenue. However, there are no designated bicycle facilities on Ivy Drive or Hamilton Avenue.

- **Costano Elementary School.** The school is located 0.2 miles south of the Project Site on University Avenue at Adams Drive. Pedestrian and bicycle access from the Project Site is via Adams Drive or O'Brien Drive. There are limited pedestrian connections between the Project Site and the school. Sidewalk facilities are lacking along O'Brien Drive and Adams Drive, and there are no crosswalks at University Avenue and O'Brien Drive or University Avenue and Adams Drive. Class II bicycle lanes and sidewalks are proposed along O'Brien Drive and Adams Drive in Menlo Park's TIF, which would improve bicycle and pedestrian access to the school. Implementation of this improvement from the TIF Program would reduce this potential effect on bicyclists and pedestrians from the proposed project.
- **Tide Academy.** This school is located approximately 1.2 miles north of the Project Site. Pedestrian and bicycle access from the Project Site to this school would be via Ivy Drive or Hamilton Avenue. Chilco Street, and Jefferson Drive. Pedestrian amenities include crosswalks and pedestrian push buttons at the intersections of Willow Road and Ivy Drive and Willow Road and Hamilton Avenue, a continuous sidewalk along the south side of Willow Road, a continuous sidewalk along both sides of Ivy Drive, Hamilton Avenue, Chilco Street, and Jefferson Drive between the school and the Project Site, and bulbouts on Hamilton Avenue. There are also designated bicycle facilities on Chilco Street and Jefferson Drive, however, there are no designated bicycle facilities on Ivy Drive or Hamilton Avenue.

### Transit Facilities

The Proposed Project would provide tram stops and shuttle stops on the Project Site for use by Meta workers. A detailed description of the tram and shuttle services is provided in Appendix I.

The Proposed Project is expected to generate an increase in transit demand, which could be accommodated by the available capacity of the SamTrans bus service. The SamTrans routes 81, 281, 296, 397, Dumbarton Express Lines, M2 Belle Haven Shuttle, and M4 Willow Road shuttle serve the immediate vicinity of the project area with approximately 15 to 25-minute headways during the AM and PM peak commute hours. Bus stops are within a typical walking distance (one-quarter mile or 5 minutes) of the Project Site. The Proposed Project would make no change to existing public transit facilities. However, by adding vehicle trips and increasing delay at intersections along bus routes, it would increase bus travel time. Bus services that would be affected in the vicinity of the Project Site include bus routes (DB, M2 Belle Haven Shuttle, M4 Willow Road Shuttle, SamTrans Route 81) along Willow Road, University Avenue, and O'Brien Drive.

Proposed intersection improvements to reduce intersection delay include improvements at Willow Road and Ivy Drive, Willow Road and Hospital Plaza/Durham Street, Willow Road and Newbridge Street, Willow Road and Bay Road, O'Brien Drive and Kavanaugh Drive, and Adam's Drive and O'Brien Drive. These improvements would help to reduce some bus delay along these routes. The City's TIF includes installing Transit Signal Priority (TSP) for queue jumps by shoulder running buses on northbound and southbound Bayfront Expressway and allowing the use of the existing right turn lane for queue jump with TSP at Willow Road and O'Brien Drive. The timing and implementation of these TSP projects are not certain

The Caltrain electrification project would enable Caltrain to provide more frequent train service at the Menlo Park, Palo Alto, and Redwood City Caltrain stations. Caltrain predicts an initial capacity increase of over 30%. It is expected that the Caltrain electrification project would accommodate the potential increase in transit ridership generated by the Proposed Project.

# 3. Non-CEQA Level of Service Transportation Analysis

This chapter describes the existing conditions level of service and observed traffic conditions at roadway facilities in the vicinity of the site. It also describes the method by which project traffic is estimated and any adverse effects to intersection levels of service caused by the proposed project under existing, near-term (2025), cumulative (2040), and cumulative (2040) with Dumbarton rail conditions.

## Existing Intersection Lane Configurations and Traffic Volumes

The existing lane configurations at the study intersections were confirmed by observations in the field and are shown on Figure 7. Existing traffic volumes were obtained from new peak hour counts collected in year 2019 and year 2020. The existing AM and PM peak hour intersection volumes are shown in Figure 8. Intersection turning-movement count data are presented in Appendix A.

## Existing Intersection Levels of Service

The results of the intersection level-of-service analysis under existing conditions show that many of the study intersections currently operate at an unacceptable level (see Table 7 and 8). As noted in the ConnectMenlo DEIR, the counted traffic volumes at the Menlo Park study intersections along Willow Road did not appropriately reflect the actual traffic demand, and isolated intersection analysis fails to capture these results. Similarly, the counted traffic volumes at the East Palo Alto study intersections in the vicinity of the US 101/University Avenue interchange do not reflect actual traffic demand. Therefore, instead of calculated level of service, the existing level of service results are reported based on level of service as identified by field observations and microsimulation to reflect “unserved demand”. The microsimulation methodology and assumptions for Willow Road are documented in Appendix B. Hexagon has also developed a microsimulation model for intersections in the vicinity of the US 101/University Avenue interchange, which has been used for other studies in East Palo Alto. This microsimulation model was used to analyze level of service for intersections near the US 101/University Avenue interchange.

The intersection level of service calculation sheets are included in Appendix C. The following study intersections (See Figure 9) currently operate at an unacceptable level of service during at least one peak hour:

11. Chrysler Drive and Constitution Drive (AM peak hour)
12. Chilco Street and Constitution Drive/MPK 22 Driveway (AM and PM peak hours)
16. Willow Road and Bayfront Expressway (AM and PM peak hours)
17. Willow Road and Hamilton Avenue (AM and PM peak hours)
19. Willow Road and Ivy Drive (AM peak hour)
20. Willow Road and O'Brien Drive (AM and PM peak hours)
21. Willow Road and Newbridge Street (AM and PM peak hours)
22. Willow Road and US 101 Northbound Ramps (AM and PM peak hours)
23. Willow Road and US 101 Southbound Ramps (PM peak hour)
24. Willow Road and Bay Road (PM peak hour)
25. Willow Road and Hospital Plaza/Durham Street (PM peak hour)
28. Willow Road and Middlefield Road (AM peak hour)
32. Adam's Drive and O'Brien Drive (PM peak hour)
33. University Avenue and Bayfront Expressway (PM peak hour)
34. University Avenue and Purdue Avenue (PM peak hour)
35. University Avenue and Adams Drive (AM and PM peak hours)
42. University Avenue and Donohoe Street (AM and PM peak hours)
43. US 101 Northbound Off-Ramp and Donohoe Street (PM peak hour)
45. University Avenue and US 101 Southbound Ramps (AM and PM peak hours)
46. University Avenue and Woodland Avenue (AM and PM peak hours)
50. E. Bayshore Road & Euclid Avenue (AM peak hour)

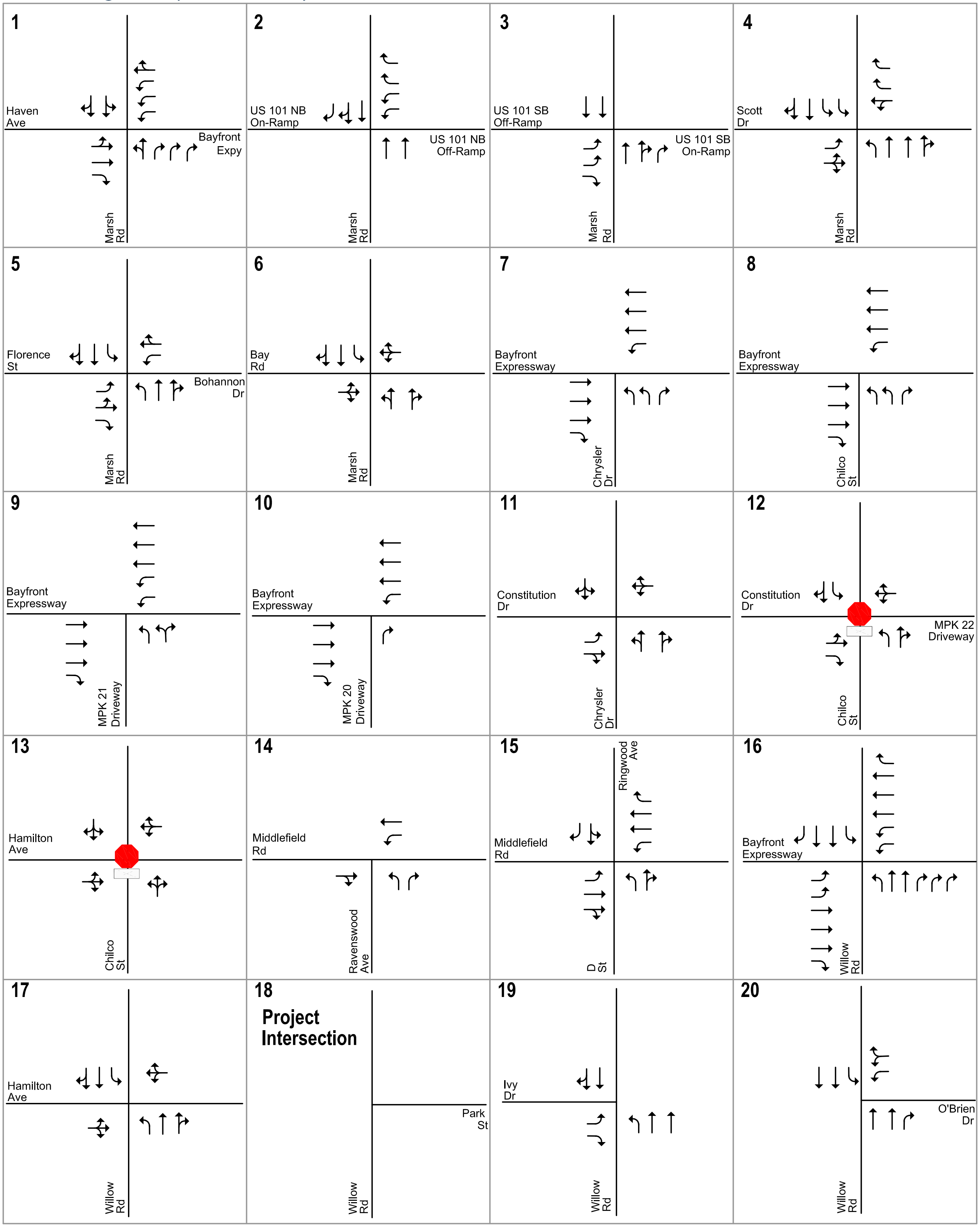



**Figure 7**
**Existing Lane Configurations**

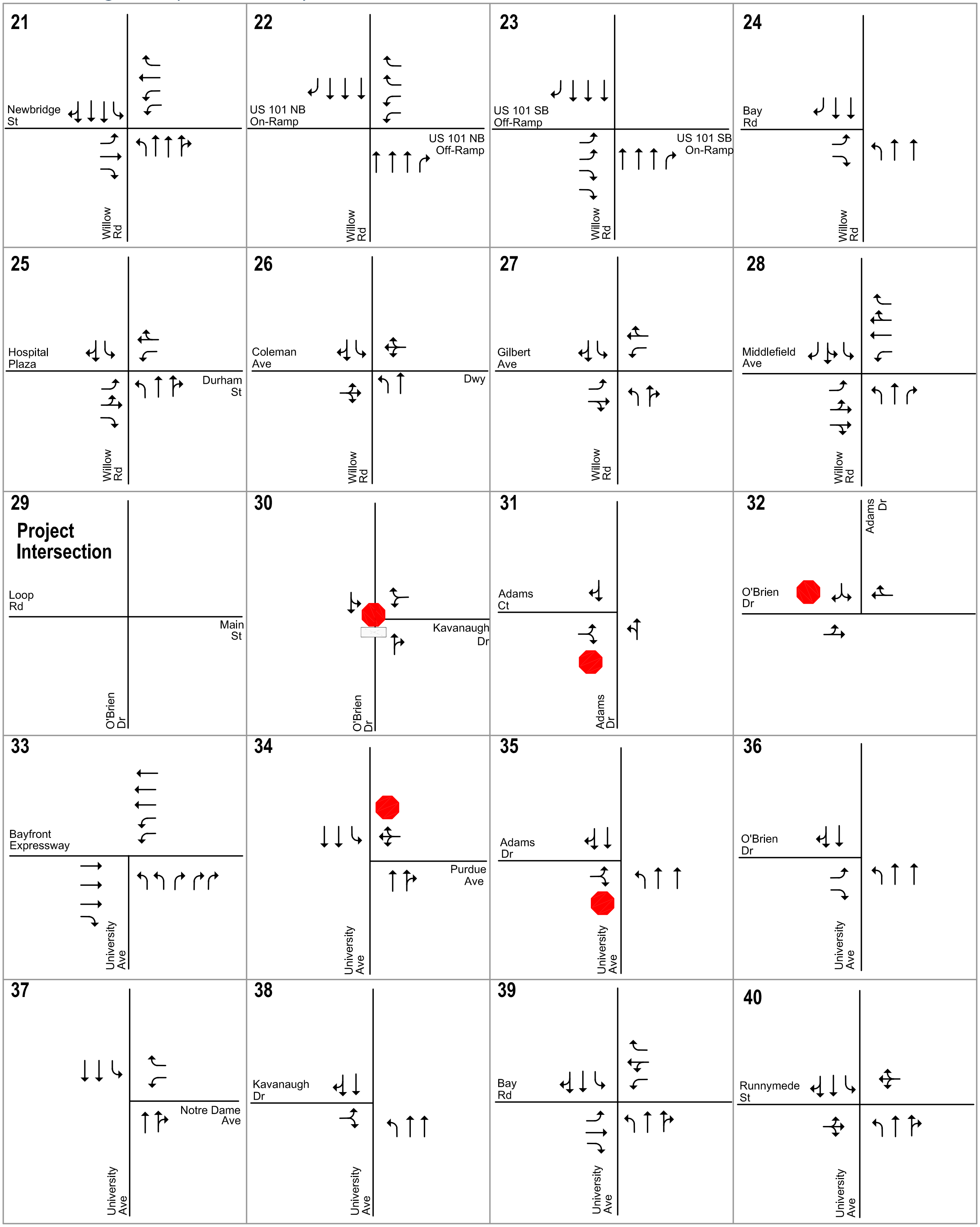



**Figure 7**
**Existing Lane Configurations**

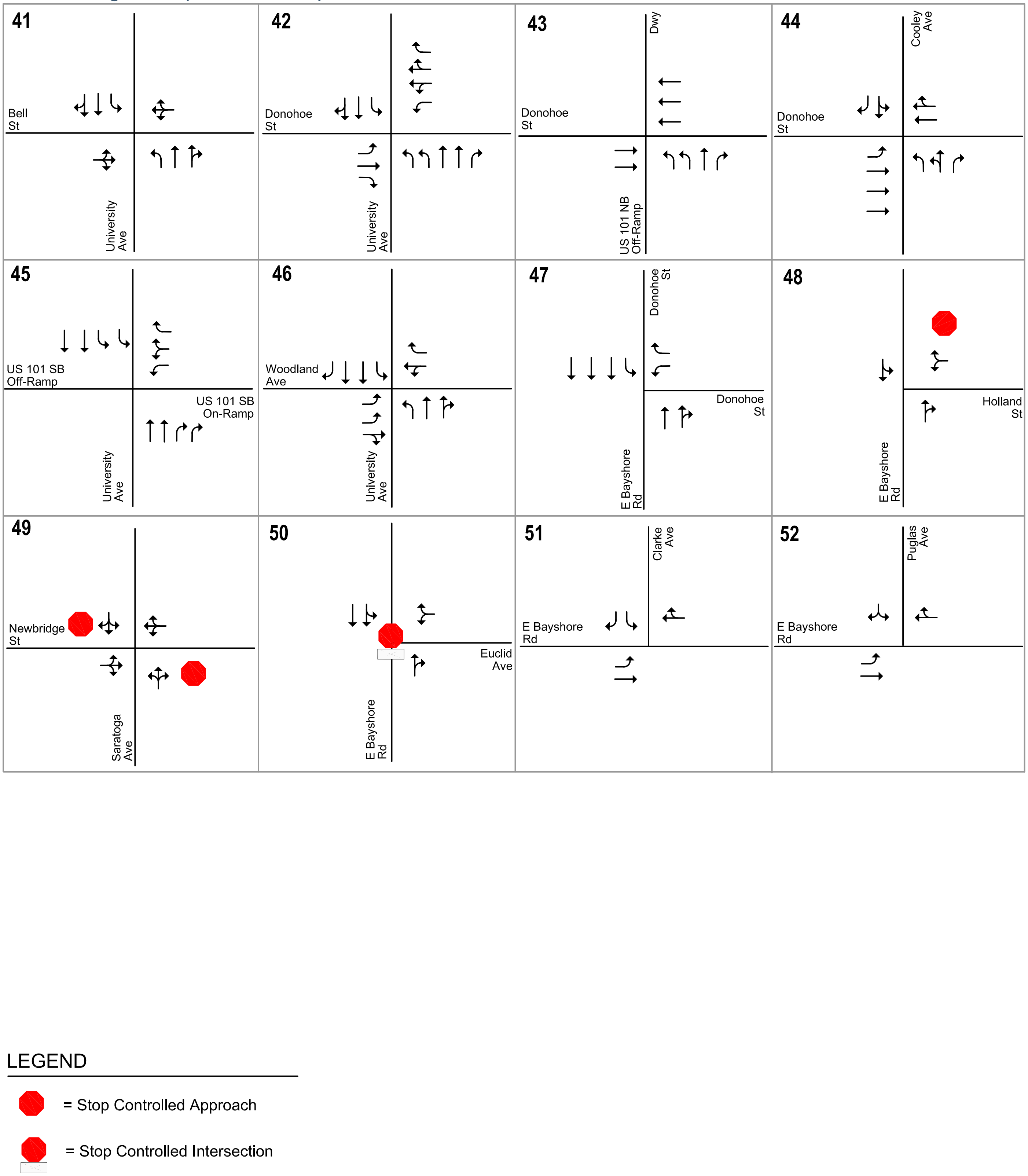



**Figure 7**
**Existing Lane Configurations**

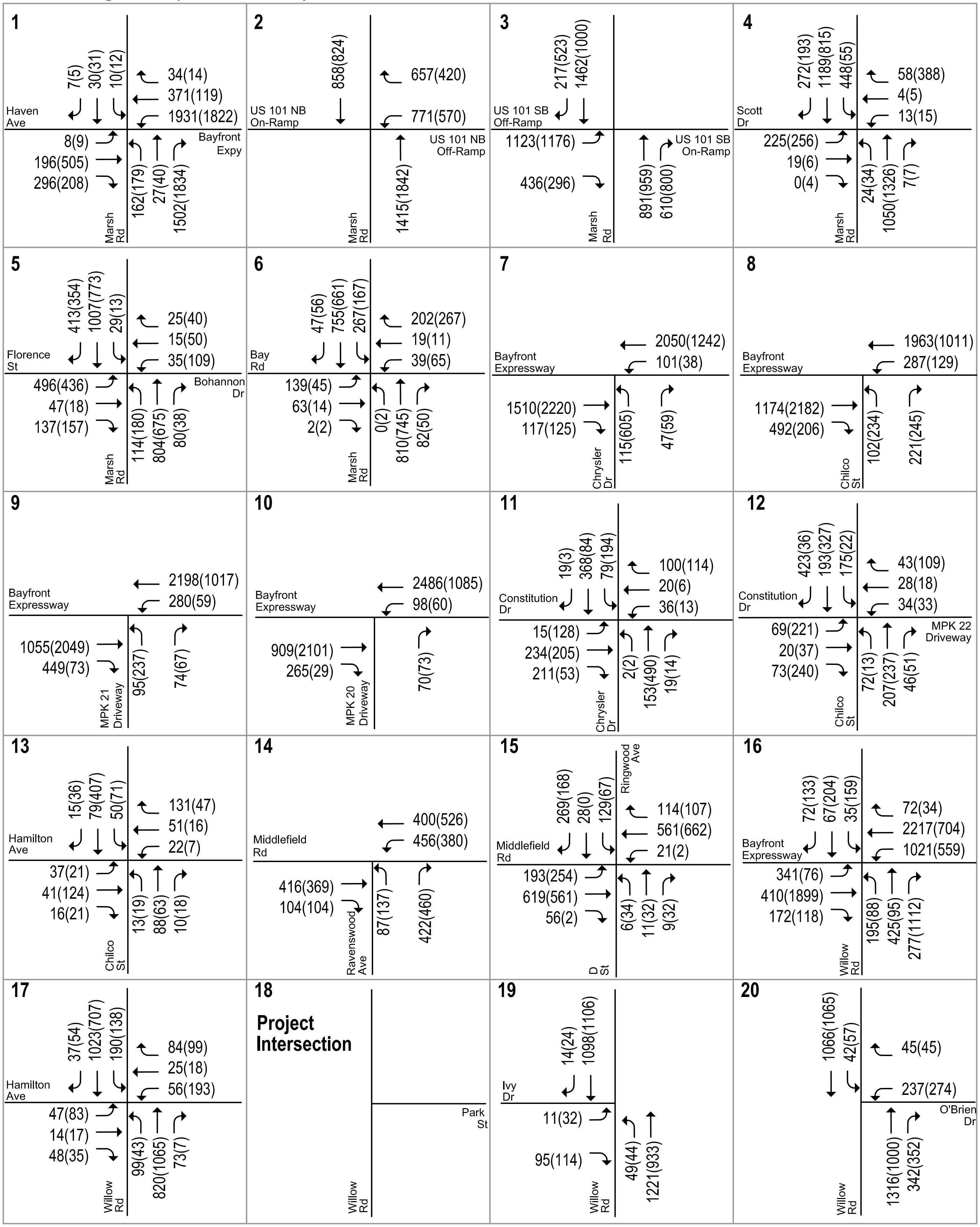



**Figure 8**
**Existing Traffic Volumes**

NORTH
Not to Scale

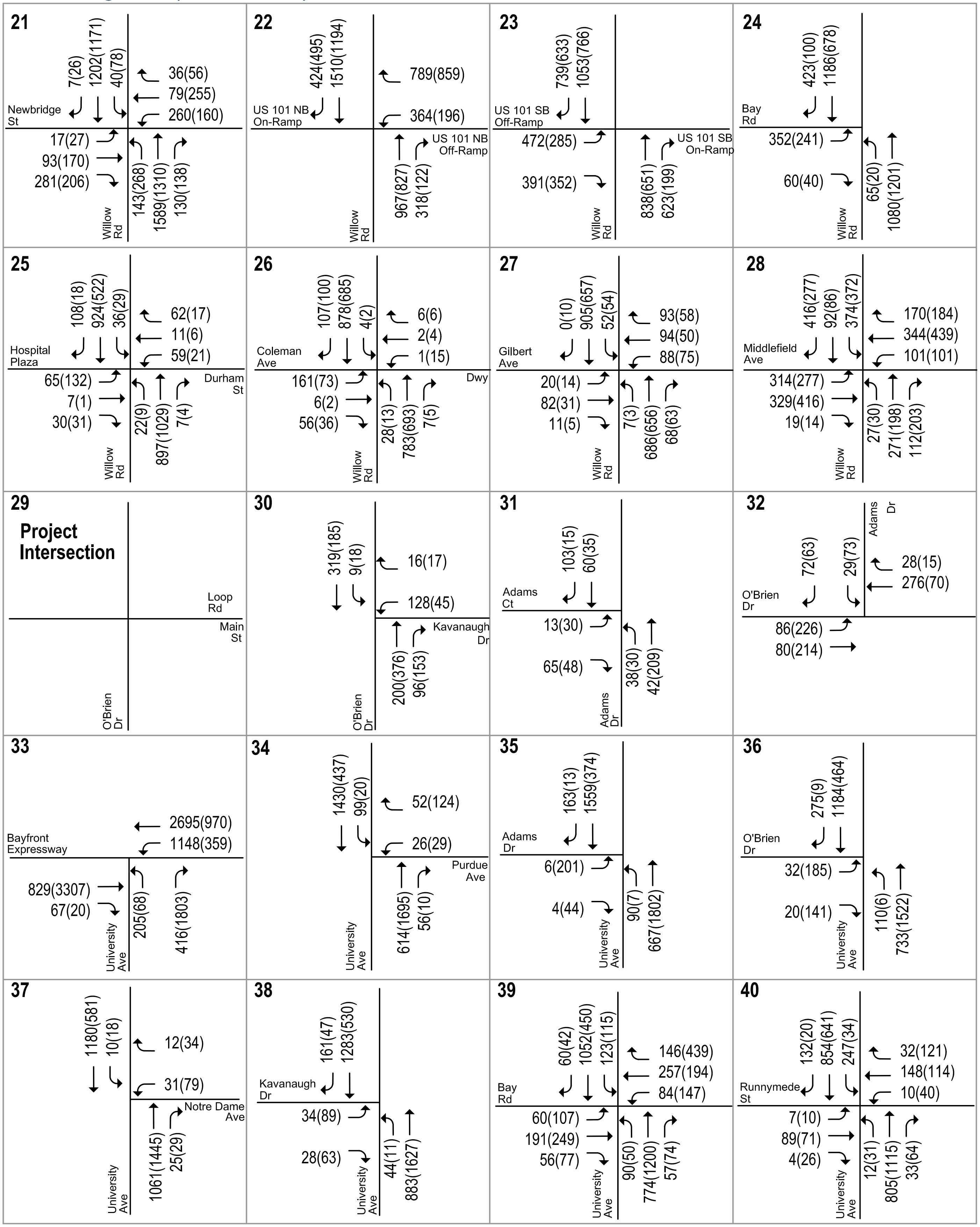
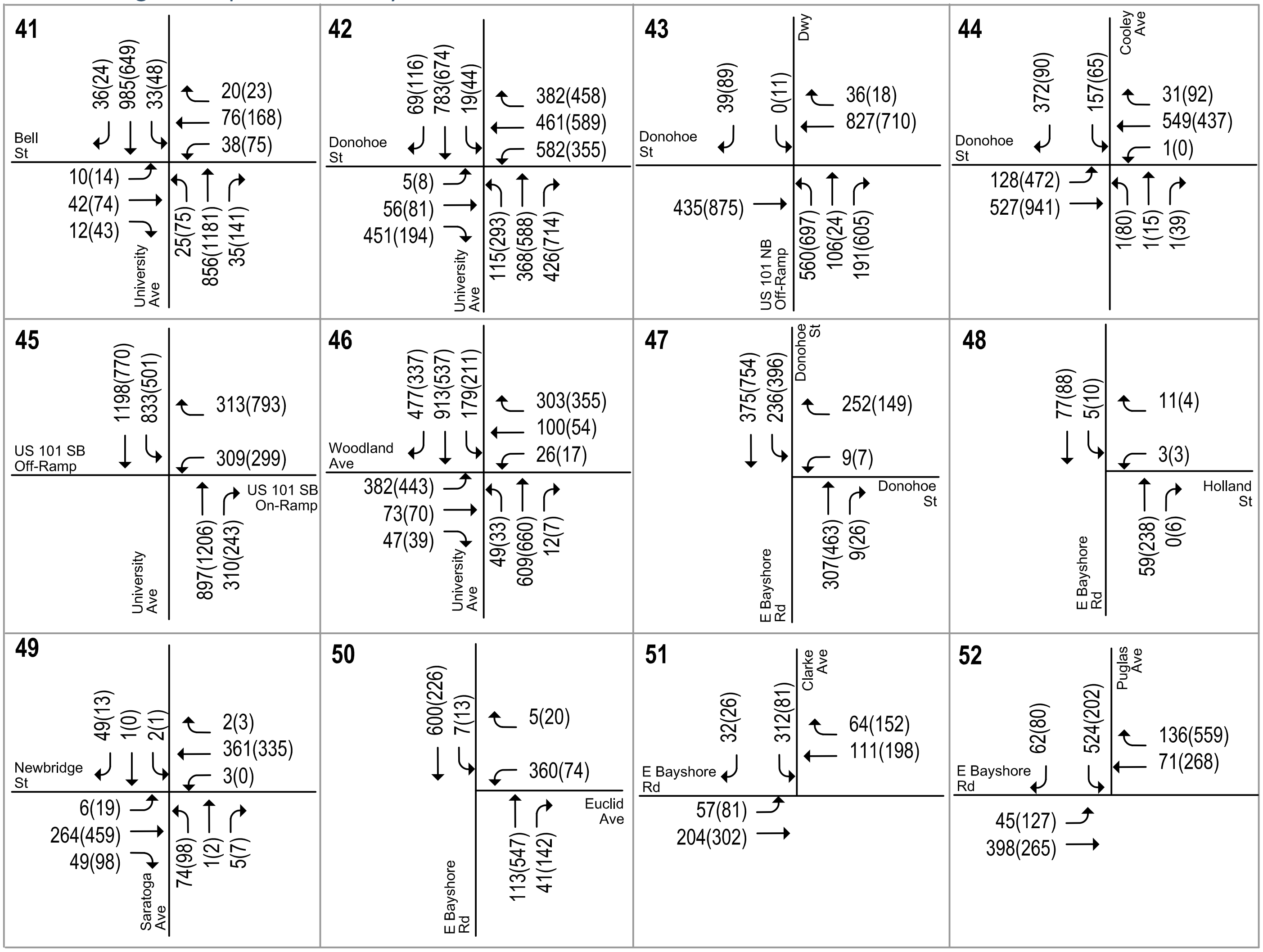



**Figure 8**
**Existing Traffic Volumes**



NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 8**
**Existing Traffic Volumes**

**Table 7**
**Existing Intersection Levels of Service (Menlo Park)**

| # | Intersection | Peak Hour | Count Date | Traffic Control | Existing Conditions Avg. Delay (sec)[1] | LOS |
|---|---|---|---|---|---|---|
| 1 | Marsh Road & Bayfront Expressway* | AM | 4/16/2019 | Signal | 50.5 | D |
| | | PM | 4/16/2019 | | 31.6 | C |
| 2 | Marsh Road & US 101 Northbound Off-Ramp | AM | 4/16/2019 | Signal | 15.8 | B |
| | | PM | 4/16/2019 | | 13.3 | B |
| 3 | Marsh Road & US 101 Southbound Off-Ramp | AM | 4/16/2019 | Signal | 19.0 | B |
| | | PM | 4/16/2019 | | 17.0 | B |
| 4 | Marsh Road & Scott Drive | AM | 4/16/2019 | Signal | 18.5 | B |
| | | PM | 4/16/2019 | | 15.3 | B |
| 5 | Marsh Road & Bohannon Drive/Florence Street | AM | 3/21/2019 | Signal | 35.3 | D |
| | | PM | 3/21/2019 | | 34.6 | C |
| 6 | Marsh Road & Bay Road | AM | 3/21/2019 | Signal | 19.7 | B |
| | | PM | 3/21/2019 | | 18.6 | B |
| 7 | Chrysler Drive & Bayfront Expressway | AM | 4/16/2019 | Signal | 8.4 | A |
| | | PM | 4/16/2019 | | 13.1 | B |
| 8 | Chilco Street & Bayfront Expressway | AM | 4/16/2019 | Signal | 10.9 | B |
| | | PM | 4/16/2019 | | 13.1 | B |
| 9 | MPK 21 Driveway & Bayfront Expressway | AM | 4/25/2019 | Signal | 7.9 | A |
| | | PM | 4/25/2019 | | 10.2 | B |
| 10 | MPK 20 Driveway (east) & Bayfront Expressway | AM | 4/25/2019 | Signal | 10.0 | A |
| | | PM | 4/25/2019 | | 8.2 | A |
| 11 | Chrysler Drive & Constitution Drive | AM | 3/21/2019 | Signal | **50.6** | **D** |
| | | PM | 3/21/2019 | | 28.0 | C |
| 12 | Chilco Street & Constitution Drive/MPK 22 Driveway | AM | 3/21/2019 | AWSC | **32.1** | **D** |
| | | PM | 3/21/2019 | | **32.5** | **D** |
| 13 | Chilco Street & Hamilton Avenue | AM | 1/0/1900 | AWSC | 9.2 | A |
| | | PM | 1/0/1900 | | 16.8 | C |
| 14 | Ravenswood Avenue & Middlefield Road | AM | 3/19/2019 | Signal | 36.1 | D |
| | | PM | 3/19/2019 | | 16.1 | B |
| 15 | Ringwood Avenue & Middlefield Road | AM | 3/19/2019 | Signal | 12.5 | B |
| | | PM | 3/19/2019 | | 13.7 | B |
| 16 | Willow Road & Bayfront Expressway*[1] | AM | 4/23/2019 | Signal | **>120** | **F** |
| | | PM | 4/23/2019 | | **>120** | **F** |
| 17 | Willow Road & Hamilton Avenue[1] | AM | 3/21/2019 | Signal | **73.3** | **E** |
| | | PM | 3/21/2019 | | **>120** | **F** |
| 18 | Willow Road & Park Street (future intersection)[1] | AM | -- | | Project | |
| | | PM | -- | | Intersection | |
| 19 | Willow Road & Ivy Drive[1] | AM | 3/21/2019 | Signal | **75.2** | **E** |
| | | PM | 3/21/2019 | | 39.5 | D |
| 20 | Willow Road & O'Brien Drive[1] | AM | 3/21/2019 | Signal | **58.9** | **E** |
| | | PM | 3/21/2019 | | **>120** | **F** |
| 21 | Willow Road & Newbridge Street[1] | AM | 3/21/2019 | Signal | **93.4** | **F** |
| | | PM | 3/21/2019 | | **>120** | **F** |
| 22 | Willow Road & US 101 Northbound Ramps[1] | AM | 3/13/2019 | Signal | **92.8** | **F** |
| | | PM | 3/13/2019 | | **83.9** | **F** |
| 23 | Willow Road & US 101 Southbound Ramps[1] | AM | 3/13/2019 | Signal | 38.5 | D |
| | | PM | 3/13/2019 | | **98.9** | **F** |
| 24 | Willow Road & Bay Road[1] | AM | 4/23/2019 | Signal | 45.3 | D |
| | | PM | 4/23/2019 | | **113.5** | **F** |

**Table 7 (Continued)**
**Existing Intersection Levels of Service (Menlo Park)**

| # | Intersection | Peak Hour | Count Date | Traffic Control | Existing Conditions Avg. Delay (sec)[1] | Existing Conditions LOS |
|---|---|---|---|---|---|---|
| 25 | Willow Road & Hospital Plaza/Durham Street[1] | AM | 4/16/2019 | Signal | 43.6 | D |
| | | PM | 4/16/2019 | | **>120** | **F** |
| 26 | Willow Road & Coleman Avenue | AM | 3/19/2019 | Signal | 18.6 | B |
| | | PM | 3/19/2019 | | 9.2 | A |
| 27 | Willow Road & Gilbert Avenue | AM | 3/19/2019 | Signal | 19.7 | B |
| | | PM | 3/19/2019 | | 10.3 | B |
| 28 | Willow Road & Middlefield Road | AM | 3/19/2019 | Signal | **61.6** | **E** |
| | | PM | 3/19/2019 | | 31.5 | C |
| 29 | O'Brien Drive/Loop Road & Main Street/O'Brien Drive (future intersection) | AM | -- | | Project | |
| | | PM | -- | | Intersection | |
| 30 | O'Brien Drive & Kavanaugh Drive | AM | 4/25/2019 | TWSC | 11.8 | B |
| | | PM | 4/25/2019 | | 15.2 | C |
| 31 | Adams Drive & Adams Court | AM | 4/25/2019 | TWSC | 11.5 | B |
| | | PM | 4/25/2019 | | 11.9 | B |
| 32 | Adams Drive & O'Brien Drive | AM | 4/25/2019 | TWSC | 17.3 | C |
| | | PM | 4/25/2019 | | **27.6** | **D** |
| 33 | University Avenue & Bayfront Expressway* | AM | 4/25/2019 | Signal | 11.4 | B |
| | | PM | 4/25/2019 | | **94.1** | **F** |

Notes:
* Denotes CMP Intersection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported
[1]Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections.
**Bold** indicates substandard level of service

**Table 8**
**Existing Intersection Levels of Service (East Palo Alto)**

| # | Intersection | Peak Hour | Count Date | Traffic Control | Existing Conditions Delay (sec)[1] | Existing Conditions LOS |
|---|---|---|---|---|---|---|
| 34 | University Avenue & Purdue Avenue | AM | 6/5/2019 | TWSC | 16.5 | C |
| | | PM | 6/5/2019 | | **47.0** | **E** |
| 35 | University Avenue & Adams Drive | AM | 4/25/2019 | TWSC | **88.1** | **F** |
| | | PM | 4/25/2019 | | **>120** | **F** |
| 36 | University Avenue & O'Brien Drive | AM | 4/23/2019 | Signalized | 9.6 | A |
| | | PM | 4/23/2019 | | 15.3 | B |
| 37 | University Avenue & Notre Dame Avenue | AM | 3/4/2020 | Signalized | 4.1 | A |
| | | PM | 3/4/2020 | | 9.3 | A |
| 38 | University Avenue & Kavanaugh Drive | AM | 4/25/2019 | Signalized | 6.3 | A |
| | | PM | 4/25/2019 | | 12.0 | B |
| 39 | University Avenue & Bay Road | AM | 4/25/2019 | Signalized | 40.4 | D |
| | | PM | 4/25/2019 | | 49.9 | D |
| 40 | University Avenue & Runnymede Street | AM | 4/25/2019 | Signalized | 6.1 | A |
| | | PM | 4/25/2019 | | 8.7 | A |
| 41 | University Avenue & Bell Street | AM | 4/25/2019 | Signalized | 11.3 | B |
| | | PM | 4/25/2019 | | 16.8 | B |
| 42 | University Avenue & Donohoe Street* | AM | 5/1/2019 | Signalized | **107.1** | **F** |
| | | PM | 5/1/2019 | | **75.2** | **E** |
| 43 | US 101 Northbound Off-Ramp & Donohoe Street* | AM | 4/25/2019 | Signalized | 49.8 | D |
| | | PM | 4/25/2019 | | **>120** | **F** |
| 44 | Cooley Avenue & Donohoe Street* | AM | 6/5/2019 | Signalized | 32.9 | C |
| | | PM | 6/5/2019 | | 36.7 | D |
| 45 | University Avenue & US 101 Southbound Ramps* | AM | 4/25/2019 | Signalized | **98.9** | **F** |
| | | PM | 4/25/2019 | | **87.1** | **F** |
| 46 | University Avenue & Woodland Avenue* | AM | 4/25/2019 | Signalized | **67.1** | **E** |
| | | PM | 4/25/2019 | | **>120** | **F** |
| 47 | E. Bayshore Road & Donahoe Street* | AM | 5/21/2019 | Signalized | 32.6 | C |
| | | PM | 5/21/2019 | | 38.5 | D |
| 48 | E. Bayshore Road & Holland Street | AM | 6/5/2019 | TWSC | 8.8 | A |
| | | PM | 6/5/2019 | | 10.0 | A |
| 49 | Saratoga Avenue & Newbridge Street | AM | 6/5/2019 | TWSC | 13.3 | B |
| | | PM | 6/5/2019 | | 15.6 | C |
| 50 | E. Bayshore Road & Euclid Avenue* | AM | 5/21/2019 | AWSC | **52.4** | **F** |
| | | PM | 5/21/2019 | | 32.6 | D |
| 51 | Clarke Avenue & E. Bayshore Road | AM | 9/25/2018 | Signalized | 13.9 | B |
| | | PM | 9/25/2018 | | 10.7 | B |
| 52 | Pulgas Avenue & E. Bayshore Road | AM | 6/5/2019 | Signalized | 20.4 | C |
| | | PM | 6/25/2019 | | 19.9 | B |

Note:
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported.
[*] Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections.
**Bold** indicates substandard level of service

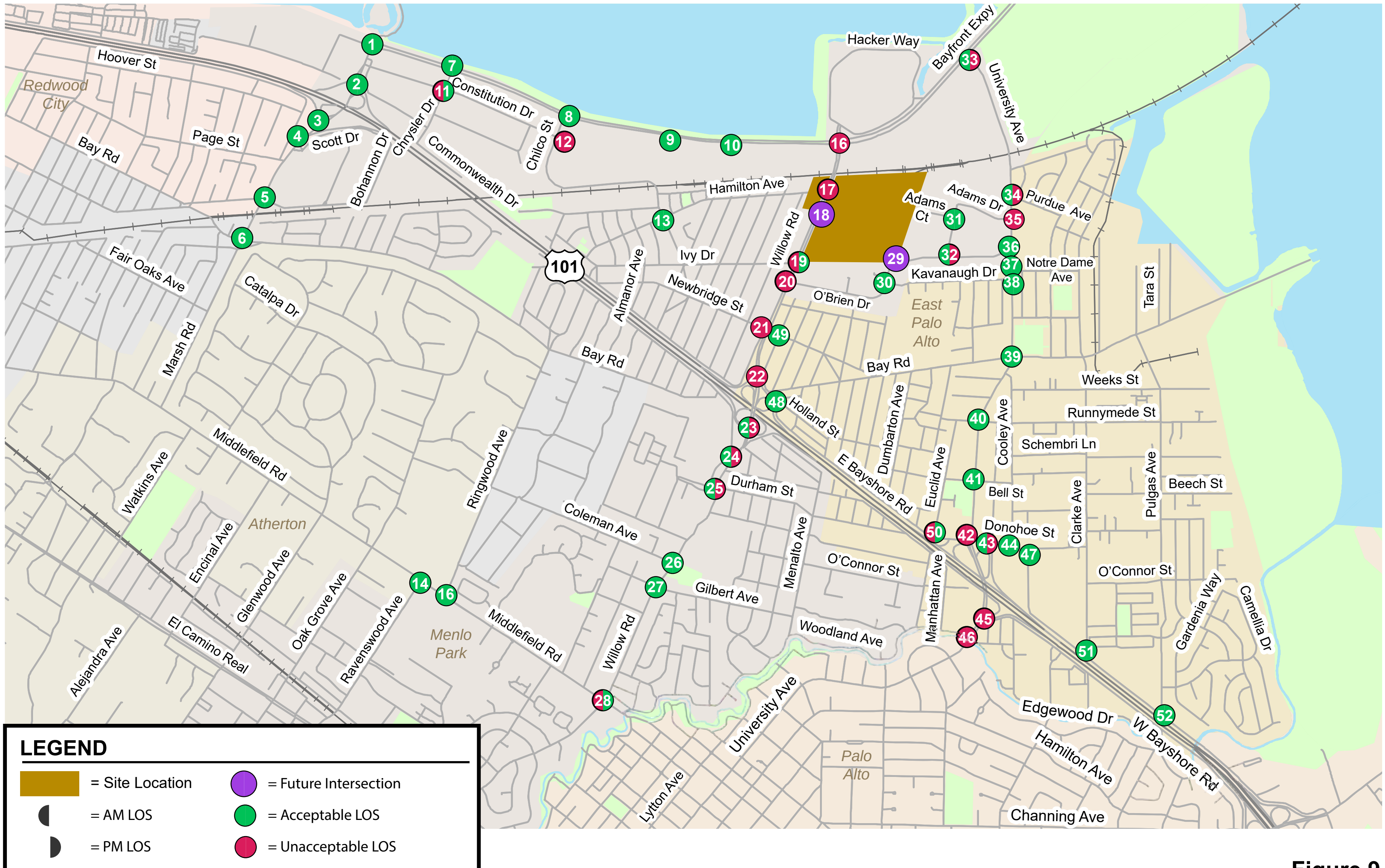



**Figure 9**
**Existing Intersection Level of Service Summary**

## Existing Freeway Levels of Service

Existing weekday AM and PM peak hour traffic volumes on the study freeway segments were obtained from the *San Mateo County Congestion Management Program 2019* for segments within San Mateo County. The *Valley Transportation Authority 2018 CMP Monitoring Report* was referenced for segments within Santa Clara County. The *Alameda County Transportation Commission 2018 LOS Monitoring Report* was referenced for segments within Alameda County. As shown on Tables 9 to 11, the following freeway segments are currently operating below their respective level of service standards, or at LOS F:

**San Mateo County**

- SR 84 – between Willow Road and University Avenue, AM Peak Hour
- SR 84 – between University Avenue and Alameda County Line, AM & PM Peak Hours
- US 101 – between Santa Clara County Line and SR 92, AM & PM Peak Hours
- SR 109 – from SR 84 to Kavanaugh Drive, AM & PM Peak Hours

**Santa Clara County**

The following mixed-flow freeway segments are currently operating at LOS F:

- US 101 – from SR 85 to Rengstorff Avenue – AM & PM Peak Hours
- US 101 – from Rengstorff to San Antonio Avenue – PM Peak Hour
- US 101 – from San Antonio Avenue to Embarcadero Road – AM & PM Peak Hours
- US 101 – from Embarcadero Road to SR 85 – PM Peak Hour

The following HOV freeway segments are currently operating at LOS F:

- US 101 – from San Antonio Avenue to Embarcadero Road – PM Peak Hour
- US 101 – from Oregon Expressway to Embarcadero Road – AM Peak Hour

**Alameda County**

- SR 84 – Paseo Padre Parkway to San Mateo County Line – AM Peak Hour
- SR 84 – Newark Boulevard to I-880 – PM Peak Hour

**Table 9**
**Existing Freeway LOS – San Mateo County**

| CMP Facility | Roadway Segment | Dir. | Pk Hr | LOS Standard | Capacity | Existing LOS |
|---|---|---|---|---|---|---|
| SR 84 | US 101 to Willow Rd | SB | AM | D | 1,100 | C |
| | | SB | PM | D | 1,100 | B |
| SR 84 | Willow Rd to US 101 | NB | AM | D | 1,100 | C |
| | | NB | PM | D | 1,100 | B |
| SR 84 | Willow Rd to University Ave | SB | AM | E | 1,100 | F |
| | | SB | PM | E | 1,100 | E |
| SR 84 | University Ave to Willow Rd | NB | AM | E | 1,100 | **F** |
| | | NB | PM | E | 1,100 | E |
| SR 84 | University Ave to Alameda County Line | SB | AM | F | 2,100 | **F** |
| | | SB | PM | F | 2,100 | **F** |
| SR 84 | Alameda County Line to University Ave | NB | AM | F | 2,100 | **F** |
| | | NB | PM | F | 2,100 | **F** |
| US 101 | Santa Clara County Line to Whipple Ave | NB | AM | F | 2,300 | **F** |
| | | NB | PM | F | 2,300 | **F** |
| US 101 | Whipple Ave to Santa Clara County Line | SB | AM | F | 2,300 | **F** |
| | | SB | PM | F | 2,300 | **F** |
| US 101 | Whipple Ave to SR 92 | NB | AM | E | 2,300 | **F** |
| | | NB | PM | E | 2,300 | **F** |
| US 101 | SR 92 to Whipple Ave | SB | AM | E | 2,300 | **F** |
| | | SB | PM | E | 2,300 | **F** |
| SR 109 (University Ave) | Kavanaugh Dr to SR 84 | EB | AM | E | 1,100 | C |
| | | EB | PM | E | 1,100 | C |
| SR 109 (University Ave) | SR 84 to Kavanaugh Dr | WB | AM | E | 1,100 | **F** |
| | | WB | PM | E | 1,100 | **F** |
| SR 114 (Willow Rd) | US 101 to SR 84 | EB | AM | E | 1,100 | B |
| | | EB | PM | E | 1,100 | B |
| SR 114 (Willow Rd) | SR 84 to US 101 | WB | AM | E | 1,100 | C |
| | | WB | PM | E | 1,100 | C |

Notes:
Data referenced San Mateo Couny City/County Association of Governments *Congestion Management Program 2019.*
**Bold** indicates non-compliant LOS

**Table 10**
**Existing Freeway LOS – Santa Clara County**

| Freeway Segment | | Dir | Peak Hour | Existing Conditions: Mixed-Flow Capacity[1] | Mixed-Flow Volume[2] (pc/hr/ln) | Mixed-Flow LOS[2] | HOV Lane Capacity[1] | HOV Lane Volume[2] (pc/hr/ln) | HOV Lane LOS[2] |
|---|---|---|---|---|---|---|---|---|---|
| US 101 | SR 85 to N. Shoreline Blvd | NB | AM | 9,200 | 1,512 | **F** | 1,650 | 1,751 | E |
| | | | PM | 9,200 | 1,358 | **F** | 1,650 | 1,635 | D |
| US 101 | N. Shoreline Blvd to Rengstorff Ave | NB | AM | 6,900 | 1,660 | **F** | 3,300 | 1,730 | D |
| | | | PM | 6,900 | 1,298 | **F** | 3,300 | 1,683 | D |
| US 101 | Rengstorff Ave to San Antonio Ave | NB | AM | 6,900 | 1,747 | E | 3,300 | 1,716 | D |
| | | | PM | 6,900 | 1,333 | **F** | 3,300 | 1,646 | D |
| US 101 | San Antonio Ave to Oregon Expwy | NB | AM | 6,900 | 1,262 | **F** | 3,300 | 1,693 | D |
| | | | PM | 6,900 | 1,083 | **F** | 3,300 | 1,482 | **F** |
| US 101 | Oregon Expwy to Embarcadero Rd | NB | AM | 6,900 | 1,367 | **F** | 1,650 | 1,693 | **F** |
| | | | PM | 6,900 | 1,271 | **F** | 1,650 | 1,588 | **F** |
| US 101 | Embarcadero Rd to Oregon Expwy | SB | AM | 6,900 | 1,991 | D | 1,650 | n/a | A |
| | | | PM | 6,900 | 1,135 | **F** | 1,650 | 1,627 | D |
| US 101 | Oregon Expwy to San Antonio Ave | SB | AM | 6,900 | 1,989 | D | 3,300 | 919 | A |
| | | | PM | 6,900 | 1,050 | **F** | 3,300 | 1,693 | D |
| US 101 | San Antonio Ave to Rengstorff Ave | SB | AM | 6,900 | 1,890 | E | 3,300 | 780 | A |
| | | | PM | 6,900 | 1,125 | **F** | 3,300 | 1,610 | D |
| US 101 | Rengstorff Ave to N. Shoreline Blvd | SB | AM | 6,900 | 1,976 | D | 3,300 | 1,369 | C |
| | | | PM | 6,900 | 1,072 | **F** | 3,300 | 1,508 | D |
| US 101 | N. Shoreline Blvd to SR 85 | SB | AM | 6,900 | 1,950 | D | 1,650 | 1,068 | A |
| | | | PM | 6,900 | 1,115 | **F** | 1,650 | 1,752 | E |

Notes:
HOV = high-occupancy vehicle; LOS = level of service
1. Capacity is based on the capacities cited in VTA's *Transportation Impact Analysis Guidelines* (2014).
2. Volume, and Level of service (LOS) on each segment are taken from VTA's *2018 CMP Monitoring Report*. VTA did not report volume and density for segments with speed above 75.2 mph.
**Bold** indicates a substandard level of service.

**Table 11**
**Existing Freeway LOS – Alameda County**

| CMP Facility | Roadway Segment | Dir. | Pk Hr | Capacity | Existing LOS |
|---|---|---|---|---|---|
| SR 84 | San Mateo County Line to Toll Plaza | EB | AM | 2,200 | A |
| | | EB | PM | 2,200 | C |
| SR 84 | Toll Plaza to San Mateo County Line | WB | AM | 2,200 | F |
| | | WB | PM | 2,200 | A |
| SR 84 | Toll Plaza to Thornton Ave | EB | AM | 2,200 | A |
| | | EB | PM | 2,200 | B |
| SR 84 | Paseo Padre Pkwy to Toll Plaza | WB | AM | 2,200 | F |
| | | WB | PM | 2,200 | C |
| SR 84 | Thornton Ave to Newark Blvd | EB | AM | 2,200 | A |
| | | EB | PM | 2,200 | C |
| SR 84 | Newark Blvd to Paseo Padre Pkwy | WB | AM | 2,200 | E |
| | | WB | PM | 2,200 | A |
| SR 84 | Newark Blvd to I-880 | EB | AM | 2,200 | D |
| | | EB | PM | 2,200 | F |
| SR 84 | I-880 to Newark Blvd | WB | AM | 2,200 | D |
| | | WB | PM | 2,200 | D |

Notes:

Data referenced the Alameda County Transportation Comission *2018 LOS Monitoring Report, Appendix B.*

## Existing Freeway Ramp Capacity Analysis

This analysis consists of a volume-to-capacity ratio evaluation of the study freeway ramps. The ramp capacities were obtained from the *Highway Capacity Manual 2000 (Chapter 25),* which considers both the free-flow speed and the number of lanes on the study ramps. It was assumed that if ramp meter equipment is present, on-ramps on northbound US 101 would be metered during the AM peak hour, and on-ramps on southbound US 101 would be metered during the PM peak hour. Metered ramps are analyzed with a capacity of 900 vehicles per hour for the mixed-flow lanes. As shown on Table 12, the existing ramps currently have sufficient capacity to serve the existing traffic volumes.

**Table 12**
**Freeway Ramp Capacity**

| Interchange | Ramp | Peak Hour | Lanes: Type | Mixed | HOV | Meter [1] | Capacity [2] | Existing Conditions: Volume [3] | V/C |
|---|---|---|---|---|---|---|---|---|---|
| US 101/Marsh Road | SB Off-ramp to Marsh Road | AM<br>PM | Diagonal | 2 | - | - | 3,800<br>3,800 | 1,332<br>1,156 | 0.35<br>0.30 |
| | NB on-ramp from WB Marsh Road | AM<br>PM | Diagonal | 2 | 1 | YES<br>- | 1,800<br>2,000 | 1,559<br>1,472 | 0.87<br>0.74 |
| US 101/Willow Road | NB off-ramp to Willow Road | AM<br>PM | Diagonal | 2 | - | - | 3,800<br>3,800 | 1,153<br>1,055 | 0.30<br>0.28 |
| | NB on-ramp from WB Willow Road | AM<br>PM | Diagonal | 1 | 1 | YES<br>- | 1,800<br>2,000 | 424<br>495 | 0.24<br>0.25 |
| | SB on-ramp from WB Willow Road | AM<br>PM | Loop | 1 | - | -<br>YES | 1,900<br>900 | 739<br>633 | 0.39<br>0.70 |
| | SB off-ramp to Willow Road | AM<br>PM | Diagonal | 2 | - | - | 3,800<br>3,800 | 863<br>637 | 0.23<br>0.17 |
| US 101/University Avenue | NB off-ramp to Donohoe Street | AM<br>PM | Diagonal | 1 | - | - | 2,000<br>2,000 | 857<br>1,326 | 0.43<br>0.66 |
| | SB on-ramp from University Avenue | AM<br>PM | Diagonal | 2 | - | -<br>YES | 1,800<br>900 | 1,143<br>744 | 0.64<br>0.83 |

Notes:
*NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound*
1. Northbound on-ramps are assumed metered during the AM peak hour. Southbound on-ramps are assumed metered during the PM peak hour.
2. Ramp capacities were obtained from *Highway Capacity Manual 2000* , and considered the free-flow speed, the number of lanes on the ramp, and ramp metering.
3. Existing volumes referenced intersection counts collected in 2019.

# Observed Existing Traffic Conditions

Traffic conditions were observed in the field at each study intersection in order to identify existing operational deficiencies and to confirm the accuracy of the calculated level of service. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to level of service, (2) identify any locations where the level of service analysis does not accurately reflect existing traffic conditions. Hexagon conducted field observations on a regular weekday during the AM and PM peak hours in May, October, and November of 2019. Some of the study intersections had no significant operational issues, and vehicular queues on all approaches were mostly able to clear in one cycle. The observed operational issues at the remaining study intersections are identified below.

## Marsh Road between Bayfront Expressway and Bay Road

There were no operational deficiencies observed along this corridor during the AM peak hour.

During the PM peak hour, the eastbound traffic on Marsh Road queued from Bayfront Expressway past the 101 SB Off-Ramp. Most eastbound vehicles required more than one cycle to clear along this queue. The southbound left-turn movement at the Marsh Road/US 101 SB Off-Ramp intersection also received heavy demand. These vehicles usually waited through more than one queue to cross the intersection due to downstream spillback queues on eastbound Marsh Road.

## Middlefield Road between Marsh Road and University Avenue

During the AM peak hour, southbound traffic was heavy. The southbound left-turn queue at the Ringwood Avenue/Middlefield Road intersection occasionally exceeded the left-turn pocket as vehicles traveled to Menlo-Atherton High School. The northbound left-turn queue at the Ravenswood Avenue/Middlefield Road intersection frequently filled the entire block and occasionally impacted operations at Ringwood Avenue, as vehicles in the through lane waited to merge into the left-turn lane.

During the PM peak hour, the northbound left-turn queue at the Ravenswood Avenue/Middlefield Road intersection sometimes filled the entire block and occasionally impacted operations at Ringwood Avenue as vehicles in the through lane waited to merge into the left-turn lane. Vehicles making an eastbound right-turn from Ravenswood Avenue were observed to wait to merge to the southbound left-turn lane at the Ringwood Avenue/Middlefield Road intersection. The northbound right-turn movement at the Willow Road/Middlefield Road intersection received heavy demand but was often observed to be blocked by the northbound through queue.

### Bayfront Expressway between Marsh Road and University Avenue

Due to signal failures at the Bayfront Expressway and Marsh Road intersection during the day of observation, the observed AM peak hour conditions along this corridor were deemed atypical.

During the PM peak hour, the southbound traffic on Bayfront Expressway queued from University Avenue northward past upstream intersections. Most southbound vehicles required multiple cycles to clear intersections along this queue. The eastbound left-turn queue at the Chrysler Drive/Bayfront Expressway intersection extended past upstream intersections and required multiple cycles to clear. The southbound right-turn and northbound left-turn movements at the Chilco Street/Bayfront Expressway intersection sometimes required two signal cycles to clear due to eastbound spillback queues at the Chilco Street and Constitution Drive intersection. The eastbound left-turn movement frequently required two signal cycles to clear the Chilco Street/Bayfront Expressway intersection.

### Chilco Street & Constitution Drive/MPK 22 Driveway

During the AM peak hour, all approaches of this unsignalized intersection were busy. Vehicles frequently made left turns at all approaches. The two unsignalized pedestrian crosswalks were heavily utilized. The westbound through-right lane frequently queued towards Bayfront Expressway and was observed to take up to a minute to clear. The queue was observed to occasionally extend to the end of the southbound right-turn pocket on Bayfront Expressway.

During the PM peak hour, eastbound spillback queues from the Chilco Street and Bayfront Expressway intersection affected traffic operations at this intersection. At the Chilco Street and Constitution Drive intersection, the westbound vehicles frequently queued towards, and sometimes onto, Bayfront Expressway.

### Chrysler Drive & Constitution Drive

During the AM peak hour, there were no significant operational issues at this intersection.

During the PM peak hour, eastbound spillback queues from the Chrysler Drive and Bayfront Expressway intersection affected traffic operations at this intersection. At the Chrysler Drive and Constitution Drive intersection, the eastbound queues extended past upstream intersections. The westbound left-turn queue frequently extended into the southbound right-turn lane on Bayfront Expressway. The westbound left-turn queue was usually able to clear in one signal cycle, although it was observed to be sometimes blocked by the eastbound spillback queue. The northbound right-turn movement sometimes required multiple signal cycles to clear due to eastbound downstream queuing issues.

### Willow Road between Hamilton Avenue and Gilbert Avenue

During the AM peak hour, there was heavy demand on westbound Willow Road along this corridor. Westbound vehicles often required multiple cycles to clear an intersection. As a result, the southbound right-turn and northbound left-turn movements on the side streets turning onto westbound Willow Road also required multiple cycles to clear the intersection. The westbound queue was usually able to clear at the Willow Road/Durham Street intersection due to the long through phase. The eastbound left-turn movement at the Newbridge Street intersection received heavy demand and occasionally required two signal cycles to clear. Vehicles at the US 101 northbound off-ramp turning right onto eastbound Willow Road frequently queued onto the auxiliary lane on US 101 and required multiple cycles to clear.

During the PM peak hour, there was heavy demand on eastbound Willow Road along this corridor. Eastbound vehicles often required multiple cycles to clear an intersection. As a result, the northbound right-turn and southbound left-turn movements on the side street turning onto eastbound Willow Road also required multiple cycles to clear the intersection. The westbound left-turn movement at the Hamilton Avenue intersection received heavy demand that often required two signal cycles to clear. Vehicles at the US 101 northbound off-ramp turning right onto eastbound Willow Road frequently queued onto the auxiliary lane on US 101 and required multiple cycles to clear. Vehicles at the US 101 southbound off-ramp turning left onto eastbound Willow Road were often impacted by eastbound spillback queues and were observed to block the westbound through movement. The westbound left-turn queue extended onto US 101 southbound and impacted freeway operations. Vehicles were observed to utilize the parking lane to access the westbound right-turn movement at the Willow Road/Coleman Avenue intersection.

### University Avenue between Purdue Avenue and Woodland Avenue

During the AM peak hour, there was heavy demand on westbound University Avenue along this corridor. Westbound vehicles often required multiple cycles to clear an intersection between Adams Drive and Woodland Avenue. Eastbound traffic between Bay Road and the US 101 SB Ramps was also heavy and often required multiple cycles to clear. At the unsignalized intersection of University Avenue and Adams Drive, the eastbound and southbound left-turn movements occasionally had extended wait periods due to continuous westbound traffic. Protected signal phasing is recommended at the University Avenue and Runnymede Street intersection due to potentially hazardous interactions between vehicles performing permitted left-turns across heavy traffic and crossing pedestrians.

During the PM peak hour, there was heavy demand on eastbound University Avenue along this corridor. Eastbound vehicles often required multiple cycles to clear an intersection. As a result, the left-turn movements on the side streets also required multiple cycles or extended wait periods to clear the intersection. Eastbound traffic between Bay Road and Donohoe Street occasionally required more than one cycle to clear. At the unsignalized intersection of University Avenue and Purdue Avenue, vehicles were observed to make northbound right-turns, despite existing signage prohibiting that maneuver. At the University Avenue/Adams Drive intersection, vehicles were observed to pass through the intersection during a break in westbound traffic and wait in the median area until drivers allowed them to merge. The westbound left-turn movement at the University Avenue/Bay Road intersection sometimes required more than one cycle to clear. The eastbound left-turn movement at the University Avenue/Bell Street intersection frequently queued out of the turn pocket and required multiple cycles to clear.

### Donohoe Street between University Avenue and Cooley Avenue

During the AM peak hour, there was heavy demand on northbound Donohoe Street along this corridor. Northbound vehicles often required multiple cycles to the clear an intersection. As a result, the westbound right-turn and eastbound left-turn movements on the side streets turning onto northbound Donohoe Street also required multiple cycles to clear the intersection. At the Cooley Avenue/Donohoe Street intersection, there was high demand for the number 1 lane. The congestion was due to spillback from the downstream intersections at University Avenue/Donohoe Street and US 101 NB Off-Ramp/Donohoe Street.

During the PM peak hour, there was heavy demand on northbound Donohoe Street along this corridor. Northbound vehicles often required multiple cycles to the clear an intersection. The eastbound left-turn vehicles at the US 101 NB Off-Ramp/Donohoe Street intersection were observed to frequently fail to clear the intersection in one green cycle due to high volume and northbound spillback queues. At the Cooley Avenue/Donohoe Street intersection, there was high demand for the number 1 lane. The congestion was due to spillback from the downstream.

## Project Trips Estimates

Trip generation estimates for the mixed-use development are based on standard trip generation rates published in the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition manual. Below is a general discussion of the trip generation estimation methodology (see Table 13). Detailed trip generation analysis is provided in Appendix D.

### Gross Project Trip Generation

A description of the source of trip generation rates for each land-use is provided below:

- ***Office***. Initial trip estimates for office and accessory uses are based on “ITE Land Use code 710: General Office Building”.
- ***Residential.*** The trip estimate is based on the “ITE Land Use code 221: Multifamily Housing (Mid-Rise)”, which includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three to ten levels. Some of the apartments are designated as senior housing, which could have a lower trip rate. Thus, the trip generation estimate for the apartments is conservative.
- ***Retail.*** Trip estimates are based on “ITE Land Use code 820: Shopping Center”, which includes several types of retail uses like restaurants, movie theaters, bowling alleys etc. that are typically present in shopping centers.
- ***Hotel.*** Trip estimates are based on “ITE Land Use code 310: Hotel”.
- ***Publicly Accessible Park.*** Trip estimates are based on “ITE Land Use code 488: Soccer Complex”. The programmatic design of the park has not been determined. In order to provide a conservative estimate of potential traffic generation and allow for flexible programming for the project through the project review process, it is assumed that the park will have play structures and open field areas for warm-ups or casual play.

## Transportation Demand Management (TDM)

The City of Menlo Park requires all new developments in the R-MU and O zoning districts to reduce their trip generation by 20 percent from standard trip generation rates via TDM strategies. The City has in practice applied the 20 percent reduction after crediting for any trip reductions based on a project's proximity to complimentary land uses, alternative transportation facilities, as well as reductions based on a project's mixed-use characteristics (see Appendix D for discussion on the project's trip reductions). As implemented by the City, this TDM ordinance is applied to daily trips, AM peak hour trips, and PM peak hour trips.

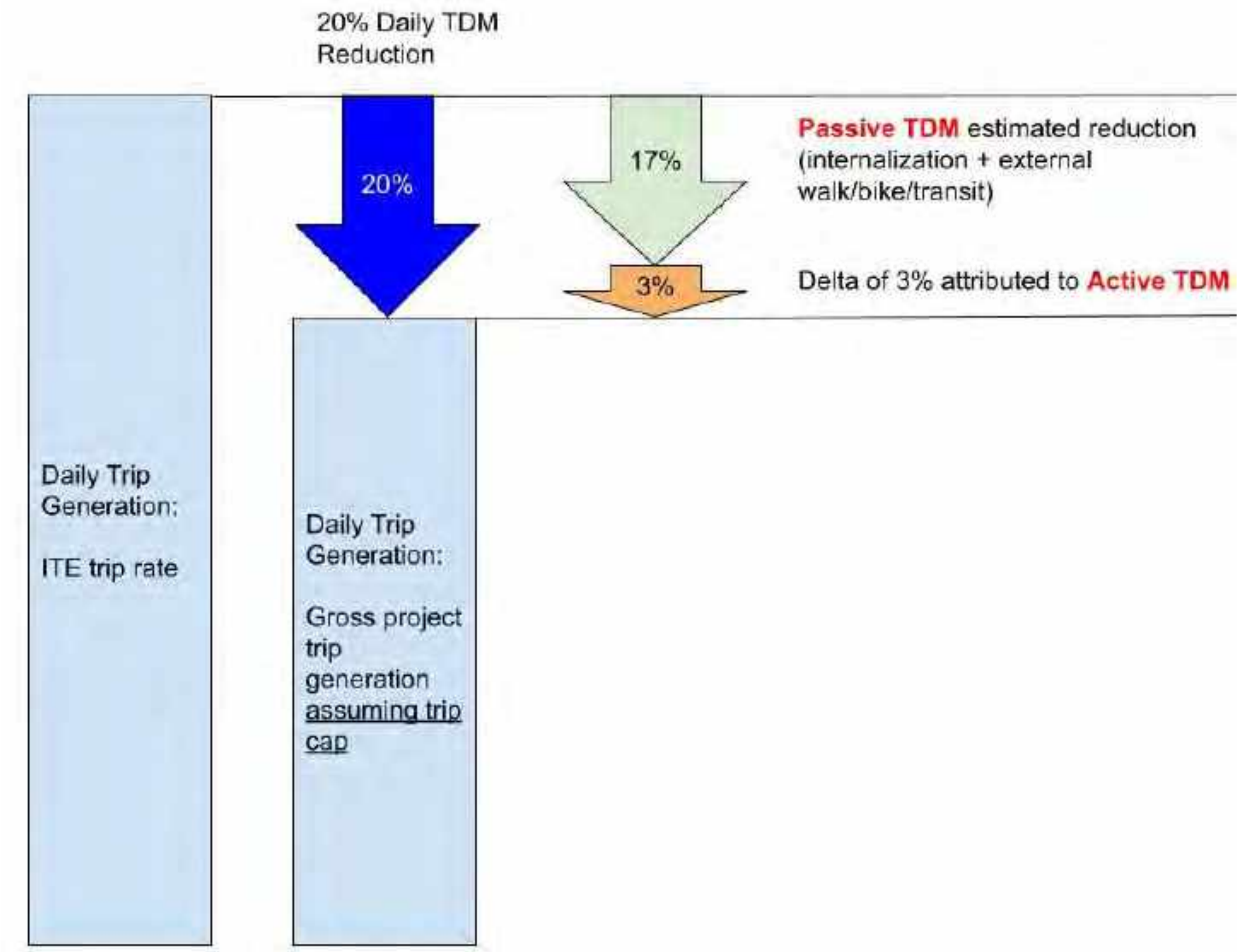
Per the Willow Village Adjustment Request: Transportation Demand Management, submitted by the applicant team, the applicant is proposing the following regarding TDM:

- For the Campus District, the applicant proposes a daily trip cap of 18,237 trips, and a trip cap of 1,670 trips during the AM and PM peak hours.
    - The daily trip cap represents a 20 percent reduction from gross ITE trip generation (see Figure 10).
    - The peak hour trip cap represents a 35-40 percent reduction from gross ITE trip generation.
- For the Residential/Shopping and Town Square Districts, the applicant proposes a 20 percent reduction from gross ITE trip generation for daily, and a 20 percent and 27 percent reduction from gross ITE trip generation during the AM and PM peak hours of commute, respectively.

**TDM Monitoring**

The City incorporates monitoring requirements into project conditions. The project's TDM plan is anticipated to be monitored annually to ensure effectiveness of the TDM plan. The details of the TDM monitoring plan will be developed as part of CDP, and will detail frequency and duration of monitoring for each land use, as well as the methodology to conduct monitoring. The monitoring plan will also specify corrective measures if the TDM plan is not achieving its stated effectiveness.

**Figure 10**
**Graphical Representation of How the Transportation Analysis Modeled Daily Trip Generation for All Land Uses**




*Note: the TDM program would achieve a higher reduction, but only a 3% reduction from active TDM measures is needed to achieve a 20% reduction off of gross trip generation estimated using ITE trip generation rates (see discussion above).*

## Net Project Trip Generation

The project trip generation assumes the applicant's proposed TDM plans for the Campus District as well as for the Residential/Shopping and Town Square Districts. It should be noted that the trip reductions due to the applicant proposed TDM plans already accounted for trip reductions due to the Proposed Project's location efficiency, as well as internal capture due to the Proposed Project's mixed use nature (see Appendix D for details).

As shown in Table 13, the proposed project trips generated by the proposed land uses after accounting for the proposed TDM plans at the main Project Site would be 33,263 daily trips, 2,396 AM peak hour trips, and 2,907 PM peak hour trips.

Net project trip generation represents the number of new project trips added to the surrounding roadway network. The following categories of trips are credited from the site-specific trip cap to derive the net project trip generation.

**Pass-By**

The retail uses would attract some of their customers from people who are passing by the site on Willow Road or Bayfront Expressway heading towards their destination. These customers would not need to make a separate vehicle trip to come to the Project Site. Such vehicle trips are categorized as pass-by trips as they are not new trips generated on the roadway network and should be credited from the project trip generation. A pass-by trip reduction for retail trips was applied based on the average pass-by reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Pass-by data are typically available only for the PM peak hour. Hexagon assumed no pass-by trip reduction for the AM peak hour and half of the PM peak pass-by trip reduction for daily trip generation.

**Existing Uses**

Trips associated with the existing uses on the Project Site were credited against the new trip generation. The trips generated by the existing buildings on the site were estimated based on driveway counts conducted over three days in September 2019 per Facebook Willow Traffic Counts Memorandum, Fehr & Peers, March 26, 2020. The existing uses on the site generated an average of 11,700 trips daily, including 985 trips in the AM peak hour (699 inbound and 286 outbound trips), and 805 trips in the PM peak hour (250 inbound and 555 outbound trips).

As shown in Table 13, the net Proposed Project trips generated by the main Project Site on the roadway network would be 20,537 daily trips, including 1,411 AM peak hour trips (939 inbound trips and 472 outbound trips), and 1,914 PM peak hour trips (719 inbound trips and 1,195 outbound trips).

As shown in Table 14, the net trips generated by the Hamilton Parcels are estimated to be 218 daily trips, including 6 AM peak hour trips (3 inbound trips and 3 outbound trips), and 18 PM peak hour trips (9 inbound trips and 9 outbound trips)[15].

[15] The Hamilton Parcels are located within C-2-S zoning, which does not require implementation of a TDM Plan. Therefore, no TDM reductions were applied.

## Table 13
## Project Trip Generation Estimates (Main Project Site)

| Land Use | ITE Land Use Code [1] | Size | Unit | Daily Rate [1] | Daily Total | AM Peak Hour Rate [1] | AM Peak Hour IN | AM Peak Hour OUT | AM Peak Hour Total | PM Peak Hour Rate [1] | PM Peak Hour IN | PM Peak Hour OUT | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Campus District*** | | | | | | | | | | | | | |
| Office | 710 | 6,950 | employees | 3.28 | 22,796 | 0.37 | 2,135 | 437 | 2,572 | 0.40 | 556 | 2,224 | 2,780 |
| *TDM Reductions* [2] | | | | | *(4,559)* | | *(765)* | *(137)* | *(902)* | | *(171)* | *(939)* | *(1,110)* |
| **Office Trip Cap** [2] | | | | | **18,237** | | **1,370** | **300** | **1,670** | | **385** | **1,285** | **1,670** |
| ***Residential/Shopping and Town Square Districts*** | | | | | | | | | | | | | |
| Residential | 221 | 1,730 | d.u. | 5.44 | 9,411 | 0.36 | 162 | 461 | 623 | 0.44 | 464 | 297 | 761 |
| Retail | 820 | 200 | ksf | 37.75 | 7,550 | 0.94 | 117 | 71 | 188 | 3.81 | 366 | 396 | 762 |
| Hotel | 310 | 193 | rooms | 8.36 | 1,613 | 0.47 | 54 | 37 | 91 | 0.60 | 59 | 57 | 116 |
| Publicly Accessible Park [3] | 488 | 3 | fields | 71.33 | 214 | 0.99 | 2 | 1 | 3 | 16.43 | 32 | 17 | 49 |
| Subtotal | | | | | 18,788 | | 335 | 570 | 905 | | 921 | 767 | 1,688 |
| *TDM Reductions* [4] | | | | | *(3,762)* | | *(67)* | *(112)* | *(179)* | | *(245)* | *(206)* | *(451)* |
| **Residential/Shopping and Town Square Districts Trips (MU)** | | | | | **15,026** | | **268** | **458** | **726** | | **676** | **561** | **1,237** |
| Project Trips *after* TDM Reductions (Office + MU) | | | | | 33,263 | | 1,638 | 758 | 2,396 | | 1,061 | 1,846 | 2,907 |
| *Retail Pass-By Reductions* [5] | | | | | *(1,026)* | | *0* | *0* | *0* | | *(92)* | *(96)* | *(188)* |
| **Total New Trips Generated by the Project** | | | | | **32,237** | | **1,638** | **758** | **2,396** | | **969** | **1,750** | **2,719** |
| Existing Trip Generation Credit [6] | | | | | (11,700) | | (699) | (286) | (985) | | (250) | (555) | (805) |
| **Net New Trips Generated on Roadway Network** | | | | | **20,537** | | **939** | **472** | **1,411** | | **719** | **1,195** | **1,914** |

Notes
*d.u. = dwelling unit, ksf = 1,000 s.f.*
1. Daily, AM, and PM peak hour average rates published in ITE Trip Generation Manual, 10th Edition, 2017 were used for each land use.
2. Office trip generation and TDM reductions reflect the proposed daily, AM and PM peak hour trip caps.
3. The publicly accessibleThe programmatic design of the park has not been determined. In order to provide a conservative estimate of potential traffic generation, it is assumed that the park will have play structures and open field areas for warm-ups or casual play. The park is planned for approximately 3.5 acres. Number of soccer fields on 3.5 acres of land was estimated based on the size of a standard soccer field. park is assumed to be programmable. ITE Land Use "Soccer Field" is analyzed as a proxy. Number of soccer fields was estimated based on the size of a standard soccer field.
4. For the Residential/Shopping and Town Square Districts, the applicant proposes a 20 percent reduction from gross ITE trip generation for daily, and a 20 percent and 27 percent reduction from gross ITE trip generation during the AM and PM peak hours of commute, respectively.
5. Pass-by trip reduction is based on the average pass-by trip reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Hexagon assumes no pass-by trip reduction during the AM peak hour and half of the PM peak pass-by reduction for daily trip generation.
6. Existing Use trip estimates based on driveway counts conducted over three days in September 2019 per Facebook Willow Traffic Counts Memorandum, Fehr & Peers, March 26, 2020. 8-9 AM in the AM peak period and 4-5 PM in the PM peak period have been considered as peak hours since they have the highest trips.

## Table 14
## Project Trip Generation Estimates (Hamilton Parcel)

| Land Use | | Size | | Daily Rate | Daily Trips | AM Peak Hour Rate | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour Rate | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Proposed Use** | **ITE Code** [1] | | | | | | | | | | | | |
| General Retail | 820 | 7.7 | ksf | 37.75 | 291 | 0.94 | 4 | 3 | 7 | 3.81 | 14 | 15 | 29 |
| *External Walk, Bike, and Transit* [2] | | | | | *(28)* | | *(1)* | *0* | *(1)* | | *(1)* | *(1)* | *(2)* |
| *Retail Pass-By Reduction (34%)* [3] | | | | | *(45)* | | *0* | *0* | *0* | | *(4)* | *(5)* | *(9)* |
| **Net Project Trips on Project Network** | | | | | **218** | | **3** | **3** | **6** | | **9** | **9** | **18** |

Notes:
ksf = 1,000 square feet
[1] Daily, AM, and PM peak hour average rates published in *ITE Trip Generation Manual, 10th Edition, 2017* were used for each land use.
[2] External walk, bike, and transit reduction developed using *US EPA Mixed Use Trip Generation Model v.4, 2010* .
[3] Pass-by trip reduction is based on the average pass-by trip reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Hexagon assumes no pass-by trip reduction during the AM peak hour and half of the PM peak pass-by reduction for daily trip generation.

## Trip Distribution and Assignment

The trip distribution pattern and trip assignment for the proposed uses were estimated based on the Menlo Park Travel Demand Model. The model estimated trip distribution pattern is summarized below:

- Dumbarton Bridge: approximately 11%
- US 101 to the north, including Haven Avenue: approximately 28%
- US 101 to the south, including Embarcadero Road: approximately 31%
- Marsh Road west of US 101: approximately 4%
- Willow Road west of US 101: approximately 8%
- University Avenue west of US 101: approximately 6%
- Menlo Park and East Palo Alto east of US 101: approximately 12%

## Future Traffic Volumes

Both near-term (year 2025) and cumulative (year 2040) scenario forecasts of intersection turning movements, freeway traffic and ramp volumes were completed using the latest Menlo Park travel demand forecast model (citywide travel demand forecast model). The citywide model is the best available model to represent travel within the City of Menlo Park, and serves as the primary forecasting tool for the City. The model is a mathematical representation of travel within the nine Bay Area counties, as well as the Santa Cruz, San Benito, Monterey and San Joaquin counties. The base model structure was developed by the Metropolitan Transportation Commission (MTC) and further refined by the City/County Association of Governments and Santa Clara Valley Transportation Authority for use within San Mateo County and Santa Clara County. The City further refined this model for application with Menlo Park to add more detail to the zone structure and transportation network. There are 81 transportation analysis zones (TAZs) within the model to represent the City of Menlo Park.

### Near-Term and Cumulative Traffic Volumes

Land use growth assumptions for Bay Area regions outside of Menlo Park and East Palo Alto for the near-term scenario (year 2025) are provided by the Association of Bay Area Governments (ABAG) and refined by VTA/C/CAG. Approved developments within the City of Menlo Park and the City of East Palo Alto were added to the existing land use to represent the year-2025 land use. The following approved projects within the City of Menlo Park and the City of East Palo Alto as of December 2020 were included:

- Menlo Gateway
- 1285 El Camino Real
- 123 Encinal Avenue
- 1010-1026 Alma Street
- 650-660 Live Oak Avenue
- 1275 El Camino Real
- Facebook Expansion Project (301-309 Constitution Drive)
- 500 El Camino Real
- New Magnet High School
- 1300 El Camino Real
- 1021 Evelyn Street
- 40 Middlefield Road
- 949 El Camino Real
- 1540 El Camino Real
- 115 El Camino Real

- 506-556 Santa Cruz Avenue
- 1125 Merrill Street
- 409 Glenwood Avenue
- 706-716 Santa Cruz Avenue
- 1345 Willow Road
- 201 El Camino Real
- 1021 Runnymede Street (East Palo Alto)

For the cumulative scenario, the City of Menlo Park land use assumed the buildout of the General Plan, as well as the portion of the proposed 123 Independence Drive project that would exceed the unrestricted dwelling units studied in the ConnectMenlo EIR. Pending developments as of December 2020 within the City of East Palo Alto were added to the near-term land use to represent the year-2040 land use for the city. Land use growth for other Bay Area regions for year 2040 were taken from Association of Bay Area Governments (ABAG) projections and refined by VTA/C/CAG. Table 15 shows the socioeconomic model inputs for the entire Bay Area separated by counties.

The forecasted intersection turning movements under all future scenarios were adjusted based on existing volumes to generate traffic volumes for near-term conditions (see Figure 11), near-term plus project conditions (see Figure 12), cumulative conditions (see Figure 13), and cumulative plus project conditions (see Figure 14).

**Table 15**
**Socioeconomic Model Inputs for Bay Area**

| County | Year 2040 Project Conditions Model Land Use Data | | | |
|---|---|---|---|---|
| | Total Households | Total Population | Employed Residents | Total Jobs |
| San Francisco | 447,340 | 1,076,365 | 559,923 | 759,509 |
| San Mateo | 320,377 | 909,511 | 444,478 | 481,116 |
| Santa Clara | 818,369 | 2,406,587 | 1,158,389 | 1,229,995 |
| Alameda | 705,337 | 1,965,356 | 891,473 | 947,642 |
| Contra Costa | 464,151 | 1,328,458 | 579,757 | 467,333 |
| Solano | 168,706 | 494,363 | 224,059 | 179,946 |
| Napa | 56,312 | 158,792 | 69,450 | 89,554 |
| Sonoma | 220,740 | 591,546 | 284,856 | 257,466 |
| Marin | 112,046 | 274,489 | 136,554 | 129,150 |
| City of Menlo Park | 18,532 | 46,741 | 21,369 | 60,969 |

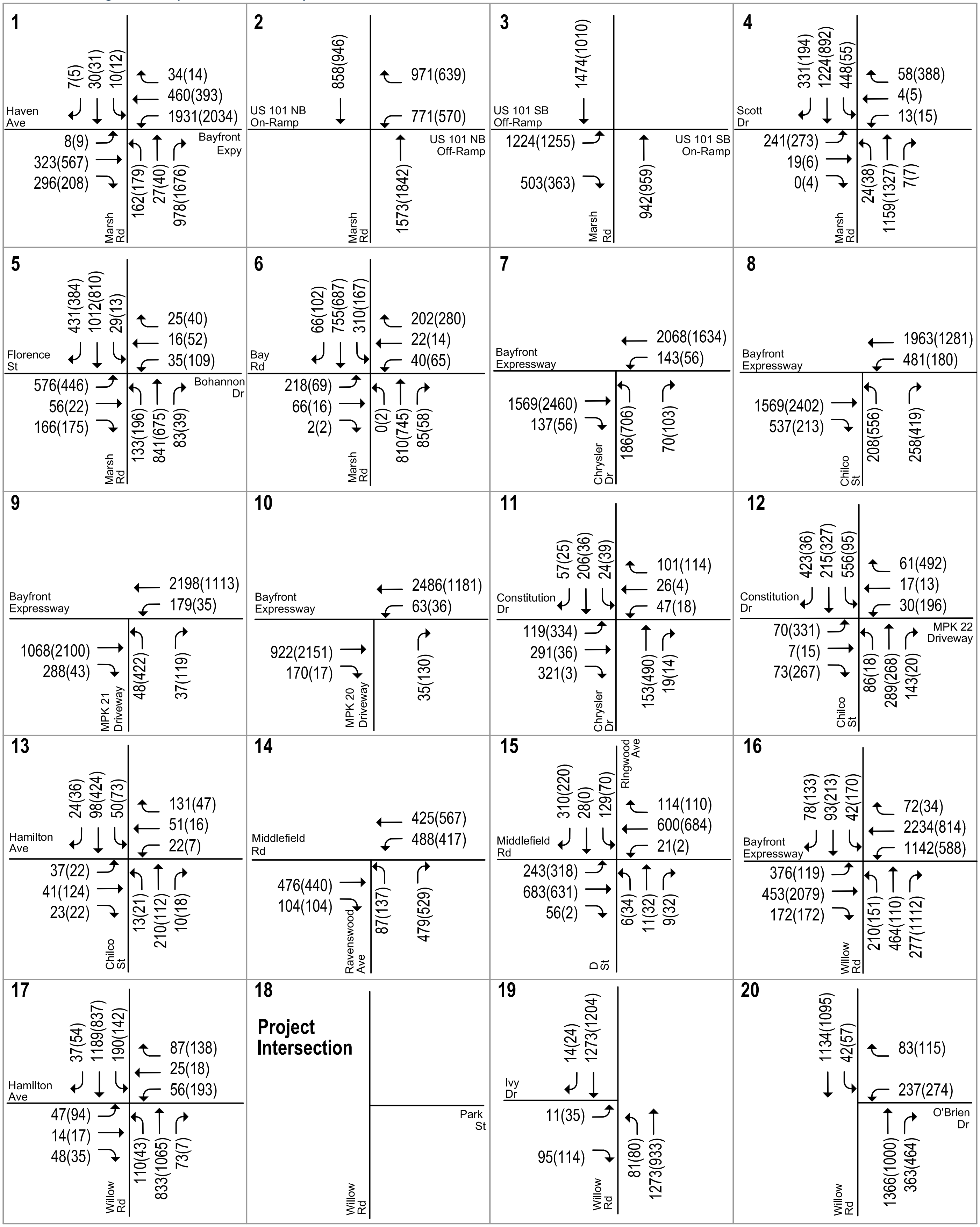



**Figure 11**
**Near-Term Traffic Volumes**

HEXAGON

NORTH
Not to Scale

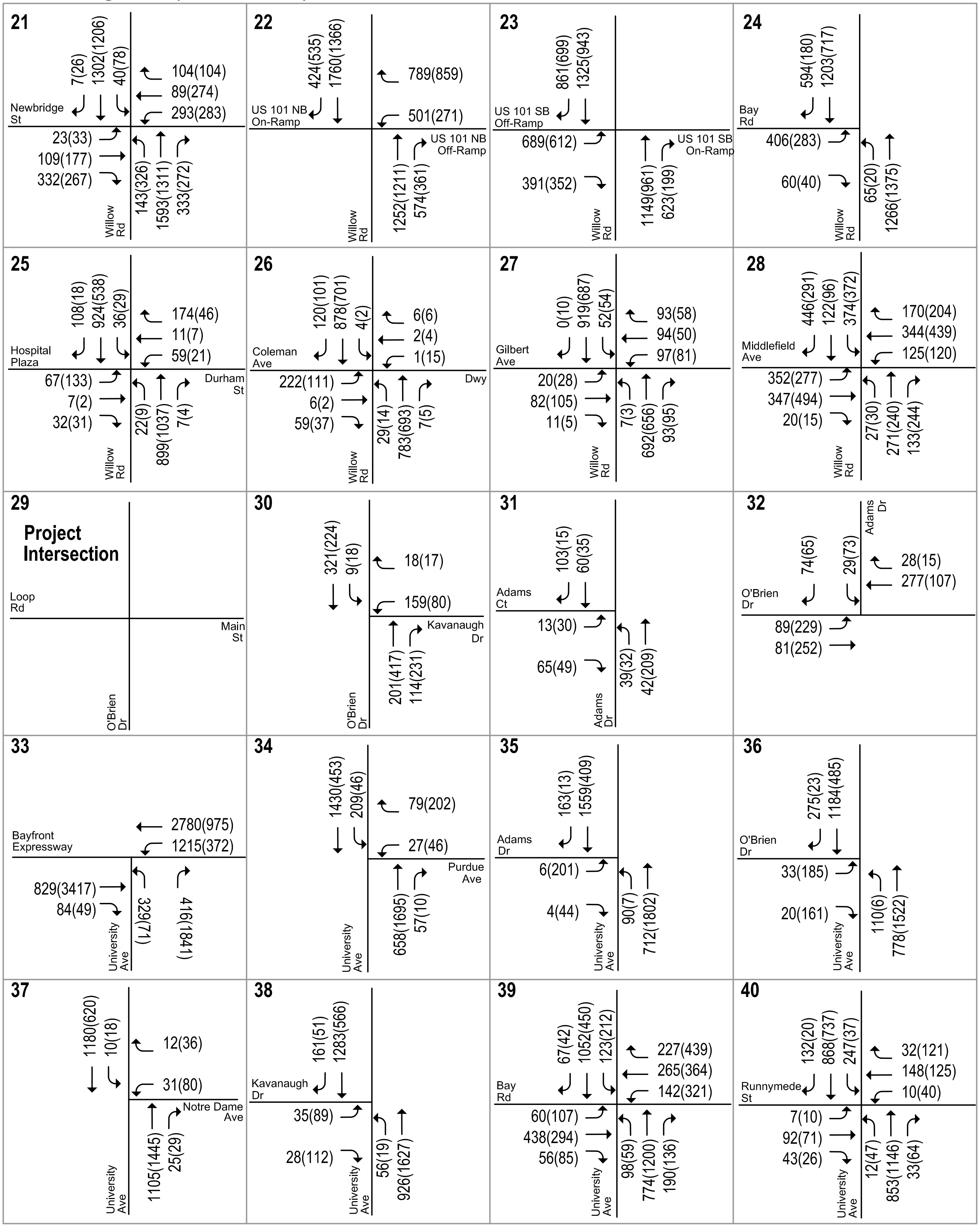
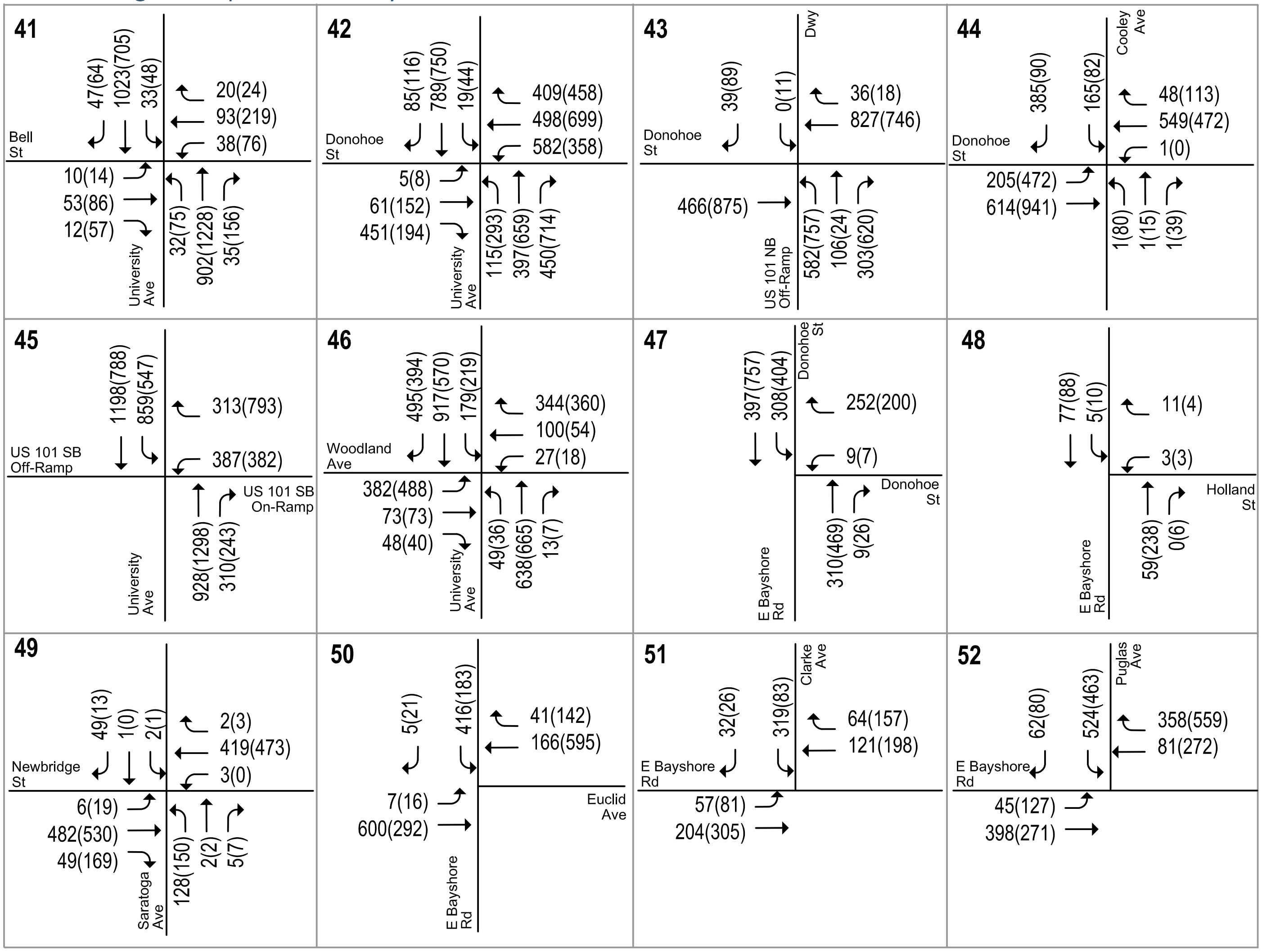



**Figure 11**
**Near-Term Traffic Volumes**




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 11**
**Near-Term Traffic Volumes**

HEXAGON

NORTH
Not to Scale

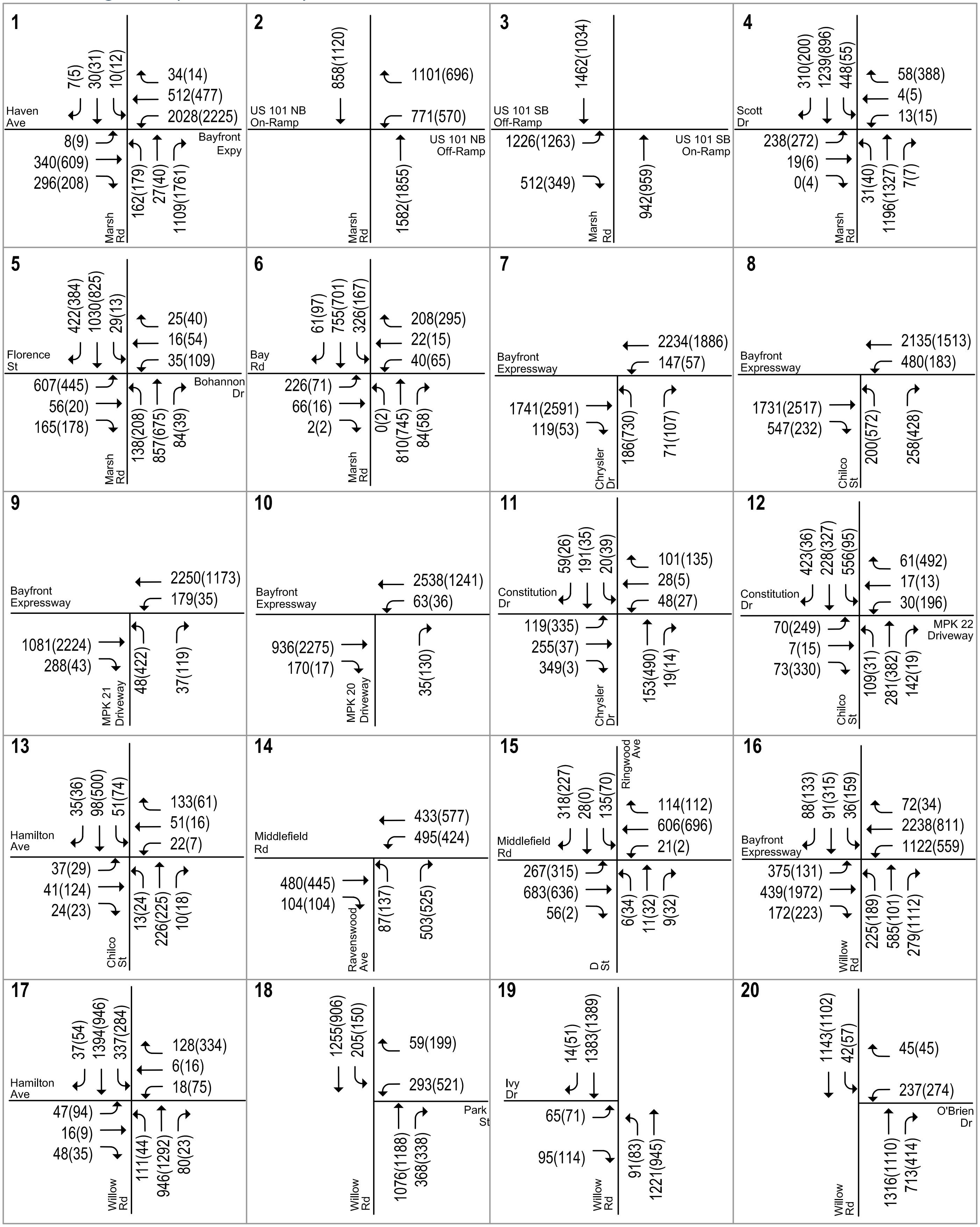


**Figure 12**
**Near-Term Plus Project Traffic Volumes**

HEXAGON

NORTH
Not to Scale

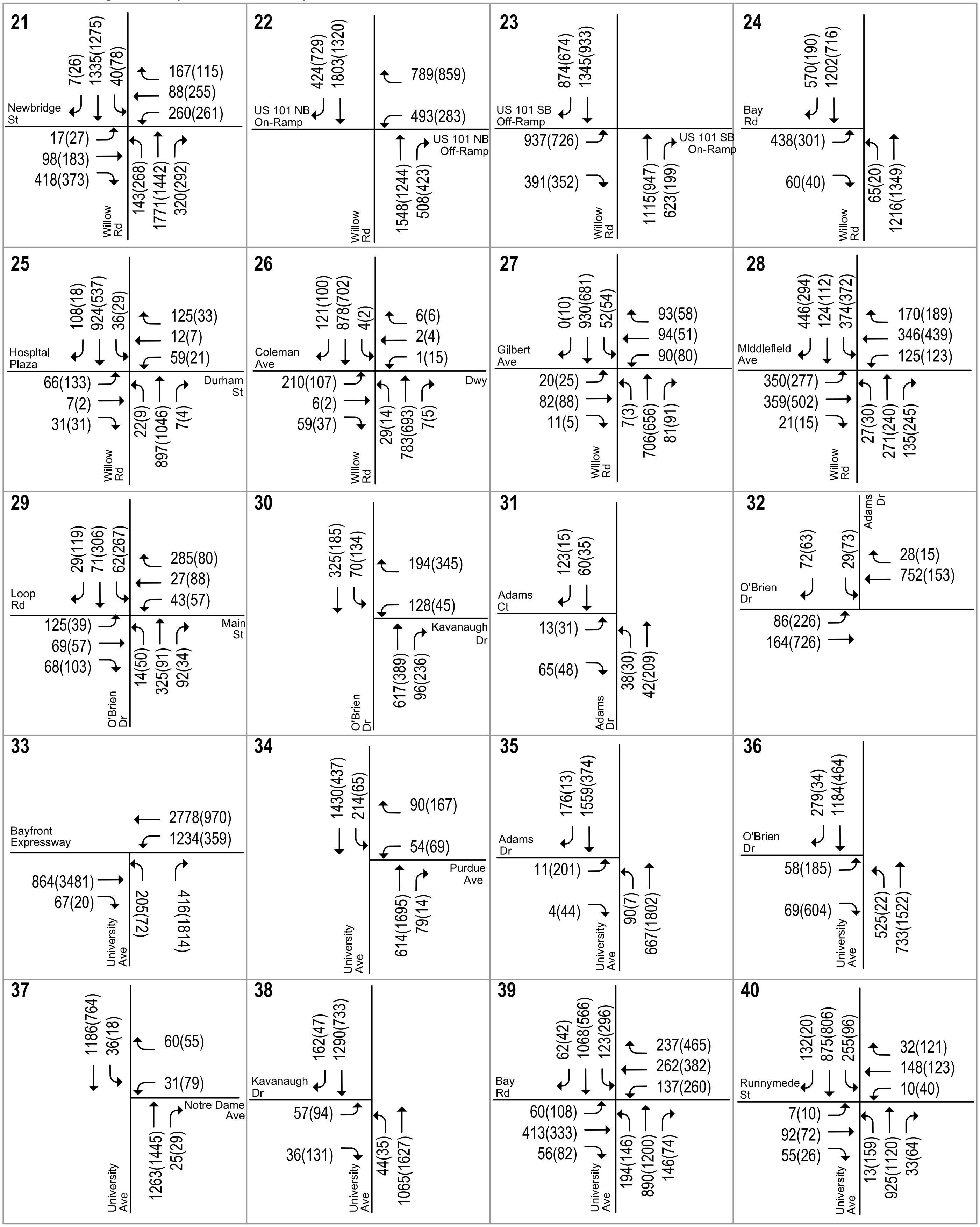
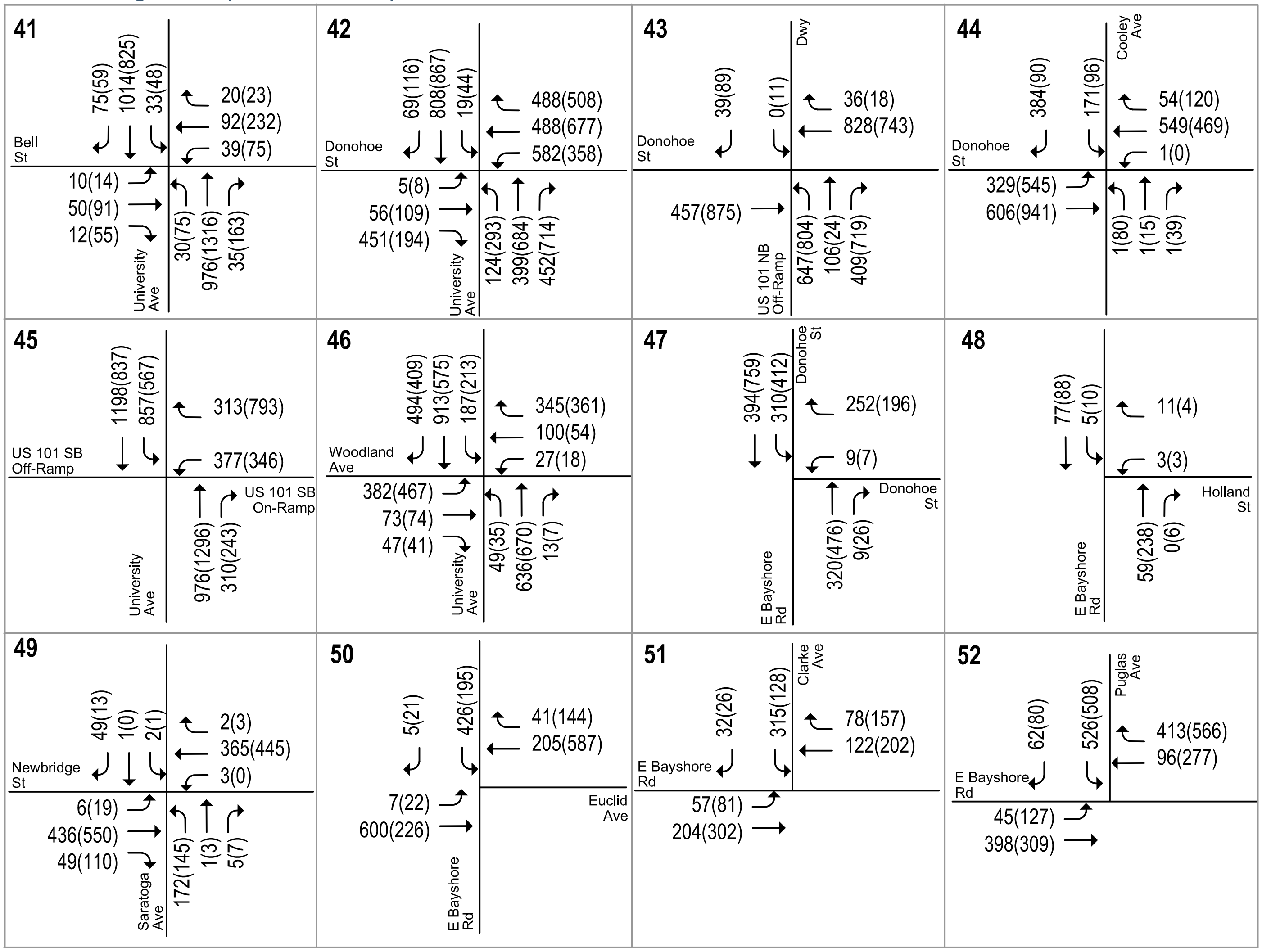



**Figure 12**
**Near-Term Plus Project Traffic Volumes**

HEXAGON

NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 12**
**Near-Term Plus Project Traffic Volumes**

HEXAGON

NORTH
Not to Scale

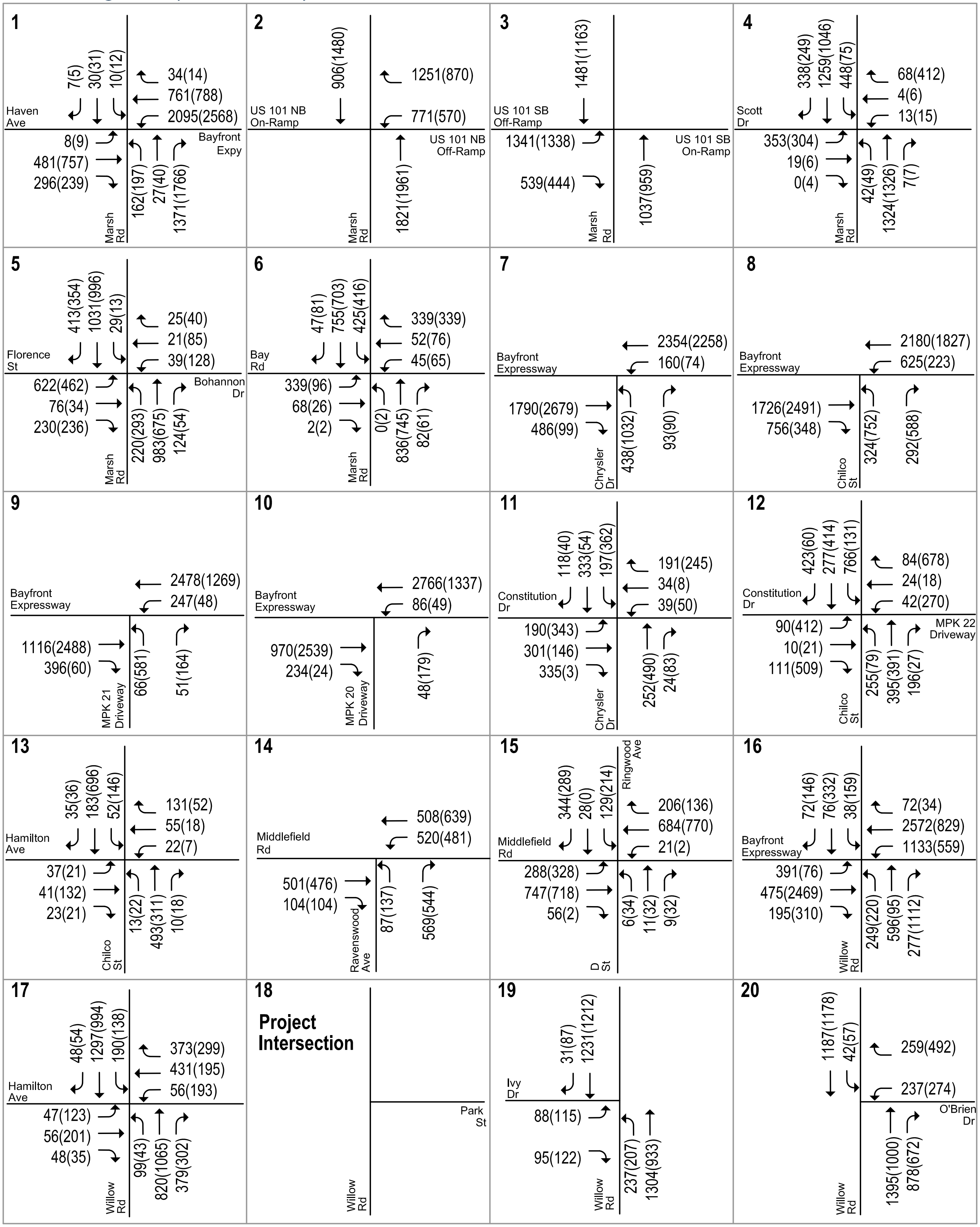



**Figure 13**
**Cumulative Traffic Volumes**

HEXAGON

NORTH
Not to Scale

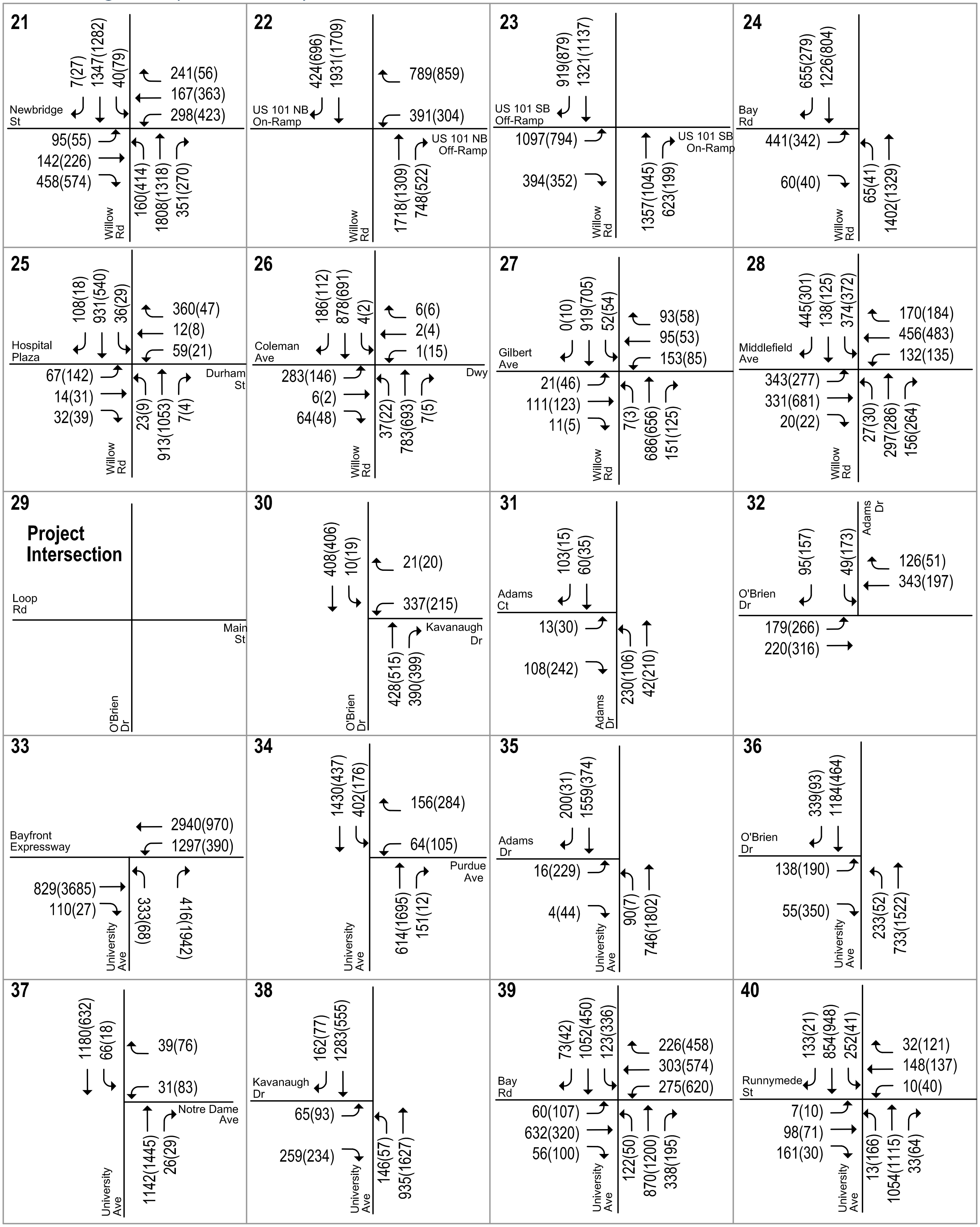
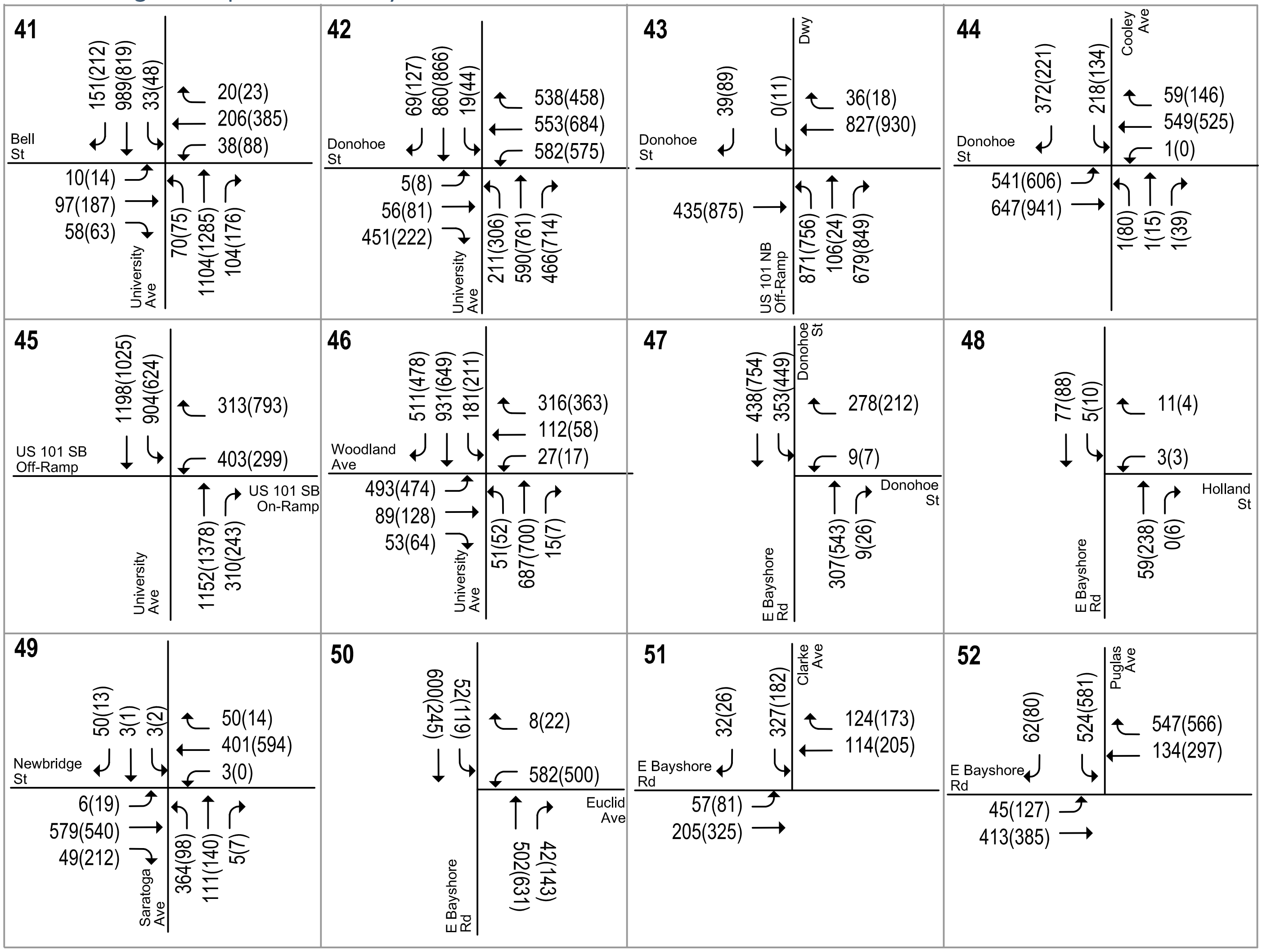



**Figure 13**
**Cumulative Traffic Volumes**

HEXAGON

NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 13**
**Cumulative Traffic Volumes**

HEXAGON

NORTH
Not to Scale

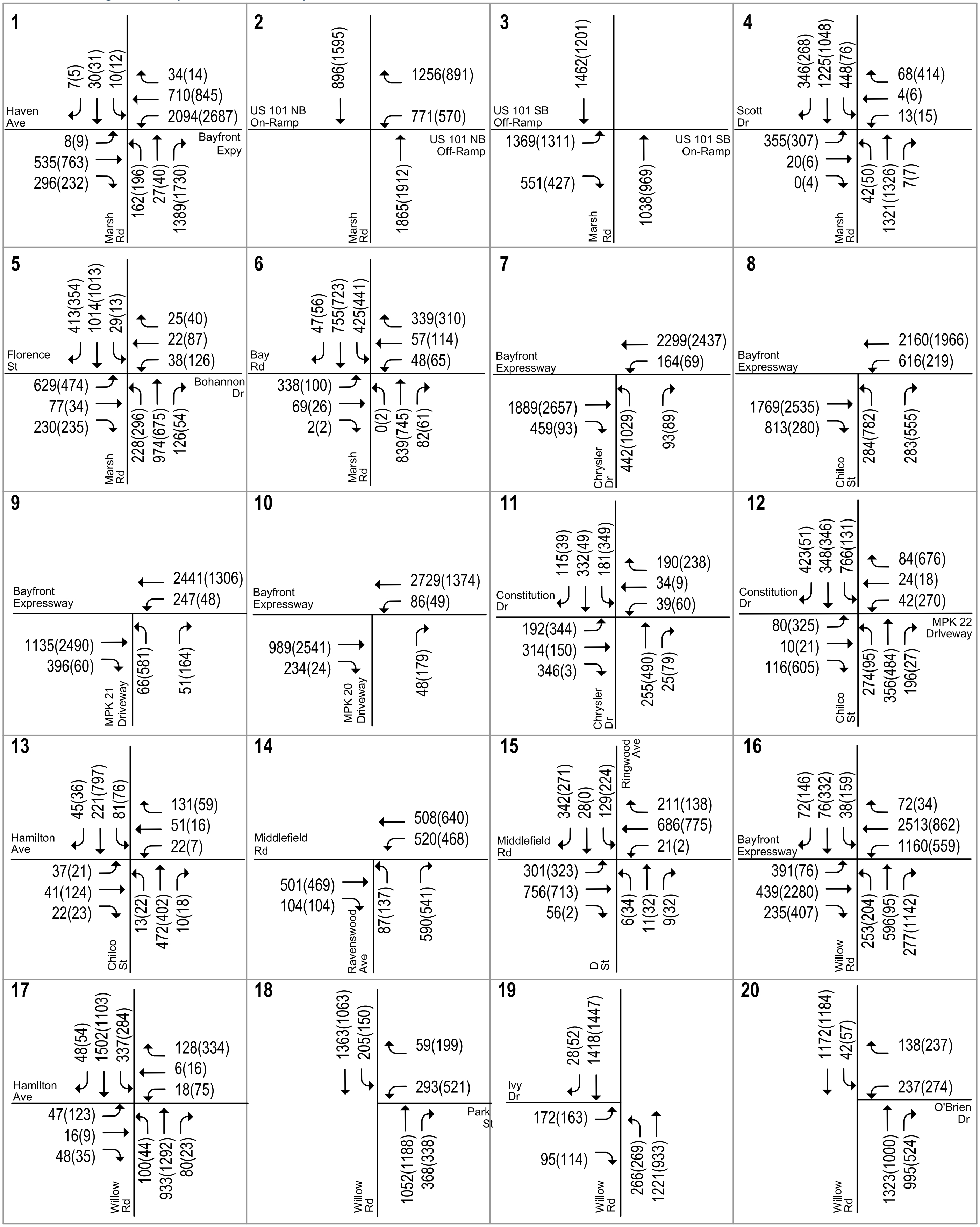



**Figure 14**
**Cumulative Plus Project Traffic Volumes**

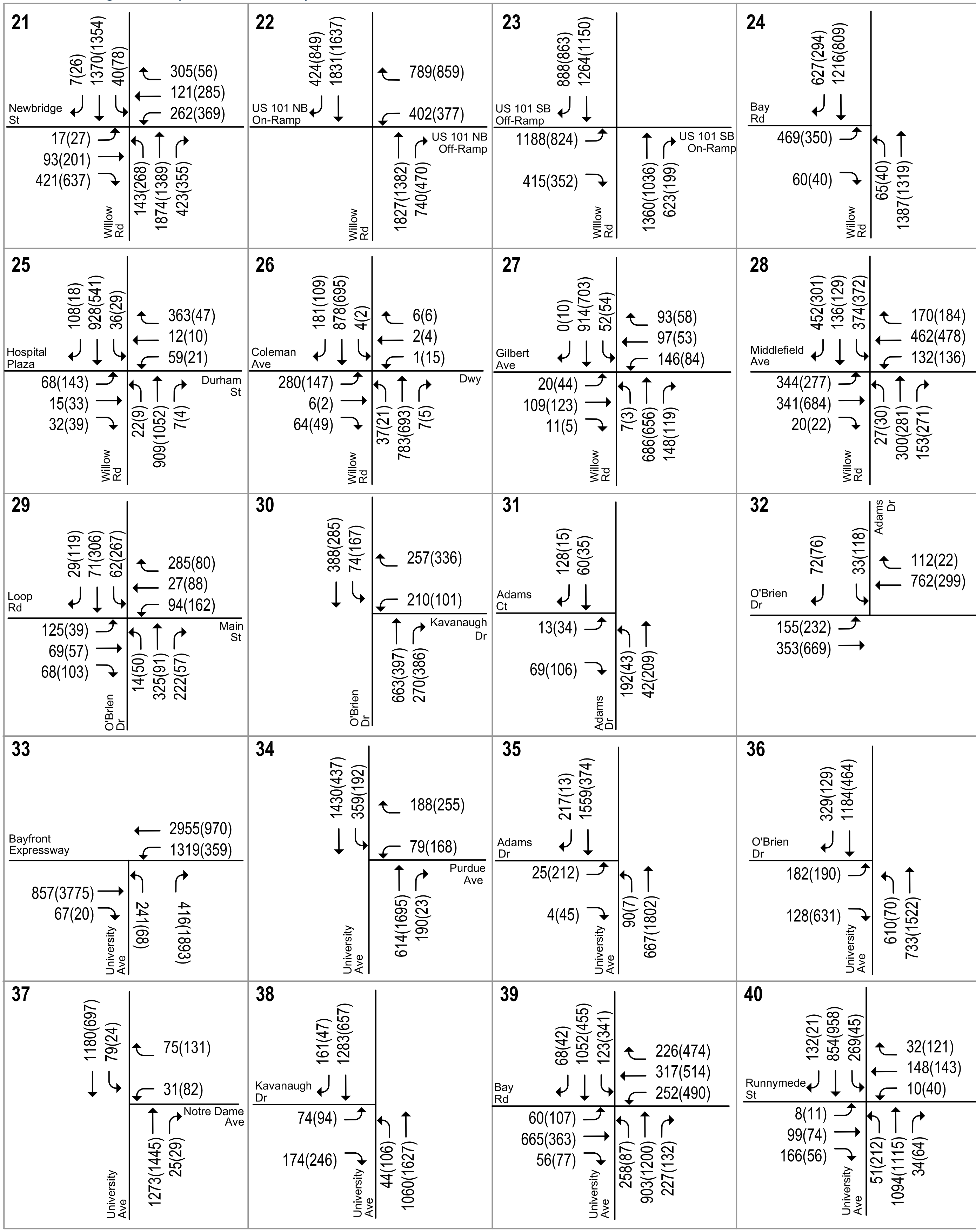
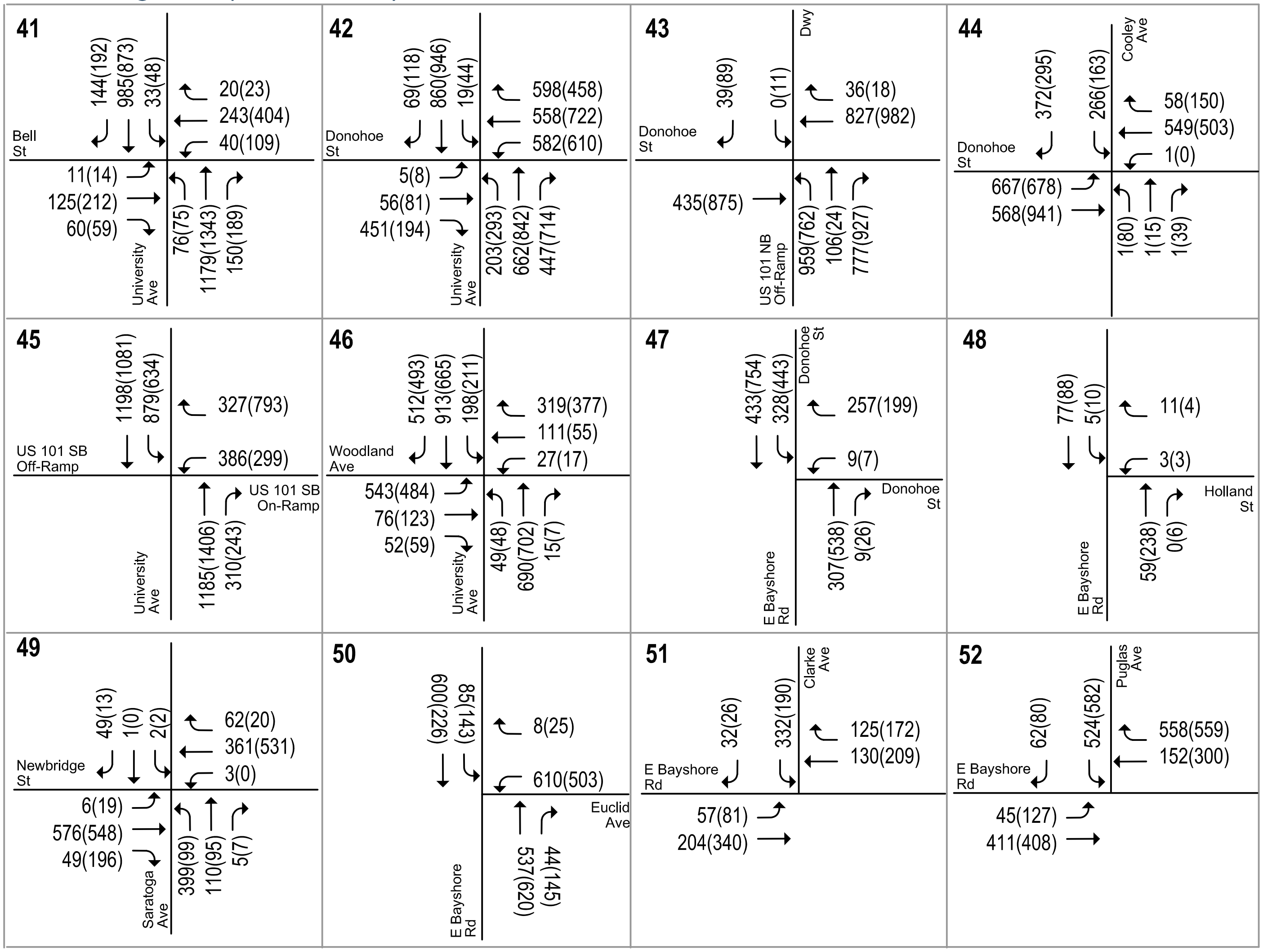



**Figure 14**
**Cumulative Plus Project Traffic Volumes**

HEXAGON

NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 14**
**Cumulative Plus Project Traffic Volumes**

HEXAGON

NORTH
Not to Scale

## Cumulative with Dumbarton Rail Scenario

Dumbarton rail service has not been designed, subjected to environmental review, approved, or funded. As a result, future Dumbarton rail service is speculative at this time and might or might not occur. If it does occur, capacity, frequency, ridership and other operational features are unknown at this time. As a result, any forecast of potential future traffic with Dumbarton rail service is speculative. The following analysis is provided for informational purposes to give the public and decision makers an idea of what impact Dumbarton rail might have on traffic based on a specific set of ridership assumptions. These impacts would occur instead of the impact identified above under Cumulative (2040) Plus Project Intersection Levels of Service.

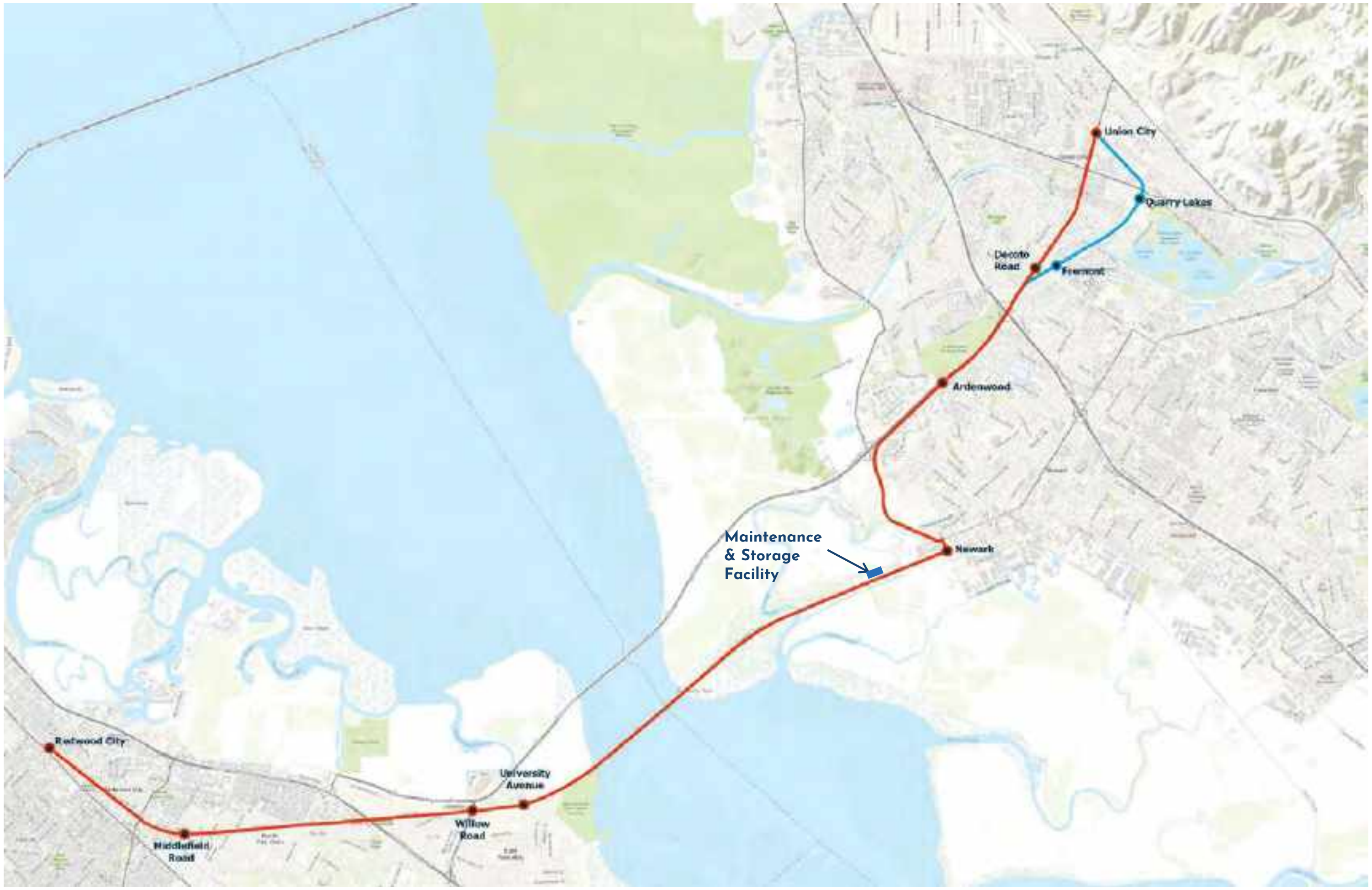
A cumulative with Dumbarton rail scenario was evaluated where the model assumed the operation of potential Dumbarton Rail service. The purpose of this scenario was to provide information on the possible effects of future Dumbarton Rail on the transportation network based on the assumptions made herein about such future service. A cumulative plus project with Dumbarton Rail scenario was compared against the cumulative with Dumbarton Rail scenario to inform the potential effects of the Project-generated traffic assuming potential Dumbarton Rail service.

Based on the *Dumbarton Rail Corridor Update* in March 2021, preliminary forecasts suggest that under 2040 conditions, the high-end ridership projections for the highest-ridership alternative would be around 24,300 riders per day. In comparison, the low-end ridership projections for the lowest-ridership alternative would be around 14,600 riders per day. As shown on Figure 15, this highest ridership forecast would be realized over a potential corridor with 10 stations located between downtown Redwood City and the Union City BART station. It should be noted that this potential corridor includes a stop on Willow Road just north of the proposed Project Site. At the time of this study's initiation, the ability to park-and-ride at the stations along this potential corridor was not available.

This study assumed the highest ridership projections as well as no park-and-ride capability at the stations. More ridership along the Dumbarton Rail corridor would mean lower traffic volumes. Therefore, the assumptions of this study would equate to evaluating the largest potential reduction in traffic volumes assuming the operation of Dumbarton Rail service.

To represent the daily ridership in the model, daily travel between TAZs within a quarter-mile radius of the stations was reduced by 24,300 daily person-level driving trips, or roughly 19,000 daily vehicular-trips. During a one-hour peak hour, based on the highest ridership projections, the Dumbarton Rail corridor would reduce approximately 1,900 vehicular trips, of which approximately half of the trip reduction would occur within the study area. These trips are assumed to be between TAZ sets within a quarter-mile radius of different stations, as the stations are assumed to not contain park-and-ride capabilities. A quarter-mile radius from the stations represents walkable distances to the stations.

Figure 16 shows the model-adjusted intersection turning movement volumes for the cumulative with Dumbarton Rail scenario. Volumes under the cumulative plus project with Dumbarton Rail scenario are shown in Figure 17. The Dumbarton Rail was estimated to reduce the Proposed Project's vehicular trip generation by approximately 4%.




San Mateo County
TRANSIT DISTRICT

# LRT, BRT, & AVT Alignment

*Note: Alignments and stations are being studied for technical feasibility in regards to engineering, operations, land use, city and agency coordination*

**Figure 15**
**Proposed Dumbarton Rail Corridor Alignment**

HEXAGON

NORTH
Not to Scale

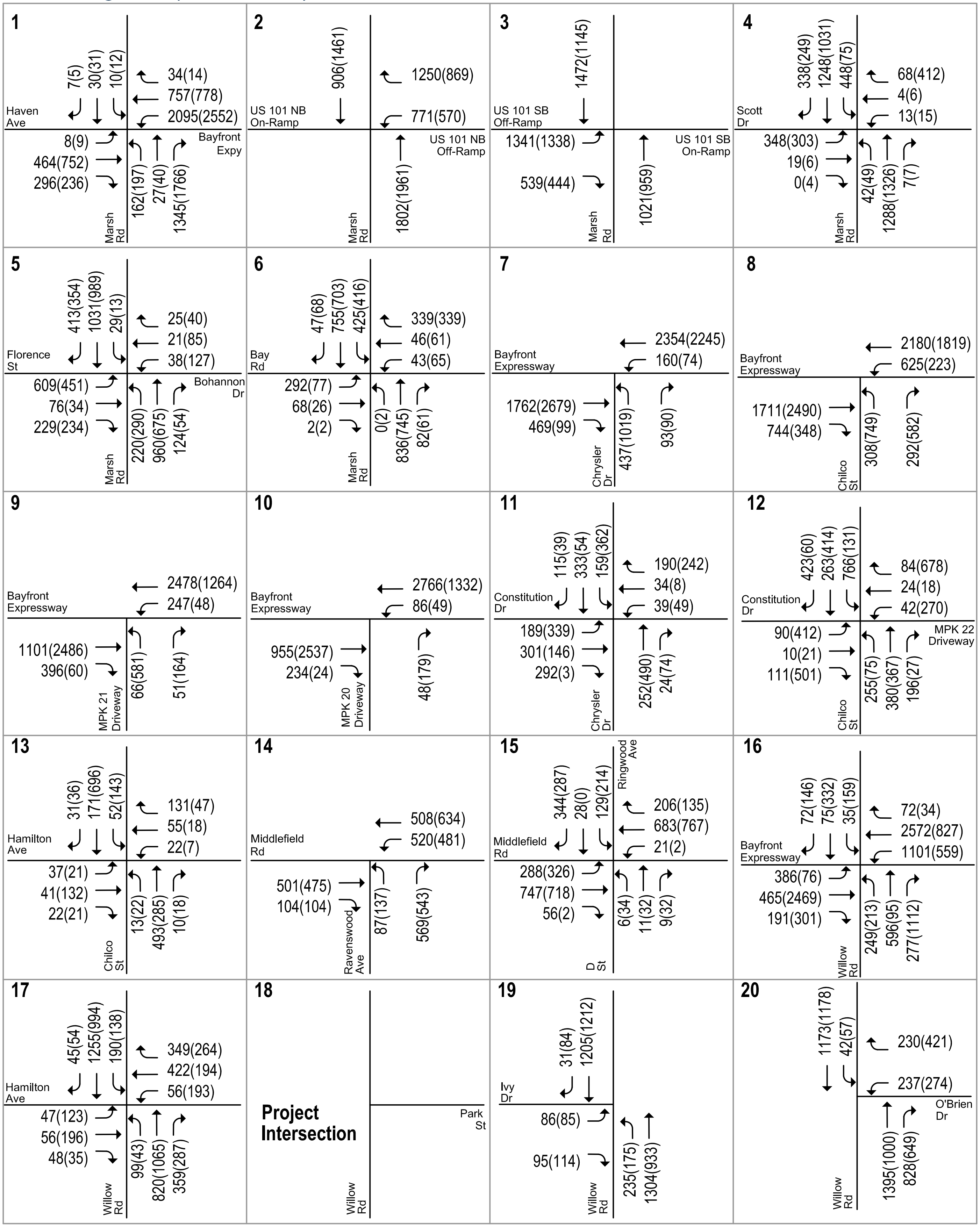



**Figure 16**
**Cumulative Traffic Volumes with Dumbarton Rail Traffic Volumes**

HEXAGON

NORTH
Not to Scale

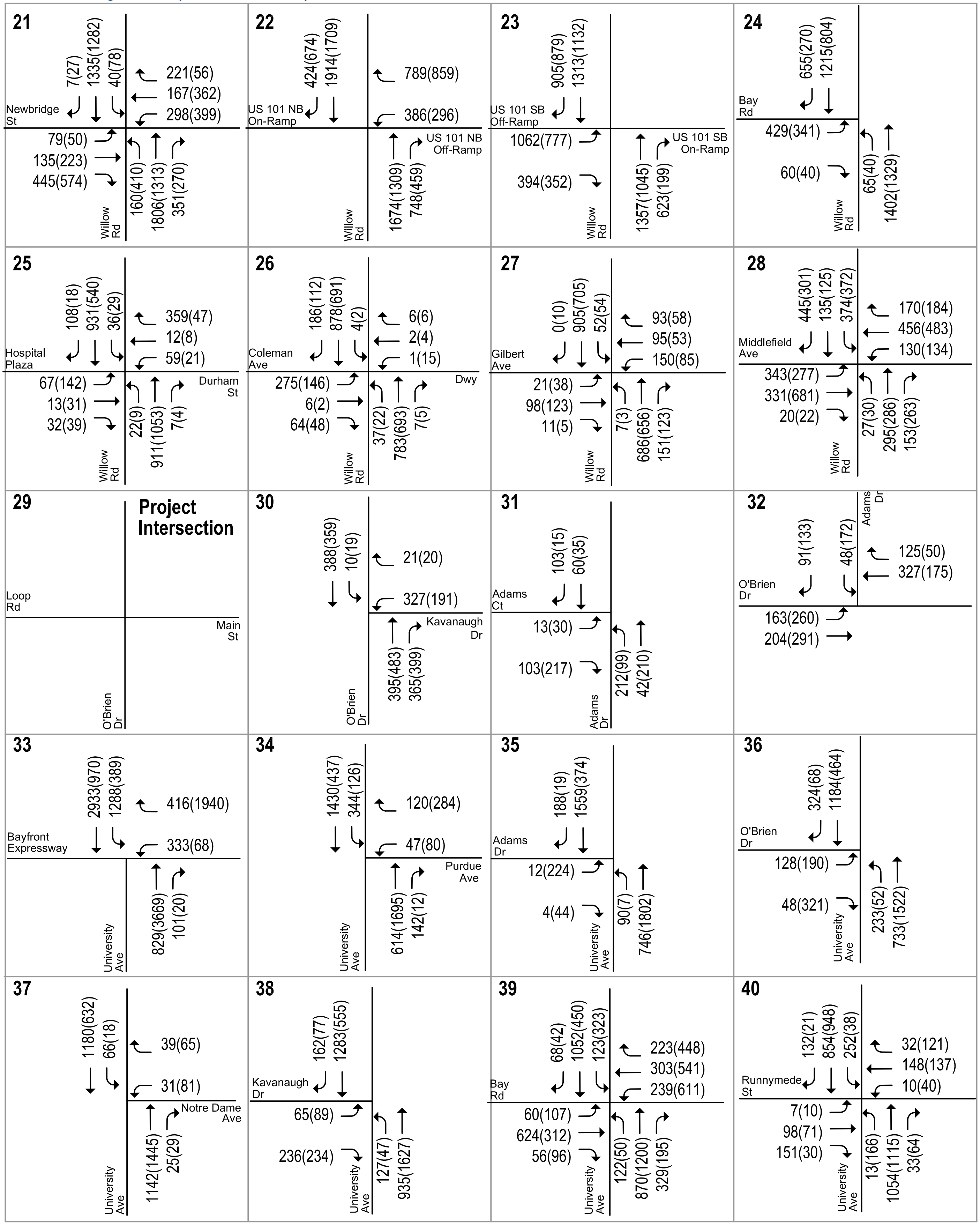
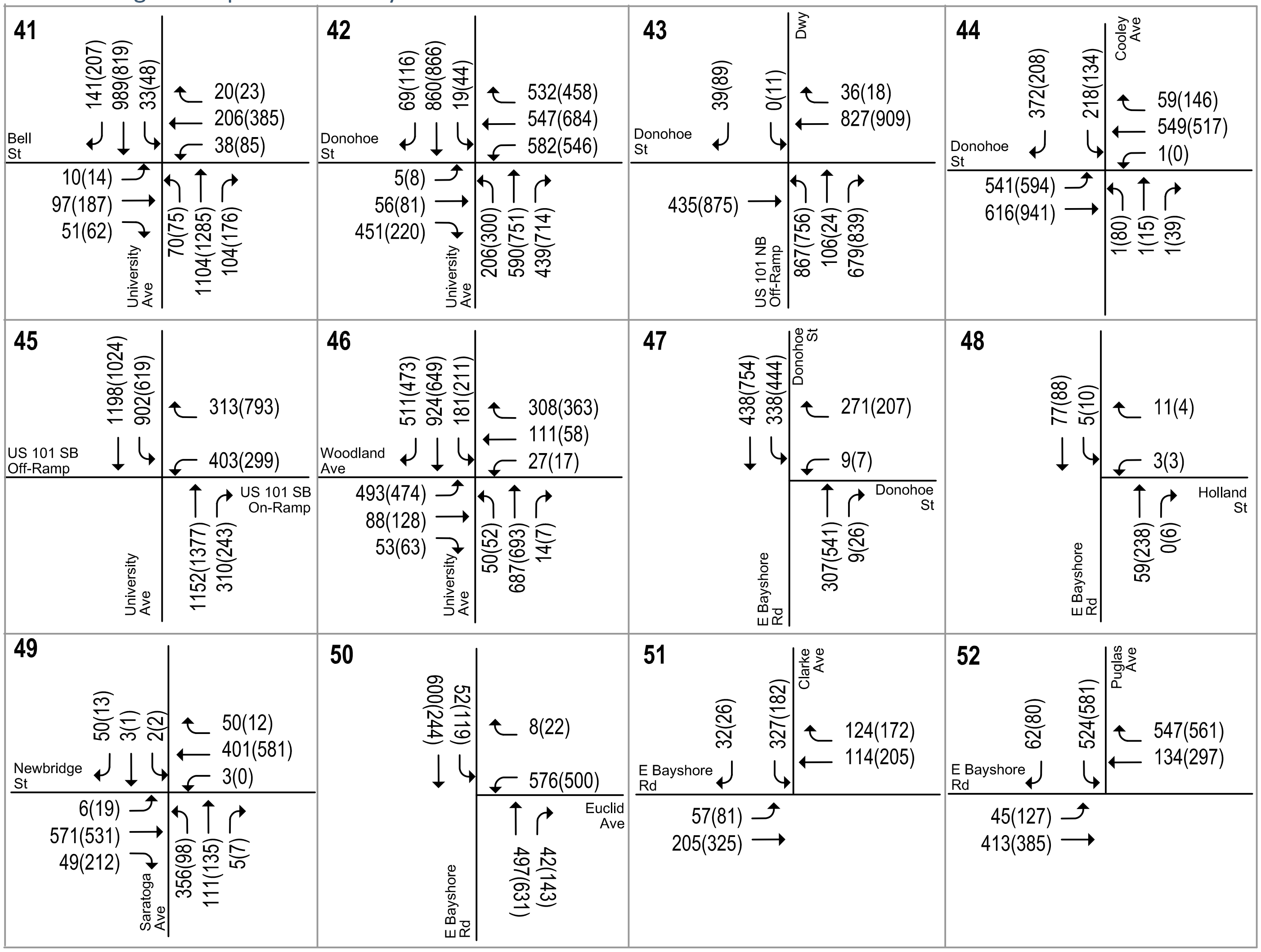


**Figure 16**
**Cumulative Traffic Volumes with Dumbarton Rail Traffic Volumes**

HEXAGON

NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 16**
**Cumulative Traffic Volumes with Dumbarton Rail Traffic Volumes**

NORTH
Not to Scale

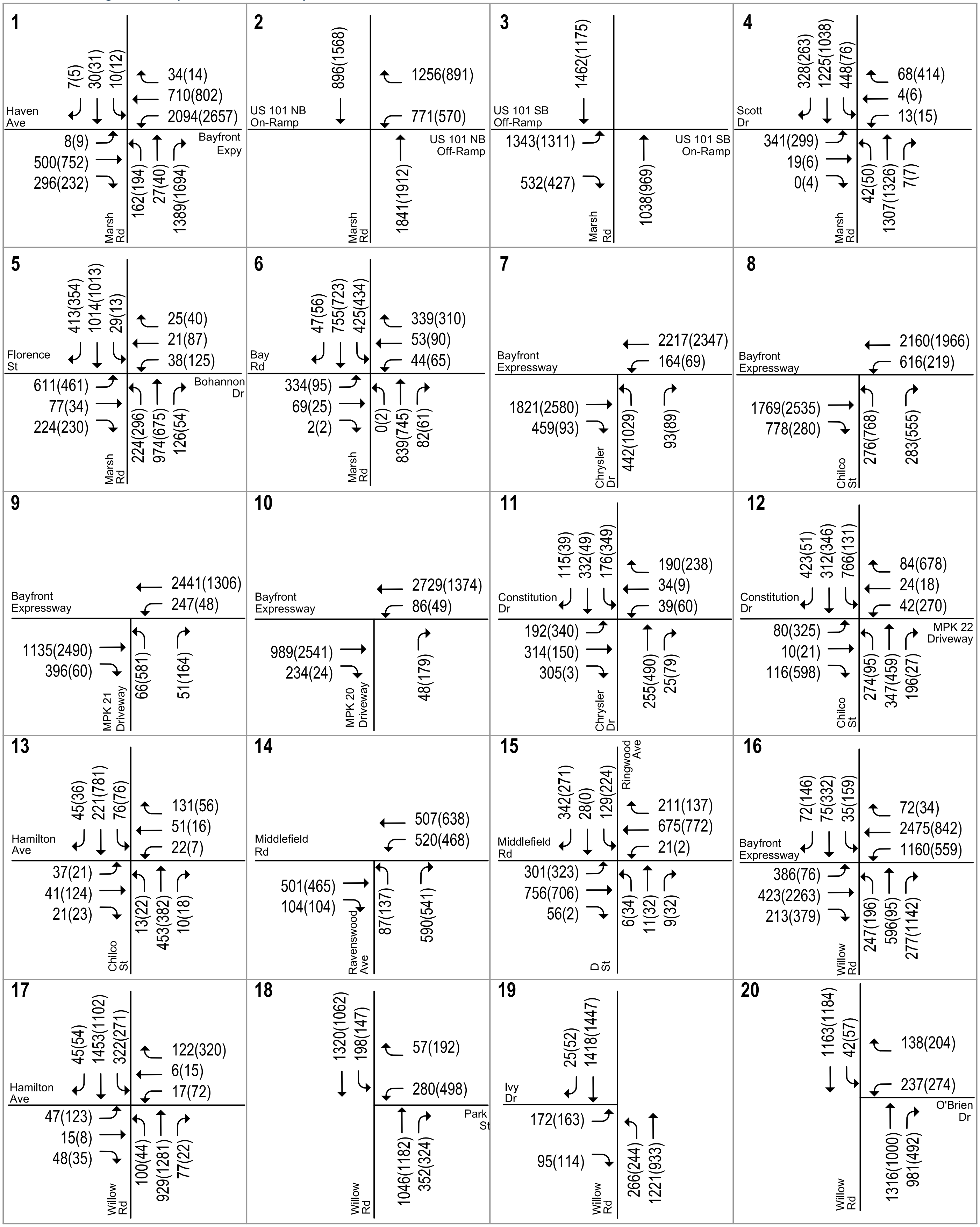



**Figure 17**
**Cumulative Plus Project Traffic Volumes with Dumbarton Rail Traffic Volumes**

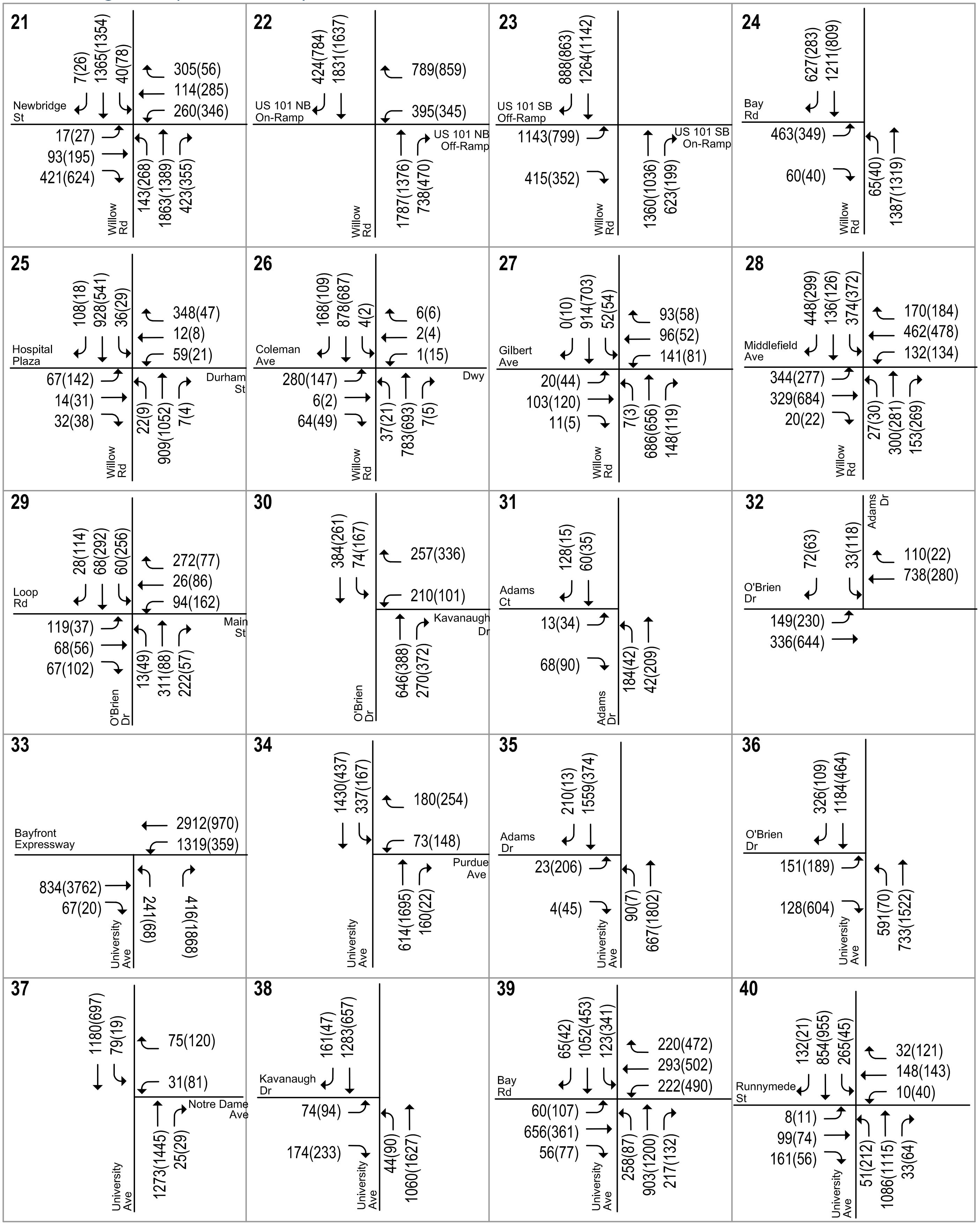
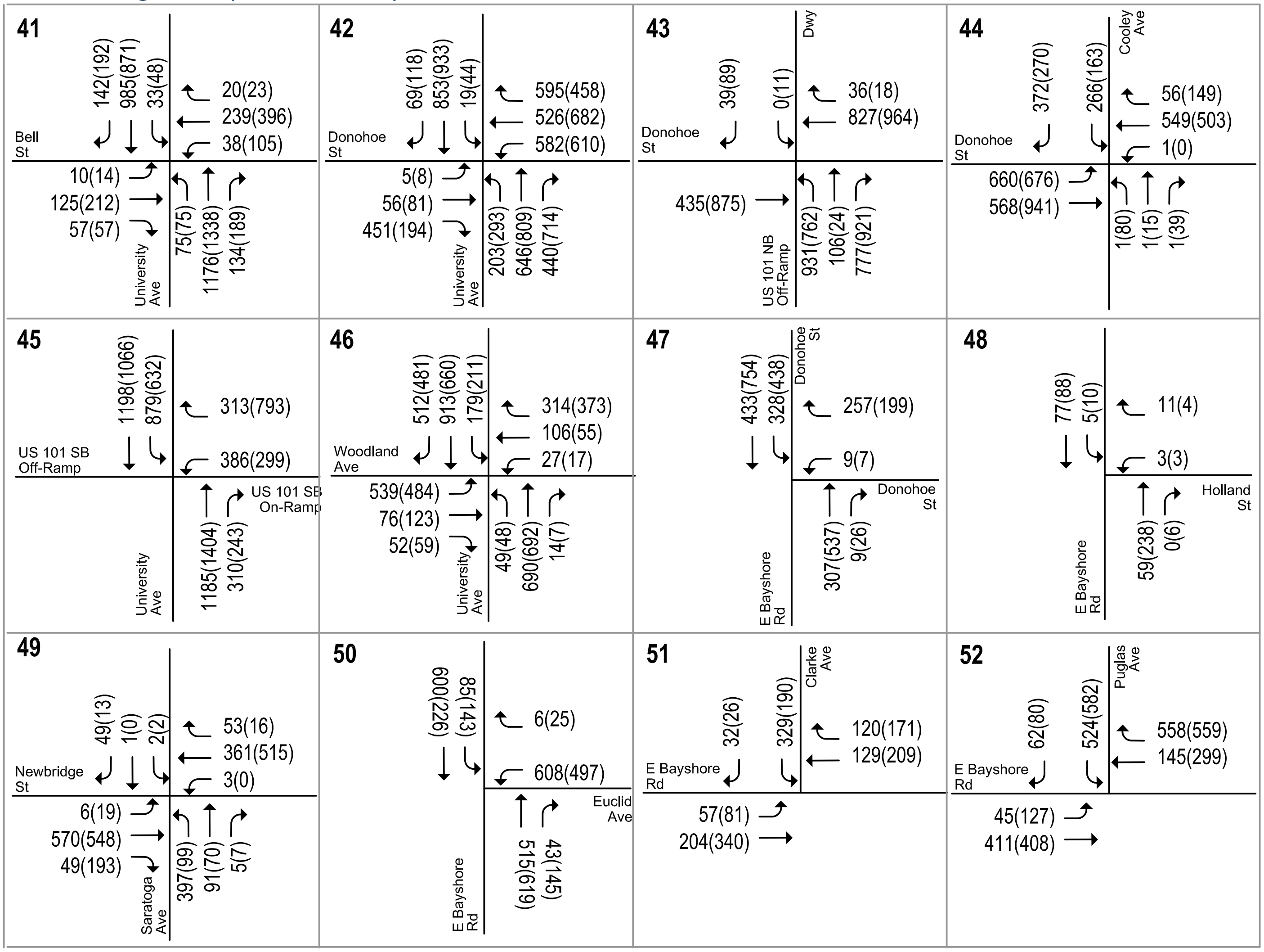



**Figure 17**
**Cumulative Plus Project Traffic Volumes with Dumbarton Rail Traffic Volumes**

HEXAGON

NORTH
Not to Scale




LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

**Figure 17**
**Cumulative Plus Project Traffic Volumes with Dumbarton Rail Traffic Volumes**

HEXAGON

NORTH
Not to Scale

## Future Transportation Networks

### Near-term (2025) Conditions

The transportation network under near term conditions assumes a signal at Chilco Street and Constitution Drive/MPK 22 Driveway, consistent with the Menlo Gateway EIR and the Bayfront Campus Expansion EIR. The intersection would be restriped to include an eastbound left-turn lane and a shared through-right lane, two westbound left-turn lanes and a shared through-right lane, a northbound shared through-left lane and a right-turn lane, and a southbound shared left-through-right lane and right-turn lane. The roadway network for other study intersections is assumed to be the same as under existing conditions.

### Near-term (2025) plus Project Conditions

The following improvements are proposed to the Street network under plus project conditions:

- **Willow Road and Hamilton Avenue**: Hamilton Avenue would be realigned and a south leg that would provide access to the Project Site would be added to the intersection. The south leg is identified as Main Street. The proposed lane configuration for the intersection would be modified to a northbound left-turn lane and shared through-right lane, a southbound left-turn lane and shared through-right lane, an eastbound left-turn lane, through lane, and shared through-right lane, and two westbound left-turn lanes, a through lane, and a shared through-right turn lane.

- **Willow Road and Park Street**: This is a proposed new signalized intersection with Park Street providing access to the Project Site. The proposed lane configuration for the intersection would be a northbound left-turn lane and a shared left right lane, an eastbound through lane and shared through-right lane, and two westbound left-turn lanes and two through lanes.

- **O'Brien Drive/Loop Road and Main Street/O'Brien Drive**: This is a proposed new roundabout intersection. The proposed lane configuration for the intersection would be one shared left-through-right lane on all approaches.

### Cumulative (2040) Conditions

The transportation network under cumulative (2040) conditions and cumulative (2040) conditions with Dumbarton rail is assumed to include the improvements under near term conditions. The following additional road improvements in East Palo Alto identified in the Ravenswood/4 Corners TOD Specific Plan Environmental Impact Report (February 22, 2013) are also assumed:

- **University Avenue and Purdue Avenue (Mitigation Measure TRA-CUM-3)**: Install a traffic signal at this intersection. Along with a new traffic signal, appropriate pedestrian and bicycle accommodation will be provided.
- **University Avenue and Bay Road (Mitigation Measure TRA-CUM-4):** Add an exclusive eastbound right-turn lane and a second eastbound left-turn lane on University Avenue, add a second northbound left-turn lane on Bay Road, add a second westbound left-turn lane on University Avenue, and modify signal phasing.
- **University Avenue and Donohoe Street (Mitigation Measure TRA-CUM-5):** Add an exclusive westbound right-turn lane on University Avenue.

### Cumulative (2040) plus Project Conditions

The transportation network under cumulative (2040) plus project conditions and cumulative (2040) plus project conditions with Dumbarton rail is assumed to include the proposed project improvements described under the near term plus project conditions. The roadway network for other study intersections is assumed to be the same as under cumulative (2040) conditions.

## Near-Term (2025) Intersection Levels of Service

The results of the intersection level of service analysis under near-term conditions are summarized in Tables 16 and 17. The Willow Road corridor and 101/University Avenue interchange were analyzed using the Simtraffic microsimulation model as described Chapter 2. The microsimulation model indicates that the intersections would experience capacity issues where the demand cannot be served by the intersections. Oversaturated conditions would operate at LOS F and are indicated using ‘OVERSAT’ in the tables below. Vistro and Traffix were used to calculate critical delay and volume to capacity ratio at the Willow Road and 101/University Avenue intersections, respectively. The intersection LOS calculation sheets are included in Appendix C. The following study intersections (see Figure 18) would operate at an unacceptable level of service during at least one peak hour:

11. Chrysler Drive and Constitution Drive (AM peak hour)
12. Chilco Street and Constitution Drive/MPK 22 Driveway (PM peak hour)
16. Willow Road and Bayfront Expressway (AM and PM peak hours)
17. Willow Road and Hamilton Avenue (AM and PM peak hours)
19. Willow Road and Ivy Drive (AM and PM peak hours)
20. Willow Road and O’Brien Drive (AM and PM peak hours)
21. Willow Road and Newbridge Street (AM and PM peak hours)
22. Willow Road and US 101 Northbound Ramps (AM and PM peak hours)
23. Willow Road and US 101 Southbound Ramps (AM and PM peak hours)
24. Willow Road and Bay Road (AM and PM peak hours)
25. Willow Road and Hospital Plaza/Durham Street (AM and PM peak hours)
28. Willow Road and Middlefield Road (AM peak hour)
30. O’Brien Drive and Kavanaugh Drive (PM peak hour)
32. Adam’s Drive and O’Brien Drive (PM peak hour)
33. University Avenue and Bayfront Expressway (PM peak hour)
34. University Avenue and Purdue Avenue (PM peak hour)
35. University Avenue and Adams Drive (AM and PM peak hours)
39. University Avenue and Bay Road (PM peak hour)
42. University Avenue and Donohoe Street (AM and PM peak hours)
43. US 101 Northbound Off-Ramp and Donohoe Street (AM and PM peak hours)
44. Cooley Avenue and Donohoe Street (AM and PM peak hours)
45. University Avenue and US 101 Southbound Ramps (AM and PM peak hours)
46. University Avenue and Woodland Avenue (AM and PM peak hours)
47. East Bayshore Road and Donohoe Street (AM and PM peak hours)
50. East Bayshore Road and Euclid Avenue (AM and PM peak hours)

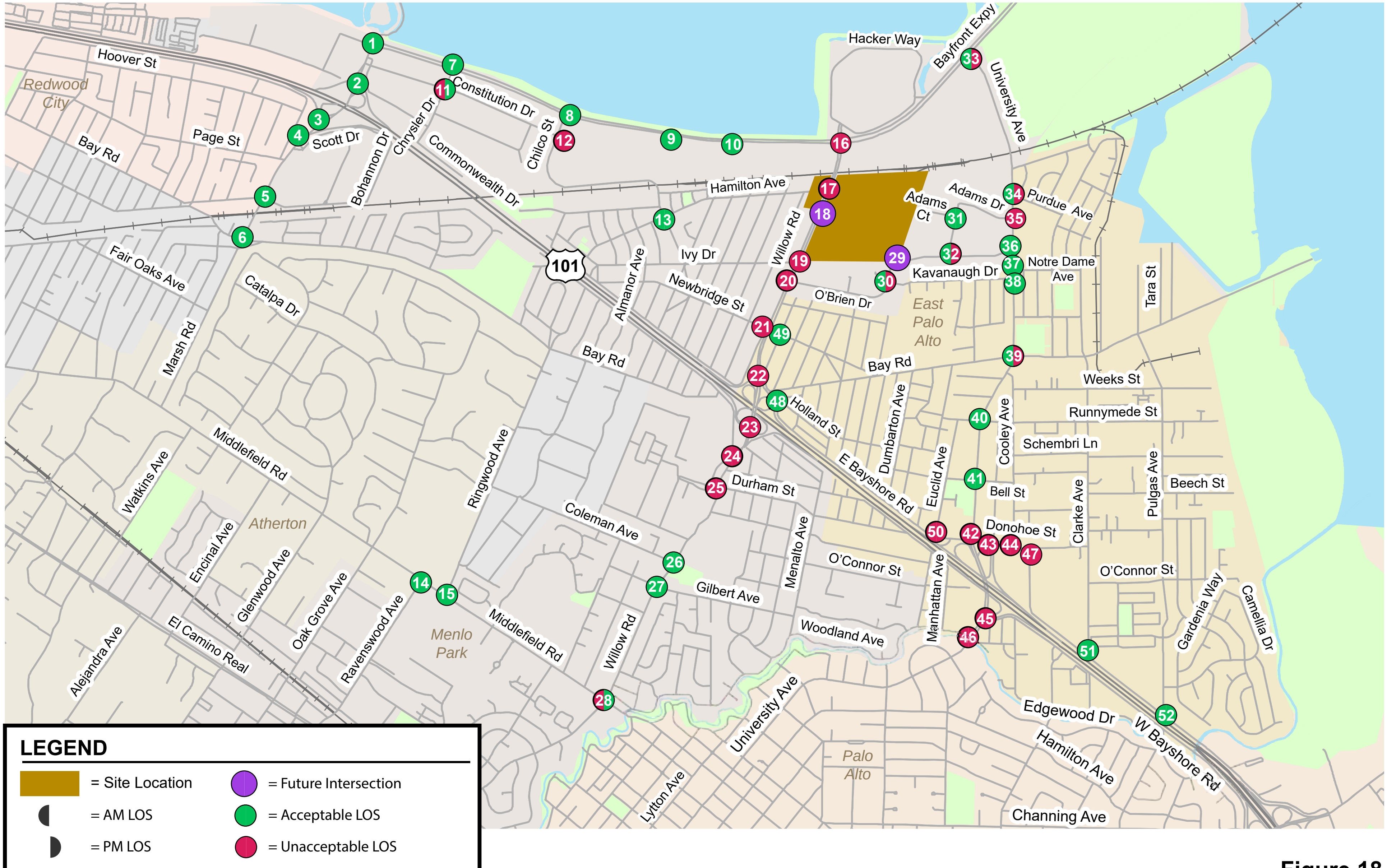



**Figure 18**
**Near-Term Intersection Level of Service**

## Near-Term (2025) Plus Project Intersection Levels of Service

The results of the intersection level of service analysis under near term (2025) plus project conditions are summarized in Table 16 and 17. The Willow Road corridor and 101/University Avenue interchange were analyzed using the Simtraffic microsimulation model as described Chapter 2. The microsimulation model indicates that the intersections would experience capacity issues where the demand cannot be served by the intersections. Oversaturated conditions would operate at LOS F and are indicated using 'OVERSAT' in the tables below. Vistro and Traffix were used to calculate critical delay and volume to capacity ratio at the Willow Road and 101/University Avenue intersections, respectively. The intersection LOS calculation sheets are included in Appendix C.

Under near-term plus project conditions, the following 16 intersections (see Figure 19) would be non-compliant with local policies and would be adversely affected during either the AM or the PM peak hour as compared to near term conditions:

1. Marsh Road and Bayfront Expressway (AM peak hour)
13. Chilco Street and Hamilton Avenue (PM peak hour)
**16. Willow Road and Bayfront Expressway (AM peak hour)**
**17. Willow Road and Hamilton Avenue (AM and PM peak hours)**
18. Willow Road and Park Street (AM and PM peak hours)
**21. Willow Road and Newbridge Street (AM and PM peak hours)**
**23. Willow Road and US 101 Southbound Ramps (AM peak hour)**
**24. Willow Road and Bay Road (AM peak hour)**
**30. O'Brien Drive and Kavanaugh Drive (AM and PM peak hours)**
**32. Adam's Drive and O'Brien Drive (AM and PM peak hours)**
**39. University Avenue and Bay Road (PM peak hour)**
**42. University Avenue and Donohoe Street (AM peak hour)**
**43. US 101 Northbound Off-Ramp and Donohoe Street (AM and PM peak hours)**
**44. Cooley Avenue and Donohoe Street (AM and PM peak hours)**
**45. University Avenue and US 101 Southbound Ramps (AM peak hour)**
**47. E. Bayshore Road and Donohoe Street (AM and PM peak hours)**

**Bold** indicates intersections that already operate unacceptably under near-term conditions.

It should be noted that at some intersections the average delay is shown to decrease with the addition of Project traffic. This occurs because the intersection delay is a weighted average of all intersection movements. When traffic is added to movements with delays lower than the average intersection delay, the average delay for the entire intersection can decrease. Furthermore, the congestion and queue spillback at an adjacent intersection can constrain the traffic volume at some intersections resulting in a small decrease in average delay.

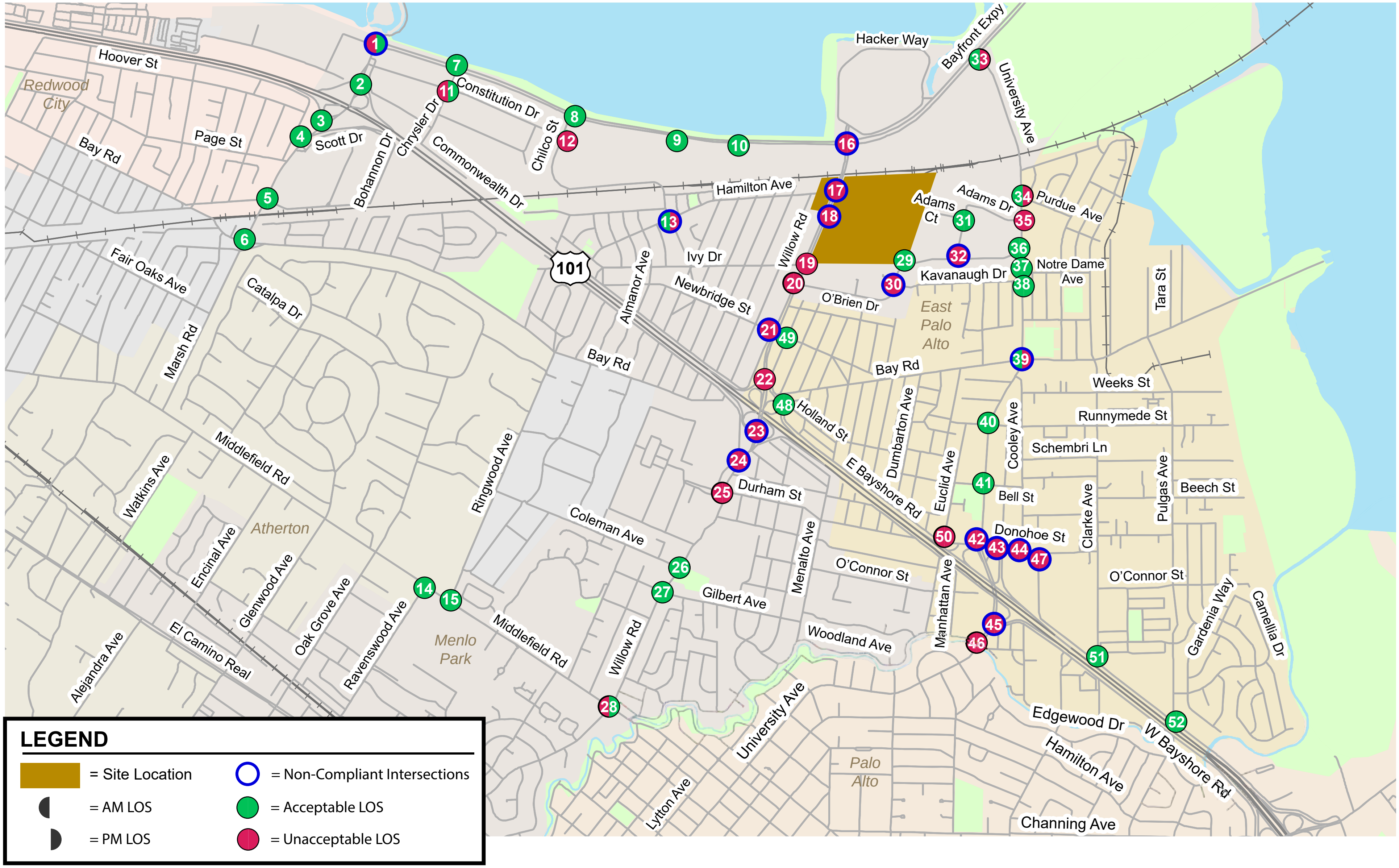



**Figure 19**
**Near-Term Plus Project Intersection Level of Service Summary**

**Table 16**
**Near-Term (2025) Intersection Levels of Service (Menlo Park)**

| | | | | Near-Term (2025) Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 1 | Marsh Road & Bayfront Expressway* | AM | Signal | 52.0 | D | **56.2** | **E** | **4.2** | **5.4** | 50.2 | D | - |
| | *Haven Avenue Southbound* | *AM* | | ***71.2*** | ***E*** | ***70.6*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | 34.9 | C | 38.7 | D | <4 | 4.7 | 38.9 | D | - |
| | *Haven Avenue Southbound* | *PM* | | ***66.9*** | ***E*** | ***65.6*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| 2 | Marsh Road & US 101 Northbound Off-Ramp | AM | Signal | 23.1 | C | 39.0 | D | 15.9 | 25.1 | | | |
| | | PM | | 15.8 | B | 16.8 | B | <4 | 1.6 | | | |
| 3 | Marsh Road & US 101 Southbound Off-Ramp | AM | Signal | 20.7 | C | 20.7 | C | <4 | <0.8 | | | |
| | | PM | | 17.6 | B | 17.6 | B | <4 | <0.8 | | | |
| 4 | Marsh Road & Scott Drive | AM | Signal | 20.3 | C | 20.5 | C | <4 | <0.8 | | | |
| | | PM | | 15.9 | B | 15.9 | B | <4 | <0.8 | | | |
| 5 | Marsh Road & Bohannon Drive/Florence Street | AM | Signal | 40.0 | D | 41.6 | D | <4 | 2.3 | | | |
| | | PM | | 36.3 | D | 37.3 | D | <4 | 2.2 | | | |
| 6 | Marsh Road & Bay Road | AM | Signal | 23.6 | C | 25.2 | C | <4 | 2.8 | | | |
| | | PM | | 18.7 | B | 19.1 | B | <4 | <0.8 | | | |
| 7 | Chrysler Drive & Bayfront Expressway | AM | Signal | 9.1 | A | 9.4 | A | <4 | <0.8 | | | |
| | | PM | | 17.3 | B | 18.3 | B | <4 | 1.5 | | | |
| 8 | Chilco Street & Bayfront Expressway | AM | Signal | 23.7 | C | 25.6 | C | <4 | 5.3 | | | |
| | | PM | | 34.1 | C | 35.9 | D | <4 | 4.5 | | | |
| 9 | MPK 21 Driveway & Bayfront Expressway | AM | Signal | 7.3 | A | 7.4 | A | <4 | <0.8 | | | |
| | | PM | | 13.7 | B | 15.0 | B | <4 | 1.4 | | | |
| 10 | MPK 20 Driveway (east) & Bayfront Expressway | AM | Signal | 7.3 | A | 7.5 | A | <4 | <0.8 | | | |
| | | PM | | 9.7 | A | 9.4 | A | <4 | <0.8 | | | |
| 11 | Chrysler Drive & Constitution Drive | AM | Signal | **59.8** | **E** | **55.1** | **E** | **<4** | **<0.8** | | | |
| | | PM | | 28.5 | C | 30.4 | C | <4 | 1.6 | | | |
| 12 | Chilco Street & Constitution Drive/MPK 22 Driveway[2] | AM | Signal | 24.8 | C | 24.6 | C | <4 | <0.8 | | | |
| | | PM | | **42.9** | **D** | **54.3** | **D** | **11.4** | **11.4** | | | |
| 13 | Chilco Street & Hamilton Avenue | AM | AWSC | 10.5 | B | 10.8 | B | <4 | <0.8 | *Traffic signal potentially* | | |
| | | PM | | 19.0 | C | **38.0** | **E** | **19.0** | **19.0** | *feasible* | | |
| 14 | Ravenswood Avenue & Middlefield Road | AM | Signal | 43.1 | D | 44.9 | D | <4 | 3.0 | | | |
| | | PM | | 17.6 | B | 17.9 | B | <4 | <0.8 | | | |

**Table 16 (Continued)**
**Near-Term (2025) Intersection Levels of Service (Menlo Park)**

| # | Intersection | Peak Hour | Traffic Control | No Project Avg. Delay (sec)[1] | No Project LOS | Project Conditions Avg. Delay (sec)[1] | Project Conditions LOS | Project Conditions Incr. in Avg. Delay | Project Conditions Incr. in Avg. Critical Delay | With Improvement Avg. Delay (sec)[1] | With Improvement LOS | With Improvement Incr. in Avg. Critical Delay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Near-Term (2025) Conditions | | | | | | | | |
| 15 | Ringwood Avenue & Middlefield Road | AM | Signal | 13.2 | B | 13.7 | B | <4 | <0.8 | | | |
| | | PM | | 15.2 | B | 15.4 | B | <4 | <0.8 | | | |
| 16 | Willow Road & Bayfront Expressway*[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **14.0** | **6.7** | ***No feasible Improvement*** | | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| 17 | Willow Road & Hamilton Avenue[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **44.1** | **54.0** | ***No feasible Improvement*** | | |
| | *Hamilton Avenue Southbound* | *AM* | | ***64.9*** | ***E*** | ***>120*** | ***F*** | ***117.9*** | ***<0.8*** | | | |
| | *Main Street Northbound* | *AM* | | ***83.3*** | ***F*** | ***113.7*** | ***F*** | ***30.4*** | ***>120*** | | | |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **>120** | **>120** | | | |
| | *Hamilton Avenue Southbound* | *PM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***>120*** | ***<0.8*** | | | |
| | *Main Street Northbound* | *PM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***<4*** | ***>120*** | | | |
| 18 | Willow Road & Park Street (future intersection)[1] | AM | Signal | Project Intersection | | **OVERSAT** | **F** | **36.8** | **53.0** | ***No feasible Improvement*** | | |
| | | PM | | | | **OVERSAT** | **F** | **17.5** | **23.1** | | | |
| 19 | Willow Road & Ivy Drive[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **20.9** | **46.6** | | | |
| | *Ivy Drive Southbound* | *AM* | | ***88.2*** | ***###*** | ***88.2*** | ***F*** | ***<4*** | ***4.7*** | | | |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **50.1** | **70.9** | | | |
| | *Ivy Drive Southbound* | *PM* | | ***68.4*** | ***E*** | ***66.1*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| 20 | Willow Road & O'Brien Drive[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *O'Brien Drive Northbound* | *AM* | | ***72.6*** | ***E*** | ***66.4*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *O'Brien Drive Northbound* | *PM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| 21 | Willow Road & Newbridge Street[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **40.3** | **49.7** | **OVERSAT** | **F** | |
| | *Newbridge Street Southbound* | *AM* | | ***69.3*** | ***E*** | ***104.2*** | ***F*** | ***34.9*** | ***43.0*** | ***79.6*** | ***F*** | ***9.0*** |
| | *Newbridge Street Northbound* | *AM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***4.4*** | ***64.0*** | *42.1* | *D* | *<0.8* |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | **OVERSAT** | **F** | |
| | *Newbridge Street Southbound* | *PM* | | ***60.8*** | ***E*** | ***59.1*** | ***E*** | ***<4*** | ***1.5*** | ***74.5*** | ***E*** | ***26.0*** |
| | *Newbridge Street Northbound* | *PM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***<4*** | ***<0.8*** | *51.3* | *D* | *<0.8* |
| 22 | Willow Road & US 101 Northbound Ramps[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **11.5** | | | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| 23 | Willow Road & US 101 Southbound Ramps[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **18.3** | **<0.8** | ***No feasible Improvement*** | | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| 24 | Willow Road & Bay Road[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **38.3** | **OVERSAT** | **F** | |
| | *Bay Road Southbound* | *AM* | | ***104.3*** | ***F*** | ***>120*** | ***F*** | ***31.7*** | ***31.7*** | *27.0* | *C* | *<0.8* |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | 6.6 | **6.7** | **OVERSAT** | **F** | |
| | *Bay Road Southbound* | *PM* | | *49.2* | *D* | *53.5* | *D* | *4.3* | *4.3* | *23.9* | *C* | *<0.8* |

## Table 16 (Continued)
## Near-Term (2025) Intersection Levels of Service (Menlo Park)

| # | Intersection | Peak Hour | Traffic Control | Near-Term (2025) Conditions: No Project Avg. Delay (sec)[1] | No Project LOS | Project Conditions Avg. Delay (sec)[1] | Project Conditions LOS | Project Conditions Incr. in Avg. Delay | Project Conditions Incr. in Avg. Critical Delay | With Improvement Avg. Delay (sec)[1] | With Improvement LOS | With Improvement Incr. in Avg. Critical Delay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Willow Road & Hospital Plaza/Durham Street[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *VA Medical Center Southbound* | *AM* | | ***73.2*** | ***E*** | ***69.5*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Durham Street Northbound* | *AM* | | ***93.6*** | ***F*** | ***79.6*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *VA Medical Center Southbound* | *PM* | | ***72.2*** | ***E*** | ***70.2*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Durham Street Northbound* | *PM* | | ***84.6*** | ***F*** | ***79.8*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| 26 | Willow Road & Coleman Avenue | AM | Signal | 25.1 | C | 23.9 | C | <4 | <0.8 | | | |
| | | PM | | 11.0 | B | 10.8 | B | <4 | <0.8 | | | |
| 27 | Willow Road & Gilbert Avenue | AM | Signal | 20.0 | C | 19.9 | B | <4 | <0.8 | | | |
| | | PM | | 13.0 | B | 12.4 | B | <4 | <0.8 | | | |
| 28 | Willow Road & Middlefield Road | AM | Signal | **62.3** | **E** | **62.5** | **E** | **<4** | **<0.8** | | | |
| | *Middlefield Road Southbound* | *AM* | | ***69.8*** | ***E*** | ***70.1*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Middlefield Road Northbound* | *AM* | | ***67.7*** | ***E*** | ***67.7*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | 34.5 | C | 34.7 | C | <4 | <0.8 | | | |
| | *Middlefield Road Southbound* | *PM* | | *34.5* | *C* | *34.7* | *C* | *<4* | *<0.8* | | | |
| | *Middlefield Road Northbound* | *PM* | | *34.3* | *C* | *34.7* | *C* | *<4* | *<0.8* | | | |
| 29 | O'Brien Drive/Loop Road & Main Street/O'Brien Drive (future intersection) | AM | Roundabout | Project Intersection | | 7.4 | A | 7.4 | 7.4 | | | |
| | | PM | | | | 9.2 | A | 9.2 | 9.2 | | | |
| 30 | O'Brien Drive & Kavanaugh Drive | AM | AWSC | 12.7 | B | **107.7** | **F** | **95.0** | **95.0** | *Traffic signal potentially feasible* | | |
| | | PM | | **29.6** | **D** | **73.7** | **F** | **44.1** | **44.1** | | | |
| 31 | Adams Drive & Adams Court | AM | TWSC | 11.5 | B | 11.6 | B | <4 | <0.8 | | | |
| | | PM | | 11.9 | B | 11.9 | B | <4 | <0.8 | | | |
| 32 | Adams Drive & O'Brien Drive | AM | TWSC | 17.6 | C | **62.5** | **F** | **44.9** | **44.9** | *Traffic signal potentially feasible* | | |
| | | PM | | **34.0** | **D** | **>120** | **F** | **>120** | **>120** | | | |
| 33 | University Avenue & Bayfront Expressway* | AM | Signal | 13.9 | B | 12.1 | B | <4 | <0.8 | | | |
| | | PM | | **105.8** | **F** | **108.7** | **F** | **<4** | **3.0** | | | |

Notes:
* Denotes CMP Intersection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[1]Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in average delay and critical delay calculated using
[2]The intersection is not considered as non-compliant under background plus project conditions because the critical movement of the local approach shifts with the addition of project traffic.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates noncompliance. The project exceeds thresholds in the City of Menlo Park's TIA Guidelines.

**Table 17**
**Near-Term (2025) Intersection Levels of Service (East Palo Alto)**

| | | | | Near-Term (2025) Conditions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project | | with Project | | | | With Improvement | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg/Crit Delay (sec)[1] | Incr. in Critical V/C | Avg. Delay (sec)[1] | LOS |
| 34 | University Avenue & Purdue Avenue | AM | TWSC | 19.7 | C | 29 | D | 0.9 | 0.118 | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **3.8** | **-0.033** | | |
| 35 | University Avenue & Adams Drive | AM | TWSC | **91.5** | **F** | **>120** | **F** | **0.4** | **0.084** | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **-2.8** | **-0.070** | | |
| 36 | University Avenue & O'Brien Drive | AM | Signalized | 9.5 | A | 28.9 | C | 26.1 | 0.261 | | |
| | | PM | | 15.4 | B | 30.5 | C | 16.7 | 0.275 | | |
| 37 | University Avenue & Notre Dame Avenue | AM | Signalized | 4.1 | A | 7.8 | A | 5.0 | 0.093 | | |
| | | PM | | 9.4 | A | 10.2 | B | 1.4 | 0.012 | | |
| 38 | University Avenue & Kavanaugh Drive | AM | Signalized | 6.9 | A | 7.9 | A | 1.3 | 0.014 | | |
| | | PM | | 15.1 | B | 16.5 | B | 1.6 | 0.015 | | |
| 39 | University Avenue & Bay Road | AM | Signalized | 52.4 | D | 54.7 | D | 6.7 | 0.046 | 40.4 | D |
| | | PM | | **60.9** | **E** | **70.6** | **E** | **18.6** | **0.063** | **57.0** | **E** |
| 40 | University Avenue & Runnymede Street | AM | Signalized | 6.4 | A | 6.6 | A | 1.5 | 0.053 | | |
| | | PM | | 8.8 | A | 8.8 | A | -0.1 | -0.009 | | |
| 41 | University Avenue & Bell Street | AM | Signalized | 11.7 | B | 11.6 | B | 0.0 | 0.006 | | |
| | | PM | | 18.3 | B | 18.8 | B | 1.1 | 0.038 | | |
| 42 | University Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **7.1** | **0.017** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **3.0** | **0.008** | ***Improvement*** | |
| 43 | US 101 Northbound Off-Ramp & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **71.7** | **0.171** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **56.4** | **0.130** | ***Improvement*** | |
| 44 | Cooley Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **8.7** | **0.091** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **18.8** | **0.074** | ***Improvement*** | |
| 45 | University Avenue & US 101 Southbound Ramps* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **7.8** | **0.019** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **1.6** | **0.004** | ***Improvement*** | |
| 46 | University Avenue & Woodland Avenue* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **0.1** | **0.000** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-7.8** | **-0.018** | ***Improvement*** | |
| 47 | E. Bayshore Road & Donahoe Street* | AM | Signalized | **OVERSAT** | **F** | **>120** | **F** | **5.7** | **0.013** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **>120** | **F** | **5.8** | **0.015** | ***Improvement*** | |

**Table 17 (Continued)**
**Near-Term (2025) Intersection Levels of Service (East Palo Alto)**

| | | | | Near-Term (2025) Conditions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project | | with Project | | | | With Improvement | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec) | LOS | Avg. Delay (sec)* | LOS | Incr. in Avg/Crit Delay (sec) | Incr. in Critical V/C | Avg. Delay (sec) | LOS |
| 48 | E. Bayshore Road & Holland Street | AM | TWSC | 8.8 | A | 8.8 | A | 0.0 | 0.000 | | |
| | | PM | | 10 | A | 10 | A | 0.0 | 0.000 | | |
| 49 | Saratoga Avenue & Newbridge Street | AM | TWSC | 17.9 | C | 18.2 | C | 0.9 | 0.074 | | |
| | | PM | | 22.0 | C | 21.0 | C | 0.0 | -0.024 | | |
| 50 | E. Bayshore Road & Euclid Avenue* | AM | AWSC | **OVERSAT** | **F** | **OVERSAT** | **F** | **3.6** | **0.028** | *Corridor Improvement* | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.5** | **-0.016** | | |
| 51 | Clarke Avenue & E. Bayshore Road | AM | Signalized | 13.9 | B | 14 | B | 0.2 | 0.008 | | |
| | | PM | | 10.7 | B | 12.5 | B | 1.7 | 0.031 | | |
| 52 | Pulgas Avenue & E. Bayshore Road | AM | Signalized | 20.9 | C | 21.7 | C | 1.7 | 0.042 | | |
| | | PM | | 33.1 | C | 37.6 | D | 5.7 | 0.034 | | |

Note:
* Denotes a CMP interesection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported.
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
* Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in critical delay and v/c calculated using Traffix.
**Bold** indicates substandard level of service
**Bold** indicates adverse effect

## Adverse Effects and Recommended Improvements

The intersection effects and recommended modifications to improve the intersections to pre-Project conditions or better are described below. It should be noted that the intersection analysis accounts for the Project's proposed trip reductions from gross ITE trip generation. The residential component's required TDM reduction to eliminate the VMT impact is partially accounted for as well (peak-hour trip generation assumed 10% active TDM reduction). The additional residential TDM reduction during the peak-hour resulting from the VMT impact mitigation would have resulted in approximately 50 (13 inbound and 37 outbound) fewer trips during the AM peak hour and 56 (34 inbound and 22 outbound) fewer trips during the PM peak hour. This level of trip reduction would not address any intersection adverse effects alone.

**Marsh Road and Bayfront Expressway (#1)**

This intersection is expected to operate at an acceptable LOS D during the AM peak hour and LOS C during the PM peak hour under near term conditions. The addition of Project traffic would cause the level of service at the intersection to worsen to an unacceptable LOS E during the AM peak hour. The intersection would operate at an acceptable LOS D during the PM peak hour. The deterioration of LOS from D to E constitutes non-compliance during the AM peak hour according to the thresholds established by the City of Menlo Park.

The recommended modification for this location is to modify the southbound approach to a shared left-through lane, shared through-right lane, and a right turn only lane. With this improvement, the intersection would operate acceptably at LOS D during both peak hours under near-term plus project conditions. This improvement is in Menlo Park's traffic impact fee (TIF) program. With implementation of these intersection modifications, the intersection would be in compliance with the TIA Guidelines and address the Proposed Project's share of the non-compliant operation.

**Chilco Street and Hamilton Avenue (#13)**

This intersection is expected to operate at an acceptable LOS B during the AM peak hour and LOS C during the PM peak hour under near term conditions. The addition of Project traffic would cause the level of service at the intersection to worsen to an unacceptable LOS E during the PM peak hour. The intersection would operate at an acceptable LOS B during the AM peak hour. The deterioration of LOS from C to E constitutes non-compliance during the PM peak hour according to the thresholds established by the City of Menlo Park.

Since the intersection currently operates as all-way-stop-controlled, potential modification to bring the intersection to pre-project conditions would be to signalize it. However, the intersection does not meet the signal warrant during either peak hour under near term plus project conditions. A traffic signal is not recommended for construction until signal warrants conducted with a future year's actual counts have been met. The recommended improvement includes conducting a signal warrant analyses for a period of five years after full Project completion to determine if a signal would be warranted and if warranted, install a new signal. This improvement is included in the City's TIF program.

Should the City pursue implementation of this improvement, the improvement would include new traffic signal and appropriate pedestrian and bicycle accommodation at this intersection including pedestrian countdown timers, Americans with Disabilities Act (ADA) compliant curbs, and bicycle detection loops. Signalization of this intersection could also encourage cut-through traffic along Chilco Street and on Hamilton Avenue when regional routes such as Bayfront Expressway, Willow Road or US 101 become congested. Potential traffic calming measures should also be considered in conjunction with a traffic signal if signal warrants are met in a future year.

With implementation of these intersection modifications (e.g. signal warrant analysis, potential signal installation, and related bicycle and pedestrian accommodations), the intersection would be in compliance with the TIA Guidelines which would address the Proposed Project's share of the non-compliant operation.

**Willow Road Corridor (#16, #17, #18, #21, #23, #24)**

Willow Road between Bayfront Expressway and Hospital Plaza/Durham Street is expected to experience capacity issues due to unserved demand at the intersections. These intersections would operate unacceptably under near term conditions during both peak hours. With the addition of Project traffic, intersections along the corridor would continue to operate unacceptably during both peak hours.

The intersections of Willow Road and Bayfront Expressway and Willow Road and US 101 southbound ramps would experience an increase in delay of over four seconds with the addition of project traffic in the AM peak hour and PM peak hour, respectively, and would be non-compliant per Menlo Park's guidelines for state-controlled intersections.

The intersections of Hamilton Avenue and Newbridge Street at Willow Road would experience an increase in delay of over 0.8 seconds with the addition of project traffic on the local approach to the intersection in both peak hours and the intersection of Bay Road at Willow Road would experience an increase in delay of over 0.8 seconds with the addition of Project traffic on the local approach to the intersection during the AM peak hour and would be non-compliant per Menlo Park's guidelines. Willow Road and Park Street, which is a new intersection under project conditions is also assumed to be non-compliant during both peak hours due to unserved demand at this intersection as determined in the microsimulation model developed for this corridor and described in Chapter 3.

The City of Menlo Park is implementing an adaptive traffic signal coordination system on the Willow Road corridor to improve traffic flow. Adaptive traffic control is a technology that automatically adjusts traffic signal timing based on actual traffic demand at an intersection. This measure will improve the intersection operations and could reduce the intersection delay. The reduction in delay due to adaptive signal coordination is not expected to bring the corridor intersections into compliance with the City's TIA guidelines or to substantially reduce the delay caused by the Project.

Physical intersection improvements (identified in the City's TIF program) that would improve intersection operations at the non-compliant intersections are:

- **Willow Road and Newbridge Street (#21)**- The TIF program proposes to modify the signal timing to a protected left-turn phasing operation on Newbridge Street, provide a leading left-turn phase on the southbound movement and a lagging left-turn phase on the northbound movement, and optimize signal timing. With implementation of these intersection modifications under project conditions, the critical movement delay would be reduced for the northbound movement to lower than no project conditions. However, the improvement would not address the southbound deficiency. Further improvements to address the southbound deficiency are not feasible.

- **Willow Road and Bay Road (#24) –** The TIF program proposes to modify the southbound approach at this intersection to two left-turn lanes and one right-turn lane and to modify the westbound approach to add a right-turn lane. With these improvements under project conditions, the critical movement delay at the local approach would be reduced to lower than no project conditions. This improvement would address the adverse effect on the intersection due to Project traffic. With implementation of these intersection modifications, the Willow Road and Bay Road intersection would be in compliance with the TIA Guidelines which would address the Proposed Project's share of the non- compliant operation. With implementation of the recommended improvements from the TIF program for the Willow Road and Bay Road intersection the deficiency attributable to the Proposed Project would be addressed. As mentioned previously, these improvements are included in the City's TIF program.

The Metropolitan Transportation Commission (MTC) Dumbarton Forward project would restripe Bayfront Expressway to add bus-only lanes on the shoulders during peak periods and implement signal timing improvements. The bus-only lanes would generally help the progression of shuttles and buses along the corridor. The signal timing improvements are also assumed to help with the general progression along Bayfront. However, specific details are unknown at this time regarding the improvements at the Willow Road and Bayfront Expressway intersection. The improvements' effectiveness in addressing the Project traffic generated adverse effect on traffic operations at this intersection cannot be determined. Furthermore, since this project is not led by the City of Menlo Park, implementation cannot be guaranteed.

Physical improvements are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel at the intersections of Willow Road and Bayfront Expressway, Willow Road and US 101 southbound ramps, Willow Road and Hamilton Avenue, and Willow Road and Park Street.

The TIF program also proposes multimodal improvements along this section of Willow Road. These include an eastbound Willow Road one-way Class IV separated bikeway between Hamilton Avenue and the US 101/Willow Road Interchange, a westbound Willow Road one-way Class IV separated bikeway between the Dumbarton Rail Corridor and the US 101/Willow Road Interchange, high-visibility crosswalks and pedestrian signals on all legs at the intersection of Willow Road and O'Brien Drive, Class II bicycle lanes on eastbound Willow Road from O'Keefe Street to Bay Road, and Class II bicycle lanes on westbound Willow Road from Bay Road to Durham Street.

Implementing recommended multi-modal facilities along the corridor (from the City's TIF program) could shift some motor vehicle traffic to alternative modes of travel and reduce congestion. With implementation of these multi-modal improvements, the intersection deficiencies could be further reduced and partially address the Proposed Project's share of the non- compliant operations along Willow Road.

**O'Brien Drive and Kavanaugh Drive (#30)**

This intersection is expected to operate at an acceptable LOS B during the AM peak hour and an unacceptable LOS D during the PM peak hour under near term conditions. With the addition of project traffic, the intersection would operate at an unacceptable LOS F during both peak hours. This constitutes non-compliance during both peak hours according to the thresholds established by the City of Menlo Park.

Since the intersection currently operates as all-way-stop-controlled, potential modification to bring the intersection to pre-project conditions would be to signalize it. The intersection would meet the MUTCD signal warrant during both peak hours under project conditions (See Appendix F). The intersection lane configuration would need to be modified to a westbound left-turn lane and through lane, northbound left turn lane and right turn lane, and eastbound shared through-right lane. With this improvement, the intersection would operate acceptably at LOS B during the AM peak hour and LOS C during the PM peak hour under near term plus project conditions.

The recommended improvement to bring this intersection back to pre-Project conditions is the installation of the new traffic signal and appropriate pedestrian and bicycle accommodation. This includes the proposed Class II bicycle lanes along O'Brien Drive between Willow Road and University Avenue, pedestrian countdown timers, Americans with Disabilities Act (ADA) compliant curbs, and bicycle detection loops. However, a decision for signalization should not be made until signal warrants conducted with a future year's actual counts have been met. It is important to note that the intersection would be located approximately 300 feet west of the proposed roundabout at O'Brien Drive and Loop Road. Prior to a decision for signalizing this intersection, further analysis should be conducted to ensure that queues resulting from the signal would not back into the roundabout and cause a gridlock situation.

Alternatively, traffic calming measures could be installed to discourage the use of Kavanaugh Drive, which is a residential street, and encourage vehicles to use O'Brien Drive and Adam's Drive instead. Kavanaugh Drive is located within the City of East Palo Alto, and the City of Menlo Park does not have jurisdiction to install traffic calming along this street. Other measures such as peak period turning movement restrictions could be considered to discourage traffic from using Kavanaugh Drive and improve intersection operations.

Monitoring of traffic operations at this intersection for a period of five years after full Project completion should be conducted to determine if signalization or alternative improvements are needed. If warranted, implementation of the new traffic signal would address the Proposed Project's share of the non-compliant operation and bring the intersection into compliance with the TIA Guidelines. If the alternative measures are implemented, the intersection may or may not be brought into compliance with the TIA Guidelines and address the Proposed Project's share of the non-compliant operation.

**Adams Drive and O'Brien Drive (#32)**

This intersection is expected to operate at an acceptable LOS C during the AM peak hour and an unacceptable LOS D during the PM peak hour under near term conditions. With the addition of Project traffic, the intersection would operate at an unacceptable LOS F during both peak hours. This constitutes non-compliance during both peak hours according to the thresholds established by the City of Menlo Park.

Since the intersection currently operates as two-way-stop-controlled, potential modification to bring the intersection to pre-project conditions would be to signalize it. The intersection would meet the MUTCD signal warrant during the PM peak hour under project conditions (see Appendix F). The intersection lane configuration would need to be modified to a westbound shared left-right lane, southbound left-turn lane and through lane, and northbound shared through-right lane. With this improvement, the intersection would operate acceptably at LOS B during the AM peak hour and LOS C during the PM peak hour under near term plus project conditions.

The recommended improvement to bring this intersection back to pre-Project conditions is the installation of the new traffic signal and appropriate pedestrian and bicycle accommodations at this intersection and within the vicinity. This includes the proposed Class II bicycle lanes along O'Brien Drive between Willow Road and University Avenue, pedestrian countdown timers, Americans with Disabilities Act (ADA) compliant curbs, and bicycle detection loops.

The expected intersection operational issues under background plus project conditions would be due to the increased through traffic on O'Brien Drive between the Project Site and University Avenue. Menlo Park's TIF program identifies an improvement to signalize the nearby intersection at University Avenue and Adams Drive in East Palo Alto. This improvement may provide an alternative route for Project vehicles to access the Project Site via University Avenue.

Monitoring of traffic operations at this intersection for a period of five years after full Project completion should be conducted to determine if signalization or alternative improvements are needed. If warranted, implementation of the new traffic signal would address the Proposed Project's share of the non-compliant operation and bring the intersection into compliance with the TIA Guidelines. If the alternative measures are implemented, the intersection may or may not be brought into compliance with the TIA Guidelines and address the Proposed Project's share of the non-compliant operation.

**University Avenue and Bay Road (#39)**

This intersection is expected to operate at an acceptable LOS D during the AM peak hour and an unacceptable LOS E during the PM peak hour under near term conditions. With the addition of Project traffic, the intersection would continue to operate acceptably in the AM peak hour. In the PM peak hour, the increase in the average critical delay would be greater than four seconds. This constitutes non-compliance during the PM peak hour according to the thresholds established by the City of East Palo Alto.

Potential modification to bring the intersection to pre-Project conditions would be to add an exclusive eastbound right-turn lane and a second eastbound left-turn lane on University Avenue, add a second northbound left-turn lane on Bay Road, add a second westbound left-turn lane on University Avenue, and modify signal phasing. This is also a mitigation measure identified in the Ravenswood/4 Corners TOD Specific Plan Environmental Impact Report (February 22, 2013), which would be implemented under cumulative conditions. With this improvement under project conditions, the average delay at the intersection would be better than under near term no project conditions. Since this intersection is located within the City of East Palo Alto, the recommended measure to bring the intersection back to pre-Project conditions and address the Project's share of the non-compliant operation would be to make a fair share (34%) contribution towards this improvement. Fair share is calculated as the percentage of net project traffic generated divided by the overall cumulative traffic growth at this intersection. The Menlo Park TIF includes improvements at the University Avenue and Bay Road intersection, but not sufficient improvements to bring the intersection back to pre-Project conditions, as described above. However, the Project's fair share contribution towards this intersection would be calculated considering credit from its TIF payment.

**US 101/University Avenue Interchange (#42, #43, #44, #45, #47)**

The US 101/University Avenue interchange is expected to experience capacity issues due to unserved demand at the intersections in its vicinity including University Avenue and Donohoe Street, US 101 northbound off-ramp and Donohoe Street, Cooley Avenue and Donohoe Street, University Avenue and US 101 southbound ramps, University Avenue and Woodland Avenue, E. Bayshore Road and Donohoe Street, and E. Bayshore Road and Euclid Avenue. These intersections would operate unacceptably under near term conditions during both peak hours. With the addition of Project traffic, these intersections would continue to operate unacceptably during both peak hours. The increase in delay is expected to be greater than four seconds, and the increase in the volume to capacity ratio is expected to be greater than 0.01 under project conditions at University Avenue and Donohoe Street in the AM peak hour, US 101 northbound off-ramp and Donohoe Street during both peak hours, Cooley Avenue and Donohoe Street during both peak hours, E. Bayshore Road and Donohoe Street during both peak hours, and University Avenue and US 101 southbound ramps in the AM peak hour. This constitutes non-compliance according to the thresholds established by the City of East Palo Alto.

East Palo Alto plans to widen the northbound approach on Donohoe Street at the US 101 northbound off-ramp to accommodate four through lanes to improve the vehicular throughput at this intersection. This improvement will require median modifications and narrowing the southbound Donohoe Street approach to Cooley Avenue to include two through lanes and a full length left-turn lane. In addition, the traffic signals will be coordinated with adjacent traffic signals on Donohoe Street.

East Palo Alto also plans to install a new traffic signal at the US 101 northbound on-ramp and Donohoe Street and Bayshore Road and Euclid Avenue to coordinate with other closely spaced traffic signals along Donohoe Street. Along with new traffic signals, appropriate pedestrian and bicycle accommodation will be provided. This includes pedestrian countdown timers, Americans with Disabilities Act (ADA) compliant curbs, and bicycle detection loops. In order to align with the proposed driveway for the University Plaza Phase II site on the north side of Donohoe Street, the US 101 on-ramp will be shifted approximately 30 feet to the south. In addition, the northbound approach on Donohoe Street will be restriped to accommodate a short exclusive left-turn pocket (approximately 60 feet in length), a shared left-through lane, and a shared through-right lane. These improvements would require widening of the US 101 northbound on-ramp to accommodate two lanes that taper down to a single lane before this ramp connects with the loop on-ramp from eastbound University Avenue. A northbound right turn only will also be added to Bayshore Road and Euclid Avenue. Planned Donohoe Street improvements are included in Appendix E.

With these improvements, average delay at these intersections would be below that under near term conditions without the Project. Since this intersection is located within the City of East Palo Alto, the recommended improvement measure to bring the intersection/interchange back to pre-Project conditions and address the Project's share of the non- compliant operation would be for the Project sponsor to make a fair share contribution towards these improvements. Because the improvements in this corridor are all interconnected and dependent on each other to work, the recommended improvement measure would be for the Project sponsor to contribute its fair share to improvements at all six intersections in this corridor. Fair share is calculated as the percentage of net project traffic generated of the overall cumulative traffic growth at this intersection.

- Donohoe Street & Cooley Avenue: 10% fair share
- Donohoe Street & US 101 Northbound Off-Ramp: 24% fair share
- Donohoe Street & University Avenue: 31% fair share
- Donohoe Street & US 101 Northbound On-Ramp: 8% fair share
- Donohoe Street/Bayshore Road & Euclid Avenue: 2% fair share
- US 101 Southbound Ramps & University Avenue: 33% fair share

The Menlo Park TIF includes improvements at the University Avenue and Donohoe Street and University Avenue and US 101 southbound ramps intersections, which funding would go toward the planned coordinated system of intersections. The Project's fair share contribution towards these two intersections would be calculated considering credit from its TIF payment.

## Cumulative (2040) Intersection Levels of Service

The results of the intersection level of service analysis under cumulative conditions are summarized in Tables 18 and 19. The Willow Road corridor and 101/University Avenue interchange were analyzed using the Simtraffic microsimulation model as described Chapter 2. The microsimulation model indicates that the intersections would experience capacity issues where the demand cannot be served by the intersections. Oversaturated conditions would operate at LOS F and are indicated using ‘OVERSAT’ in the tables below. Vistro and Traffix were used to calculate critical delay and volume to capacity ratio at the Willow Road and 101/University Avenue intersections, respectively. The intersection LOS calculation sheets are included in Appendix C. The following study intersections (see Figure 20) would operate at an unacceptable level of service during at least one peak hour:

1. Marsh Road and Bayfront Expressway (AM and PM peak hours)
2. Marsh Road and US 101 Northbound off-ramp (AM peak hour)
5. Marsh Road and Bohannon Drive/Florence Street (AM peak hour)
6. Marsh Road and Bay Road (AM peak hour)
8. Chilco Street and Bayfront Expressway (PM peak hour)
11. Chrysler Drive and Constitution Drive (AM and PM peak hours)
12. Chilco Street and Constitution Drive/MPK 22 Driveway (AM and PM peak hours)
13. Chilco Street and Hamilton Avenue (PM peak hour)
16. Willow Road and Bayfront Expressway (AM and PM peak hours)
17. Willow Road and Hamilton Avenue (AM and PM peak hours)
19. Willow Road and Ivy Drive (AM and PM peak hours)
20. Willow Road and O’Brien Drive (AM and PM peak hours)
21. Willow Road and Newbridge Street (AM and PM peak hours)
22. Willow Road and US 101 Northbound Ramps (AM and PM peak hours)
23. Willow Road and US 101 Southbound Ramps (AM and PM peak hours)
24. Willow Road and Bay Road (AM and PM peak hours)
25. Willow Road and Hospital Plaza/Durham Street (AM and PM peak hours)
28. Willow Road and Middlefield Road (AM peak hour)
30. O’Brien Drive and Kavanaugh Drive (AM and PM peak hours)
32. Adam’s Drive and O’Brien Drive (AM and PM peak hours)
33. University Avenue and Bayfront Expressway (PM peak hour)
35. University Avenue and Adams Drive (AM and PM peak hours)
39. University Avenue and Bay Road (PM peak hour)
42. University Avenue and Donohoe Street (AM and PM peak hours)
43. US 101 Northbound Off-Ramp and Donohoe Street (AM and PM peak hours)
44. Cooley Avenue and Donohoe Street (AM and PM peak hours)
45. University Avenue and US 101 Southbound Ramps (AM and PM peak hours)
46. University Avenue and Woodland Avenue (AM and PM peak hours)
47. E. Bayshore Road and Donohoe Street (AM and PM peak hour)
49. Saratoga Avenue and Newbridge Street (AM and PM peak hours)
50. East Bayshore Road and Euclid Avenue (AM and PM peak hours)

## Cumulative (2040) Plus Project Intersection Levels of Service

The results of the intersection level of service analysis under near cumulative (2040) plus project conditions are summarized in Tables 18 and 19. The intersection LOS calculation sheets are included in Appendix C. Under cumulative plus project conditions, the following 17 intersections (see Figure 21) would be non-compliant with local policies during either the AM or the PM peak hour as compared to cumulative conditions. All of these intersections would already be operating at unacceptable levels of service under cumulative conditions.

**5. Marsh Road and Bohannon Drive/Florence Street (AM peak hour)**
13. Chilco Street and Hamilton Avenue (AM and PM peak hours)
18. Willow Road and Park Street (AM and PM peak hours)
**19. Willow Road and Ivy Drive (PM peak hour)**
21. Willow Road and Newbridge Street (AM and PM peak hours)
24. Willow Road and Bay Road (AM and PM peak hours)
**25. Willow Road and Hospital Plaza/Durham Street (AM and PM peak hours)**
30. O'Brien Drive and Kavanaugh Drive (AM peak hour)
32. Adam's Drive and O'Brien Drive (AM and PM peak hours)
43. US 101 Northbound Off-Ramp and Donohoe Street (AM and PM peak hours)
44. Cooley Avenue and Donohoe Street (PM peak hour)
45. University Avenue and US 101 Southbound Ramps (PM peak hour)
**46. University Avenue and Woodland Avenue (AM and PM peak hours)**
**49. Saratoga Avenue and Newbridge Street (AM peak hour)**
**50. East Bayshore Road and Euclid Avenue (AM peak hour)**

**Bold** denotes intersections that would be non-compliant under cumulative plus project conditions during either AM or PM peak hours but are compliant under near-term plus project conditions during both peak hours.

It should be noted that at some intersections the average delay is shown to decrease with the addition of Project traffic. This occurs because the intersection delay is a weighted average of all intersection movements. When traffic is added to movements with delays lower than the average intersection delay, the average delay for the entire intersection can decrease. Furthermore, the congestion and queue spillback at an adjacent intersection can constrain the traffic volume at some intersections resulting in a small decrease in average delay.

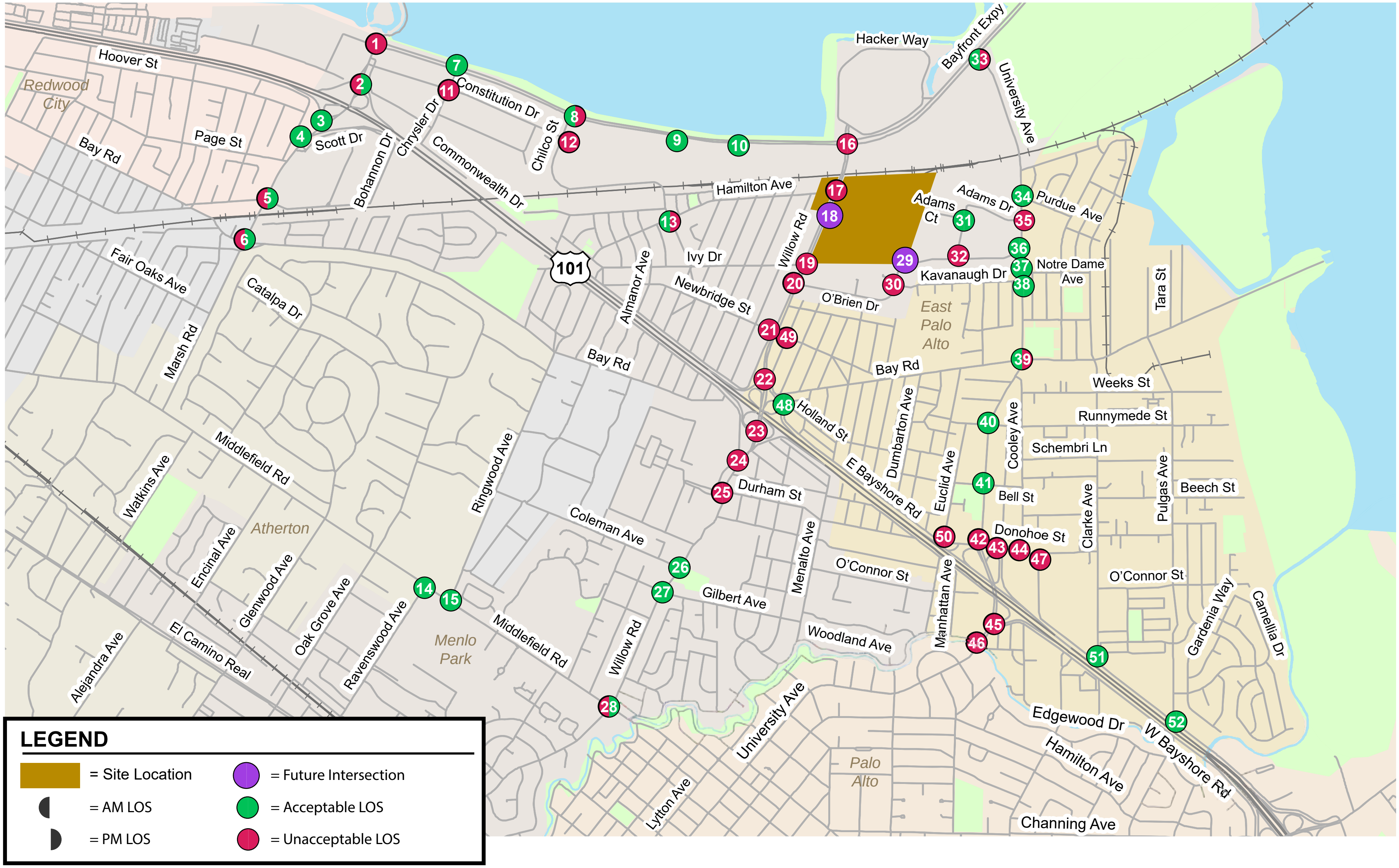



**Figure 20**
**Cumulative (2040) Intersection Level of Service Summary**

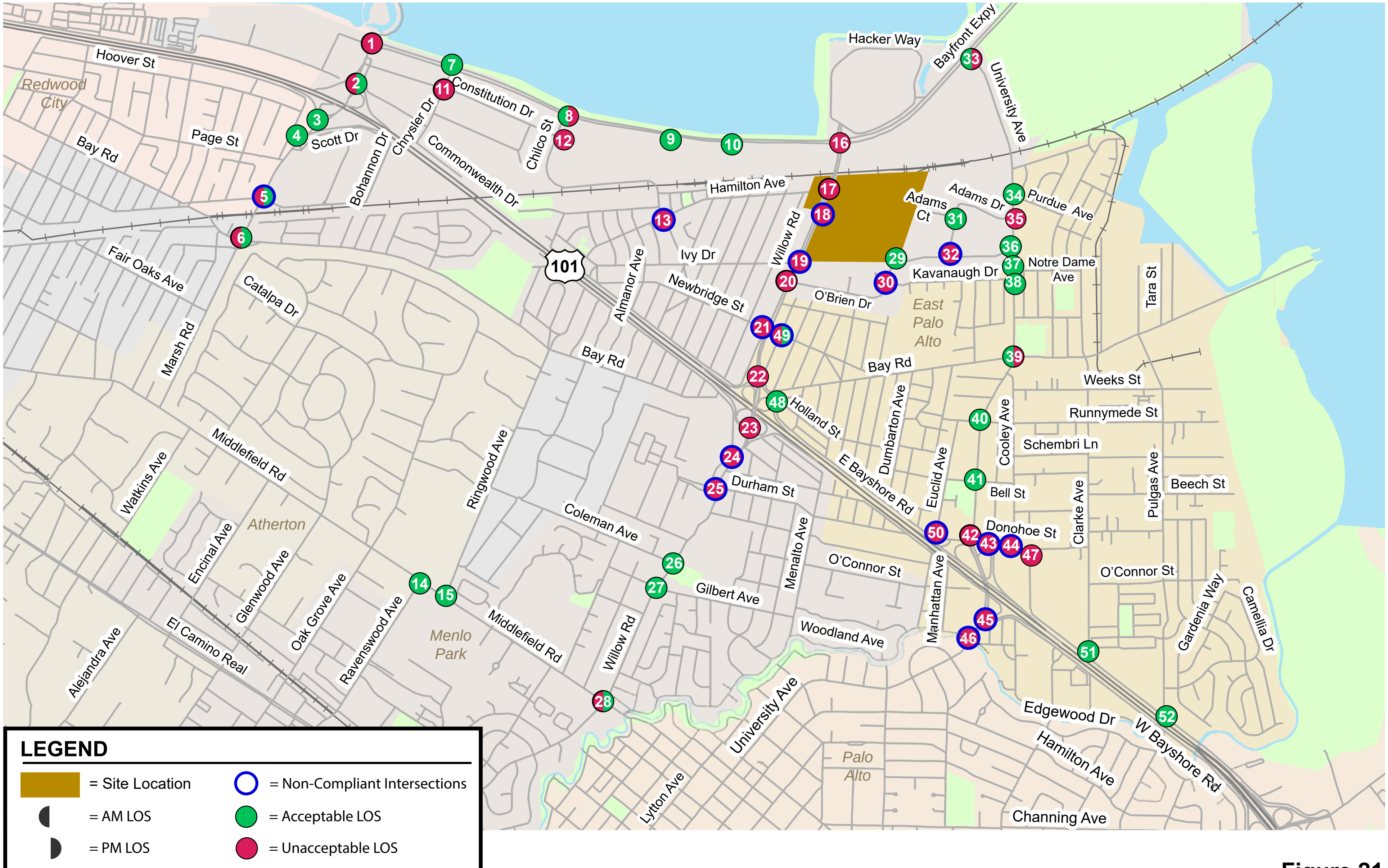



**Figure 21**
**Cumulative (2040) Plus Project Intersection Level of Service Summary**

## Table 18
## Cumulative (2040) Intersection Levels of Service (Menlo Park)

| | | | | Cumulative (2040) Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | General Plan Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 1 | Marsh Road & Bayfront Expressway* | AM | Signal | **68.7** | **E** | **65.6** | **E** | **<4** | **<0.8** | | | |
| | *Haven Avenue Southbound* | *AM* | | ***71.2*** | ***E*** | ***73.4*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | **65.0** | **E** | **77.9** | **E** | **12.9** | **12.5** | | | |
| | *Haven Avenue Southbound* | *PM* | | ***67.7*** | ***E*** | ***67.7*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| 2 | Marsh Road & US 101 Northbound Off-Ramp | AM | Signal | **60.9** | **E** | **62.2** | **E** | **<4** | **1.5** | | | |
| | | PM | | 22.9 | C | 22.8 | C | <4 | <0.8 | | | |
| 3 | Marsh Road & US 101 Southbound Off-Ramp | AM | Signal | 22.8 | C | 24.4 | C | <4 | 2.0 | | | |
| | | PM | | 19.2 | B | 18.8 | B | <4 | <0.8 | | | |
| 4 | Marsh Road & Scott Drive | AM | Signal | 31.9 | C | 31.8 | C | <4 | <0.8 | | | |
| | | PM | | 17.9 | B | 18.1 | B | <4 | <0.8 | | | |
| 5 | Marsh Road & Bohannon Drive/Florence Street | AM | Signal | **58.0** | **E** | **60.4** | **E** | **<4** | **4.9** | **56.7** | **E** | **<0.8** |
| | | PM | | 52.5 | D | 53.6 | D | <4 | 1.6 | 48.3 | D | <0.8 |
| 6 | Marsh Road & Bay Road | AM | Signal | **64.2** | **E** | **64.8** | **E** | <4 | <0.8 | | | |
| | | PM | | 47.6 | D | 54.9 | D | 7.3 | 14.4 | | | |
| 7 | Chrysler Drive & Bayfront Expressway | AM | Signal | 13.1 | B | 12.8 | B | <4 | 6.4 | | | |
| | | PM | | 39.5 | D | 36.3 | D | <4 | <0.8 | | | |
| 8 | Chilco Street & Bayfront Expressway | AM | Signal | 44.5 | D | 49.2 | D | 4.7 | 13.5 | | | |
| | *Chilco Street Eastbound* | *AM* | | ***112.4*** | ***F*** | ***108.9*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| | | PM | | **69.6** | **E** | **66.9** | **E** | **<4** | **<0.8** | | | |
| | *Chilco Street Eastbound* | *PM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| 9 | MPK 21 Driveway & Bayfront Expressway | AM | Signal | 5.7 | A | 5.6 | A | <4 | <0.8 | | | |
| | | PM | | 36.3 | D | 36.1 | D | <4 | <0.8 | | | |
| 10 | MPK 20 Driveway (east) & Bayfront Expressway | AM | Signal | 10.0 | B | 9.9 | A | <4 | <0.8 | | | |
| | | PM | | 18.7 | B | 18.8 | B | <4 | <0.8 | | | |
| 11 | Chrysler Drive & Constitution Drive | AM | Signal | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | | | |
| 12 | Chilco Street & Constitution Drive/MPK 22 Driveway[2] | AM | Signal | **52.9** | **D** | **51.1** | **D** | **<4** | **<0.8** | | | |
| | | PM | | **113.5** | **F** | **101.8** | **F** | **<4** | **<0.8** | | | |
| 13 | Chilco Street & Hamilton Avenue | AM | AWSC | 24.5 | C | **27.1** | **D** | <4 | 2.6 | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **24.7** | **24.7** | | | |
| 14 | Ravenswood Avenue & Middlefield Road | AM | Signal | 49.7 | D | 49.7 | D | <4 | <0.8 | | | |
| | | PM | | 20.2 | C | 19.5 | B | <4 | <0.8 | | | |

**Table 18 (continued)**
**Cumulative (2040) Intersection Levels of Service (Menlo Park)**

| | | | | Cumulative (2040) Conditions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | General Plan Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 15 | Ringwood Avenue & Middlefield Road | AM | Signal | 13.2 | B | 13.2 | B | <4 | <0.8 | | | |
| | | PM | | 21.0 | C | 21.1 | C | <4 | <0.8 | | | |
| 16 | Willow Road & Bayfront Expressway*[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 17 | Willow Road & Hamilton Avenue[1][2] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *Hamilton Avenue Southbound* | AM | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | *Main Street Northbound* | AM | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *Hamilton Avenue Southbound* | PM | | >120 | F | >120 | F | <4 | <0.8 | | | |
| | *Main Street Northbound* | PM | | >120 | F | >120 | F | <4 | >120 | | | |
| 18 | Willow Road & Park Street (future intersection)[1] | AM | Signal | Project Intersection | | OVERSAT | F | 34.2 | 49.1 | *No feasible Improvement* | | |
| | | PM | | | | OVERSAT | F | 17.2 | 23.1 | | | |
| 19 | Willow Road & Ivy Drive[1] | AM | Signal | OVERSAT | F | OVERSAT | F | 46.2 | 98.7 | OVERSAT | F | |
| | *Ivy Drive Southbound* | AM | | 70.9 | E | 69.6 | E | <4 | <0.8 | 61.2 | E | <0.8 |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | 80.8 | 102.4 | OVERSAT | F | |
| | *Ivy Drive Southbound* | PM | | 68.1 | E | 71.7 | E | <4 | 3.6 | 49.0 | D | <0.8 |
| 20 | Willow Road & O'Brien Drive[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *O'Brien Drive Northbound* | AM | | >120 | F | 80.4 | F | <4 | <0.8 | | | |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *O'Brien Drive Northbound* | PM | | >120 | F | >120 | F | <4 | <0.8 | | | |
| 21 | Willow Road & Newbridge Street[1] | AM | Signal | OVERSAT | F | OVERSAT | F | 25.9 | 74.2 | OVERSAT | F | |
| | *Newbridge Street Southbound* | AM | | >120 | F | 108.8 | F | <4 | <0.8 | >120 | F | 67.3 |
| | *Newbridge Street Northbound* | AM | | >120 | F | >120 | F | 101.4 | >120 | 73.5 | E | <0.8 |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | |
| | *Newbridge Street Southbound* | PM | | 84.3 | F | >120 | F | 47.1 | 74.2 | >120 | F | >120 |
| | *Newbridge Street Northbound* | PM | | >120 | F | >120 | F | <4 | <0.8 | 50.7 | D | <0.8 |
| 22 | Willow Road & US 101 Northbound Ramps[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 23 | Willow Road & US 101 Southbound Ramps[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 24 | Willow Road & Bay Road[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | 5.4 | OVERSAT | F | |
| | *Bay Road Southbound* | AM | | >120 | F | >120 | F | 30.3 | 30.3 | 27.8 | C | <0.8 |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | |
| | *Bay Road Southbound* | PM | | 75.6 | E | 82.7 | F | 7.0 | 7.0 | 26.5 | C | <0.8 |

## Table 18 (continued)
## Cumulative (2040) Intersection Levels of Service (Menlo Park)

| # | Intersection | Peak Hour | Traffic Control | Cumulative (2040) Conditions: General Plan Conditions Avg. Delay (sec)[1] | General Plan Conditions LOS | Project Conditions Avg. Delay (sec)[1] | Project Conditions LOS | Project Conditions Incr. in Avg. Delay | Project Conditions Incr. in Avg. Critical Delay | With Improvement Avg. Delay (sec)[1] | With Improvement LOS | With Improvement Incr. in Avg. Critical Delay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Willow Road & Hospital Plaza/Durham Street[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **11.0** | **OVERSAT** | **F** | |
| | *VA Medical Center Southbound* | *AM* | | ***74.8*** | ***E*** | ***74.7*** | ***E*** | ***<4*** | ***<0.8*** | ***74.7*** | ***E*** | ***<0.8*** |
| | *Durham Street Northbound* | *AM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***6.0*** | ***5.4*** | ***>120*** | ***F*** | ***<0.8*** |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **1.3** | **OVERSAT** | **F** | |
| | *VA Medical Center Southbound* | *PM* | | ***74.2*** | ***E*** | ***74.5*** | ***E*** | ***<4*** | ***<0.8*** | ***69.4*** | ***E*** | ***<0.8*** |
| | *Durham Street Northbound* | *PM* | | ***88.1*** | ***F*** | ***90.3*** | ***F*** | ***<4*** | ***2.8*** | ***59.9*** | ***E*** | ***<0.8*** |
| 26 | Willow Road & Coleman Avenue | AM | Signal | 34.9 | C | 34.3 | C | <4 | <0.8 | | | |
| | | PM | | 13.1 | B | 13.2 | B | <4 | <0.8 | | | |
| 27 | Willow Road & Gilbert Avenue | AM | Signal | 24.4 | C | 23.9 | C | <4 | <0.8 | | | |
| | | PM | | 14.2 | B | 14.1 | B | <4 | <0.8 | | | |
| 28 | Willow Road & Middlefield Road | AM | Signal | **64.5** | **E** | **65.0** | **E** | **<4** | **<0.8** | | | |
| | *Middlefield Road Southbound* | *AM* | | ***69.9*** | ***E*** | ***70.4*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Middlefield Road Northbound* | *AM* | | ***67.4*** | ***E*** | ***67.2*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | 42.5 | D | 42.4 | D | <4 | <0.8 | | | |
| | *Middlefield Road Southbound* | *PM* | | *42.1* | *D* | *42.2* | *D* | *<4* | *<0.8* | | | |
| | *Middlefield Road Northbound* | *PM* | | *40.6* | *D* | *40.8* | *D* | *<4* | *<0.8* | | | |
| 29 | O'Brien Drive/Loop Road & Main Street/O'Brien Drive (future intersection) | AM | Roundabout | Project Intersection | | 8.8 | A | 8.8 | 8.8 | | | |
| | | PM | | | | 11.0 | B | 11.0 | 11.0 | | | |
| 30 | O'Brien Drive & Kavanaugh Drive | AM | AWSC | **>120** | **F** | **>120** | **F** | **105.8** | **105.8** | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | | | |
| 31 | Adams Drive & Adams Court | AM | TWSC | 20.1 | C | 17.8 | C | <4 | <0.8 | | | |
| | | PM | | 16.4 | C | 12.7 | B | <4 | <0.8 | | | |
| 32 | Adams Drive & O'Brien Drive | AM | TWSC | **62.4** | **F** | **>120** | **F** | **>120** | **>120** | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **>120** | **>120** | | | |
| 33 | University Avenue & Bayfront Expressway* | AM | Signal | 14.8 | B | 13.3 | B | <4 | <0.8 | | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **<4** | **2.9** | | | |

Notes:
* Denotes CMP Intersection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[1]Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in average delay and critical delay calculated using Vistro.

[2]The intersection is not considered as non-compliant under cumulative plus project conditions because the critical movement of the local approach shifts with the addition of project traffic.
**Bold** indicates substandard level of service
**Bold** (boxed) indicates noncompliance. The project exceeds thresholds in the City of Menlo Park's TIA Guidelines.

**Table 19**
**Cumulative (2040) Intersection Levels of Service (East Palo Alto)**

| | | | | Cumulative (2040) Conditions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | General Plan Conditions | | with Project | | | | With Improvement | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec) | LOS | Avg. Delay (sec) | LOS | Incr. in Critical Delay (sec) | Incr. in Critical V/C | Avg. Delay (sec) | LOS |
| 34 | University Avenue & Purdue Avenue | AM | Signalized | 25.9 | C | 28 | C | 0.8 | 0.017 | | |
| | | PM | | 37.1 | D | 40.8 | D | 4.2 | 0.031 | | |
| 35 | University Avenue & Adams Drive | AM | TWSC | **>120** | **F** | **>120** | **F** | **1.4** | **0.253** | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **-7.3** | **-0.130** | | |
| 36 | University Avenue & O'Brien Drive | AM | Signalized | 21.1 | C | 43.1 | D | 29.3 | 0.245 | | |
| | | PM | | 21.3 | C | 32.6 | C | 14.1 | 0.175 | | |
| 37 | University Avenue & Notre Dame Avenue | AM | Signalized | 8.0 | A | 10.6 | B | 3.1 | 0.070 | | |
| | | PM | | 12.2 | B | 15.6 | B | 4.1 | 0.038 | | |
| 38 | University Avenue & Kavanaugh Drive | AM | Signalized | 26.8 | C | 17.5 | B | -12.1 | -0.110 | | |
| | | PM | | 23.1 | C | 24.8 | C | 0.8 | 0.009 | | |
| 39 | University Avenue & Bay Road | AM | Signalized | 48.8 | D | 53.5 | D | 8.9 | 0.054 | | |
| | | PM | | **68.3** | **E** | **69.0** | **E** | **-1.9** | **-0.008** | | |
| 40 | University Avenue & Runnymede Street | AM | Signalized | 9.7 | A | 11.7 | B | 11 | 0.075 | | |
| | | PM | | 8.9 | A | 8.9 | A | 3.6 | 0.102 | | |
| 41 | University Avenue & Bell Street | AM | Signalized | 14.9 | B | 16.2 | B | 2 | 0.067 | | |
| | | PM | | 26.4 | C | 34.8 | C | 13.4 | 0.069 | | |
| 42 | University Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **-1.4** | **-0.002** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-4.9** | **-0.009** | ***Improvement*** | |
| 43 | US 101 Northbound Off-Ramp & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **77.2** | **0.158** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **46.5** | **0.102** | ***Improvement*** | |
| 44 | Cooley Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **29.3** | **0.091** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **63.7** | **0.143** | ***Improvement*** | |
| 45 | University Avenue & US 101 Southbound Ramps* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.0** | **-0.004** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **6.7** | **0.016** | ***Improvement*** | |
| 46 | University Avenue & Woodland Avenue* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **14.1** | **0.040** | ***Corridor*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **19.1** | **0.045** | ***Improvement*** | |
| 47 | E. Bayshore Road & Donahoe Street* | AM | Signalized | **>120** | **F** | **>120** | **F** | **-22.4** | **-0.048** | ***Corridor*** | |
| | | PM | | **>120** | **F** | **>120** | **F** | **-5.3** | **-0.011** | ***Improvement*** | |

**Table 19 (continued)**
**Cumulative (2040) Intersection Levels of Service (East Palo Alto)**

| | | | | General Plan Conditions | | Cumulative (2040) Conditions with Project | | | | With Improvement | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec) | LOS | Avg. Delay (sec) | LOS | Incr. in Critical Delay (sec) | Incr. in Critical V/C | Avg. Delay (sec) | LOS |
| 48 | E. Bayshore Road & Holland Street | AM | TWSC | 8.8 | A | 8.8 | A | 0.0 | 0.000 | | |
| | | PM | | 10.0 | A | 10.0 | A | 0.0 | 0.000 | | |
| 49 | Saratoga Avenue & Newbridge Street | AM | TWSC | **>120** | **F** | **>120** | **F** | **9.8** | **0.061** | ***No Feasible Improvement*** | |
| | | PM | | **40.0** | **E** | 28.6 | D | **-2.2** | **-0.120** | | |
| 50 | E. Bayshore Road & Euclid Avenue* | AM | AWSC | **OVERSAT** | **F** | **OVERSAT** | **F** | **53.8** | **0.057** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.7** | **-0.009** | | |
| 51 | Clarke Avenue & E. Bayshore Road | AM | Signalized | 14.1 | B | 14.2 | B | 0.2 | 0.014 | | |
| | | PM | | 13.9 | B | 14.0 | B | 0.2 | 0.007 | | |
| 52 | Pulgas Avenue & E. Bayshore Road | AM | Signalized | 25.4 | C | 26.5 | C | 1.4 | 0.017 | | |
| | | PM | | 48.1 | D | 47.3 | D | -0.4 | -0.002 | | |

Note:
* Denotes a CMP interesection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported.
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[*] Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in critical delay and v/c calculated using Traffix.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates adverse effect

## Adverse Effects and Recommended Improvements

For intersections that are non-compliant under both near-term plus project conditions and cumulative plus project conditions, the recommended improvements proposed under near term plus project conditions would be sufficient to address cumulative non-compliance. Improvements for intersections that are non-compliant only under cumulative plus project conditions are described below.

**Marsh Road and Bohannon Drive/Florence Street (#5)**

This intersection is expected to operate at an unacceptable LOS E during the AM peak hour and an acceptable LOS D during the PM peak hour under cumulative conditions. The addition of Project traffic would cause the average critical delay to increase by more than 0.8 during the AM peak hour. The intersection would continue to operate at an acceptable LOS D during the PM peak hour. This constitutes non-compliance during the AM peak hour according to the thresholds established by the City of Menlo Park.

Modification of the westbound approach at this intersection to a left-turn lane, two through lanes, and a right-turn lane would improve the average delay to better than cumulative no project conditions. Menlo Park's TIF program proposes Class II buffered bike lanes along Marsh Road from Bay Road to Scott Road in both directions and the removal of on-street parking in the eastbound direction. The restriping of the vehicle travel lanes to include a westbound right-turn only lane and the proposed Class II buffered bike lane would require narrowing the travel lanes to 11 feet and removal of the median. While this is possible, removal of the median would require removing at least one tree as well as the signal pole in the median. Upgrades to at least one mast arm would be required to replace the removed median signal. Physical improvements at this intersection are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel. The City's TIF program includes multi-modal improvements along the Marsh Road corridor such as Class II buffered bike lanes along Marsh Road from Bay Road to Scott Road, and installing sidewalks along the north-side of Marsh Road between Page Street and Bohannon Drive/Florence Street. Implementing recommended multi-modal facilities along the corridor (from the City's TIF program) could shift some motor vehicle traffic to alternative modes of travel and reduce congestion. With implementation of these multi-modal improvements, the intersection deficiencies could be further reduced and partially address the Proposed Project's share of the non-compliant operations at this intersection.

**Willow Road and Ivy Drive (#19)**

Willow Road and Ivy Drive is an intersection on the Willow Road Corridor, which is expected to experience capacity issues due to unserved demand at the intersections. This intersection would operate unacceptably under cumulative conditions during both peak hours. With the addition of Project traffic, it would continue to operate unacceptable during both peak hours. In the PM peak hour, the increase in the critical movement delay of the local approach would be greater than 0.8 seconds. This constitutes non-compliance during the PM peak hour according to the thresholds established by the City of Menlo Park.

The Menlo Park TIF proposes to install a right-turn overlap phase on southbound Ivy Drive and restrict eastbound Willow Road U-turns. This would improve the critical movement delay of the local approach to better than cumulative no project conditions. The Project is required to pay traffic impact fees according to the City's current TIF schedule.

**Willow Road and Hospital Plaza/Durham Street (#25)**

Willow Road and Hospital Plaza/Durham Street is an intersection on the Willow Road Corridor, which is expected to experience capacity issues due to unserved demand at the intersections. This intersection would operate unacceptably under cumulative conditions during both peak hours. With the addition of Project traffic, it would continue to operate unacceptably during both peak hours. In the AM and PM peak hour, the increase in the critical movement delay of the local approach would be greater than 0.8 seconds. This constitutes non-compliance during both peak hours according to the thresholds established by the City of Menlo Park.

The recommended improvement measure for this intersection is restriping northbound Durham Street as a shared left-through lane and right-turn lane, and adding a northbound right turn overlap phase. With this improvement, the critical movement delay of the local approach would improve to better than cumulative no project conditions in the AM peak hour. The PM peak hour would continue to be non-compliant. If this recommended improvement measure is implemented, the Project should contribute its fair share (25%) towards the improvement. Fair share is calculated as the percentage of net project traffic generated of the overall cumulative traffic growth at this intersection.

**University Avenue and Woodland Avenue (#46)**

University Avenue and Woodland Avenue is in the vicinity of the US 101/University Avenue interchange and is expected to experience capacity issues due to unserved demand at the intersections. This intersection would operate unacceptably under cumulative conditions during both peak hours. With the addition of Project traffic, it would continue to operate unacceptably during both peak hours. In the AM and PM peak hour, the increase in the average critical delay would be greater than four seconds and the increase in the volume to capacity ratio would be greater than 0.01. This constitutes non-compliance during both peak hours according to the thresholds established by the City of East Palo Alto.

The recommended Donohoe Street improvements (see Appendix E) at Euclid Avenue and at the US 101 northbound on-ramp would improve traffic flow on University Avenue and eliminate the queue spillback that extends from Donohoe Street past Woodland Avenue. While the University Avenue and Woodland Avenue intersection is expected to continue to operate at LOS F during both peak hours, the Donohoe Street improvements would reduce the average delay at the intersection below cumulative conditions without the Project. With these improvements, the intersection would comply with the City of East Palo Alto's level of service policy. As discussed under the background plus Project discussion above, the project would pay its fair share costs towards the intersection improvements at the 6 intersections of the University Avenue/Donohoe Street/US 101 corridor.

**Saratoga Avenue and Newbridge Street (#49)**

This intersection is expected to operate at an acceptable LOS F during the AM peak hour and an unacceptable LOS E during the PM peak hour under cumulative conditions. With the addition of Project traffic, the intersection average critical delay at the intersection would increase by four seconds and the volume to capacity ratio would increase by 0.01 during the AM peak hour. This constitutes as non-compliance during the AM peak hour according to the thresholds established by the City of East Palo Alto.

Since the intersection currently operates as two-way-stop-controlled, potential modification to bring the intersection to pre-project conditions would be to signalize it. The intersection would meet the MUTCD signal warrant during both peak hours under project conditions (see Appendix F). With this improvement, the intersection would operate acceptably at LOS C during the AM peak hour and LOS B during the PM peak hour under cumulative plus project conditions. However, since the intersection is located only 200 feet south of Willow Road, signalization is not recommended. Short of signalization, no other improvements are feasible. Furthermore, given this intersection is located outside of the City of Menlo Park, the City cannot ensure implementation of any improvements. This intersection is also not listed with improvements in the City of East Palo Alto TIF.

**Bayshore Road and Euclid Avenue (#50)**

Bayshore Road and Euclid Avenue is in the vicinity of the US 101/University Avenue interchange and is expected to experience capacity issues due to unserved demand at the intersections. This intersection would operate unacceptably under cumulative conditions during both peak hours. With the addition of Project traffic, it would continue to operate unacceptably during both peak hours. In the AM peak hour, the increase in the average critical delay would be greater than four seconds and the increase in the volume to capacity ratio would be greater than 0.01. This constitutes non-compliance during the AM peak hour according to the thresholds established by the City of East Palo Alto.

Since the intersection currently operates as all-way-stop-controlled, potential modification to bring the intersection to pre-project conditions would be to signalize it and add a westbound right turn only lane. This improvement is included in the recommended Donohoe Street improvements (see Appendix E, Transportation/Traffic, of this EIR). The proposed improvements at Euclid Avenue and at the US 101 northbound on-ramp would improve traffic flow on University Avenue and eliminate the queue spillback that extends from Donohoe Street past Woodland Avenue. This would reduce the average delay at the intersection below cumulative conditions without the project. With these improvements, the intersection would be in compliance with the City of East Palo Alto's level of service policy. As discussed under the background plus project discussion above, the Project would pay its fair share costs towards the intersection improvements at the 6 intersections of the University Avenue/Donohoe Street/US 101 corridor, which includes the intersection at Bayshore Road and Euclid Avenue.

## Cumulative (2040) Plus Dumbarton Rail Intersection Levels of Service

The results of the intersection level of service analysis under cumulative conditions with the Dumbarton Rail are summarized in Table 20 and 21. All study intersections are expected to operate better cumulative conditions with the Dumbarton rail than without the Dumbarton rail. The intersection LOS calculation sheets are included in Appendix C. The following study intersection would improve to acceptable LOS with the Dumbarton Rail during at least one peak hour:

6. Marsh Road and Bay Road (AM peak hour)

## Cumulative (2040) Plus Project with Dumbarton Rail Intersection Levels of Service

The results of the intersection level of service analysis under cumulative (2040) plus project conditions with the Dumbarton rail are summarized in Tables 20 and 21. Compared to cumulative plus project conditions without the Dumbarton Rail, the delay at all of the intersections would improve with Dumbarton Rail. While the overall motor vehicle operations would experience reduced delay with Dumbarton Rail, when evaluating for intersection LOS compliance, the determination is based on the relative increase in delay due to the Project compared to no project conditions (cumulative conditions with Dumbarton Rail). Comparing "cumulative plus project with Dumbarton Rail" conditions to "cumulative plus project without Dumbarton Rail" conditions, the following study intersection would no longer be non-compliant:

25. Willow Road & Durham Street

The following additional study intersections would be non-compliant under cumulative plus project conditions with the Dumbarton rail as compared to cumulative plus project conditions without the Dumbarton Rail:

6. Marsh Road and Bay Road (AM peak hour)
11. Chrysler Drive and Constitution Drive (AM peak hour)
16. Willow Road and Bayfront Expressway (AM peak hour)

Under cumulative conditions with or without the Project, the road network is over saturated. Since the Dumbarton rail would reduce vehicular traffic in the area due to the increase in transit mode share, the Menlo Park Travel Demand model assigns more Project-generated traffic at some intersections where vehicular capacity is now available. Menlo Park's level of service standards and adverse effect criteria are very stringent where a small change in traffic can trigger a non-compliance at an intersection. Therefore, the relative increase in delay due to the Project at some intersections between "cumulative with Dumbarton Rail" and "cumulative plus project with Dumbarton Rail" would be greater than the Menlo Park's threshold, causing additional intersections to be non-compliant under cumulative plus project conditions with the Dumbarton rail.

## Adverse Effects and Recommended Improvements

For intersections that are non-compliant under cumulative plus project conditions and cumulative plus project with Dumbarton rail conditions, the improvements proposed under cumulative plus project conditions would be sufficient to address cumulative non-compliance. Improvements for intersections that are non-compliant only under cumulative plus project with Dumbarton rail conditions are described below. As noted below, no additional feasible improvements are identified and the improvement measures identified below are for informational purposes only.

**Marsh Road and Bay Road (#6)**

This intersection is expected to operate at an acceptable LOS D during both peak hours under cumulative conditions with the Dumbarton rail. The addition of Project traffic would cause the intersection to operate at LOS E during the AM peak hour. The intersection would continue to operate at an acceptable LOS D during the PM peak hour. This constitutes non-compliance during the AM peak hour according to the thresholds established by the City of Menlo Park.

Physical improvements at this intersection are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel. Menlo Park's TIF program proposes Class II buffered bike lanes along Marsh Road from Bay Road to Scott Road in both directions. The improvement may lead to an overall increase in bicycle mode share but would not offset the Project traffic.

**Chrysler Drive and Constitution Drive (#11)**

This intersection is expected to operate at an unacceptable LOS F during both peak hours under cumulative conditions with Dumbarton rail. With the addition of Project traffic, the average critical delay would increase by more than 0.8 seconds during the AM peak hour. The intersection would continue to operate acceptably during the PM peak hour. This constitutes non-compliance during the AM peak hour according to the thresholds established by the City of Menlo Park.

Physical improvements at this intersection are considered infeasible due to right-of-way constraints and/or adverse effects on pedestrian and bicycle travel.

**Willow Road and Bayfront Expressway 9#16)**

Improvements for this intersection are discussed under the near term plus project section as part of the Willow Road corridor improvements, and is not repeated here.

## Table 20
## Cumulative (2040) With Dumbarton Rail Intersection Levels of Service (Menlo Park)

| | | | | Cumulative Conditions (With Dumbarton Rail) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 1 | Marsh Road & Bayfront Expressway* | AM | Signal | **68.5** | **E** | **65.3** | **E** | **<4** | **<0.8** | | | |
| | *Haven Avenue Southbound* | *AM* | | ***70.5*** | ***E*** | ***71.7*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | **63.2** | **E** | **72.8** | **E** | **9.6** | **11.4** | | | |
| | *Haven Avenue Southbound* | *PM* | | ***67.6*** | ***E*** | ***67.6*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| 2 | Marsh Road & US 101 Northbound Off-Ramp | AM | Signal | **60.7** | **E** | **61.9** | **E** | **<4** | **1.4** | | | |
| | | PM | | 22.9 | C | 22.7 | C | <4 | <0.8 | | | |
| 3 | Marsh Road & US 101 Southbound Off-Ramp | AM | Signal | 22.8 | C | 22.6 | C | <4 | <0.8 | | | |
| | | PM | | 19.2 | B | 18.7 | B | <4 | <0.8 | | | |
| 4 | Marsh Road & Scott Drive | AM | Signal | 31.2 | C | 30.4 | C | <4 | <0.8 | | | |
| | | PM | | 17.8 | B | 17.8 | B | <4 | <0.8 | | | |
| 5 | Marsh Road & Bohannon Drive/Florence Street | AM | Signal | **57.8** | **E** | **58.7** | **E** | **<4** | **2.7** | **55.1** | **E** | **<0.8** |
| | | PM | | 51.5 | D | 53.1 | D | <4 | 2.7 | 48.1 | D | <0.8 |
| 6 | Marsh Road & Bay Road | AM | Signal | 54.5 | D | **63.5** | **E** | **9.0** | **18.9** | ***No feasible Improvement*** | | |
| | | PM | | 47.9 | D | 51.2 | D | <4 | 6.8 | | | |
| 7 | Chrysler Drive & Bayfront Expressway | AM | Signal | 13.0 | B | 12.5 | B | <4 | 6.0 | | | |
| | | PM | | 38.3 | D | 33.5 | C | <4 | <0.8 | | | |
| 8 | Chilco Street & Bayfront Expressway | AM | Signal | 43.2 | D | 45.5 | D | <4 | 7.3 | | | |
| | *Chilco Street Eastbound* | *AM* | | ***116.3*** | ***F*** | ***108.8*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| | | PM | | **68.3** | **E** | **65.6** | **E** | **<4** | **<0.8** | | | |
| | *Chilco Street Eastbound* | *PM* | | *>120* | *F* | ***>120*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| 9 | MPK 21 Driveway & Bayfront Expressway | AM | Signal | 5.7 | A | 5.6 | A | <4 | <0.8 | | | |
| | | PM | | 36.3 | D | 36.1 | D | <4 | <0.8 | | | |
| 10 | MPK 20 Driveway (east) & Bayfront Expressway | AM | Signal | 10.1 | B | 9.9 | A | <4 | <0.8 | | | |
| | | PM | | 18.6 | B | 18.8 | B | <4 | <0.8 | | | |
| 11 | Chrysler Drive & Constitution Drive | AM | Signal | **>120** | **F** | **>120** | **F** | **31.2** | **50.3** | ***No feasible Improvement*** | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | | | |
| 12 | Chilco Street & Constitution Drive/MPK 22 Driveway[2] | AM | Signal | **50.1** | **D** | **53.9** | **D** | **<4** | **<0.8** | | | |
| | | PM | | **111.8** | **F** | **99.2** | **F** | **<4** | **<0.8** | | | |
| 13 | Chilco Street & Hamilton Avenue | AM | AWSC | 23.6 | C | 24.3 | C | <4 | <0.8 | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **18.2** | **18.2** | | | |
| 14 | Ravenswood Avenue & Middlefield Road | AM | Signal | 49.7 | D | 49.7 | D | <4 | <0.8 | | | |
| | | PM | | 20.3 | C | 19.5 | B | <4 | <0.8 | | | |

**Table 20 (continued)**
**Cumulative (2040) with Dumbarton Rail Intersection Levels of Service (Menlo Park)**

| | | | | Cumulative Conditions (With Dumbarton Rail) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 15 | Ringwood Avenue & Middlefield Road | AM | Signal | 13.2 | B | 13.2 | B | <4 | <0.8 | | | |
| | | PM | | 21.0 | C | 21.1 | C | <4 | <0.8 | | | |
| 16 | Willow Road & Bayfront Expressway*[1] | AM | Signal | OVERSAT | F | OVERSAT | F | 5.3 | <0.8 | *No feasible Improvement* | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 17 | Willow Road & Hamilton Avenue[1][2] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *Hamilton Avenue Southbound* | *AM* | | *>120* | *F* | *>120* | *F* | *<4* | *<0.8* | | | |
| | *Main Street Northbound* | *AM* | | *>120* | *F* | *>120* | *F* | *<4* | *<0.8* | | | |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *Hamilton Avenue Southbound* | *PM* | | *>120* | *F* | *>120* | *F* | *27.4* | *<0.8* | | | |
| | *Main Street Northbound* | *PM* | | *>120* | *F* | *>120* | *F* | *<4* | *>120* | | | |
| 18 | Willow Road & Park Street (future intersection)[1] | AM | Signal | Project Intersection | | OVERSAT | F | 33.6 | 47.8 | *No feasible Improvement* | | |
| | | PM | | | | OVERSAT | F | 16.2 | 21.7 | | | |
| 19 | Willow Road & Ivy Drive[1] | AM | Signal | OVERSAT | F | OVERSAT | F | 52.0 | 105.8 | OVERSAT | F | |
| | *Ivy Drive Southbound* | *AM* | | *72.8* | *E* | *69.6* | *E* | *<4* | *<0.8* | *61.3* | *E* | *<0.8* |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | 85.2 | 107.3 | OVERSAT | F | |
| | *Ivy Drive Southbound* | *PM* | | *65.2* | *E* | *71.7* | *E* | *6.5* | *7.9* | *60.4* | *E* | *<0.8* |
| 20 | Willow Road & O'Brien Drive[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *O'Brien Drive Northbound* | *AM* | | *108.2* | *F* | *80.4* | *F* | *<4* | *<0.8* | | | |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | *O'Brien Drive Northbound* | *PM* | | *>120* | *F* | *>120* | *F* | *<4* | *<0.8* | | | |
| 21 | Willow Road & Newbridge Street[1] | AM | Signal | OVERSAT | F | OVERSAT | F | 31.5 | 97.3 | OVERSAT | F | |
| | *Newbridge Street Southbound* | *AM* | | *115.1* | *F* | *108.8* | *F* | *<4* | *<0.8* | *>120* | *F* | *103.1* |
| | *Newbridge Street Northbound* | *AM* | | *>120* | *F* | *>120* | *F* | *>120* | *>120* | *23.2* | *C* | *<0.8* |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | |
| | *Newbridge Street Southbound* | *PM* | | *83.5* | *F* | *>120* | *F* | *42.8* | *67.4* | *>120* | *F* | *101.1* |
| | *Newbridge Street Northbound* | *PM* | | *>120* | *F* | *>120* | *F* | *<4* | *<0.8* | *31.2* | *C* | *<0.8* |
| 22 | Willow Road & US 101 Northbound Ramps[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 23 | Willow Road & US 101 Southbound Ramps[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| | | PM | | OVERSAT | F | OVERSAT | F | <4 | <0.8 | | | |
| 24 | Willow Road & Bay Road[1] | AM | Signal | OVERSAT | F | OVERSAT | F | <4 | 6.7 | OVERSAT | F | |
| | *Bay Road Southbound* | *AM* | | *>120* | *F* | *>120* | *F* | *36.1* | *36.1* | *27.6* | *C* | *<0.8* |
| | | PM | Signal | OVERSAT | F | OVERSAT | F | <4 | <0.8 | OVERSAT | F | |
| | *Bay Road Southbound* | *PM* | | *74.5* | *E* | *81.7* | *F* | *7.2* | *7.2* | *26.5* | *C* | *<0.8* |

## Table 20 (continued)
## Cumulative (2040) With Dumbarton Rail Intersection Levels of Service (Menlo Park)

| | | | | Cumulative Conditions (With Dumbarton Rail) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project Conditions | | Project Conditions | | | | With Improvement | | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec)[1] | LOS | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Delay | Incr. in Avg. Critical Delay | Avg. Delay (sec)[1] | LOS | Incr. in Avg. Critical Delay |
| 25 | Willow Road & Hospital Plaza/Durham Street[1] | AM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *VA Medical Center Southbound* | *AM* | | ***74.7*** | ***E*** | ***74.7*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Durham Street Northbound* | *AM* | | ***>120*** | ***F*** | ***>120*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | **OVERSAT** | **F** | **OVERSAT** | **F** | **<4** | **<0.8** | | | |
| | *VA Medical Center Southbound* | *PM* | | ***74.2*** | ***E*** | ***74.0*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Durham Street Northbound* | *PM* | | ***88.1*** | ***F*** | ***88.1*** | ***F*** | ***<4*** | ***<0.8*** | | | |
| 26 | Willow Road & Coleman Avenue | AM | Signal | 33.9 | C | 33.6 | C | <4 | 3.4 | | | |
| | | PM | | 13.1 | B | 13.2 | B | <4 | <0.8 | | | |
| 27 | Willow Road & Gilbert Avenue | AM | Signal | 23.7 | C | 23.4 | C | <4 | <0.8 | | | |
| | | PM | | 14.1 | B | 13.9 | B | <4 | <0.8 | | | |
| 28 | Willow Road & Middlefield Road | AM | Signal | **64.4** | **E** | **64.8** | **E** | **<4** | **0.8** | | | |
| | *Middlefield Road Southbound* | *AM* | | ***69.8*** | ***E*** | ***70.0*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | *Middlefield Road Northbound* | *AM* | | ***67.4*** | ***E*** | ***67.2*** | ***E*** | ***<4*** | ***<0.8*** | | | |
| | | PM | Signal | 42.5 | D | 42.3 | D | <4 | <0.8 | | | |
| | *Middlefield Road Southbound* | *PM* | | *42.1* | *D* | *42.1* | *D* | *<4* | *<0.8* | | | |
| | *Middlefield Road Northbound* | *PM* | | *40.6* | *D* | *40.7* | *D* | *<4* | *<0.8* | | | |
| 29 | O'Brien Drive/Loop Road & Main Street/O'Brien Drive (future intersection) | AM | Roundabout | Project Intersection | | 8.4 | A | 8.4 | 8.4 | | | |
| | | PM | | | | 10.2 | B | 10.2 | 10.2 | | | |
| 30 | O'Brien Drive & Kavanaugh Drive | AM | AWSC | **>120** | **F** | **>120** | **F** | **>120** | **>120** | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **10.9** | **10.9** | | | |
| 31 | Adams Drive & Adams Court | AM | TWSC | 18.9 | C | 17.3 | C | <4 | <0.8 | | | |
| | | PM | | 15.8 | C | 12.6 | B | <4 | <0.8 | | | |
| 32 | Adams Drive & O'Brien Drive | AM | TWSC | **47.2** | **E** | **>120** | **F** | **>120** | **>120** | *Traffic signal potentially feasible* | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **>120** | **>120** | | | |
| 33 | University Avenue & Bayfront Expressway* | AM | Signal | 14.7 | B | 13.1 | B | <4 | <0.8 | | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **<4** | **<0.8** | | | |

Notes:
* Denotes CMP Intersection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[1]Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in average delay and critical delay calculated using Vistro.
[2]The intersection is not considered as non-compliant under cumulative plus project conditions because the critical movement of the local approach shifts with the addition of project traffic.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates noncompliance. The project exceeds thresholds in the City of Menlo Park's TIA Guidelines.

**Table 21**
**Cumulative (2040) With Dumbarton Rail Intersection Levels of Service (East Palo Alto)**

| | | | | Cumulative (2040) Conditions (Dumbarton Rail) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project | | with Project | | | | With Improvement | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec) | LOS | Avg. Delay (sec) | LOS | Incr. in Critical Delay (sec) | Incr. in Critical V/C | Avg. Delay (sec) | LOS |
| 34 | University Avenue & Purdue Avenue | AM | Signalized | 25.9 | C | 22.3 | C | -3.8 | -0.071 | | |
| | | PM | | 28.0 | C | 24.2 | C | -3.6 | -0.081 | | |
| 35 | University Avenue & Adams Drive | AM | TWSC | **>120** | **F** | **>120** | **F** | **1.5** | **0.322** | | |
| | | PM | | **>120** | **F** | **>120** | **F** | **-6.9** | **-0.122** | | |
| 36 | University Avenue & O'Brien Drive | AM | Signalized | 20.4 | C | 38.7 | D | 24.3 | 0.225 | | |
| | | PM | | 20.1 | C | 31.4 | C | 14.4 | 0.176 | | |
| 37 | University Avenue & Notre Dame Avenue | AM | Signalized | 8.0 | A | 10.6 | B | 3.1 | 0.070 | | |
| | | PM | | 11.3 | B | 14.8 | B | 4.1 | 0.036 | | |
| 38 | University Avenue & Kavanaugh Drive | AM | Signalized | 24.7 | C | 17.5 | B | 3.1 | 0.070 | | |
| | | PM | | 22.7 | C | 23.5 | C | 4.4 | 0.039 | | |
| 39 | University Avenue & Bay Road | AM | Signalized | 47.4 | D | 52 | D | 8.4 | 0.056 | | |
| | | PM | | **64.0** | **E** | **67.7** | **E** | **3.7** | **0.012** | | |
| 40 | University Avenue & Runnymede Street | AM | Signalized | 9.4 | A | 10.9 | B | 8.1 | 0.062 | | |
| | | PM | | 8.9 | A | 8.9 | A | 3.5 | 0.100 | | |
| 41 | University Avenue & Bell Street | AM | Signalized | 14.9 | B | 15.9 | B | 1.6 | 0.055 | | |
| | | PM | | 26.1 | C | 32.9 | C | 10.9 | 0.062 | | |
| 42 | University Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **4.6** | **0.011** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-4.9** | **-0.009** | | |
| 43 | US 101 Northbound Off-Ramp & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **77.2** | **0.158** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **48.9** | **0.108** | | |
| 44 | Cooley Avenue & Donohoe Street* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **27.2** | **0.085** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **62.9** | **0.143** | | |
| 45 | University Avenue & US 101 Southbound Ramps* | AM | Signalized | **OVERSAT** | **F** | **OVERSAT** | **F** | **-2.5** | **-0.005** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **7.0** | **0.017** | | |
| 46 | University Avenue & Woodland Avenue* | AM | Signalized | **OVERSAT** | **E** | **OVERSAT** | **E** | **14.1** | **0.040** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **12.0** | **0.028** | | |
| 47 | E. Bayshore Road & Donahoe Street* | AM | Signalized | **>120** | **F** | **>120** | **F** | **-8.8** | **-0.019** | ***Corridor Improvement*** | |
| | | PM | | **>120** | **F** | **>120** | **F** | **-4.9** | **-0.010** | | |

**Table 21 (continued)**
**Cumulative (2040) With Dumbarton Rail Intersection Levels of Service (East Palo Alto)**

| | | | | Cumulative (2040) Conditions (Dumbarton Rail) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Project | | with Project | | | | With Improvement | |
| # | Intersection | Peak Hour | Traffic Control | Avg. Delay (sec) | LOS | Avg. Delay (sec) | LOS | Incr. in Critical Delay (sec) | Incr. in Critical V/C | Avg. Delay (sec) | LOS |
| 48 | E. Bayshore Road & Holland Street | AM | TWSC | 8.8 | A | 8.8 | A | 0.0 | 0.000 | | |
| | | PM | | 10.0 | A | 10.0 | A | 0.0 | 0.000 | | |
| 49 | Saratoga Avenue & Newbridge Street | AM | TWSC | **>120** | **F** | $\boxed{\textbf{>120}}$ | $\boxed{\textbf{F}}$ | **4.7** | **0.075** | ***No Feasible Improvement*** | |
| | | PM | | **37.2** | **E** | 25.0 | D | -2.6 | -0.103 | | |
| 50 | E. Bayshore Road & Euclid Avenue* | AM | AWSC | **OVERSAT** | **F** | $\boxed{\textbf{OVERSAT}}$ | $\boxed{\textbf{F}}$ | **42.4** | **0.062** | ***Corridor Improvement*** | |
| | | PM | | **OVERSAT** | **F** | **OVERSAT** | **F** | **-5.7** | **-0.016** | | |
| 51 | Clarke Avenue & E. Bayshore Road | AM | Signalized | 14.1 | B | 14.2 | B | 0.1 | 0.008 | | |
| | | PM | | 13.9 | B | 14.0 | B | 0.1 | 0.007 | | |
| 52 | Pulgas Avenue & E. Bayshore Road | AM | Signalized | 25.4 | C | 26.2 | C | 1.1 | 0.013 | | |
| | | PM | | 47.4 | D | 47.2 | D | 0.2 | 0.001 | | |

Note:
* Denotes a CMP interesection
AWSC - All Way Stop Control; TWSC - Two Way Stop Control
[1] Average delay is reported for signalized and AWSC intersections. For TWSC intersections, the delay for the worst stop-controlled movement is reported.
"OVERSAT" indicates that the SimTraffic microsimulation model indicates that the intersection would experience capacity issues where the demand cannot be served by the intersection. Oversaturated intersections would operate at LOS F.
[*] Intersections were analyzed using Synchro/SimTraffic software due to the close proximity of these intersections. Changes in critical delay and v/c calculated using Traffix.
**Bold** indicates substandard level of service
$\boxed{\textbf{Bold}}$ indicates adverse effect

## Intersection Vehicle Queuing

The analysis of intersection levels of service was supplemented with a vehicle queuing analysis for intersection left-turning movements where the proposed project would add significant trips per lane in the vicinity of the Project Site and affect intersection operations (see Figure 22). This analysis provides a basis for estimating future storage requirements at these intersections (see Table 22). Vehicle queues were estimated using the methodology described in Chapter 1. The following turn movements were selected for evaluation:

- Northbound left-turn at Marsh Road and Bayfront Expressway
- Eastbound left-turn at Willow Road and Bayfront Expressway
- Eastbound left-turn and Southbound left-turn at Willow Road and Ivy Drive
- Southbound left-turn at Willow Road and US 101 southbound ramps
- Southbound left-turn at Willow Road and Bay Road
- Westbound shared left-through lane and Eastbound shared through-right lane at O’Brien Drive and Kavanaugh Drive
- Southbound shared left/through lane at Adams Drive and O’Brien Drive
- Eastbound left-turn and Southbound left-turn at University Avenue and O’Brien Drive
- Eastbound left-turn at University Avenue and Kavanaugh Drive

Locations where the estimated 95th percentile queues would exceed the available storage capacity for the movement are discussed below. Queuing issues are operational issues resulting from signal timing and queue storage provisions. Queuing issues are not considered a CEQA issue related to hazards.

### Eastbound Left-turn at Willow Road and Bayfront Expressway (#16)

The existing vehicle storage for the eastbound left turn pocket on Willow Road at Bayfront Expressway is 300 feet, which provides enough space for about 12 vehicles. Under existing conditions, the 95th percentile queue would exceed the storage of the left turn pocket by 12 vehicles in the AM peak hour. Under near-term conditions, the 95th percentile queue would exceed the storage length of the turn pocket by 15 vehicles during the AM peak hour and four vehicles during the PM peak hour. The Proposed Project would add three vehicles to the 95th percentile queue during the AM peak hour and PM peak hour. There is no room to extend the left turn pocket due to the emergency vehicle only lane cut in the median.

### Eastbound Left-turn at Willow Road and Ivy Drive (#19)

The existing vehicle storage for the eastbound left turn pocket on Willow Road at Ivy Drive is 125 feet, which provides enough space for about 5 vehicles. Under existing conditions, the 95th percentile queue would be accommodated by the left turn pocket. Under near-term conditions, the 95th percentile queue exceeds the storage length of the turn pocket by three vehicles during the AM peak hour. The Proposed Project would add one vehicle to the 95th percentile queue during the AM peak hour and one vehicle during the PM peak hour. There is no room to further extend this left-turn.

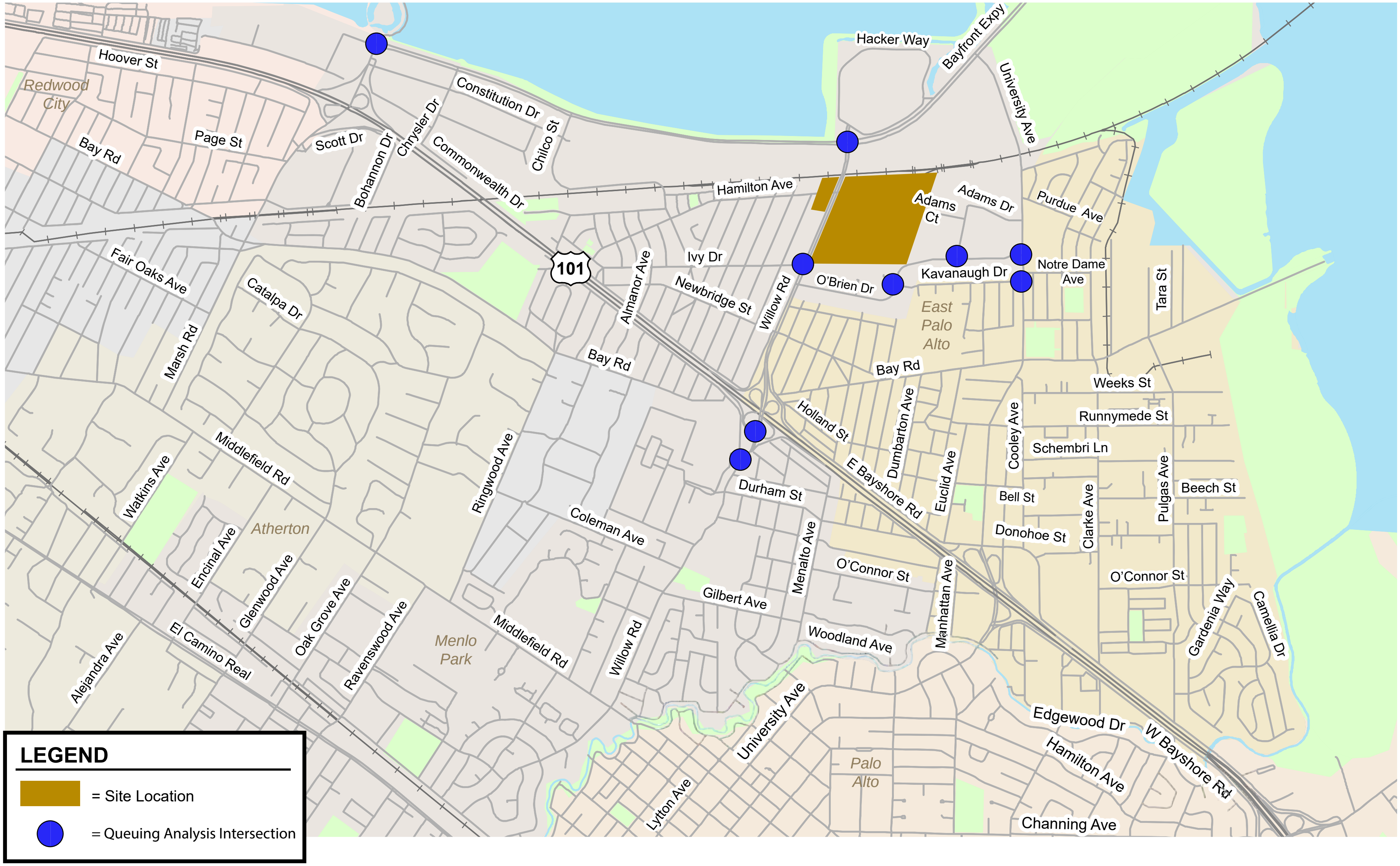



**Figure 22**
**Queuing Analysis Locations**

HEXAGON

NORTH
Not to Scale

### Southbound Left-turn at Willow Road and Bay Road (#24)

The existing vehicle storage for the southbound left turn pocket on Willow Road at Bay Road is 250 feet, which provides enough space for about 10 vehicles. Under existing conditions, the 95th percentile queue would exceed the storage length of the left turn pocket by 6 vehicles. Under near-term conditions, the 95th percentile queue exceeds the storage length of the turn pocket by 13 vehicles during the AM peak hour and one vehicle during the PM peak hour. The Proposed Project would add six vehicles to the 95th percentile queue during the AM peak hour and three vehicles during the PM peak hour. Menlo Park's TIF has a project to add a second left-turn lane to this intersection, which would add additional storage for left-turning vehicles. The exact length of the addition will be determined during the design phase for the intersection improvement. Construction of the recommended improvement would reduce the queuing deficiency created by the Proposed Project.

### Eastbound Left-turn and Southbound left-turn at University Avenue and O'Brien Drive (#36)

The existing vehicle storage for the eastbound left turn pocket on University Avenue at O'Brien Drive is 125 feet, which provides enough spaces for about 5 vehicles. Under existing conditions, the 95th percentile queue exceeds the storage length of the turn pocket by 3 vehicles during the AM peak hour. The Proposed Project would add 22 vehicles to the 95th percentile queue during the AM peak hour. There is no room to lengthen the eastbound left turn pocket.

The existing vehicle storage for the southbound left turn pocket on O'Brien Drive at University Avenue is 60 feet, which provides enough spaces for 2 vehicles. Under existing conditions, the 95th percentile queue exceeds the storage length of the turn pocket by one vehicle during the AM peak hour and 11 vehicles during the PM peak hour. The Project would add one vehicle to the 95th percentile queue during the AM peak hour. There would be no increase to the 95th percentile queue length during the PM peak hour. There is room to extend the left turn pocket to accommodate the estimated 95$^{th}$ percentile queue of 325 feet.

Menlo Park's Traffic Impact Fee (TIF) program identifies an improvement to signalize the nearby intersection at University Avenue and Adams Drive in East Palo Alto. This improvement may provide an alternative route for Project vehicles to access the Project Site via University Avenue, and alleviate potential queuing issues at this intersection.

**Table 22**
**Intersection Vehicle Queuing Results**

| Intersection | Marsh Road & Bayfront Expressway[4] | | Willow Road & Bayfront Expressway[4] | | Willow Road & Ivy Drive[4] | | | |
|---|---|---|---|---|---|---|---|---|
| Movement | NBLT | | EBLT | | EBLT | | SBLT | |
| Peak Hour Period | AM | PM | AM | PM | AM | PM | AM | PM |
| ***Existing*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 160 | 160 | 140 | 140 | 130 | 130 | 130 | 130 |
| Lanes | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 1931 | 1822 | 195 | 88 | 49 | 44 | 11 | 32 |
| 95th% Queue (veh/ln) | 36 | 29 | 24 | 5 | 4 | 3 | 1 | 2 |
| 95th% Queue (ft/ln) | 900 | 725 | 600 | 125 | 100 | 75 | 25 | 50 |
| Storage (ft/ ln) | 1350 | 1350 | 300 | 300 | 125 | 125 | 125 | 125 |
| Adequate (Y/N) | Y | Y | ***N*** | Y | Y | Y | Y | Y |
| ***Near-Term*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 160 | 160 | 140 | 140 | 130 | 130 | 130 | 130 |
| Lanes | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 1931 | 2034 | 210 | 151 | 81 | 80 | 11 | 35 |
| 95th% Queue (veh/ln) | 36 | 34 | 27 | 8 | 8 | 5 | 1 | 2 |
| 95th% Queue (ft/ln) | 900 | 850 | 675 | 200 | 200 | 125 | 25 | 50 |
| Storage (ft/ ln) | 1350 | 1350 | 300 | 300 | 125 | 125 | 125 | 125 |
| Adequate (Y/N) | Y | Y | ***N*** | Y | ***N*** | Y | Y | Y |
| ***Near-Term Plus Project*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 160 | 160 | 140 | 140 | 130 | 130 | 130 | 130 |
| Lanes | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 2028 | 2225 | 225 | 189 | 91 | 83 | 65 | 71 |
| 95th% Queue (veh/ln) | 41 | 40 | 30 | 9 | 11 | 6 | 4 | 4 |
| 95th% Queue (ft/ln) | 1025 | 1000 | 750 | 225 | 275 | 150 | 100 | 100 |
| Storage (ft/ ln) | 1350 | 1350 | 300 | 300 | 125 | 125 | 125 | 125 |
| Adequate (Y/N) | Y | Y | ***N*** | Y | ***N*** | ***N*** | Y | Y |

Notes:
NB = northbound; SB = southbound; WB = westbound; EB = eastbound; L/T/R = shared left-through-right; RT = right turn movement; LT = left turn movement
[1] Vehicle queue calculations based on cycle length for signalized intersections and delay for the approach for unsignalized intersections.
[2] Assumes 25 feet per vehicle queued.
[3] Intersection is all-way-stop-controlled under existing conditions and signalized under background condiitions.
[4] 95th Percentile queue length used from Vistro software.
[5] 95th Percentile queue length developed using Poisson Distribution.

**Table 22**
**Intersection Vehicle Queuing Results (Continued)**

| Intersection | Willow Road & US 101 Southbound Ramps[4] | | Willow Road & Bay Road[4] | | O'Brien Drive & Kavanugh Drive[4] | | | |
|---|---|---|---|---|---|---|---|---|
| Movement | SBLT | | SBLT | | WBL/T | | EBT/R | |
| Peak Hour Period | AM | PM | AM | PM | AM | PM | AM | PM |
| ***Existing*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 80 | 80 | 48 | 48 | 12.7 | 10.1 | 11.4 | 17.9 |
| Lanes | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 472 | 285 | 352 | 241 | 328 | 203 | 296 | 529 |
| 95th% Queue (veh/ln) | 8 | 3 | 16 | 7 | 3 | 2 | 3 | 7 |
| 95th% Queue (ft/ln) | 200 | 75 | 400 | 175 | 75 | 50 | 75 | 175 |
| Storage (ft/ ln) | 400 | 400 | 250 | 250 | 330 | 330 | 1800 | 1800 |
| Adequate (Y/N) | Y | Y | ***N*** | Y | Y | Y | Y | Y |
| ***Near-Term*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 80 | 80 | 48 | 48 | 13.6 | 11.8 | 12.4 | 39 |
| Lanes | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 689 | 612 | 406 | 283 | 330 | 242 | 315 | 648 |
| 95th% Queue (veh/ln) | 10 | 8 | 23 | 11 | 3 | 2 | 3 | 14 |
| 95th% Queue (ft/ln) | 250 | 200 | 575 | 275 | 75 | 50 | 75 | 350 |
| Storage (ft/ ln) | 400 | 400 | 250 | 250 | 330 | 330 | 1800 | 1800 |
| Adequate (Y/N) | Y | Y | ***N*** | ***N*** | Y | Y | Y | Y |
| ***Near-Term Plus Project*** | | | | | | | | |
| Cycle/Delay[1] (sec) | 80 | 80 | 48 | 48 | 28.6 | 22.4 | 190.5 | 129.2 |
| Lanes | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 937 | 726 | 438 | 301 | 395 | 319 | 713 | 625 |
| 95th% Queue (veh/ln) | 13 | 9 | 29 | 13 | 7 | 5 | 35 | 26 |
| 95th% Queue (ft/ln) | 325 | 225 | 725 | 325 | 175 | 125 | 875 | 650 |
| Storage (ft/ ln) | 400 | 400 | 250 | 250 | 330 | 330 | 1800 | 1800 |
| Adequate (Y/N) | Y | Y | ***N*** | ***N*** | Y | Y | Y | Y |

Notes:
NB = northbound; SB = southbound; WB = westbound; EB = eastbound; L/T/R = shared left-through-right; RT = right turn movement; LT = left turn movement
[1] Vehicle queue calculations based on cycle length for signalized intersections and delay for the approach for unsignalized intersections.
[2] Assumes 25 feet per vehicle queued.
[3] Intersection is all-way-stop-controlled under existing conditions and signalized under background condiitions.
[4] 95th Percentile queue length used from Vistro software.
[5] 95th Percentile queue length developed using Poisson Distribution.

**Table 22**
**Intersection Vehicle Queuing Results (Continued)**

| Intersection | Adams Drive and O'Brien Drive[4] | | University Avenue & Purdue Avenue[5] | | | |
|---|---|---|---|---|---|---|
| Movement | SBL/T | | WBLT | | NBLT | |
| Peak Hour Period | AM | PM | AM | PM | AM | PM |
| ***Existing*** | | | | | | |
| Cycle/Delay[1] (sec) | 4.4 | 4.1 | 16.5 | 16.5 | 16.5 | 16.5 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 166 | 440 | 99 | 20 | 26 | 29 |
| 95th% Queue (veh/ln) | 1 | 1 | 2 | 1 | 1 | 1 |
| 95th% Queue (ft/ln) | 25 | 25 | 50 | 25 | 25 | 25 |
| Storage (ft/ ln) | 625 | 625 | 75 | 75 | 50 | 50 |
| Adequate (Y/N) | Y | Y | Y | Y | Y | Y |
| ***Near-Term*** | | | | | | |
| Cycle/Delay[1] (sec) | 4.5 | 3.9 | 16.5 | 16.5 | 16.5 | 16.5 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 170 | 481 | 209 | 46 | 27 | 46 |
| 95th% Queue (veh/ln) | 1 | 1 | 3 | 1 | 1 | 1 |
| 95th% Queue (ft/ln) | 25 | 25 | 75 | 25 | 25 | 25 |
| Storage (ft/ ln) | 625 | 625 | 75 | 75 | 50 | 50 |
| Adequate (Y/N) | Y | Y | Y | Y | Y | Y |
| ***Near-Term Plus Project*** | | | | | | |
| Cycle/Delay[1] (sec) | 3.9 | 1.2 | 16.5 | 16.5 | 16.5 | 16.5 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 250 | 952 | 214 | 65 | 54 | 69 |
| 95th% Queue (veh/ln) | 1 | 1 | 3 | 1 | 1 | 1 |
| 95th% Queue (ft/ln) | 25 | 25 | 75 | 25 | 25 | 25 |
| Storage (ft/ ln) | 625 | 625 | 75 | 75 | 50 | 50 |
| Adequate (Y/N) | Y | Y | Y | Y | Y | Y |

Notes:
NB = northbound; SB = southbound; WB = westbound; EB = eastbound; L/T/R = shared left-through-right; RT = right turn movement; LT = left turn movement
[1] Vehicle queue calculations based on cycle length for signalized intersections and delay for the approach for unsignalized intersections.
[2] Assumes 25 feet per vehicle queued.
[3] Intersection is all-way-stop-controlled under existing conditions and signalized under background condiitions.
[4] 95th Percentile queue length used from Vistro software.
[5] 95th Percentile queue length developed using Poisson Distribution.

**Table 22**
**Intersection Vehicle Queuing Results (Continued)**

| Intersection | University Avenue & O'Brien Drive[5] | | | | University Avenue & Kavanaugh Drive[5] | |
|---|---|---|---|---|---|---|
| Movement | EBLT | | SBLT | | EBLT | |
| Peak Hour Period | AM | PM | AM | PM | AM | PM |
| ***Existing*** | | | | | | |
| Cycle/Delay[1] (sec) | 150 | 150 | 150 | 150 | 150 | 150 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 110 | 6 | 32 | 185 | 44 | 11 |
| 95th% Queue (veh/ln) | 8 | 1 | 3 | 13 | 4 | 2 |
| 95th% Queue (ft/ln) | 200 | 25 | 75 | 325 | 100 | 50 |
| Storage (ft/ ln) | 125 | 125 | 50 | 50 | 100 | 100 |
| Adequate (Y/N) | ***N*** | Y | ***N*** | ***N*** | Y | Y |
| ***Near-Term*** | | | | | | |
| Cycle/Delay[1] (sec) | 150 | 150 | 150 | 150 | 150 | 150 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 110 | 6 | 33 | 185 | 56 | 19 |
| 95th% Queue (veh/ln) | 8 | 1 | 4 | 13 | 5 | 2 |
| 95th% Queue (ft/ln) | 200 | 25 | 100 | 325 | 125 | 50 |
| Storage (ft/ ln) | 125 | 125 | 50 | 50 | 100 | 100 |
| Adequate (Y/N) | ***N*** | Y | ***N*** | ***N*** | ***N*** | Y |
| ***Near-Term Plus Project*** | | | | | | |
| Cycle/Delay[1] (sec) | 150 | 150 | 150 | 150 | 150 | 150 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vph) | 525 | 22 | 58 | 185 | 44 | 35 |
| 95th% Queue (veh/ln) | 30 | 3 | 5 | 13 | 4 | 4 |
| 95th% Queue (ft/ln) | 750 | 75 | 125 | 325 | 100 | 100 |
| Storage (ft/ ln) | 125 | 125 | 50 | 50 | 100 | 100 |
| Adequate (Y/N) | ***N*** | Y | ***N*** | ***N*** | Y | Y |

Notes:
NB = northbound; SB = southbound; WB = westbound; EB = eastbound; L/T/R = shared left-through-right; RT = right turn movement; LT = left turn movement
[1] Vehicle queue calculations based on cycle length for signalized intersections and delay for the approach for unsignalized intersections.
[2] Assumes 25 feet per vehicle queued.
[3] Intersection is all-way-stop-controlled under existing conditions and signalized under background condiitions.
[4] 95th Percentile queue length used from Vistro software.
[5] 95th Percentile queue length developed using Poisson Distribution.

## Freeway Facilities Analysis

In analyzing the freeway segments, the citywide travel demand forecast model was used to forecast the increase in traffic volumes between existing and near term plus project conditions. For the purpose of this study, freeway levels of service under cumulative conditions are calculated based on volume to capacity (V/C) ratio. A freeway segment is assumed to operate at LOS F under future conditions if,

- The freeway segment already operates at LOS F under existing conditions, or
- The ConnectMenlo model forecasts the freeway segment to operate at a V/C ratio above 1 under future conditions.

### Definition of Adverse Freeway Effects

**San Mateo County**

Within San Mateo County, the project is said to create an adverse effect on traffic conditions on a freeway segment if for either peak hour:

1. The analysis indicates that the combination of the proposed project and future traffic demand will result in the freeway segment operating at a level of service that exceeds the standard adopted by the current CMP and the proposed project increases traffic demand on the freeway segment by an amount equal to one percent (1%) or more of the segment capacity, or
2. The project will add traffic demand equal to one percent (1%) or more of the segment capacity if the freeway segment is currently not in compliance with the adopted LOS standard.

**Santa Clara County**

VTA CMP guidelines define that a project would cause an adverse effect on freeway operations if for either peak hour:

1. The project would deteriorate freeway levels of service from an acceptable level to an unacceptable level, or
2. If the freeway already operates at an unacceptable level under existing conditions, and the project would add traffic exceeding one percent (1%) of the freeway capacity.

**Alameda County**

The Alameda County CMP does not have a policy for determining a threshold of significance for CMP requirements. The freeway segment analysis (see Table 25 below) is provided only for information.

### Freeway Analysis

To determine the Proposed Project's potential freeway adverse effects, a select-zone analysis within the Menlo Park model was performed to estimate the increase in project traffic volume between existing conditions and near term with project conditions. Freeway segments that would experience a freeway adverse effect generated by the Proposed Project are identified below.

**San Mateo County**

As shown on Table 23, the proposed project would add traffic greater than 1% capacity to the following study freeway segments operating below its LOS standard:

- SR 84 – from Willow Road to Alameda County Line – PM Peak Hour
- SR 84 – from Alameda County Line to Willow Road – AM Peak Hour
- US 101 – between Santa Clara County Line and Whipple Avenue – AM & PM Peak Hours
- US 101 – from Whipple Avenue to SR 92 – PM Peak Hour
- US 101 – from SR 92 to Whipple Avenue – AM Peak Hour

**Santa Clara County**

As shown on Table 24, the proposed project would add traffic greater than 1% capacity to the following mixed-flow freeway segments operating below its LOS standard:

- US 101 – from SR 85 to Embarcadero Road – AM & PM Peak Hours
- US 101 – from Embarcadero Road to SR 85 – PM Peak hour

The proposed project would add traffic greater than 1% capacity to the following HOV freeway segment operating below its LOS standard:

- US 101 – from Oregon Expressway to Embarcadero Road – AM Peak Hour

## Freeway Improvements

It should be noted that the near term plus project conditions model run assumed the US 101 express lane project in San Mateo County. Improvements to eliminate the adverse freeway effects on US 101 and on SR 84 within San Mateo County would require additional capacity improvements and/or additional TDM measures that would reduce peak-hour vehicle trip-making by more than 70%. San Mateo County currently has no plans to further improve US 101 beyond the identified express lane projects. There are also no identified plans to improve the Bayfront Expressway (SR 84) corridor. Such an aggressive TDM plan would also not be feasible.

Within Santa Clara County, Valley Transportation Authority's Valley Transportation Plan 2040 identifies freeway express lane projects along US 101 that would convert the existing HOV lanes to express lanes and add a second express lane in each direction. This improvement would increase the capacity of the freeway and would adequately address the freeway impacts.

The potential Dumbarton Rail corridor would slightly reduce the Project contribution to the identified adverse effects but would not eliminate any. Therefore, the Project's adverse effects on US 101 and on SR 84 freeway segments in San Mateo County would remain.

**Table 23**
**Freeway Analysis – San Mateo County**

| CMP Facility | Roadway Segment | Dir. | Pk Hr | LOS Standard | Capacity | Existing LOS | Near Term + Project LOS | Near Term + Project % Project Added |
|---|---|---|---|---|---|---|---|---|
| SR 84 | US 101 to Willow Rd | SB | AM | D | 1,100 | C | C | 0.0% |
| | | SB | PM | D | 1,100 | B | D | 2.2% |
| SR 84 | Willow Rd to US 101 | NB | AM | D | 1,100 | C | D | 4.3% |
| | | NB | PM | D | 1,100 | B | B | 2.1% |
| SR 84 | Willow Rd to University Ave | SB | AM | E | 1,100 | F | **F** | **0.9%** |
| | | SB | PM | E | 1,100 | E | **F** | **4.0%** |
| SR 84 | University Ave to Willow Rd | NB | AM | E | 1,100 | **F** | **F** | **3.2%** |
| | | NB | PM | E | 1,100 | E | E | 1.0% |
| SR 84 | University Ave to Alameda County Line | SB | AM | F | 2,100 | **F** | **F** | **0.5%** |
| | | SB | PM | F | 2,100 | **F** | **F** | **2.1%** |
| SR 84 | Alameda County Line to University Ave | NB | AM | F | 2,100 | **F** | **F** | **1.7%** |
| | | NB | PM | F | 2,100 | **F** | **F** | **0.5%** |
| US 101 | Santa Clara County Line to Whipple Ave | NB | AM | F | 2,300 | **F** | **F** | **1.1%** |
| | | NB | PM | F | 2,300 | **F** | **F** | **2.7%** |
| US 101 | Whipple Ave to Santa Clara County Line | SB | AM | F | 2,300 | **F** | **F** | **2.3%** |
| | | SB | PM | F | 2,300 | **F** | **F** | **1.4%** |
| US 101 | Whipple Ave to SR 92 | NB | AM | E | 2,300 | **F** | **F** | **0.7%** |
| | | NB | PM | E | 2,300 | **F** | **F** | **1.6%** |
| US 101 | SR 92 to Whipple Ave | SB | AM | E | 2,300 | **F** | **F** | **1.2%** |
| | | SB | PM | E | 2,300 | **F** | **F** | **0.9%** |
| SR 109 (University Ave) | Kavanaugh Dr to SR 84 | EB | AM | E | 1,100 | C | C | 0.0% |
| | | EB | PM | E | 1,100 | C | D | 0.1% |
| SR 109 (University Ave) | SR 84 to Kavanaugh Dr | WB | AM | E | 1,100 | **F** | **F** | **0.1%** |
| | | WB | PM | E | 1,100 | **F** | **F** | **0.0%** |
| SR 114 (Willow Rd) | US 101 to SR 84 | EB | AM | E | 1,100 | B | B | 9.6% |
| | | EB | PM | E | 1,100 | B | B | 9.6% |
| SR 114 (Willow Rd) | SR 84 to US 101 | WB | AM | E | 1,100 | C | C | 5.2% |
| | | WB | PM | E | 1,100 | C | C | 5.7% |

Notes:
Data referenced San Mateo Couny City/County Association of Governments *Congestion Management Program 2019.*
**Bold** indicates non-compliant LOS
**box and BOLD** indicates adverse effect

## Table 24
## Freeway Analysis – Santa Clara County

| | | | | Existing Conditions | | | | | | Near Term + Project Conditions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mixed-Flow | | | HOV Lane | | | Mixed Flow | | | HOV | | |
| Freeway | Segment | Dir | Peak Hour | Capacity[1] | Volume [2] (pc/hr/ln) | LOS [2] | Capacity[1] | Volume [2] (pc/hr/ln) | LOS [2] | LOS | Project added | % Capacity | LOS | Project added | % Capacity |
| US 101 | SR 85 to N. Shoreline Blvd | NB | AM | 9,200 | 1,512 | **F** | 1,650 | 1,751 | E | **F** | **187** | **2.0%** | E | 8 | 0.5% |
| | | | PM | 9,200 | 1,358 | **F** | 1,650 | 1,635 | D | **F** | **118** | **1.3%** | D | 6 | 0.4% |
| US 101 | N. Shoreline Blvd to Rengstorff Ave | NB | AM | 6,900 | 1,660 | **F** | 3,300 | 1,730 | D | **F** | **198** | **2.9%** | D | 16 | 0.5% |
| | | | PM | 6,900 | 1,298 | **F** | 3,300 | 1,683 | D | **F** | **124** | **1.8%** | D | 12 | 0.4% |
| US 101 | Rengstorff Ave to San Antonio Ave | NB | AM | 6,900 | 1,747 | E | 3,300 | 1,716 | D | **F** | **208** | **3.0%** | D | 17 | 0.5% |
| | | | PM | 6,900 | 1,333 | **F** | 3,300 | 1,646 | D | **F** | **132** | **1.9%** | D | 14 | 0.4% |
| US 101 | San Antonio Ave to Oregon Expwy | NB | AM | 6,900 | 1,262 | **F** | 3,300 | 1,693 | D | **F** | **232** | **3.4%** | D | 12 | 0.4% |
| | | | PM | 6,900 | 1,083 | **F** | 3,300 | 1,482 | **F** | **F** | **152** | **2.2%** | **F** | **15** | **0.4%** |
| US 101 | Oregon Expwy to Embarcadero Rd | NB | AM | 6,900 | 1,367 | **F** | 1,650 | 1,693 | **F** | **F** | **224** | **3.3%** | **F** | **19** | **1.1%** |
| | | | PM | 6,900 | 1,271 | **F** | 1,650 | 1,588 | **F** | **F** | **151** | **2.2%** | **F** | **16** | **0.9%** |
| US 101 | Embarcadero Rd to Oregon Expwy | SB | AM | 6,900 | 1,991 | D | 1,650 | n/a | A | D | 118 | 1.7% | C | 11 | 0.7% |
| | | | PM | 6,900 | 1,135 | **F** | 1,650 | 1,627 | D | **F** | **190** | **2.8%** | D | 17 | 1.0% |
| US 101 | Oregon Expwy to San Antonio Ave | SB | AM | 6,900 | 1,989 | D | 3,300 | 919 | A | D | 118 | 1.7% | B | 11 | 0.3% |
| | | | PM | 6,900 | 1,050 | **F** | 3,300 | 1,693 | D | **F** | **191** | **2.8%** | D | 17 | 0.5% |
| US 101 | San Antonio Ave to Rengstorff Ave | SB | AM | 6,900 | 1,890 | E | 3,300 | 780 | A | E | 104 | 1.5% | B | 10 | 0.3% |
| | | | PM | 6,900 | 1,125 | **F** | 3,300 | 1,610 | D | **F** | **201** | **2.9%** | D | 15 | 0.5% |
| US 101 | Rengstorff Ave to N. Shoreline Blvd | SB | AM | 6,900 | 1,976 | D | 3,300 | 1,369 | C | D | 101 | 1.5% | C | 10 | 0.3% |
| | | | PM | 6,900 | 1,072 | **F** | 3,300 | 1,508 | D | **F** | **195** | **2.8%** | D | 15 | 0.4% |
| US 101 | N. Shoreline Blvd to SR 85 | SB | AM | 6,900 | 1,950 | D | 1,650 | 1,068 | A | E | 56 | 0.8% | A | 4 | 0.3% |
| | | | PM | 6,900 | 1,115 | **F** | 1,650 | 1,752 | E | **F** | **93** | **1.3%** | E | 7 | 0.4% |

Notes:
HOV = high-occupancy vehicle; LOS = level of service
1. Capacity is based on the capacities cited in VTA's *Transportation Impact Analysis Guidelines* (2014).
2. Volume, and Level of service (LOS) on each segment are taken from VTA's *2018 CMP Monitoring Report*. VTA did not report volume and density for segments with speed above 75.2
**Bold** indicates a substandard level of service.
Outline indicates an adverse effect

**Table 25**
**Freeway Analysis – Alameda County**

| CMP Facility | Roadway Segment | Dir. | Pk Hr | Capacity | Existing LOS | Near Term + Project Conditions | |
|---|---|---|---|---|---|---|---|
| | | | | | | Project Traffic | % Capacity |
| SR 84 | San Mateo County Line to Toll Plaza | EB | AM | 2,200 | A | 30 | 0.5% |
| | | EB | PM | 2,200 | C | 131 | 2.0% |
| SR 84 | Toll Plaza to San Mateo County Line | WB | AM | 2,200 | F | 109 | 1.7% |
| | | WB | PM | 2,200 | A | 33 | 0.5% |
| SR 84 | Toll Plaza to Thornton Ave | EB | AM | 2,200 | A | 30 | 0.5% |
| | | EB | PM | 2,200 | B | 131 | 2.0% |
| SR 84 | Paseo Padre Pkwy to Toll Plaza | WB | AM | 2,200 | F | 108 | 1.2% |
| | | WB | PM | 2,200 | C | 33 | 0.4% |
| SR 84 | Thornton Ave to Newark Blvd | EB | AM | 2,200 | A | 21 | 0.3% |
| | | EB | PM | 2,200 | C | 99 | 1.5% |
| SR 84 | Newark Blvd to Paseo Padre Pkwy | WB | AM | 2,200 | E | 74 | 0.8% |
| | | WB | PM | 2,200 | A | 25 | 0.3% |
| SR 84 | Newark Blvd to I-880 | EB | AM | 2,200 | D | 17 | 0.3% |
| | | EB | PM | 2,200 | F | 75 | 1.1% |
| SR 84 | I-880 to Newark Blvd | WB | AM | 2,200 | D | 57 | 0.6% |
| | | WB | PM | 2,200 | D | 22 | 0.3% |

Notes:
Data referenced the Alameda County Transportation Comission *2018 LOS Monitoring Report, Appendix B.*

## Freeway Ramp Analysis

A freeway ramp analysis is conducted under near term plus project conditions to determine whether freeway ramps would continue to have sufficient capacity to serve the forecasted traffic demand. For the purpose of this study, the project is said to create an adverse effect on a freeway ramp if:

- The project would cause the volume-to-capacity (V/C) ratio of the freeway ramp to exceed 1.0; or
- The project would increase the amount of traffic on a freeway ramp that is already exceeding its capacity by more than one percent (1%) of the ramp's capacity.

As shown on Table 26, under near term plus project conditions, all study freeway ramps would continue to have sufficient capacity to serve the anticipated demand.

**Table 26**
**Freeway Ramp Capacity Analysis**

| Interchange | Ramp | Peak Hour | Lanes Type | Mixed | HOV | Meter [1] | Capacity [2] | Existing Conditions Volume [3] | Existing Conditions V/C | Near Term + Project Conditions Volume | Near Term + Project Conditions V/C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101/Marsh Road | SB Off-ramp to Marsh Road | AM | Diagonal | 2 | - | - | 3,800 | 1,332 | 0.35 | 1,441 | 0.38 |
| | | PM | | | | | 3,800 | 1,156 | 0.30 | 1,212 | 0.32 |
| | NB on-ramp from WB Marsh Road | AM | Diagonal | 2 | 1 | YES | 1,800 | 1,559 | 0.87 | 1,738 | 0.97 |
| | | PM | | | | - | 2,000 | 1,472 | 0.74 | 1,612 | 0.81 |
| US 101/Willow Road | NB off-ramp to Willow Road | AM | Diagonal | 2 | - | - | 3,800 | 1,153 | 0.30 | 1,282 | 0.34 |
| | | PM | | | | | 3,800 | 1,055 | 0.28 | 1,142 | 0.30 |
| | NB on-ramp from WB Willow Road | AM | Diagonal | 1 | 1 | YES | 1,800 | 424 | 0.24 | 424 | 0.24 |
| | | PM | | | | - | 2,000 | 495 | 0.25 | 729 | 0.36 |
| | SB on-ramp from WB Willow Road | AM | Loop | 1 | - | - | 1,900 | 739 | 0.39 | 874 | 0.46 |
| | | PM | | | | YES | 900 | 633 | 0.70 | 674 | 0.75 |
| | SB off-ramp to Willow Road | AM | Diagonal | 2 | - | - | 3,800 | 863 | 0.23 | 1,328 | 0.35 |
| | | PM | | | | | 3,800 | 637 | 0.17 | 1,078 | 0.28 |
| US 101/University Avenue | NB off-ramp to Donohoe Street | AM | Diagonal | 1 | - | - | 2,000 | 857 | 0.43 | 1,162 | 0.58 |
| | | PM | | | | | 2,000 | 1,326 | 0.66 | 1,547 | 0.77 |
| | SB on-ramp from University Avenue | AM | Diagonal | 2 | - | - | 1,800 | 1,143 | 0.64 | 1,167 | 0.65 |
| | | PM | | | | YES | 900 | 744 | 0.83 | 810 | 0.90 |

Notes:
*NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound*
1. Northbound on-ramps are assumed metered during the AM peak hour. Southbound on-ramps are assumed metered during the PM peak hour.
2. Ramp capacities were obtained from *Highway Capacity Manual 2000* , and considered the free-flow speed, the number of lanes on the ramp, and ramp metering.
3. Existing volumes referenced intersection counts collected in 2019.

## Roadway ADT Analysis

This analysis included the evaluation of roadway average daily traffic (ADT) for 10 roadway segments (see Table 27 below) to determine the project's effect on City street segments. According to the City of Menlo Park *Transportation Impact Analysis Guidelines* published in July 2020, a project-generated traffic impact on City street segments would be considered potentially noncompliant if:

1. On Main Street, Avenue-Mixed Use, and Avenue-Neighborhood, a traffic impact may be considered potentially noncompliant if the existing ADT is:
    1) Greater than 19,000, and there is a net increase of 100 trips or more in ADT due to project related traffic;
    2) The ADT is greater than 10,000 but less than 18,000, and the project related traffic increases the ADT by 12.5%, or the ADT becomes 18,000 or more; or
    3) The ADT is less than 10,000, and the project related traffic increases the ADT by 25%.
2. On Mixed-Use Collector, and Neighborhood Collector, a traffic impact may be considered potentially noncompliant if the existing ADT is:
    1) Greater than 9,000, and there is a net increase of 50 trips or more in ADT due to project related traffic;
    2) The ADT is greater than 5,000 but less than 9,000, and the project related traffic increases the ADT by 12.5% or the ADT becomes 9,000 or more; or
    3) The ADT is less than 5,000, and the project related traffic increases the ADT by 25%.
3. On Neighborhood Connector, Bicycle Boulevard, and Local Access, a traffic impact may be considered potentially noncompliant if the existing ADT is:
    1) Greater than 1,350, and there is a net increase of 25 trips or more in ADT due to project related traffic;
    2) The ADT is greater than 750 but less than 1,350, and the project related traffic increases the ADT by 12.5% or the ADT becomes 1,350; or
    3) The ADT is less than 740, and the project related traffic increases the ADT by 25%.

The roadway ADT analysis was conducted under cumulative with project conditions. To determine net Project added traffic, a select zone analysis was conducted using the Menlo Park model under cumulative with project conditions and existing conditions. As shown on Table 27, the Project would generate non-compliance at the following roadway segments:

- Willow Road, east of Durham Street
- Willow Road, east of Blackburn Avenue
- Middlefield Road, south of Willow Road
- Marsh Road, east of Bohannon Drive
- O'Brien Drive, south of Willow Road
- O'Brien Drive, north of University Avenue
- Bay Road, north of Willow Road

**Table 27**
**Roadway ADT Analysis**

| Roadway | Classification | Average Daily Traffic | | | Compliance Analysis | |
|---|---|---|---|---|---|---|
| | | Existing [1] | Cumulative with Project | Net Increase in Project Traffic | Applicable Criteria | Compliant? |
| Willow Road, east of Durham Street | Avenue - Mixed Use | 28,875 | 31,400 | 550 | 7.B.1(1) | **No** |
| Willow Road, east of Blackburn Avenue | Avenue - Mixed Use | 22,962 | 24,050 | 410 | 7.B.1(1) | **No** |
| Middlefield Road, north of Willow Road | Avenue - Mixed Use | 18,188 | 20,037 | 64 | 7.B.1(1) | Yes |
| Middlefield Road, south of Willow Road | Avenue - Mixed Use | 21,058 | 23,687 | 285 | 7.B.1(1) | **No** |
| Marsh Road, east of Bohannon Drive | Mixed Use Collector | 33,128 | 39,213 | 669 | 7.B.2(1) | **No** |
| Hamilton Avenue, south of Madera Avenue | Neighborhood Collector | 2,866 | 3,589 | 265 | 7.B.2(3) | Yes |
| O'Brien Drive, south of Willow Road | Mixed Use Collector | 7,409 | 13,942 | 2,600 | 7.B.2(2) | **No** |
| O'Brien Drive, north of University Avenue | Mixed Use Collector | 4,635 | 16,232 | 6,457 | 7.B.2(3) | **No** |
| Adams Drive, north of University Avenue [2] | Mixed Use Collector | 3,265 | 3,763 | 84 | 7.B.2(3) | Yes |
| Bay Road, north of Willow Road | Neighborhood Collector | 6,362 | 12,637 | 841 | 7.B.2(2) | **No** |

Notes:
[1] Average Daily Traffic data was obtained from the City of Menlo Park
[2] Average Daily Traffic was estimated using factors derived from ADT data and peak hour counts
**Bold** indicates a project-generated non-compliance for study roadway

## Internal Site Access, Circulation, and Parking

Appendix H includes the analysis of the main Willow Village site as well as the Hamilton parcels. The site plan review evaluated the internal site's intersection operations, potential queuing issues, and general site access and circulation for the proposed seven new internal streets, 14 parking garage driveways, and 20 new intersections. The results of the level of service analysis show that the intersection of Driveway B & East Loop Road would operate at LOS D during the AM peak hour. Vehicles turning left out of Driveway B would be expected to experience an average delay of 31 seconds while waiting for a sufficient opening on East Loop Road. During the AM peak hour, approximately 101 vehicles (16 heading eastbound and 85 heading westbound) would be expected to exit the garage, which would be one to two vehicles per minute. Therefore, although exiting drivers would experience some wait time, operations at Driveway B are expected to be adequate. The results of the queuing analysis show that the intersection of Hamilton Avenue/Main Street & Willow Road is expected to have insufficient turn lane storage to accommodate the anticipated traffic volumes under near-term plus project conditions. However, it is assumed that vehicles would choose to instead enter the project site via Park Street. Hexagon recommends the following regarding the internal project circulation:

**Circulation Related Recommendations**

- To prevent southbound queues from spilling back onto Willow Road on Park Street and Main Street, Hexagon recommends coordinating the adjacent signals.

**Sight Distance Related Recommendations**

- As discussed under Mitigation Measure TRA-3 (see Transportation Chapter of the draft EIR), prior to issuance of the building permit for the North Garage, the applicant shall revise the access design to provide adequate sight distance for the eastern driveway or other design solutions to reduce hazards to a less than significant level, to the satisfaction of the Public Works Director. Potential solutions that would reduce hazards to a less than significant level include restricting the eastern driveway to inbound vehicles only or prohibiting exiting left turns, modifying landscaping or relocating the driveway to the west to allow for adequate sight distance for exiting vehicles, or installing an all-way stop or signal. If driveway A were restricted to inbound vehicles only, all outbound vehicles would use Driveway B, which would provide adequate sight distance for vehicles exiting the north office garage. Driveway B might need multiple exiting lanes to limit queuing inside the garage for exiting vehicles. Alternatively, Driveway A could be moved farther west on East Loop Road so that adequate sight distance could be provided.
- Prior to final design, the project applicant should ensure that landscaping and vegetation would not obstruct visibility at the parking garage driveways.
- Hexagon recommends including 30 feet of red curb on both sides of all garage driveways to prevent vehicles from parking and obstructing the vision of exiting drivers.
- If vehicles exiting the garages cannot see oncoming pedestrians on the sidewalk, Hexagon recommends installing warning signs to alert pedestrians when vehicles are exiting the garages.
- If any driveways are moved from their position on the current site plan, sight distance should be reevaluated.

**Parking Garage Circulation Related Recommendations**

- Prior to final design, it is recommended that all driveway widths meet the City's requirements.
- At garage driveways where gates and garage doors are proposed, Hexagon recommends conducting an operational analysis to ensure that gate opening and closing times would not create queuing issues or cause vehicles to spill onto the roadway network.
- Prior to final design, the residential parking on level P1 of building RS2 should be shown to be gated and separated from the retail parking on levels 1 and 2. In addition, the roll-up gate in building RS3 should be clearly shown to separate the retail parking in level B1 and the residential parking in level B2.
- It is recommended that all drive aisle and parking stall widths meet the City's requirements.
- It is recommended that adequate turnaround space is provided at all dead-end drive aisles.

**Parking Related Recommendations**

- If individual vehicles are not able to be retrieved in the tandem puzzle parking, the tandem spaces should be assigned to one residential unit.
- Prior to final design, Hexagon recommends that the required number of ADA and EV parking spaces be provided in all parking garages.

**Pedestrian Related Recommendations**

- Hexagon recommends that a crosswalk is provided at the intersection of Center Street & East Street and that midblock crosswalks are provided on Center Street and Park Street to reduce block size and improve pedestrian convenience.

**Hamilton Parcels Recommendations**

- The Hamilton Avenue Parcels are located within the C-2-S zoning district, which per Menlo Park Municipal Code Section 16.37(7), will have parking requirements established by the planning commission for each development. The Hamilton Avenue Parcel North proposes total potential development up to 22,402 square feet and 93 spaces. The Hamilton Avenue Parcel South proposes total development of 5,760 s.f. and 13 spaces. It is recommended that the project applicant confirm that sufficient parking is provided for the proposed total development as part of future architectural control and use permit applications with the City.

# Willow Village Master Plan Project

## Technical Appendices

April 16, 2022

# Appendix A
## Traffic Counts

agon_Data\Active\Menlo Park\Facebook Willow Campus EIR-18GB08\Vistro\Existing Conditions_AM.vistro

ulation Help Scenario: 16 Existing AM (2019 vols) Intersection: 163 Bayfront Expy/Marsh Rd

42

## Intersection Setup

Enter text to search...

| | ↑ | | | ↓ | | | → | | | ← | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | 163 | | | | | | | | | | | |
| Intersection | **Bayfront Expy/Marsh Rd** | | | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| Control Type | Signalized | | | | | | | | | | | |
| Analysis Method | HCM 6th Edition | | | | | | | | | | | |
| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
| Show Name | ☑ | | | ☑ | | | ☑ | | | ☑ | | |
| Approach | *Northbound* | | | *Southbound* | | | *Eastbound* | | | *Westbound* | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* |
| Base Volume Input [veh/h] | 162 | 27 | 1502 | 10 | 30 | 7 | 8 | 196 | 296 | 1931 | 371 | 34 |
| Total Analysis Volume [veh/h] | *169* | *28* | *1565* | *10* | *31* | *7* | *8* | *204* | *308* | *2011* | *386* | *35* |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

ulation Help

Scenario: 16 Existing PM (2019 vols)

Intersection: 163 Bayfront Expy/Marsh Rd

42

Intersection Setup

Enter text to search...

| | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | 163 | | | | | | | | | | | |
| Intersection | **Bayfront Expy/Marsh Rd** | | | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| Control Type | Signalized | | | | | | | | | | | |
| Analysis Method | HCM 6th Edition | | | | | | | | | | | |
| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
| Show Name | ☑ | | | ☑ | | | ☑ | | | ☑ | | |
| Approach | *Northbound* | | | *Southbound* | | | *Eastbound* | | | *Westbound* | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* |
| Base Volume Input [veh/h] | 179 | 40 | 1834 | 12 | 31 | 5 | 9 | 505 | 208 | 1822 | 119 | 14 |
| Total Analysis Volume [veh/h] | *186* | *42* | *1910* | *13* | *32* | *5* | *9* | *526* | *217* | *1898* | *124* | *15* |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45AM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

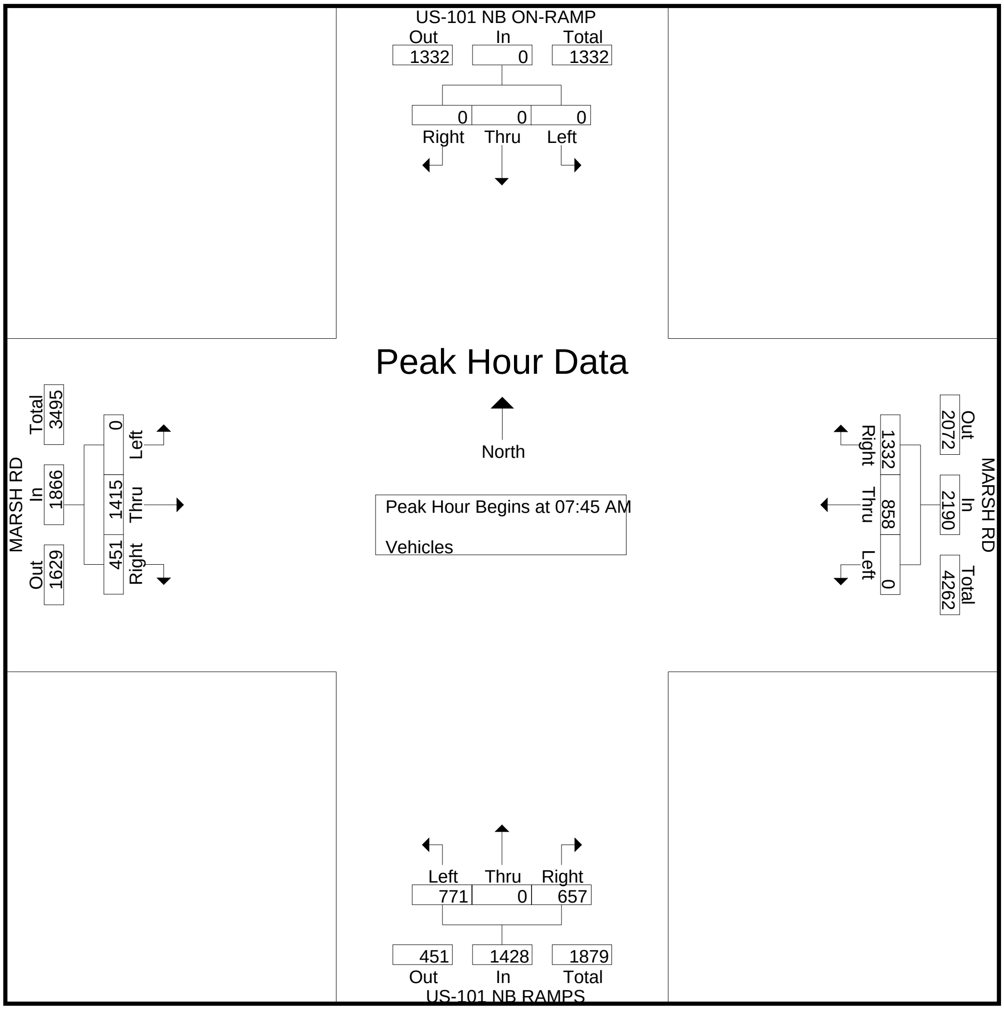
| | US-101 NB ON-RAMP Southbound | | | | | MARSH RD Westbound | | | | | US-101 NB RAMPS Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 355 | 189 | 0 | 0 | 544 | 85 | 0 | 198 | 0 | 283 | 82 | 252 | 0 | 0 | 334 | 1161 |
| 07:15 AM | 0 | 0 | 0 | 1 | 1 | 369 | 207 | 0 | 0 | 576 | 98 | 0 | 231 | 2 | 331 | 100 | 301 | 0 | 0 | 401 | 1309 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 318 | 178 | 0 | 0 | 496 | 116 | 0 | 229 | 1 | 346 | 102 | 281 | 0 | 0 | 383 | 1225 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 338 | 196 | 0 | 0 | 534 | 129 | 0 | 208 | 0 | 337 | 101 | 354 | 0 | 0 | 455 | 1326 |
| Total | 0 | 0 | 0 | 1 | 1 | 1380 | 770 | 0 | 0 | 2150 | 428 | 0 | 866 | 3 | 1297 | 385 | 1188 | 0 | 0 | 1573 | 5021 |
| 08:00 AM | 0 | 0 | 0 | 2 | 2 | 313 | 214 | 0 | 1 | 528 | 164 | 0 | 214 | 0 | 378 | 110 | 355 | 0 | 0 | 465 | 1373 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 331 | 211 | 0 | 0 | 542 | 179 | 0 | 218 | 0 | 397 | 117 | 357 | 0 | 0 | 474 | 1413 |
| 08:30 AM | 0 | 0 | 0 | 1 | 1 | 350 | 237 | 0 | 1 | 588 | 185 | 0 | 131 | 0 | 316 | 123 | 349 | 0 | 0 | 472 | 1377 |
| 08:45 AM | 0 | 0 | 0 | 2 | 2 | 382 | 190 | 0 | 0 | 572 | 189 | 0 | 133 | 0 | 322 | 92 | 334 | 0 | 0 | 426 | 1322 |
| Total | 0 | 0 | 0 | 5 | 5 | 1376 | 852 | 0 | 2 | 2230 | 717 | 0 | 696 | 0 | 1413 | 442 | 1395 | 0 | 0 | 1837 | 5485 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 320 | 170 | 0 | 0 | 490 | 172 | 0 | 136 | 0 | 308 | 97 | 367 | 0 | 0 | 464 | 1262 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 344 | 144 | 0 | 0 | 488 | 180 | 0 | 109 | 0 | 289 | 89 | 313 | 0 | 0 | 402 | 1179 |
| 09:30 AM | 0 | 0 | 0 | 3 | 3 | 339 | 191 | 0 | 0 | 530 | 153 | 0 | 115 | 0 | 268 | 117 | 364 | 0 | 0 | 481 | 1282 |
| 09:45 AM | 0 | 0 | 0 | 2 | 2 | 376 | 153 | 0 | 1 | 530 | 187 | 0 | 118 | 0 | 305 | 92 | 338 | 0 | 0 | 430 | 1267 |
| Total | 0 | 0 | 0 | 5 | 5 | 1379 | 658 | 0 | 1 | 2038 | 692 | 0 | 478 | 0 | 1170 | 395 | 1382 | 0 | 0 | 1777 | 4990 |
| Grand Total | 0 | 0 | 0 | 11 | 11 | 4135 | 2280 | 0 | 3 | 6418 | 1837 | 0 | 2040 | 3 | 3880 | 1222 | 3965 | 0 | 0 | 5187 | 15496 |
| Apprch % | 0 | 0 | 0 | 100 | | 64.4 | 35.5 | 0 | 0 | | 47.3 | 0 | 52.6 | 0.1 | | 23.6 | 76.4 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0.1 | 0.1 | 26.7 | 14.7 | 0 | 0 | 41.4 | 11.9 | 0 | 13.2 | 0 | 25 | 7.9 | 25.6 | 0 | 0 | 33.5 | |

| | US-101 NB ON-RAMP Southbound | | | | MARSH RD Westbound | | | | US-101 NB RAMPS Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | 0 | 0 | 0 | 338 | 196 | 0 | 534 | 129 | 0 | 208 | 337 | 101 | 354 | 0 | 455 | 1326 |
| 08:00 AM | 0 | 0 | 0 | 0 | 313 | 214 | 0 | 527 | 164 | 0 | 214 | 378 | 110 | 355 | 0 | 465 | 1370 |
| 08:15 AM | 0 | 0 | 0 | 0 | 331 | 211 | 0 | 542 | 179 | 0 | **218** | **397** | 117 | **357** | 0 | **474** | **1413** |
| 08:30 AM | 0 | 0 | 0 | 0 | **350** | **237** | 0 | **587** | **185** | 0 | 131 | 316 | **123** | 349 | 0 | 472 | 1375 |
| Total Volume | 0 | 0 | 0 | 0 | 1332 | 858 | 0 | 2190 | 657 | 0 | 771 | 1428 | 451 | 1415 | 0 | 1866 | 5484 |
| % App. Total | 0 | 0 | 0 | | 60.8 | 39.2 | 0 | | 46 | 0 | 54 | | 24.2 | 75.8 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .951 | .905 | .000 | .933 | .888 | .000 | .884 | .899 | .917 | .991 | .000 | .984 | .970 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45AM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 2



Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45AM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

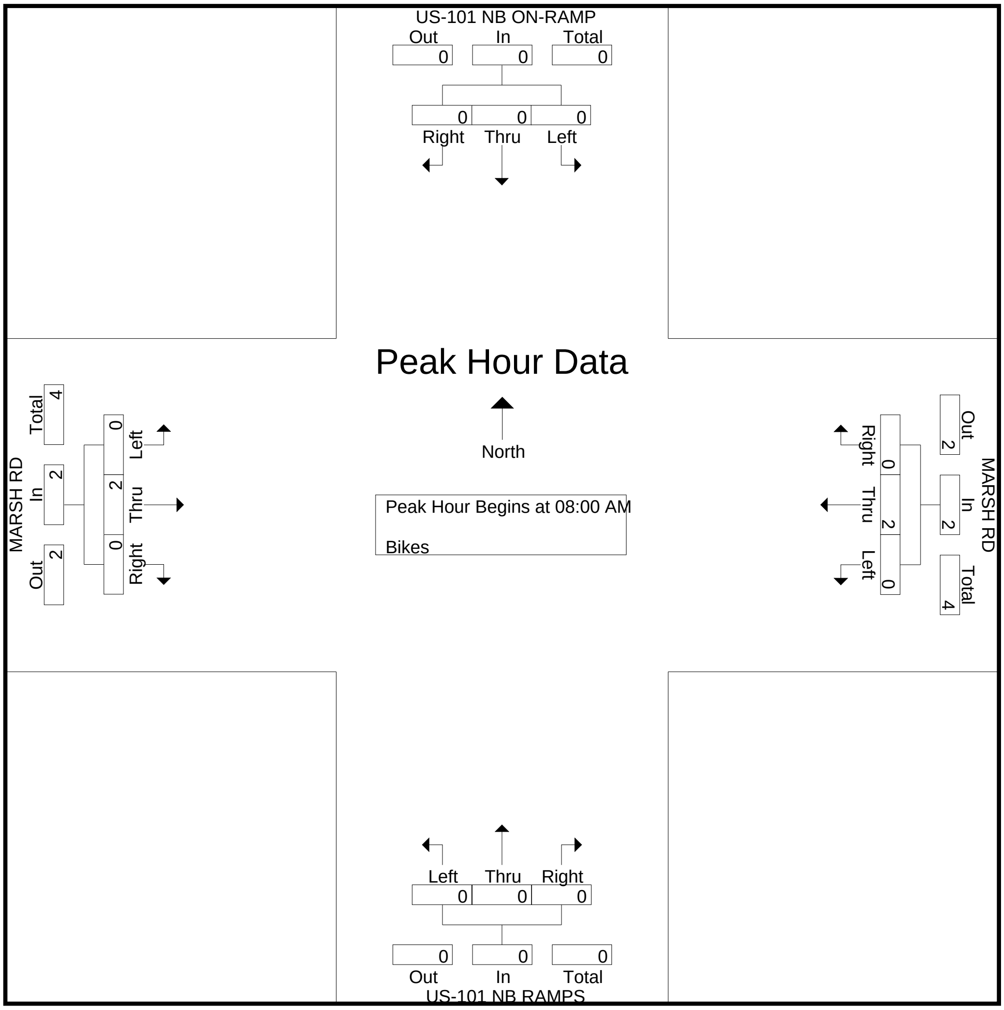
| | US-101 NB ON-RAMP Southbound | | | | | MARSH RD Westbound | | | | | US-101 NB RAMPS Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 50 | |

| | US-101 NB ON-RAMP Southbound | | | | MARSH RD Westbound | | | | US-101 NB RAMPS Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | **2** |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 4 |
| % App. Total | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .500 | .000 | .500 | .000 | .000 | .000 | .000 | .000 | .500 | .000 | .500 | .500 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45AM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45PM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

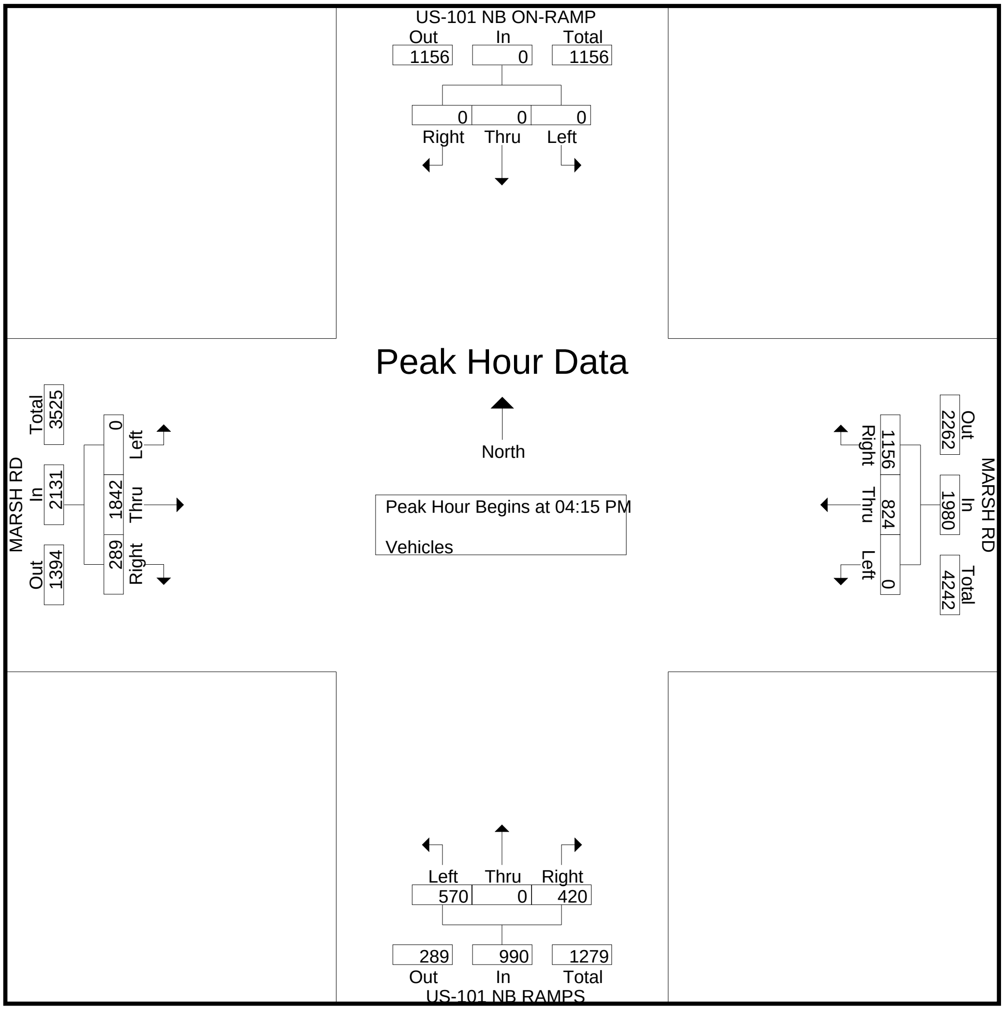
| | US-101 NB ON-RAMP Southbound | | | | | MARSH RD Westbound | | | | | US-101 NB RAMPS Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 238 | 193 | 0 | 0 | 431 | 140 | 0 | 119 | 0 | 259 | 82 | 427 | 0 | 0 | 509 | 1199 |
| 04:15 PM | 0 | 0 | 0 | 2 | 2 | 294 | 174 | 0 | 0 | 468 | 111 | 0 | 144 | 1 | 256 | 82 | 448 | 0 | 0 | 530 | 1256 |
| 04:30 PM | 0 | 0 | 0 | 1 | 1 | 279 | 222 | 0 | 0 | 501 | 109 | 0 | 136 | 0 | 245 | 71 | 449 | 0 | 0 | 520 | 1267 |
| 04:45 PM | 0 | 0 | 0 | 2 | 2 | 292 | 218 | 0 | 0 | 510 | 102 | 0 | 147 | 0 | 249 | 64 | 466 | 0 | 0 | 530 | 1291 |
| Total | 0 | 0 | 0 | 5 | 5 | 1103 | 807 | 0 | 0 | 1910 | 462 | 0 | 546 | 1 | 1009 | 299 | 1790 | 0 | 0 | 2089 | 5013 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 1 | 1 | 291 | 210 | 0 | 0 | 501 | 98 | 0 | 143 | 0 | 241 | 72 | 479 | 0 | 0 | 551 | 1294 |
| 05:15 PM | 0 | 0 | 0 | 3 | 3 | 300 | 225 | 0 | 0 | 525 | 91 | 0 | 133 | 0 | 224 | 78 | 418 | 0 | 0 | 496 | 1248 |
| 05:30 PM | 0 | 0 | 0 | 8 | 8 | 275 | 228 | 0 | 0 | 503 | 78 | 0 | 150 | 0 | 228 | 59 | 447 | 0 | 0 | 506 | 1245 |
| 05:45 PM | 0 | 0 | 0 | 3 | 3 | 243 | 201 | 0 | 0 | 444 | 90 | 0 | 139 | 1 | 230 | 72 | 430 | 0 | 0 | 502 | 1179 |
| Total | 0 | 0 | 0 | 15 | 15 | 1109 | 864 | 0 | 0 | 1973 | 357 | 0 | 565 | 1 | 923 | 281 | 1774 | 0 | 0 | 2055 | 4966 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 1 | 1 | 248 | 242 | 0 | 0 | 490 | 115 | 0 | 151 | 0 | 266 | 74 | 350 | 0 | 0 | 424 | 1181 |
| 06:15 PM | 0 | 0 | 0 | 2 | 2 | 258 | 239 | 0 | 0 | 497 | 89 | 0 | 158 | 0 | 247 | 60 | 370 | 0 | 0 | 430 | 1176 |
| 06:30 PM | 0 | 0 | 0 | 6 | 6 | 261 | 222 | 0 | 0 | 483 | 65 | 0 | 139 | 0 | 204 | 94 | 397 | 0 | 0 | 491 | 1184 |
| 06:45 PM | 0 | 0 | 0 | 2 | 2 | 223 | 163 | 0 | 0 | 386 | 60 | 0 | 122 | 0 | 182 | 67 | 345 | 0 | 0 | 412 | 982 |
| Total | 0 | 0 | 0 | 11 | 11 | 990 | 866 | 0 | 0 | 1856 | 329 | 0 | 570 | 0 | 899 | 295 | 1462 | 0 | 0 | 1757 | 4523 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 31 | 31 | 3202 | 2537 | 0 | 0 | 5739 | 1148 | 0 | 1681 | 2 | 2831 | 875 | 5026 | 0 | 0 | 5901 | 14502 |
| Apprch % | 0 | 0 | 0 | 100 | | 55.8 | 44.2 | 0 | 0 | | 40.6 | 0 | 59.4 | 0.1 | | 14.8 | 85.2 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0.2 | 0.2 | 22.1 | 17.5 | 0 | 0 | 39.6 | 7.9 | 0 | 11.6 | 0 | 19.5 | 6 | 34.7 | 0 | 0 | 40.7 | |

| | US-101 NB ON-RAMP Southbound | | | | MARSH RD Westbound | | | | US-101 NB RAMPS Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 0 | 0 | 0 | **294** | 174 | 0 | 468 | **111** | 0 | 144 | **255** | **82** | 448 | 0 | 530 | 1253 |
| 04:30 PM | 0 | 0 | 0 | 0 | 279 | **222** | 0 | 501 | 109 | 0 | 136 | 245 | 71 | 449 | 0 | 520 | 1266 |
| 04:45 PM | 0 | 0 | 0 | 0 | 292 | 218 | 0 | **510** | 102 | 0 | **147** | 249 | 64 | 466 | 0 | 530 | 1289 |
| 05:00 PM | 0 | 0 | 0 | 0 | 291 | 210 | 0 | 501 | 98 | 0 | 143 | 241 | 72 | **479** | 0 | **551** | **1293** |
| Total Volume | 0 | 0 | 0 | 0 | 1156 | 824 | 0 | 1980 | 420 | 0 | 570 | 990 | 289 | 1842 | 0 | 2131 | 5101 |
| % App. Total | 0 | 0 | 0 | | 58.4 | 41.6 | 0 | | 42.4 | 0 | 57.6 | | 13.6 | 86.4 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .983 | .928 | .000 | .971 | .946 | .000 | .969 | .971 | .881 | .961 | .000 | .967 | .986 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45PM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45PM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

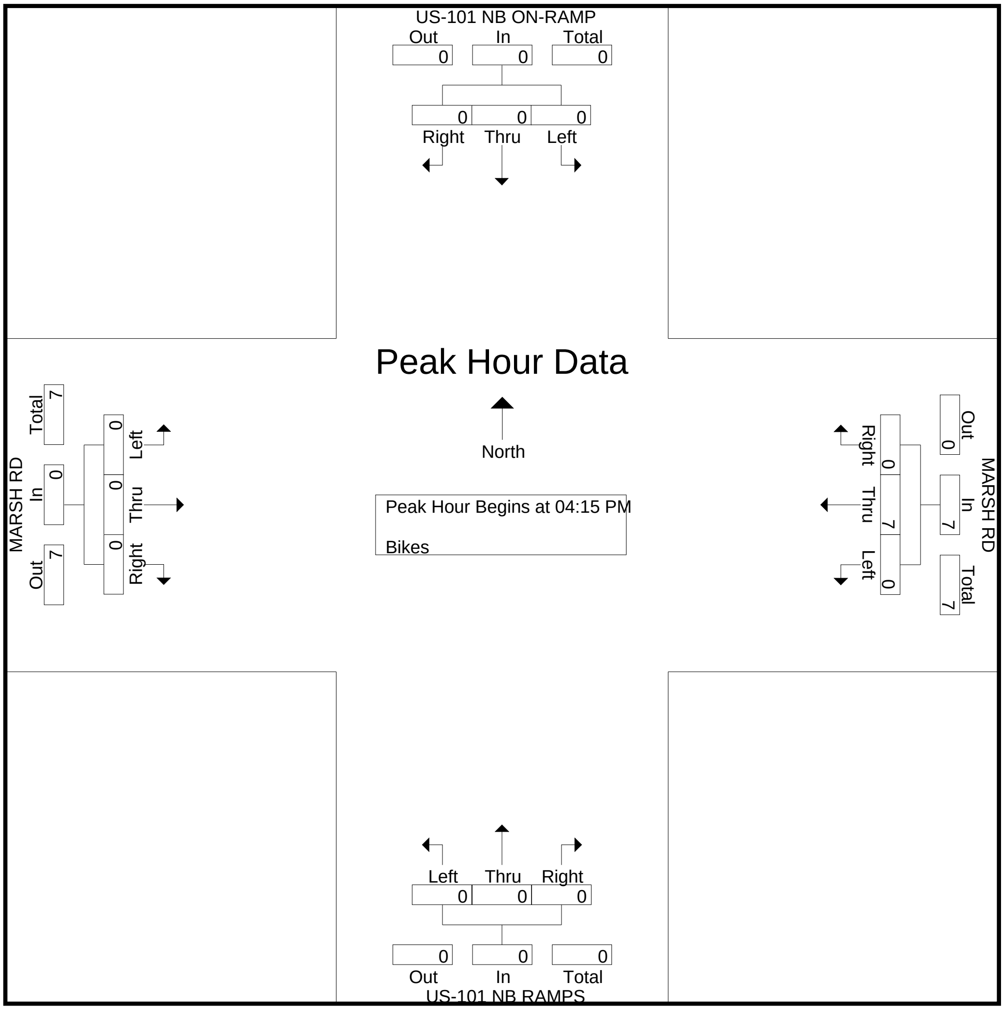
| | US-101 NB ON-RAMP Southbound | | | | | MARSH RD Westbound | | | | | US-101 NB RAMPS Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 7 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 11 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 90.9 | 0 | 0 | 90.9 | 0 | 0 | 0 | 0 | 0 | 0 | 9.1 | 0 | 0 | 9.1 | |

| | US-101 NB ON-RAMP Southbound | | | | MARSH RD Westbound | | | | US-101 NB RAMPS Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | **4** | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| % App. Total | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .438 | .000 | .438 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .438 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 45PM FINAL
Site Code : 00000045
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 44AM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

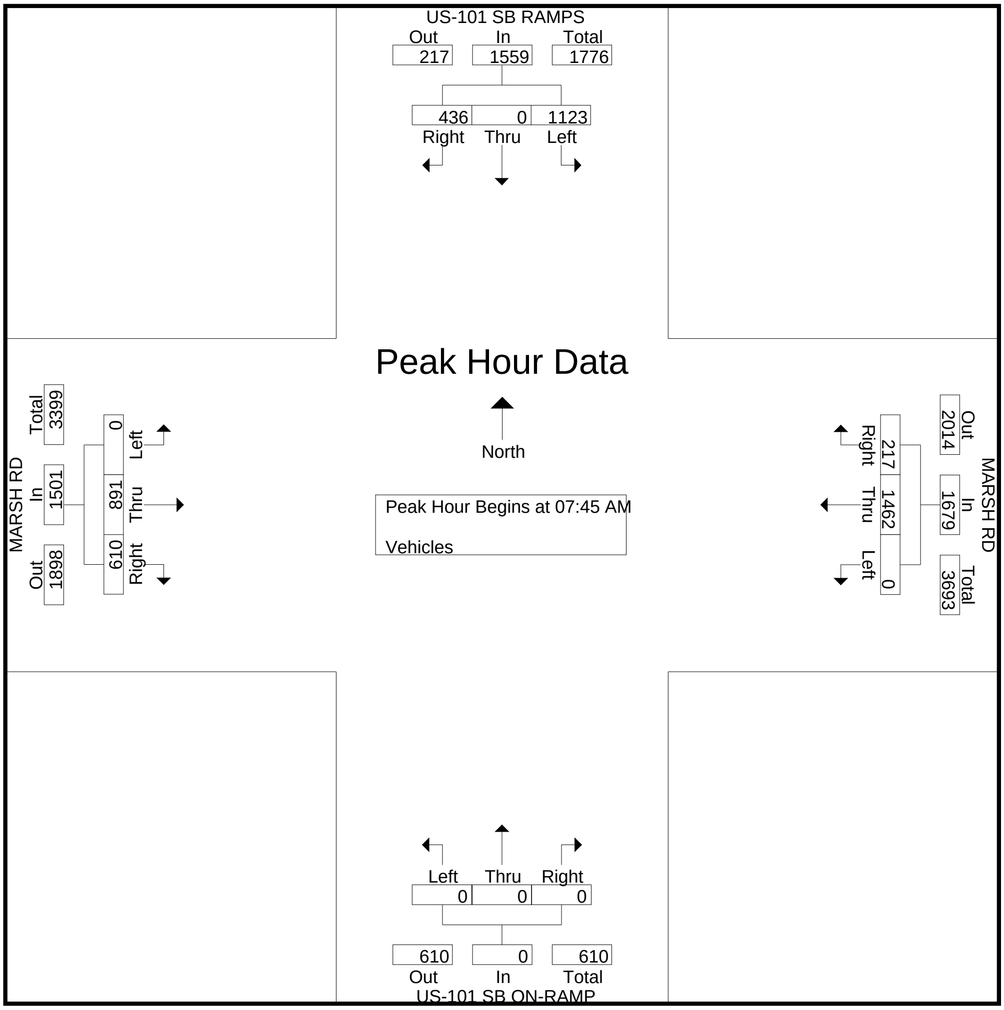
| | US-101 SB RAMPS Southbound | | | | | MARSH RD Westbound | | | | | US-101 SB ON-RAMP Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 118 | 0 | 193 | 0 | 311 | 44 | 339 | 0 | 0 | 383 | 0 | 0 | 0 | 0 | 0 | 148 | 136 | 0 | 0 | 284 | 978 |
| 07:15 AM | 133 | 0 | 245 | 0 | 378 | 42 | 352 | 0 | 0 | 394 | 0 | 0 | 0 | 0 | 0 | 156 | 154 | 0 | 1 | 311 | 1083 |
| 07:30 AM | 117 | 0 | 211 | 0 | 328 | 52 | 355 | 0 | 0 | 407 | 0 | 0 | 0 | 0 | 0 | 167 | 179 | 0 | 1 | 347 | 1082 |
| 07:45 AM | 120 | 0 | 276 | 0 | 396 | 46 | 345 | 0 | 0 | 391 | 0 | 0 | 0 | 0 | 0 | 162 | 202 | 0 | 0 | 364 | 1151 |
| Total | 488 | 0 | 925 | 0 | 1413 | 184 | 1391 | 0 | 0 | 1575 | 0 | 0 | 0 | 0 | 0 | 633 | 671 | 0 | 2 | 1306 | 4294 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 101 | 0 | 280 | 0 | 381 | 58 | 385 | 0 | 0 | 443 | 0 | 0 | 0 | 0 | 0 | 168 | 210 | 0 | 0 | 378 | 1202 |
| 08:15 AM | 121 | 0 | 265 | 0 | 386 | 45 | 396 | 0 | 0 | 441 | 0 | 0 | 0 | 0 | 0 | 138 | 238 | 0 | 0 | 376 | 1203 |
| 08:30 AM | 94 | 0 | 302 | 0 | 396 | 68 | 336 | 0 | 0 | 404 | 0 | 0 | 0 | 0 | 0 | 142 | 241 | 0 | 0 | 383 | 1183 |
| 08:45 AM | 90 | 0 | 265 | 0 | 355 | 51 | 301 | 0 | 0 | 352 | 0 | 0 | 0 | 0 | 0 | 99 | 173 | 0 | 0 | 272 | 979 |
| Total | 406 | 0 | 1112 | 0 | 1518 | 222 | 1418 | 0 | 0 | 1640 | 0 | 0 | 0 | 0 | 0 | 547 | 862 | 0 | 0 | 1409 | 4567 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 110 | 0 | 269 | 0 | 379 | 35 | 272 | 0 | 0 | 307 | 0 | 0 | 0 | 0 | 0 | 92 | 193 | 0 | 0 | 285 | 971 |
| 09:15 AM | 52 | 0 | 250 | 0 | 302 | 36 | 220 | 0 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 87 | 180 | 0 | 0 | 267 | 825 |
| 09:30 AM | 89 | 0 | 276 | 3 | 368 | 38 | 272 | 0 | 0 | 310 | 0 | 0 | 0 | 0 | 0 | 116 | 194 | 0 | 0 | 310 | 988 |
| 09:45 AM | 91 | 0 | 262 | 2 | 355 | 30 | 242 | 0 | 0 | 272 | 0 | 0 | 0 | 0 | 0 | 106 | 164 | 0 | 0 | 270 | 897 |
| Total | 342 | 0 | 1057 | 5 | 1404 | 139 | 1006 | 0 | 0 | 1145 | 0 | 0 | 0 | 0 | 0 | 401 | 731 | 0 | 0 | 1132 | 3681 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 1236 | 0 | 3094 | 5 | 4335 | 545 | 3815 | 0 | 0 | 4360 | 0 | 0 | 0 | 0 | 0 | 1581 | 2264 | 0 | 2 | 3847 | 12542 |
| Apprch % | 28.5 | 0 | 71.4 | 0.1 | | 12.5 | 87.5 | 0 | 0 | | 0 | 0 | 0 | 0 | | 41.1 | 58.9 | 0 | 0.1 | | |
| Total % | 9.9 | 0 | 24.7 | 0 | 34.6 | 4.3 | 30.4 | 0 | 0 | 34.8 | 0 | 0 | 0 | 0 | 0 | 12.6 | 18.1 | 0 | 0 | 30.7 | |

| | US-101 SB RAMPS Southbound | | | | MARSH RD Westbound | | | | US-101 SB ON-RAMP Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 120 | 0 | 276 | **396** | 46 | 345 | 0 | 391 | 0 | 0 | 0 | 0 | 162 | 202 | 0 | 364 | 1151 |
| 08:00 AM | 101 | 0 | 280 | 381 | 58 | 385 | 0 | **443** | 0 | 0 | 0 | 0 | **168** | 210 | 0 | 378 | 1202 |
| 08:15 AM | **121** | 0 | 265 | 386 | 45 | **396** | 0 | 441 | 0 | 0 | 0 | 0 | 138 | 238 | 0 | 376 | **1203** |
| 08:30 AM | 94 | 0 | **302** | 396 | **68** | 336 | 0 | 404 | 0 | 0 | 0 | 0 | 142 | **241** | 0 | **383** | 1183 |
| Total Volume | 436 | 0 | 1123 | 1559 | 217 | 1462 | 0 | 1679 | 0 | 0 | 0 | 0 | 610 | 891 | 0 | 1501 | 4739 |
| % App. Total | 28 | 0 | 72 | | 12.9 | 87.1 | 0 | | 0 | 0 | 0 | | 40.6 | 59.4 | 0 | | |
| PHF | .901 | .000 | .930 | .984 | .798 | .923 | .000 | .948 | .000 | .000 | .000 | .000 | .908 | .924 | .000 | .980 | .985 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 44AM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44AM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

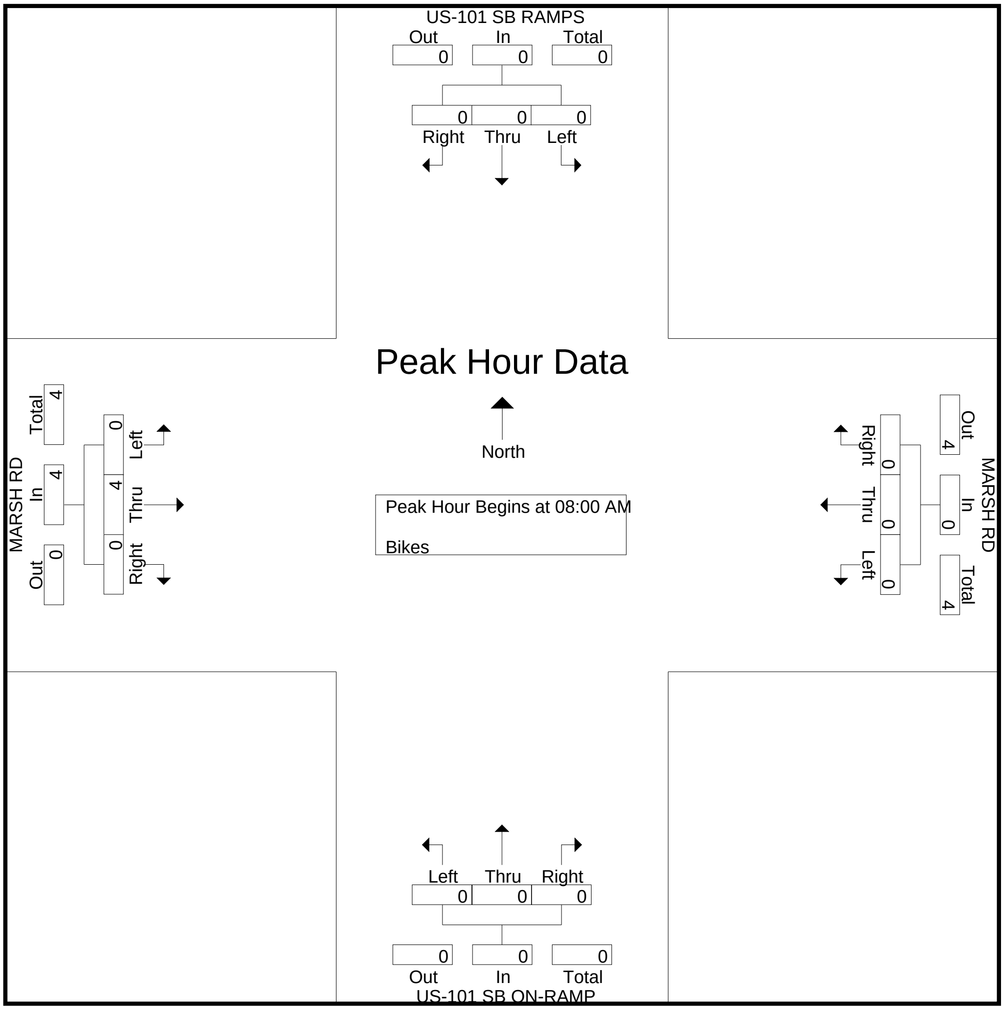
| | US-101 SB RAMPS Southbound | | | | | MARSH RD Westbound | | | | | US-101 SB ON-RAMP Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 4 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 5 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 100 | |

| | US-101 SB RAMPS Southbound | | | | MARSH RD Westbound | | | | US-101 SB ON-RAMP Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | **1** |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 4 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | 1.00 | .000 | 1.00 | 1.00 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44AM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44PM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

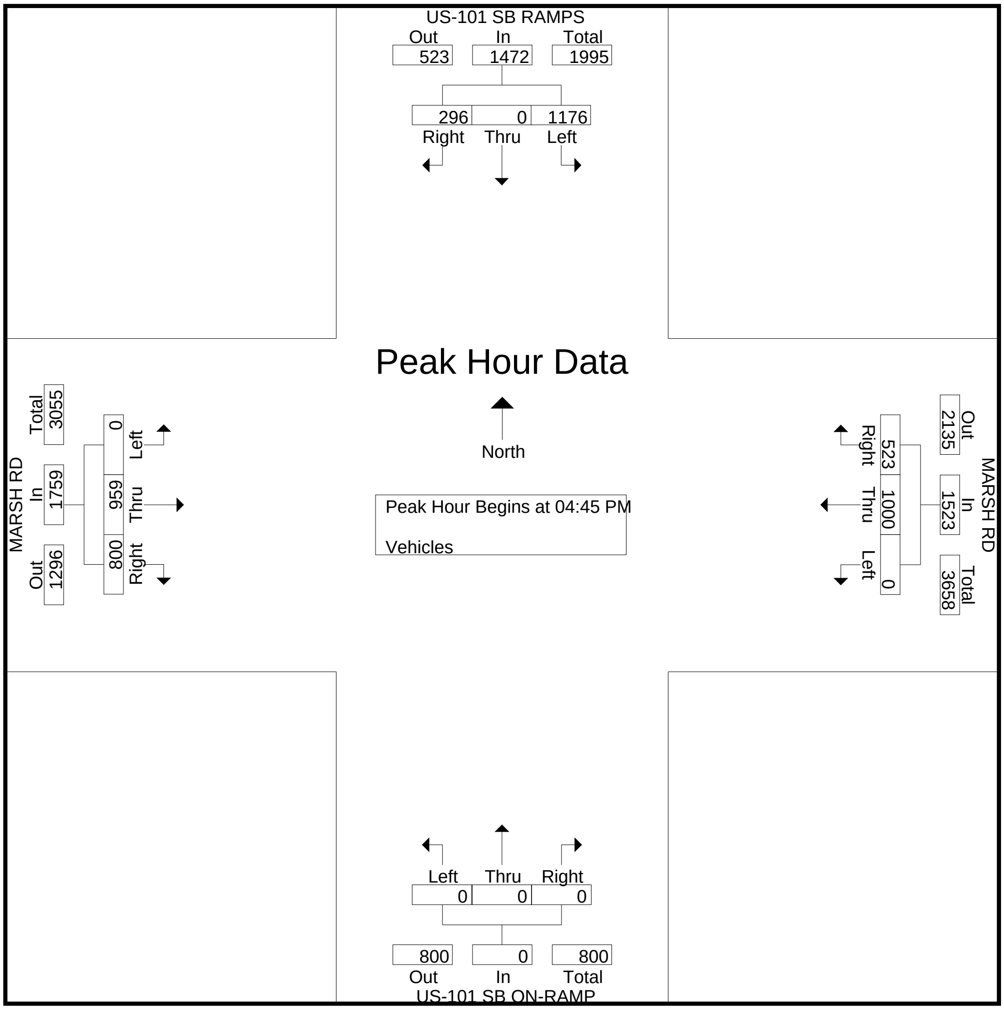
| | US-101 SB RAMPS Southbound | | | | | MARSH RD Westbound | | | | | US-101 SB ON-RAMP Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 55 | 0 | 223 | 1 | 279 | 108 | 201 | 0 | 0 | 309 | 0 | 0 | 0 | 0 | 0 | 233 | 281 | 0 | 0 | 514 | 1102 |
| 04:15 PM | 52 | 0 | 276 | 1 | 329 | 125 | 198 | 0 | 0 | 323 | 0 | 0 | 0 | 0 | 0 | 238 | 287 | 0 | 1 | 526 | 1178 |
| 04:30 PM | 67 | 0 | 262 | 0 | 329 | 127 | 216 | 0 | 0 | 343 | 0 | 0 | 0 | 0 | 0 | 207 | 260 | 0 | 0 | 467 | 1139 |
| 04:45 PM | 51 | 0 | 309 | 1 | 361 | 130 | 263 | 0 | 0 | 393 | 0 | 0 | 0 | 0 | 0 | 199 | 247 | 0 | 0 | 446 | 1200 |
| Total | 225 | 0 | 1070 | 3 | 1298 | 490 | 878 | 0 | 0 | 1368 | 0 | 0 | 0 | 0 | 0 | 877 | 1075 | 0 | 1 | 1953 | 4619 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 56 | 0 | 275 | 2 | 333 | 129 | 228 | 0 | 0 | 357 | 0 | 0 | 0 | 0 | 0 | 198 | 282 | 0 | 0 | 480 | 1170 |
| 05:15 PM | 75 | 0 | 261 | 2 | 338 | 130 | 252 | 0 | 0 | 382 | 0 | 0 | 0 | 0 | 0 | 218 | 244 | 0 | 0 | 462 | 1182 |
| 05:30 PM | 114 | 0 | 331 | 4 | 449 | 134 | 257 | 0 | 0 | 391 | 0 | 0 | 0 | 0 | 0 | 185 | 186 | 0 | 0 | 371 | 1211 |
| 05:45 PM | 97 | 0 | 282 | 2 | 381 | 135 | 228 | 0 | 0 | 363 | 0 | 0 | 0 | 0 | 0 | 170 | 225 | 0 | 0 | 395 | 1139 |
| Total | 342 | 0 | 1149 | 10 | 1501 | 528 | 965 | 0 | 0 | 1493 | 0 | 0 | 0 | 0 | 0 | 771 | 937 | 0 | 0 | 1708 | 4702 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 81 | 0 | 228 | 2 | 311 | 143 | 264 | 0 | 1 | 408 | 0 | 0 | 0 | 0 | 0 | 173 | 185 | 0 | 0 | 358 | 1077 |
| 06:15 PM | 94 | 0 | 264 | 3 | 361 | 155 | 250 | 0 | 0 | 405 | 0 | 0 | 0 | 0 | 0 | 136 | 175 | 0 | 0 | 311 | 1077 |
| 06:30 PM | 99 | 0 | 278 | 2 | 379 | 143 | 223 | 0 | 0 | 366 | 0 | 0 | 0 | 3 | 3 | 101 | 207 | 0 | 0 | 308 | 1056 |
| 06:45 PM | 108 | 0 | 224 | 4 | 336 | 93 | 197 | 0 | 0 | 290 | 0 | 0 | 0 | 0 | 0 | 126 | 203 | 0 | 0 | 329 | 955 |
| Total | 382 | 0 | 994 | 11 | 1387 | 534 | 934 | 0 | 1 | 1469 | 0 | 0 | 0 | 3 | 3 | 536 | 770 | 0 | 0 | 1306 | 4165 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 949 | 0 | 3213 | 24 | 4186 | 1552 | 2777 | 0 | 1 | 4330 | 0 | 0 | 0 | 3 | 3 | 2184 | 2782 | 0 | 1 | 4967 | 13486 |
| Apprch % | 22.7 | 0 | 76.8 | 0.6 | | 35.8 | 64.1 | 0 | 0 | | 0 | 0 | 0 | 100 | | 44 | 56 | 0 | 0 | | |
| Total % | 7 | 0 | 23.8 | 0.2 | 31 | 11.5 | 20.6 | 0 | 0 | 32.1 | 0 | 0 | 0 | 0 | 0 | 16.2 | 20.6 | 0 | 0 | 36.8 | |

| | US-101 SB RAMPS Southbound | | | | MARSH RD Westbound | | | | US-101 SB ON-RAMP Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 51 | 0 | 309 | 360 | 130 | **263** | 0 | **393** | 0 | 0 | 0 | 0 | 199 | 247 | 0 | 446 | 1199 |
| 05:00 PM | 56 | 0 | 275 | 331 | 129 | 228 | 0 | 357 | 0 | 0 | 0 | 0 | 198 | **282** | 0 | **480** | 1168 |
| 05:15 PM | 75 | 0 | 261 | 336 | 130 | 252 | 0 | 382 | 0 | 0 | 0 | 0 | **218** | 244 | 0 | 462 | 1180 |
| 05:30 PM | **114** | 0 | **331** | **445** | **134** | 257 | 0 | 391 | 0 | 0 | 0 | 0 | 185 | 186 | 0 | 371 | **1207** |
| Total Volume | 296 | 0 | 1176 | 1472 | 523 | 1000 | 0 | 1523 | 0 | 0 | 0 | 0 | 800 | 959 | 0 | 1759 | 4754 |
| % App. Total | 20.1 | 0 | 79.9 | | 34.3 | 65.7 | 0 | | 0 | 0 | 0 | | 45.5 | 54.5 | 0 | | |
| PHF | .649 | .000 | .888 | .827 | .976 | .951 | .000 | .969 | .000 | .000 | .000 | .000 | .917 | .850 | .000 | .916 | .985 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44PM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44PM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

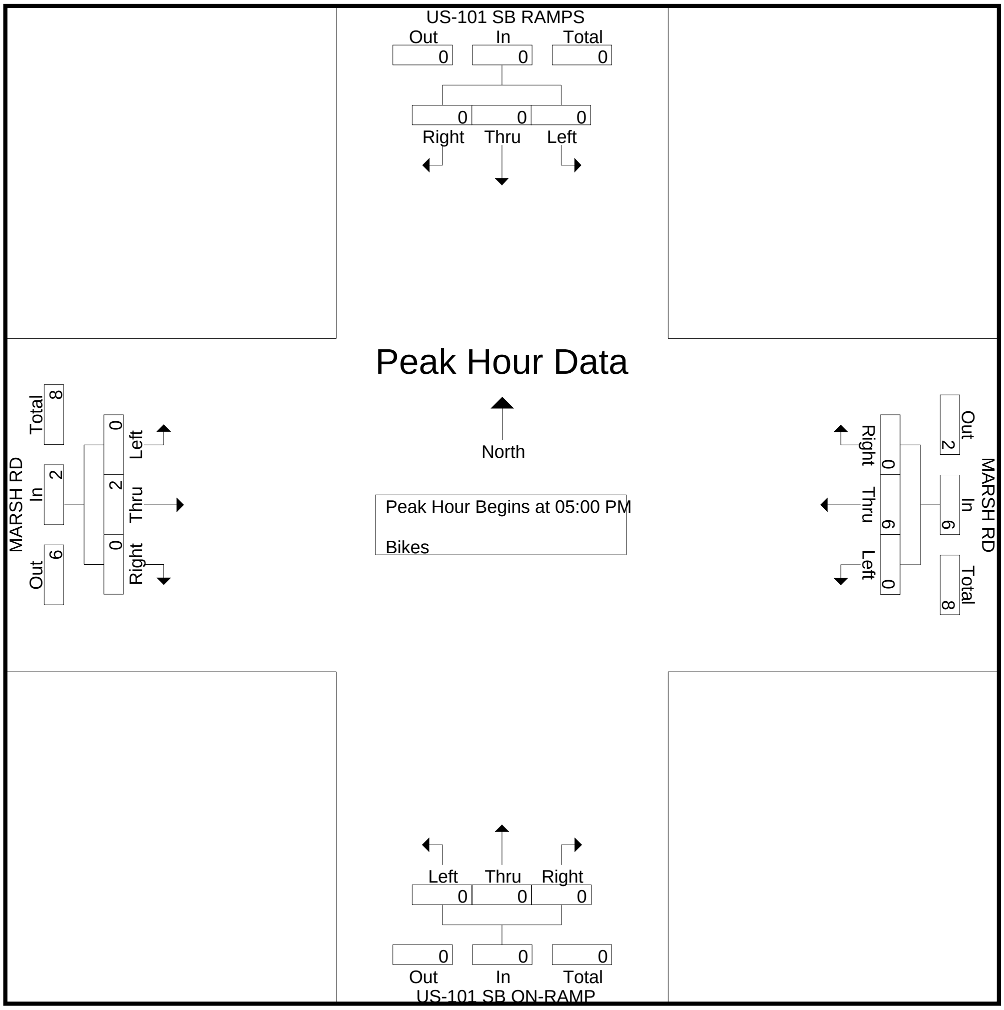
| | US-101 SB RAMPS Southbound | | | | | MARSH RD Westbound | | | | | US-101 SB ON-RAMP Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 8 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 12 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 83.3 | 0 | 0 | 83.3 | 0 | 0 | 0 | 0 | 0 | 0 | 16.7 | 0 | 0 | 16.7 | |

| | US-101 SB RAMPS Southbound | | | | MARSH RD Westbound | | | | US-101 SB ON-RAMP Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | **5** | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **5** |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 2 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 8 |
| % App. Total | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .300 | .000 | .300 | .000 | .000 | .000 | .000 | .000 | .500 | .000 | .500 | .400 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 44PM FINAL
Site Code : 00000044
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 22AM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

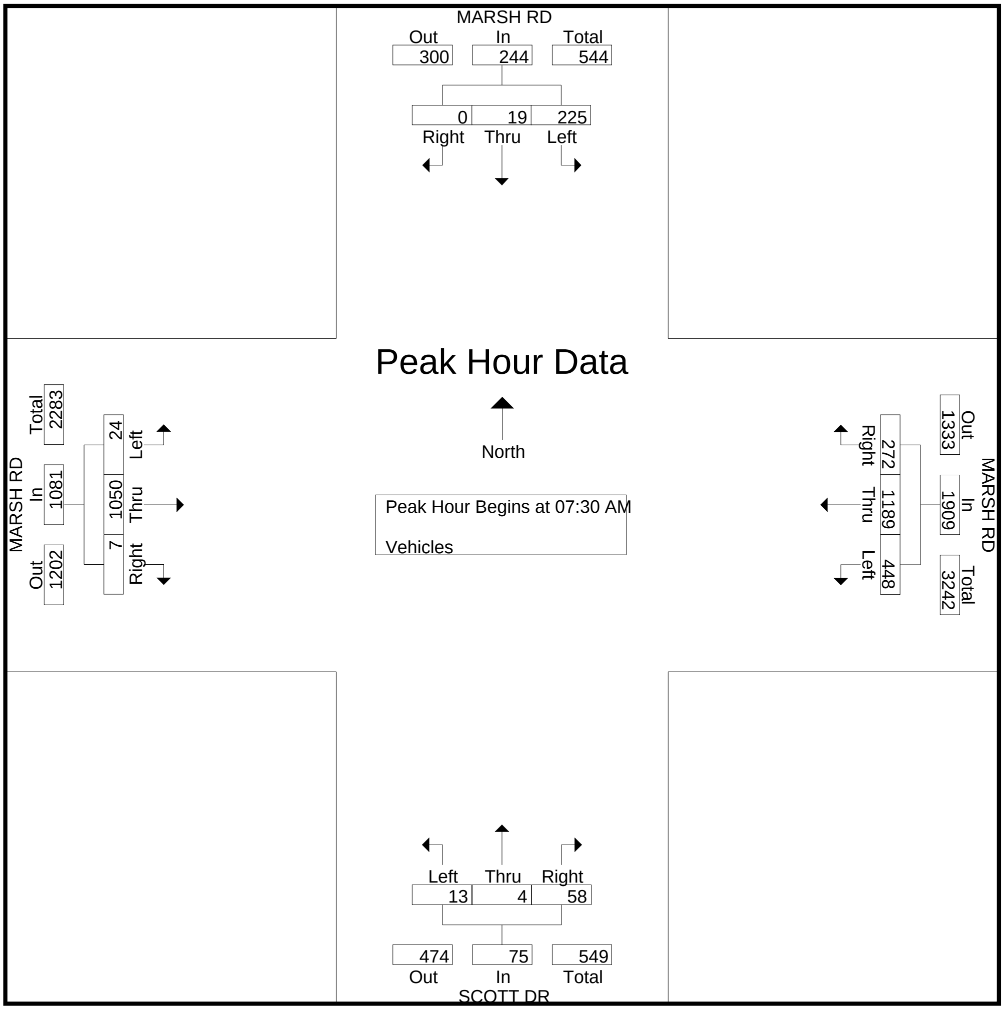
| | MARSH RD Southbound | | | | | MARSH RD Westbound | | | | | SCOTT DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 2 | 62 | 0 | 64 | 51 | 316 | 79 | 0 | 446 | 9 | 0 | 3 | 0 | 12 | 4 | 208 | 2 | 1 | 215 | 737 |
| 07:15 AM | 0 | 2 | 52 | 0 | 54 | 78 | 309 | 79 | 0 | 466 | 13 | 4 | 1 | 0 | 18 | 1 | 225 | 2 | 1 | 229 | 767 |
| 07:30 AM | 0 | 2 | 62 | 0 | 64 | 69 | 324 | 87 | 0 | 480 | 15 | 1 | 0 | 0 | 16 | 3 | 247 | 3 | 0 | 253 | 813 |
| 07:45 AM | 0 | 6 | 77 | 0 | 83 | 65 | 284 | 106 | 0 | 455 | 14 | 2 | 6 | 0 | 22 | 0 | 234 | 7 | 0 | 241 | 801 |
| Total | 0 | 12 | 253 | 0 | 265 | 263 | 1233 | 351 | 0 | 1847 | 51 | 7 | 10 | 0 | 68 | 8 | 914 | 14 | 2 | 938 | 3118 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 7 | 39 | 0 | 46 | 72 | 250 | 100 | 1 | 423 | 18 | 1 | 3 | 2 | 24 | 1 | 280 | 6 | 1 | 288 | 781 |
| 08:15 AM | 0 | 4 | 47 | 0 | 51 | 66 | 331 | 155 | 0 | 552 | 11 | 0 | 4 | 0 | 15 | 3 | 289 | 8 | 1 | 301 | 919 |
| 08:30 AM | 1 | 4 | 39 | 0 | 44 | 43 | 280 | 109 | 0 | 432 | 22 | 0 | 4 | 0 | 26 | 2 | 293 | 9 | 1 | 305 | 807 |
| 08:45 AM | 0 | 5 | 25 | 0 | 30 | 28 | 254 | 105 | 0 | 387 | 21 | 1 | 3 | 0 | 25 | 2 | 231 | 8 | 0 | 241 | 683 |
| Total | 1 | 20 | 150 | 0 | 171 | 209 | 1115 | 469 | 1 | 1794 | 72 | 2 | 14 | 2 | 90 | 8 | 1093 | 31 | 3 | 1135 | 3190 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 1 | 32 | 0 | 33 | 44 | 220 | 117 | 1 | 382 | 17 | 0 | 1 | 1 | 19 | 3 | 224 | 3 | 2 | 232 | 666 |
| 09:15 AM | 0 | 1 | 35 | 1 | 37 | 36 | 170 | 75 | 0 | 281 | 15 | 1 | 6 | 0 | 22 | 3 | 211 | 8 | 0 | 222 | 562 |
| 09:30 AM | 0 | 1 | 30 | 1 | 32 | 34 | 207 | 89 | 0 | 330 | 20 | 0 | 4 | 0 | 24 | 1 | 260 | 2 | 0 | 263 | 649 |
| 09:45 AM | 1 | 0 | 32 | 1 | 34 | 31 | 242 | 77 | 0 | 350 | 12 | 0 | 7 | 0 | 19 | 6 | 226 | 7 | 0 | 239 | 642 |
| Total | 1 | 3 | 129 | 3 | 136 | 145 | 839 | 358 | 1 | 1343 | 64 | 1 | 18 | 1 | 84 | 13 | 921 | 20 | 2 | 956 | 2519 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 2 | 35 | 532 | 3 | 572 | 617 | 3187 | 1178 | 2 | 4984 | 187 | 10 | 42 | 3 | 242 | 29 | 2928 | 65 | 7 | 3029 | 8827 |
| Apprch % | 0.3 | 6.1 | 93 | 0.5 | | 12.4 | 63.9 | 23.6 | 0 | | 77.3 | 4.1 | 17.4 | 1.2 | | 1 | 96.7 | 2.1 | 0.2 | | |
| Total % | 0 | 0.4 | 6 | 0 | 6.5 | 7 | 36.1 | 13.3 | 0 | 56.5 | 2.1 | 0.1 | 0.5 | 0 | 2.7 | 0.3 | 33.2 | 0.7 | 0.1 | 34.3 | |

| | MARSH RD Southbound | | | | MARSH RD Westbound | | | | SCOTT DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 2 | 62 | 64 | 69 | 324 | 87 | 480 | 15 | 1 | 0 | 16 | **3** | 247 | 3 | 253 | 813 |
| 07:45 AM | 0 | 6 | **77** | **83** | 65 | 284 | 106 | 455 | 14 | **2** | **6** | **22** | 0 | 234 | 7 | 241 | 801 |
| 08:00 AM | 0 | **7** | 39 | 46 | **72** | 250 | 100 | 422 | **18** | 1 | 3 | 22 | 1 | 280 | 6 | 287 | 777 |
| 08:15 AM | 0 | 4 | 47 | 51 | 66 | **331** | **155** | **552** | 11 | 0 | 4 | 15 | 3 | **289** | **8** | **300** | **918** |
| Total Volume | 0 | 19 | 225 | 244 | 272 | 1189 | 448 | 1909 | 58 | 4 | 13 | 75 | 7 | 1050 | 24 | 1081 | 3309 |
| % App. Total | 0 | 7.8 | 92.2 | | 14.2 | 62.3 | 23.5 | | 77.3 | 5.3 | 17.3 | | 0.6 | 97.1 | 2.2 | | |
| PHF | .000 | .679 | .731 | .735 | .944 | .898 | .723 | .865 | .806 | .500 | .542 | .852 | .583 | .908 | .750 | .901 | .901 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22AM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22AM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

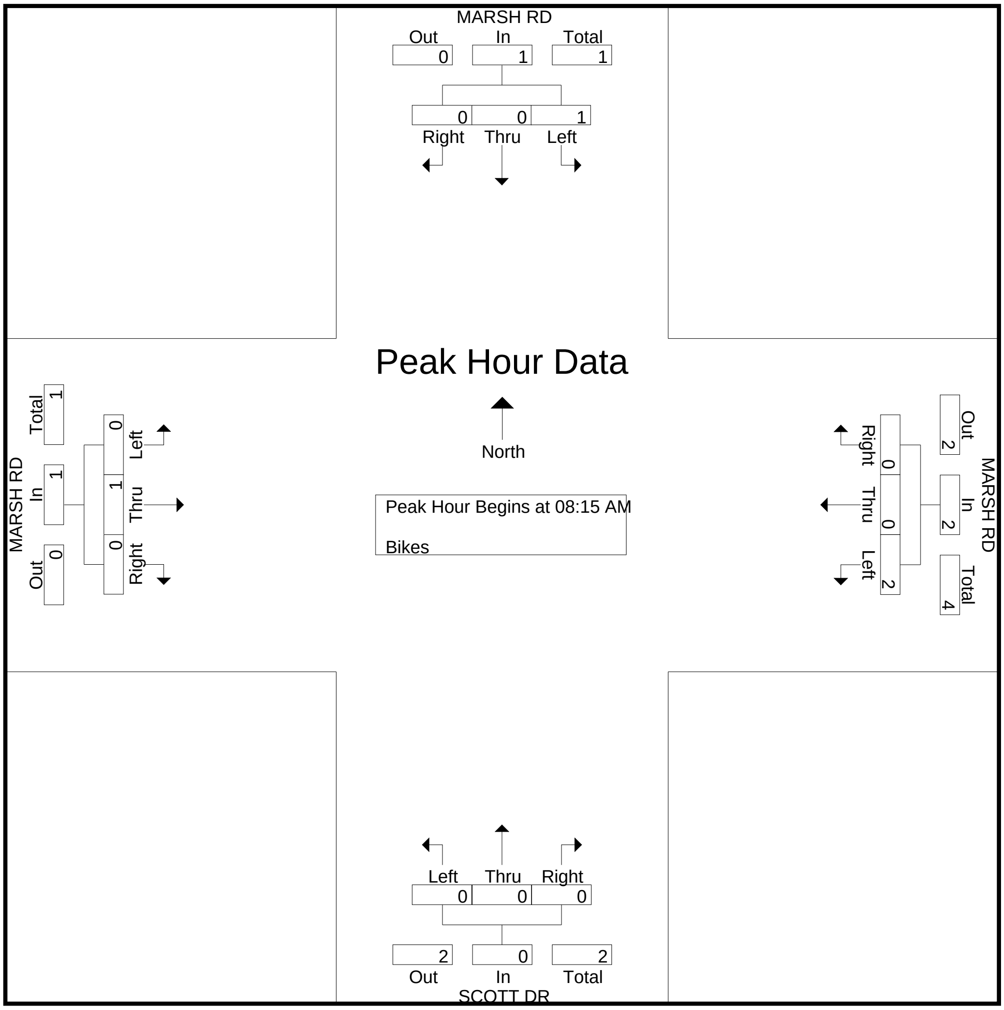
| | MARSH RD Southbound | | | | | MARSH RD Westbound | | | | | SCOTT DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| 09:00 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| Grand Total | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 5 |
| Apprch % | 0 | 0 | 100 | 0 | | 0 | 0 | 100 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 20 | 0 | 20 | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 40 | |

| | MARSH RD Southbound | | | | MARSH RD Westbound | | | | SCOTT DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:15 AM | | | | | | | | | | | | | | | | | |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 1 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | **2** | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 AM | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| % App. Total | 0 | 0 | 100 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .250 | .250 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .500 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22AM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22PM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

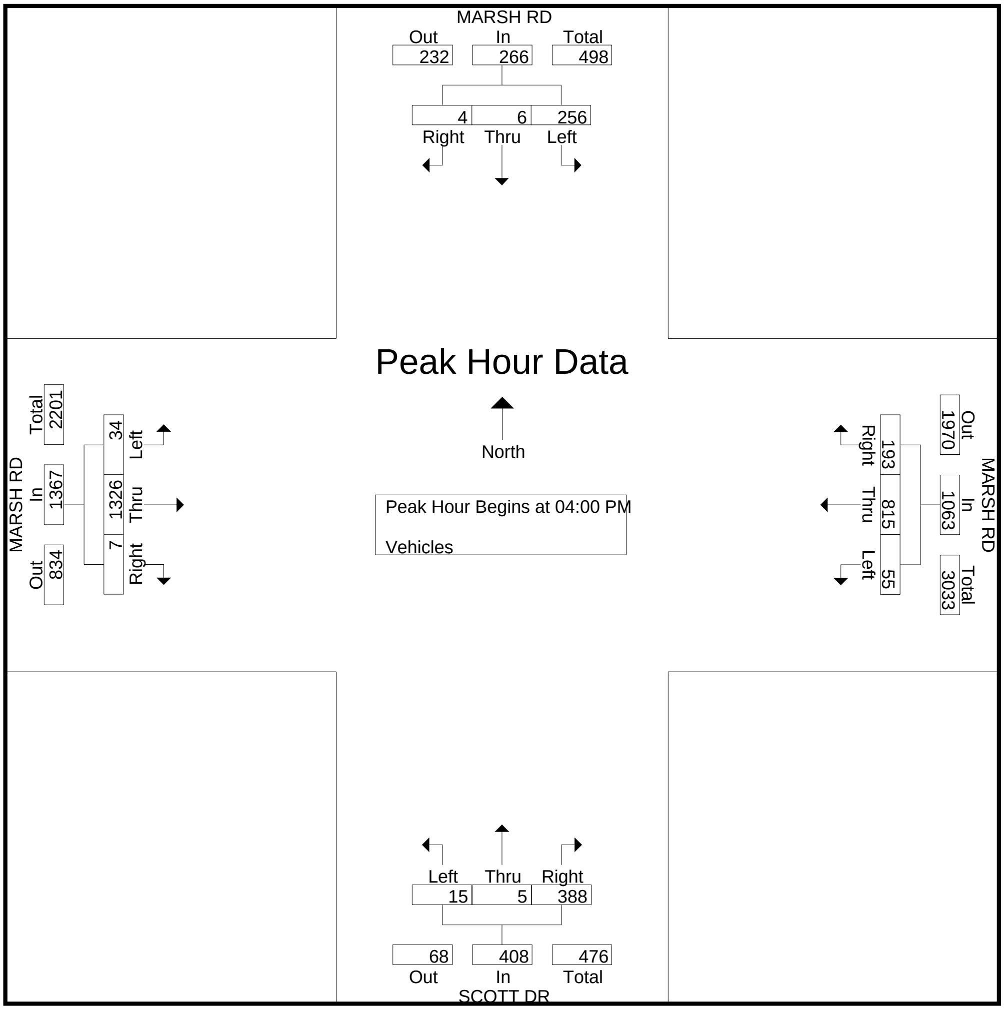
| | MARSH RD Southbound | | | | | MARSH RD Westbound | | | | | SCOTT DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 3 | 4 | 72 | 0 | 79 | 45 | 172 | 21 | 0 | 238 | 111 | 2 | 4 | 0 | 117 | 2 | 346 | 8 | 0 | 356 | 790 |
| 04:15 PM | 0 | 2 | 65 | 1 | 68 | 48 | 188 | 13 | 0 | 249 | 85 | 1 | 6 | 0 | 92 | 2 | 388 | 9 | 1 | 400 | 809 |
| 04:30 PM | 0 | 0 | 68 | 0 | 68 | 47 | 220 | 6 | 0 | 273 | 116 | 1 | 4 | 0 | 121 | 1 | 270 | 11 | 1 | 283 | 745 |
| 04:45 PM | 1 | 0 | 51 | 0 | 52 | 53 | 235 | 15 | 0 | 303 | 76 | 1 | 1 | 0 | 78 | 2 | 322 | 6 | 0 | 330 | 763 |
| Total | 4 | 6 | 256 | 1 | 267 | 193 | 815 | 55 | 0 | 1063 | 388 | 5 | 15 | 0 | 408 | 7 | 1326 | 34 | 2 | 1369 | 3107 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 2 | 73 | 3 | 78 | 48 | 215 | 14 | 0 | 277 | 117 | 1 | 6 | 0 | 124 | 0 | 289 | 12 | 0 | 301 | 780 |
| 05:15 PM | 0 | 4 | 65 | 0 | 69 | 46 | 246 | 19 | 0 | 311 | 105 | 1 | 4 | 0 | 110 | 0 | 278 | 10 | 0 | 288 | 778 |
| 05:30 PM | 1 | 3 | 46 | 3 | 53 | 54 | 278 | 20 | 0 | 352 | 78 | 3 | 6 | 0 | 87 | 1 | 242 | 10 | 0 | 253 | 745 |
| 05:45 PM | 1 | 2 | 37 | 1 | 41 | 47 | 269 | 13 | 0 | 329 | 66 | 1 | 7 | 0 | 74 | 4 | 277 | 8 | 1 | 290 | 734 |
| Total | 2 | 11 | 221 | 7 | 241 | 195 | 1008 | 66 | 0 | 1269 | 366 | 6 | 23 | 0 | 395 | 5 | 1086 | 40 | 1 | 1132 | 3037 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 2 | 28 | 1 | 31 | 47 | 273 | 17 | 0 | 337 | 60 | 5 | 6 | 0 | 71 | 1 | 267 | 12 | 0 | 280 | 719 |
| 06:15 PM | 0 | 1 | 41 | 0 | 42 | 52 | 275 | 22 | 0 | 349 | 39 | 1 | 6 | 0 | 46 | 1 | 237 | 8 | 0 | 246 | 683 |
| 06:30 PM | 0 | 1 | 30 | 1 | 32 | 45 | 263 | 9 | 0 | 317 | 47 | 0 | 5 | 2 | 54 | 0 | 225 | 7 | 0 | 232 | 635 |
| 06:45 PM | 0 | 1 | 24 | 0 | 25 | 51 | 248 | 10 | 0 | 309 | 38 | 2 | 2 | 0 | 42 | 0 | 265 | 8 | 1 | 274 | 650 |
| Total | 0 | 5 | 123 | 2 | 130 | 195 | 1059 | 58 | 0 | 1312 | 184 | 8 | 19 | 2 | 213 | 2 | 994 | 35 | 1 | 1032 | 2687 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 6 | 22 | 600 | 10 | 638 | 583 | 2882 | 179 | 0 | 3644 | 938 | 19 | 57 | 2 | 1016 | 14 | 3406 | 109 | 4 | 3533 | 8831 |
| Apprch % | 0.9 | 3.4 | 94 | 1.6 | | 16 | 79.1 | 4.9 | 0 | | 92.3 | 1.9 | 5.6 | 0.2 | | 0.4 | 96.4 | 3.1 | 0.1 | | |
| Total % | 0.1 | 0.2 | 6.8 | 0.1 | 7.2 | 6.6 | 32.6 | 2 | 0 | 41.3 | 10.6 | 0.2 | 0.6 | 0 | 11.5 | 0.2 | 38.6 | 1.2 | 0 | 40 | |

| | MARSH RD Southbound | | | | MARSH RD Westbound | | | | SCOTT DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | **3** | **4** | **72** | **79** | 45 | 172 | **21** | 238 | 111 | **2** | 4 | 117 | **2** | 346 | 8 | 356 | 790 |
| 04:15 PM | 0 | 2 | 65 | 67 | 48 | 188 | 13 | 249 | 85 | 1 | **6** | 92 | 2 | **388** | 9 | **399** | **807** |
| 04:30 PM | 0 | 0 | 68 | 68 | 47 | 220 | 6 | 273 | **116** | 1 | 4 | **121** | 1 | 270 | **11** | 282 | 744 |
| 04:45 PM | 1 | 0 | 51 | 52 | **53** | **235** | 15 | **303** | 76 | 1 | 1 | 78 | 2 | 322 | 6 | 330 | 763 |
| Total Volume | 4 | 6 | 256 | 266 | 193 | 815 | 55 | 1063 | 388 | 5 | 15 | 408 | 7 | 1326 | 34 | 1367 | 3104 |
| % App. Total | 1.5 | 2.3 | 96.2 | | 18.2 | 76.7 | 5.2 | | 95.1 | 1.2 | 3.7 | | 0.5 | 97 | 2.5 | | |
| PHF | .333 | .375 | .889 | .842 | .910 | .867 | .655 | .877 | .836 | .625 | .625 | .843 | .875 | .854 | .773 | .857 | .962 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22PM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22PM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

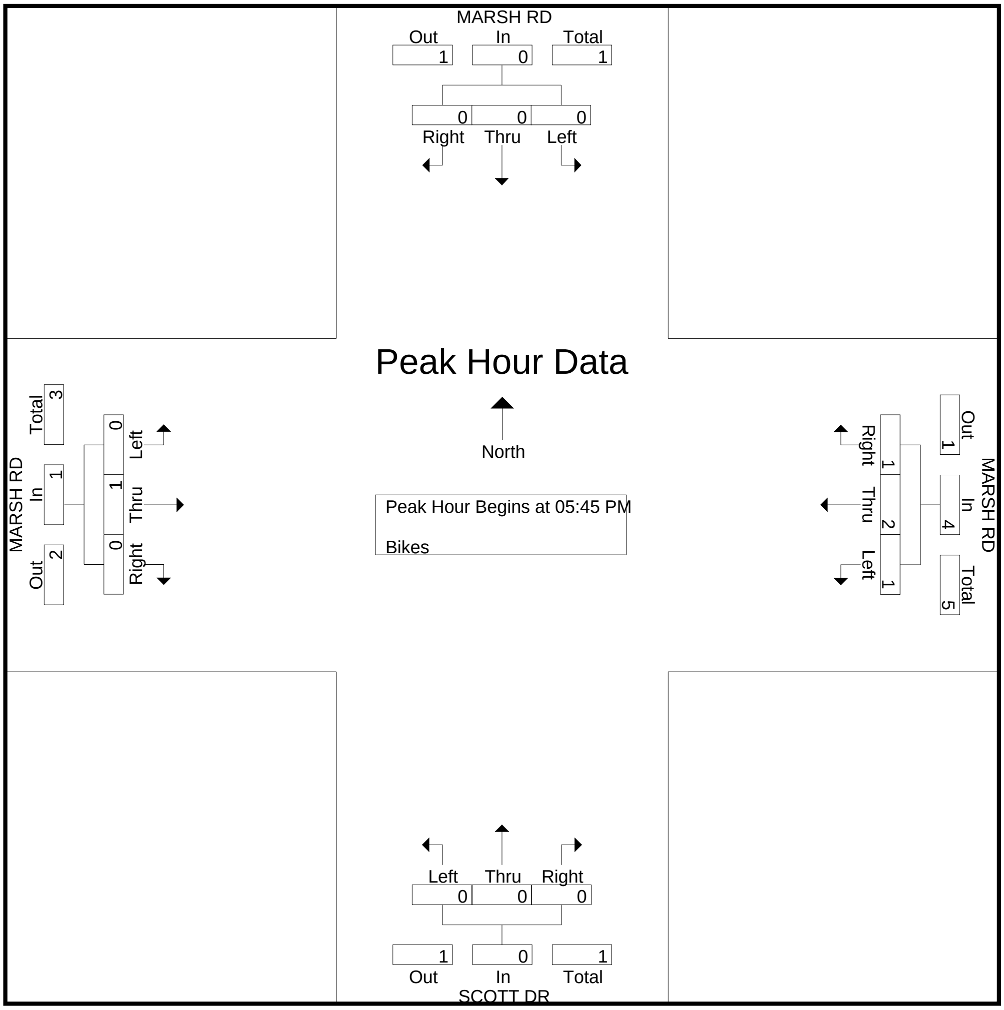
| | MARSH RD Southbound | | | | | MARSH RD Westbound | | | | | SCOTT DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 3 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 6 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 10 |
| Apprch % | 0 | 0 | 0 | 0 | | 33.3 | 50 | 16.7 | 0 | | 100 | 0 | 0 | 0 | | 0 | 33.3 | 33.3 | 33.3 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 20 | 30 | 10 | 0 | 60 | 10 | 0 | 0 | 0 | 10 | 0 | 10 | 10 | 10 | 30 | |

| | MARSH RD Southbound | | | | MARSH RD Westbound | | | | SCOTT DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:45 PM | | | | | | | | | | | | | | | | | |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 1 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 PM | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | **1** | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| Total Volume | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |
| % App. Total | 0 | 0 | 0 | | 25 | 50 | 25 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .250 | .500 | .250 | .500 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .625 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 22PM FINAL
Site Code : 00000022
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21AM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

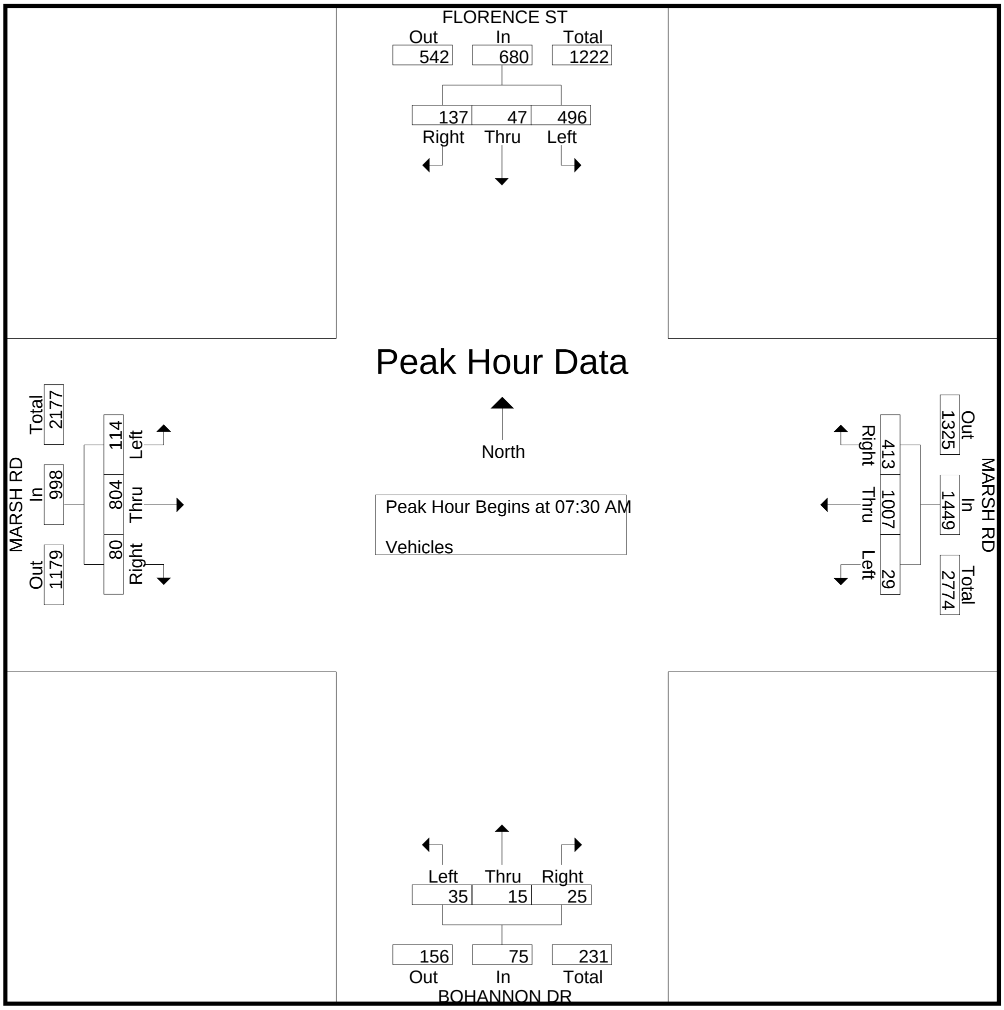
| | FLORENCE ST Southbound | | | | | MARSH RD Westbound | | | | | BOHANNON DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 33 | 5 | 83 | 2 | 123 | 108 | 224 | 6 | 0 | 338 | 1 | 2 | 2 | 1 | 6 | 10 | 126 | 7 | 0 | 143 | 610 |
| 07:15 AM | 33 | 11 | 90 | 1 | 135 | 103 | 262 | 13 | 1 | 379 | 9 | 3 | 6 | 1 | 19 | 20 | 134 | 28 | 0 | 182 | 715 |
| 07:30 AM | 38 | 6 | 140 | 0 | 184 | 111 | 291 | 5 | 0 | 407 | 5 | 4 | 9 | 0 | 18 | 17 | 156 | 17 | 0 | 190 | 799 |
| 07:45 AM | 33 | 13 | 132 | 0 | 178 | 104 | 242 | 10 | 1 | 357 | 5 | 4 | 5 | 0 | 14 | 26 | 181 | 24 | 0 | 231 | 780 |
| Total | 137 | 35 | 445 | 3 | 620 | 426 | 1019 | 34 | 2 | 1481 | 20 | 13 | 22 | 2 | 57 | 73 | 597 | 76 | 0 | 746 | 2904 |
| 08:00 AM | 38 | 11 | 122 | 0 | 171 | 111 | 235 | 6 | 0 | 352 | 9 | 5 | 9 | 0 | 23 | 20 | 222 | 36 | 0 | 278 | 824 |
| 08:15 AM | 28 | 17 | 102 | 1 | 148 | 87 | 239 | 8 | 2 | 336 | 6 | 2 | 12 | 0 | 20 | 17 | 245 | 37 | 2 | 301 | 805 |
| 08:30 AM | 39 | 8 | 79 | 0 | 126 | 74 | 188 | 4 | 0 | 266 | 4 | 0 | 7 | 1 | 12 | 20 | 258 | 37 | 8 | 323 | 727 |
| 08:45 AM | 27 | 12 | 77 | 0 | 116 | 68 | 217 | 4 | 0 | 289 | 8 | 6 | 8 | 0 | 22 | 32 | 228 | 38 | 7 | 305 | 732 |
| Total | 132 | 48 | 380 | 1 | 561 | 340 | 879 | 22 | 2 | 1243 | 27 | 13 | 36 | 1 | 77 | 89 | 953 | 148 | 17 | 1207 | 3088 |
| 09:00 AM | 36 | 6 | 69 | 1 | 112 | 65 | 168 | 7 | 1 | 241 | 5 | 6 | 16 | 0 | 27 | 31 | 165 | 25 | 1 | 222 | 602 |
| 09:15 AM | 34 | 12 | 69 | 1 | 116 | 56 | 169 | 6 | 1 | 232 | 3 | 2 | 15 | 0 | 20 | 19 | 156 | 21 | 0 | 196 | 564 |
| 09:30 AM | 22 | 16 | 62 | 1 | 101 | 53 | 147 | 9 | 0 | 209 | 9 | 7 | 12 | 2 | 30 | 37 | 156 | 42 | 7 | 242 | 582 |
| 09:45 AM | 23 | 12 | 58 | 0 | 93 | 52 | 134 | 6 | 0 | 192 | 10 | 9 | 26 | 0 | 45 | 23 | 150 | 43 | 1 | 217 | 547 |
| Total | 115 | 46 | 258 | 3 | 422 | 226 | 618 | 28 | 2 | 874 | 27 | 24 | 69 | 2 | 122 | 110 | 627 | 131 | 9 | 877 | 2295 |
| Grand Total | 384 | 129 | 1083 | 7 | 1603 | 992 | 2516 | 84 | 6 | 3598 | 74 | 50 | 127 | 5 | 256 | 272 | 2177 | 355 | 26 | 2830 | 8287 |
| Apprch % | 24 | 8 | 67.6 | 0.4 | | 27.6 | 69.9 | 2.3 | 0.2 | | 28.9 | 19.5 | 49.6 | 2 | | 9.6 | 76.9 | 12.5 | 0.9 | | |
| Total % | 4.6 | 1.6 | 13.1 | 0.1 | 19.3 | 12 | 30.4 | 1 | 0.1 | 43.4 | 0.9 | 0.6 | 1.5 | 0.1 | 3.1 | 3.3 | 26.3 | 4.3 | 0.3 | 34.1 | |

| | FLORENCE ST Southbound | | | | MARSH RD Westbound | | | | BOHANNON DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | **38** | 6 | **140** | **184** | **111** | **291** | 5 | **407** | 5 | 4 | 9 | 18 | 17 | 156 | 17 | 190 | 799 |
| 07:45 AM | 33 | 13 | 132 | 178 | 104 | 242 | **10** | 356 | 5 | 4 | 5 | 14 | **26** | 181 | 24 | 231 | 779 |
| 08:00 AM | 38 | 11 | 122 | 171 | 111 | 235 | 6 | 352 | **9** | **5** | 9 | **23** | 20 | 222 | 36 | 278 | **824** |
| 08:15 AM | 28 | **17** | 102 | 147 | 87 | 239 | 8 | 334 | 6 | 2 | **12** | 20 | 17 | **245** | **37** | **299** | 800 |
| Total Volume | 137 | 47 | 496 | 680 | 413 | 1007 | 29 | 1449 | 25 | 15 | 35 | 75 | 80 | 804 | 114 | 998 | 3202 |
| % App. Total | 20.1 | 6.9 | 72.9 | | 28.5 | 69.5 | 2 | | 33.3 | 20 | 46.7 | | 8 | 80.6 | 11.4 | | |
| PHF | .901 | .691 | .886 | .924 | .930 | .865 | .725 | .890 | .694 | .750 | .729 | .815 | .769 | .820 | .770 | .834 | .971 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21AM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21AM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

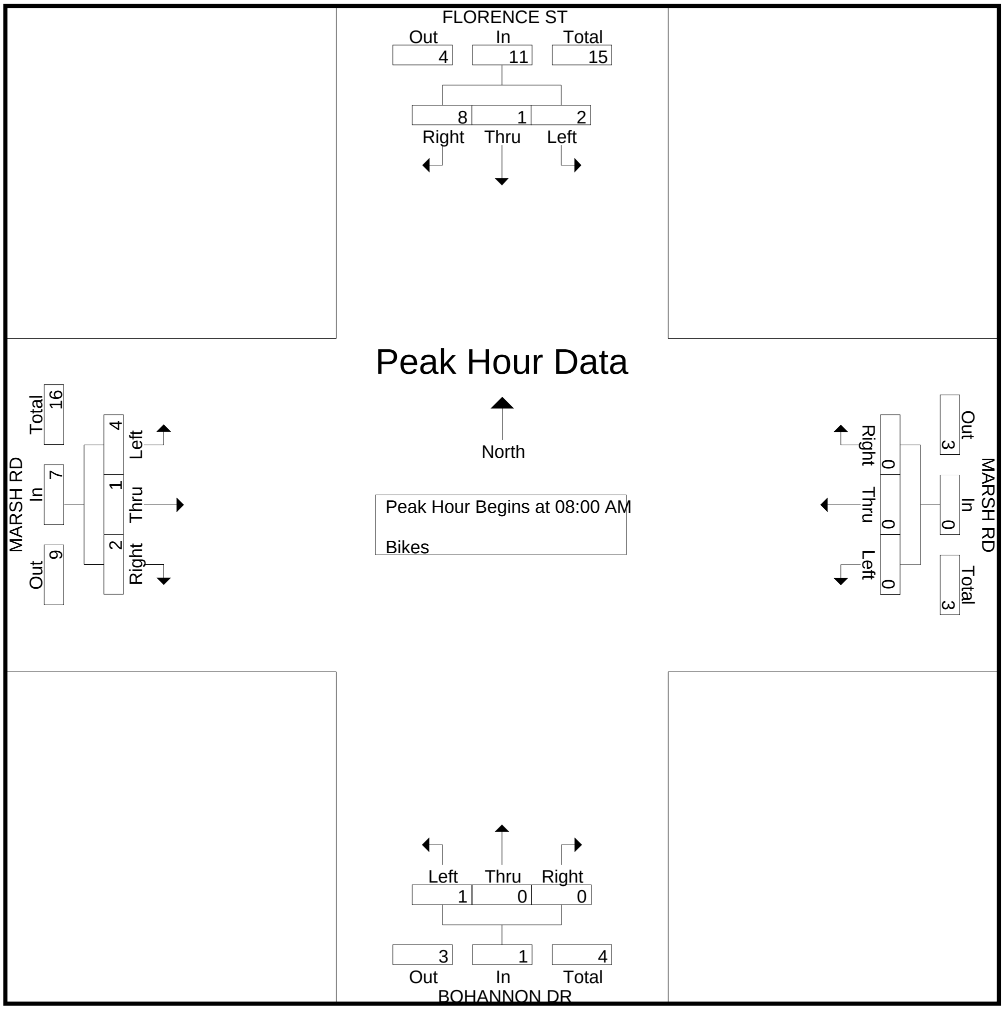
| | FLORENCE ST Southbound | | | | | MARSH RD Westbound | | | | | BOHANNON DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:15 AM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 2 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 08:00 AM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 08:15 AM | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 4 |
| 08:30 AM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 6 |
| 08:45 AM | 2 | 1 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 6 |
| Total | 8 | 1 | 2 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 4 | 0 | 7 | 19 |
| 09:00 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 09:15 AM | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 09:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 09:45 AM | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 5 | 1 | 1 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 10 |
| Grand Total | 15 | 3 | 3 | 0 | 21 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 2 | 3 | 4 | 0 | 9 | 33 |
| Apprch % | 71.4 | 14.3 | 14.3 | 0 | | 50 | 50 | 0 | 0 | | 0 | 0 | 100 | 0 | | 22.2 | 33.3 | 44.4 | 0 | | |
| Total % | 45.5 | 9.1 | 9.1 | 0 | 63.6 | 3 | 3 | 0 | 0 | 6.1 | 0 | 0 | 3 | 0 | 3 | 6.1 | 9.1 | 12.1 | 0 | 27.3 | |

| | FLORENCE ST Southbound | | | | MARSH RD Westbound | | | | BOHANNON DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | **2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| 08:15 AM | 2 | 0 | **1** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 1 | 4 |
| 08:30 AM | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **3** | **4** | **6** |
| 08:45 AM | 2 | **1** | 1 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 1 | 0 | 0 | 1 | 6 |
| Total Volume | 8 | 1 | 2 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 4 | 7 | 19 |
| % App. Total | 72.7 | 9.1 | 18.2 | | 0 | 0 | 0 | | 0 | 0 | 100 | | 28.6 | 14.3 | 57.1 | | |
| PHF | 1.00 | .250 | .500 | .688 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .500 | .250 | .333 | .438 | .792 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21AM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21PM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

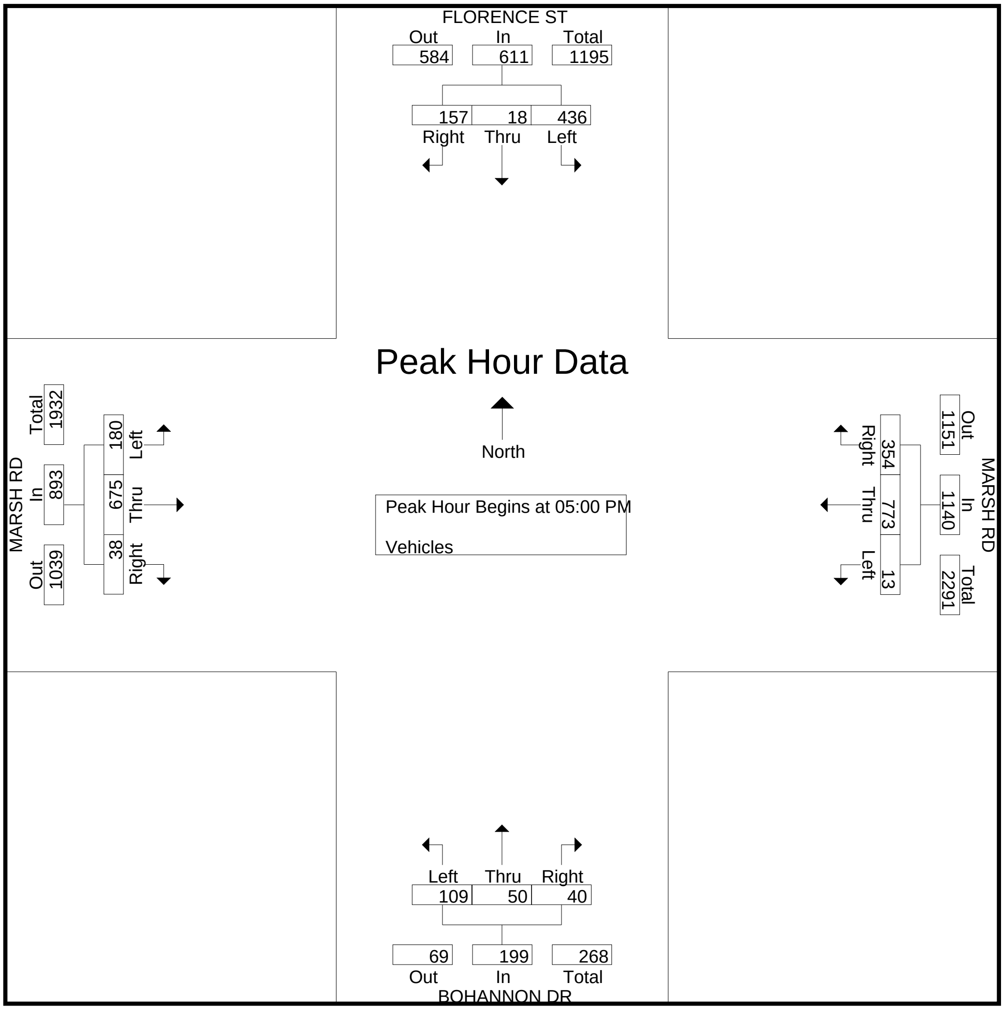
| | FLORENCE ST Southbound | | | | | MARSH RD Westbound | | | | | BOHANNON DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 24 | 8 | 106 | 2 | 140 | 81 | 137 | 3 | 2 | 223 | 12 | 10 | 32 | 1 | 55 | 18 | 184 | 49 | 6 | 257 | 675 |
| 04:15 PM | 33 | 7 | 125 | 2 | 167 | 78 | 145 | 6 | 2 | 231 | 15 | 10 | 13 | 0 | 38 | 13 | 212 | 41 | 2 | 268 | 704 |
| 04:30 PM | 32 | 12 | 119 | 3 | 166 | 66 | 135 | 3 | 3 | 207 | 12 | 11 | 30 | 0 | 53 | 14 | 184 | 42 | 7 | 247 | 673 |
| 04:45 PM | 32 | 9 | 102 | 1 | 144 | 83 | 143 | 5 | 0 | 231 | 19 | 15 | 29 | 0 | 63 | 33 | 183 | 52 | 2 | 270 | 708 |
| Total | 121 | 36 | 452 | 8 | 617 | 308 | 560 | 17 | 7 | 892 | 58 | 46 | 104 | 1 | 209 | 78 | 763 | 184 | 17 | 1042 | 2760 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 41 | 3 | 123 | 3 | 170 | 79 | 179 | 5 | 1 | 264 | 16 | 10 | 46 | 0 | 72 | 8 | 213 | 39 | 1 | 261 | 767 |
| 05:15 PM | 35 | 2 | 102 | 0 | 139 | 104 | 159 | 3 | 0 | 266 | 7 | 19 | 26 | 0 | 52 | 9 | 173 | 50 | 1 | 233 | 690 |
| 05:30 PM | 45 | 5 | 105 | 0 | 155 | 82 | 203 | 5 | 1 | 291 | 5 | 13 | 21 | 1 | 40 | 7 | 143 | 43 | 0 | 193 | 679 |
| 05:45 PM | 36 | 8 | 106 | 3 | 153 | 89 | 232 | 0 | 0 | 321 | 12 | 8 | 16 | 0 | 36 | 14 | 146 | 48 | 1 | 209 | 719 |
| Total | 157 | 18 | 436 | 6 | 617 | 354 | 773 | 13 | 2 | 1142 | 40 | 50 | 109 | 1 | 200 | 38 | 675 | 180 | 3 | 896 | 2855 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 27 | 7 | 75 | 4 | 113 | 87 | 216 | 5 | 2 | 310 | 9 | 7 | 24 | 0 | 40 | 5 | 180 | 45 | 1 | 231 | 694 |
| 06:15 PM | 33 | 6 | 67 | 2 | 108 | 79 | 174 | 4 | 5 | 262 | 7 | 7 | 7 | 0 | 21 | 4 | 165 | 39 | 0 | 208 | 599 |
| 06:30 PM | 25 | 2 | 65 | 1 | 93 | 95 | 205 | 6 | 0 | 306 | 16 | 4 | 15 | 0 | 35 | 7 | 159 | 42 | 1 | 209 | 643 |
| 06:45 PM | 30 | 6 | 97 | 4 | 137 | 84 | 194 | 1 | 1 | 280 | 6 | 8 | 5 | 1 | 20 | 16 | 180 | 32 | 0 | 228 | 665 |
| Total | 115 | 21 | 304 | 11 | 451 | 345 | 789 | 16 | 8 | 1158 | 38 | 26 | 51 | 1 | 116 | 32 | 684 | 158 | 2 | 876 | 2601 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 393 | 75 | 1192 | 25 | 1685 | 1007 | 2122 | 46 | 17 | 3192 | 136 | 122 | 264 | 3 | 525 | 148 | 2122 | 522 | 22 | 2814 | 8216 |
| Apprch % | 23.3 | 4.5 | 70.7 | 1.5 | | 31.5 | 66.5 | 1.4 | 0.5 | | 25.9 | 23.2 | 50.3 | 0.6 | | 5.3 | 75.4 | 18.6 | 0.8 | | |
| Total % | 4.8 | 0.9 | 14.5 | 0.3 | 20.5 | 12.3 | 25.8 | 0.6 | 0.2 | 38.9 | 1.7 | 1.5 | 3.2 | 0 | 6.4 | 1.8 | 25.8 | 6.4 | 0.3 | 34.3 | |

| | FLORENCE ST Southbound | | | | MARSH RD Westbound | | | | BOHANNON DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 41 | 3 | **123** | **167** | 79 | 179 | **5** | 263 | **16** | 10 | **46** | **72** | 8 | **213** | 39 | **260** | **762** |
| 05:15 PM | 35 | 2 | 102 | 139 | **104** | 159 | 3 | 266 | 7 | **19** | 26 | 52 | 9 | 173 | **50** | 232 | 689 |
| 05:30 PM | **45** | 5 | 105 | 155 | 82 | 203 | 5 | 290 | 5 | 13 | 21 | 39 | 7 | 143 | 43 | 193 | 677 |
| 05:45 PM | 36 | **8** | 106 | 150 | 89 | **232** | 0 | **321** | 12 | 8 | 16 | 36 | **14** | 146 | 48 | 208 | 715 |
| Total Volume | 157 | 18 | 436 | 611 | 354 | 773 | 13 | 1140 | 40 | 50 | 109 | 199 | 38 | 675 | 180 | 893 | 2843 |
| % App. Total | 25.7 | 2.9 | 71.4 | | 31.1 | 67.8 | 1.1 | | 20.1 | 25.1 | 54.8 | | 4.3 | 75.6 | 20.2 | | |
| PHF | .872 | .563 | .886 | .915 | .851 | .833 | .650 | .888 | .625 | .658 | .592 | .691 | .679 | .792 | .900 | .859 | .933 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21PM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 21PM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

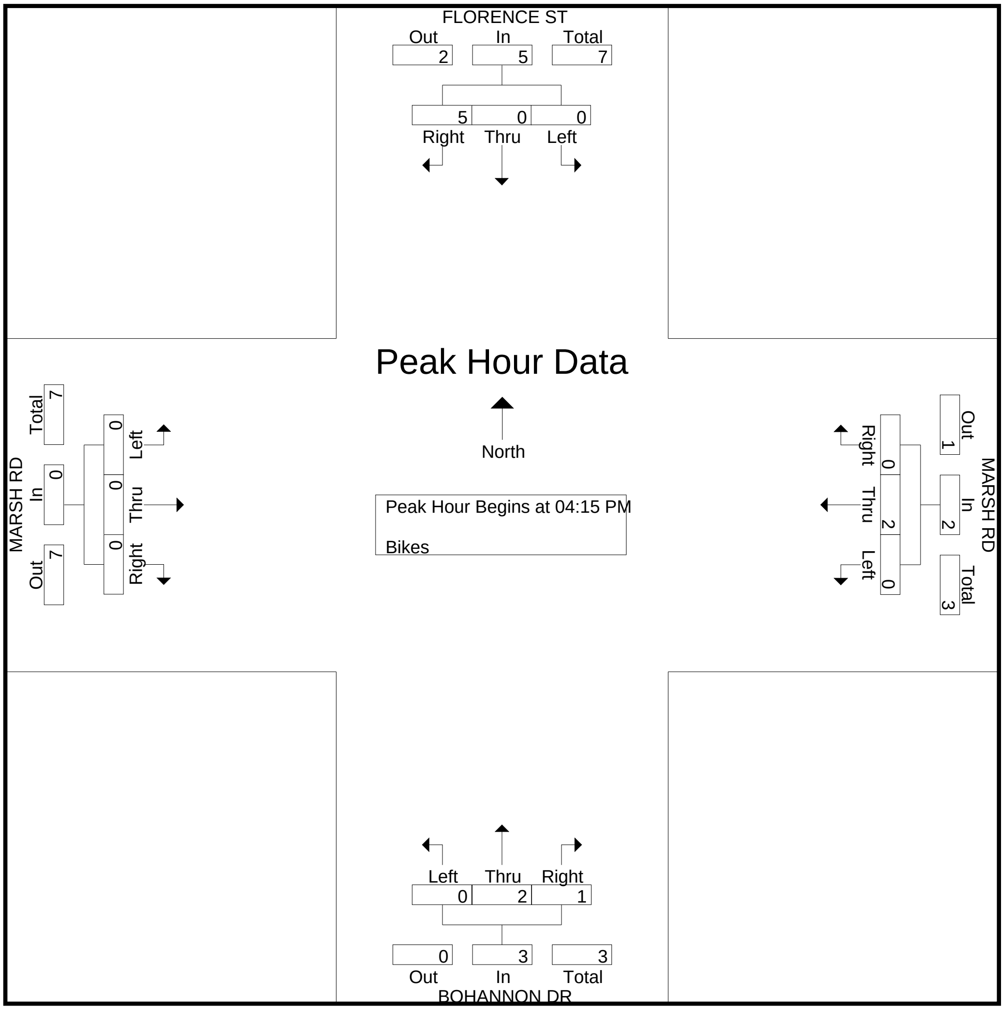
| | FLORENCE ST Southbound | | | | | MARSH RD Westbound | | | | | BOHANNON DR Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 3 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 4 | 0 | 0 | 0 | 4 | 1 | 2 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 9 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:15 PM | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 05:45 PM | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 3 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 7 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| Total | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 6 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 10 | 0 | 0 | 0 | 10 | 3 | 2 | 0 | 0 | 5 | 1 | 2 | 0 | 0 | 3 | 1 | 0 | 3 | 0 | 4 | 22 |
| Apprch % | 100 | 0 | 0 | 0 | | 60 | 40 | 0 | 0 | | 33.3 | 66.7 | 0 | 0 | | 25 | 0 | 75 | 0 | | |
| Total % | 45.5 | 0 | 0 | 0 | 45.5 | 13.6 | 9.1 | 0 | 0 | 22.7 | 4.5 | 9.1 | 0 | 0 | 13.6 | 4.5 | 0 | 13.6 | 0 | 18.2 | |

| | FLORENCE ST Southbound | | | | MARSH RD Westbound | | | | BOHANNON DR Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | **3** | 0 | 0 | **3** | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 05:00 PM | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| Total Volume | 5 | 0 | 0 | 5 | 0 | 2 | 0 | 2 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 10 |
| % App. Total | 100 | 0 | 0 | | 0 | 100 | 0 | | 33.3 | 66.7 | 0 | | 0 | 0 | 0 | | |
| PHF | .417 | .000 | .000 | .417 | .000 | .500 | .000 | .500 | .250 | .500 | .000 | .750 | .000 | .000 | .000 | .000 | .625 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 21PM FINAL
Site Code : 00000021
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20AM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

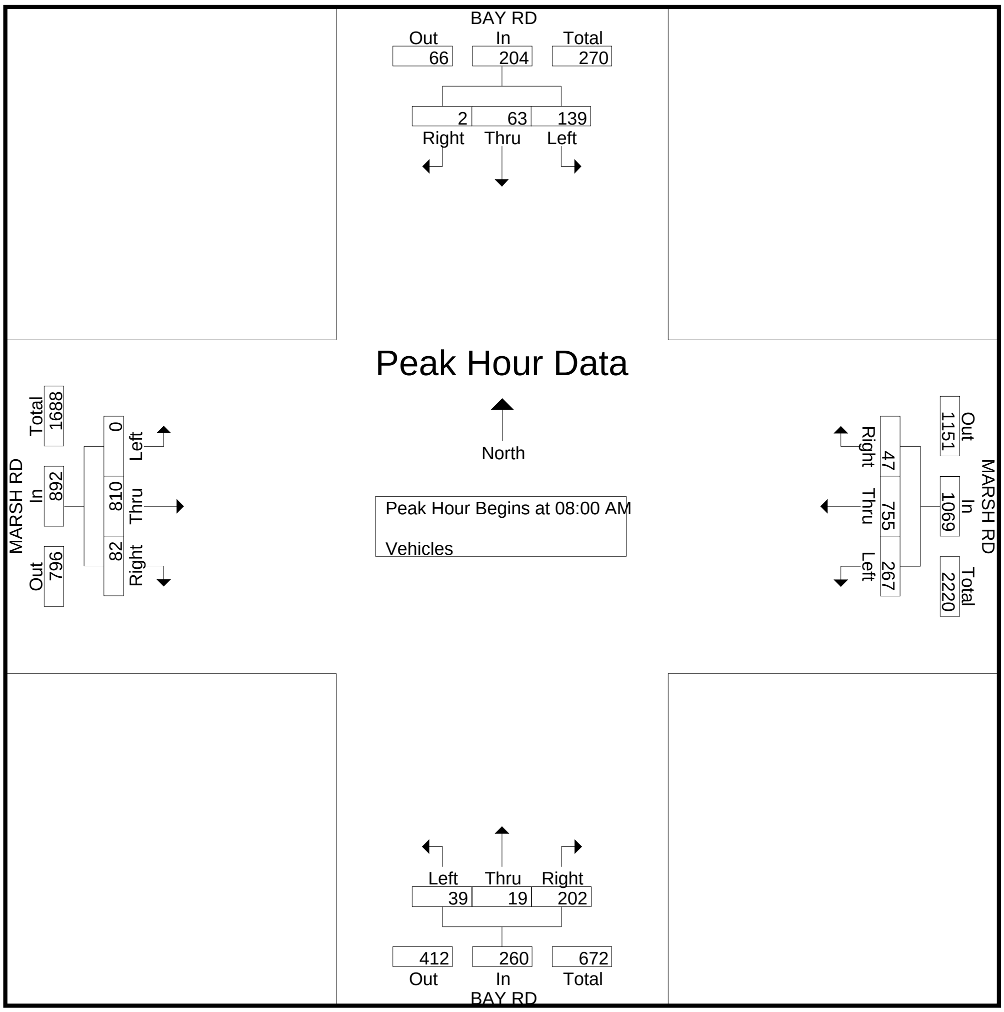
| | BAY RD Southbound | | | | | MARSH RD Westbound | | | | | BAY RD Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 1 | 1 | 25 | 1 | 28 | 5 | 217 | 26 | 2 | 250 | 26 | 0 | 4 | 0 | 30 | 2 | 89 | 0 | 0 | 91 | 399 |
| 07:15 AM | 0 | 1 | 23 | 0 | 24 | 8 | 252 | 36 | 0 | 296 | 30 | 2 | 4 | 0 | 36 | 10 | 123 | 0 | 0 | 133 | 489 |
| 07:30 AM | 2 | 7 | 26 | 1 | 36 | 16 | 268 | 60 | 2 | 346 | 41 | 3 | 17 | 0 | 61 | 7 | 138 | 0 | 1 | 146 | 589 |
| 07:45 AM | 0 | 13 | 30 | 1 | 44 | 18 | 205 | 58 | 4 | 285 | 32 | 4 | 18 | 0 | 54 | 9 | 156 | 0 | 0 | 165 | 548 |
| Total | 3 | 22 | 104 | 3 | 132 | 47 | 942 | 180 | 8 | 1177 | 129 | 9 | 43 | 0 | 181 | 28 | 506 | 0 | 1 | 535 | 2025 |
| 08:00 AM | 0 | 13 | 38 | 0 | 51 | 26 | 193 | 76 | 2 | 297 | 48 | 1 | 19 | 1 | 69 | 21 | 183 | 0 | 0 | 204 | 621 |
| 08:15 AM | 0 | 13 | 34 | 0 | 47 | 9 | 191 | 76 | 4 | 280 | 44 | 7 | 6 | 0 | 57 | 19 | 209 | 0 | 0 | 228 | 612 |
| 08:30 AM | 1 | 23 | 44 | 2 | 70 | 5 | 178 | 58 | 2 | 243 | 60 | 6 | 6 | 1 | 73 | 23 | 201 | 0 | 0 | 224 | 610 |
| 08:45 AM | 1 | 14 | 23 | 0 | 38 | 7 | 193 | 57 | 2 | 259 | 50 | 5 | 8 | 0 | 63 | 19 | 217 | 0 | 0 | 236 | 596 |
| Total | 2 | 63 | 139 | 2 | 206 | 47 | 755 | 267 | 10 | 1079 | 202 | 19 | 39 | 2 | 262 | 82 | 810 | 0 | 0 | 892 | 2439 |
| 09:00 AM | 0 | 12 | 17 | 0 | 29 | 8 | 156 | 43 | 3 | 210 | 39 | 2 | 4 | 1 | 46 | 9 | 171 | 0 | 0 | 180 | 465 |
| 09:15 AM | 3 | 4 | 20 | 1 | 28 | 10 | 172 | 33 | 4 | 219 | 47 | 4 | 16 | 0 | 67 | 12 | 139 | 0 | 0 | 151 | 465 |
| 09:30 AM | 2 | 7 | 13 | 1 | 23 | 7 | 148 | 31 | 2 | 188 | 44 | 4 | 9 | 0 | 57 | 16 | 167 | 0 | 0 | 183 | 451 |
| 09:45 AM | 0 | 6 | 18 | 1 | 25 | 7 | 134 | 30 | 2 | 173 | 31 | 1 | 4 | 0 | 36 | 15 | 142 | 0 | 0 | 157 | 391 |
| Total | 5 | 29 | 68 | 3 | 105 | 32 | 610 | 137 | 11 | 790 | 161 | 11 | 33 | 1 | 206 | 52 | 619 | 0 | 0 | 671 | 1772 |
| Grand Total | 10 | 114 | 311 | 8 | 443 | 126 | 2307 | 584 | 29 | 3046 | 492 | 39 | 115 | 3 | 649 | 162 | 1935 | 0 | 1 | 2098 | 6236 |
| Apprch % | 2.3 | 25.7 | 70.2 | 1.8 | | 4.1 | 75.7 | 19.2 | 1 | | 75.8 | 6 | 17.7 | 0.5 | | 7.7 | 92.2 | 0 | 0 | | |
| Total % | 0.2 | 1.8 | 5 | 0.1 | 7.1 | 2 | 37 | 9.4 | 0.5 | 48.8 | 7.9 | 0.6 | 1.8 | 0 | 10.4 | 2.6 | 31 | 0 | 0 | 33.6 | |

| | BAY RD Southbound | | | | MARSH RD Westbound | | | | BAY RD Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 13 | 38 | 51 | **26** | **193** | **76** | **295** | 48 | 1 | **19** | 68 | 21 | 183 | 0 | 204 | **618** |
| 08:15 AM | 0 | 13 | 34 | 47 | 9 | 191 | 76 | 276 | 44 | **7** | 6 | 57 | 19 | 209 | 0 | 228 | 608 |
| 08:30 AM | **1** | **23** | **44** | **68** | 5 | 178 | 58 | 241 | **60** | 6 | 6 | **72** | **23** | 201 | 0 | 224 | 605 |
| 08:45 AM | 1 | 14 | 23 | 38 | 7 | 193 | 57 | 257 | 50 | 5 | 8 | 63 | 19 | **217** | 0 | **236** | 594 |
| Total Volume | 2 | 63 | 139 | 204 | 47 | 755 | 267 | 1069 | 202 | 19 | 39 | 260 | 82 | 810 | 0 | 892 | 2425 |
| % App. Total | 1 | 30.9 | 68.1 | | 4.4 | 70.6 | 25 | | 77.7 | 7.3 | 15 | | 9.2 | 90.8 | 0 | | |
| PHF | .500 | .685 | .790 | .750 | .452 | .978 | .878 | .906 | .842 | .679 | .513 | .903 | .891 | .933 | .000 | .945 | .981 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20AM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20AM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

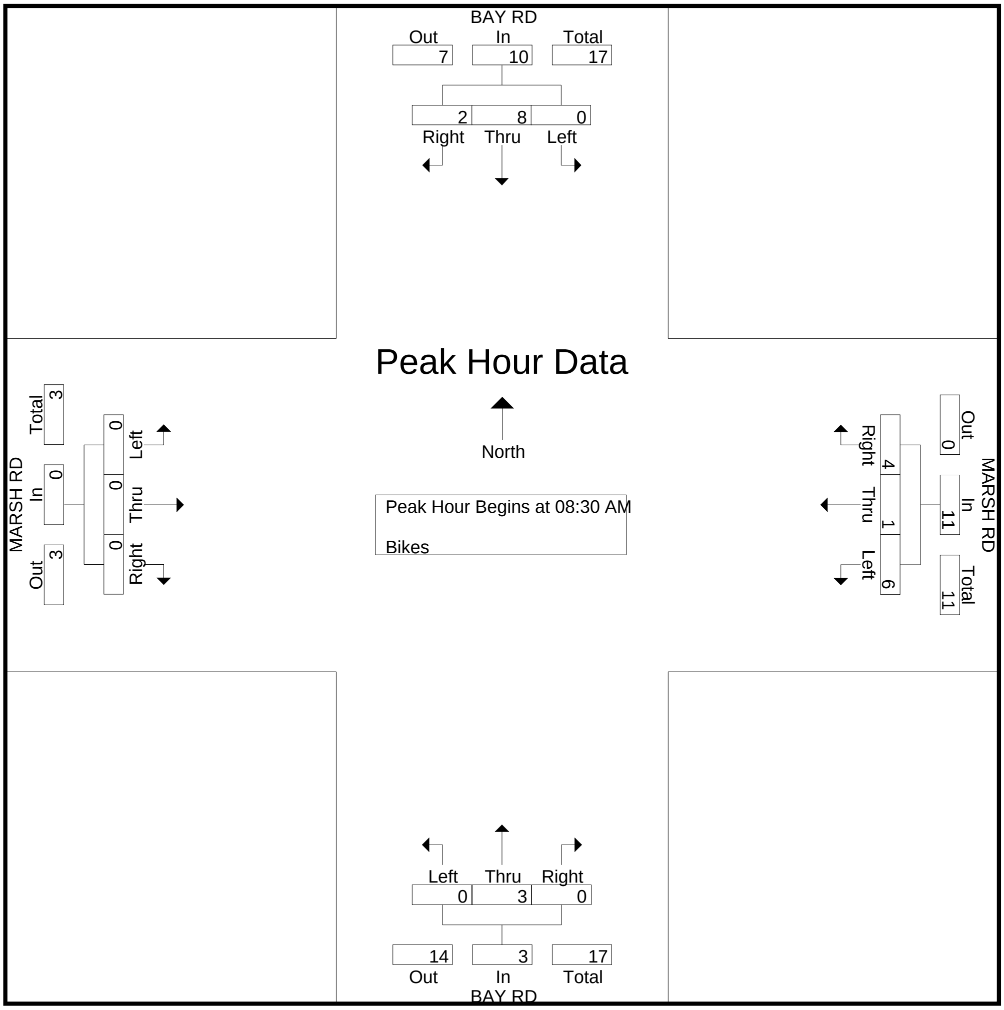
| | BAY RD Southbound | | | | | MARSH RD Westbound | | | | | BAY RD Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:15 AM | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 08:30 AM | 1 | 5 | 0 | 0 | 6 | 2 | 0 | 2 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| 08:45 AM | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Total | 1 | 8 | 0 | 0 | 9 | 5 | 2 | 5 | 0 | 12 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 23 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| 09:30 AM | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 3 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| 09:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 2 | 3 | 0 | 0 | 5 | 4 | 0 | 3 | 0 | 7 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 15 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 3 | 12 | 0 | 0 | 15 | 9 | 3 | 10 | 0 | 22 | 0 | 4 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 42 |
| Apprch % | 20 | 80 | 0 | 0 | | 40.9 | 13.6 | 45.5 | 0 | | 0 | 80 | 20 | 0 | | 0 | 0 | 0 | 0 | | |
| Total % | 7.1 | 28.6 | 0 | 0 | 35.7 | 21.4 | 7.1 | 23.8 | 0 | 52.4 | 0 | 9.5 | 2.4 | 0 | 11.9 | 0 | 0 | 0 | 0 | 0 | |

| | BAY RD Southbound | | | | MARSH RD Westbound | | | | BAY RD Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:30 AM | | | | | | | | | | | | | | | | | |
| 08:30 AM | **1** | **5** | 0 | **6** | **2** | 0 | 2 | **4** | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | **12** |
| 08:45 AM | 0 | 2 | 0 | 2 | 0 | **1** | **3** | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 1 | 1 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 5 |
| Total Volume | 2 | 8 | 0 | 10 | 4 | 1 | 6 | 11 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 24 |
| % App. Total | 20 | 80 | 0 | | 36.4 | 9.1 | 54.5 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .500 | .400 | .000 | .417 | .500 | .250 | .500 | .688 | .000 | .375 | .000 | .375 | .000 | .000 | .000 | .000 | .500 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20AM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20PM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

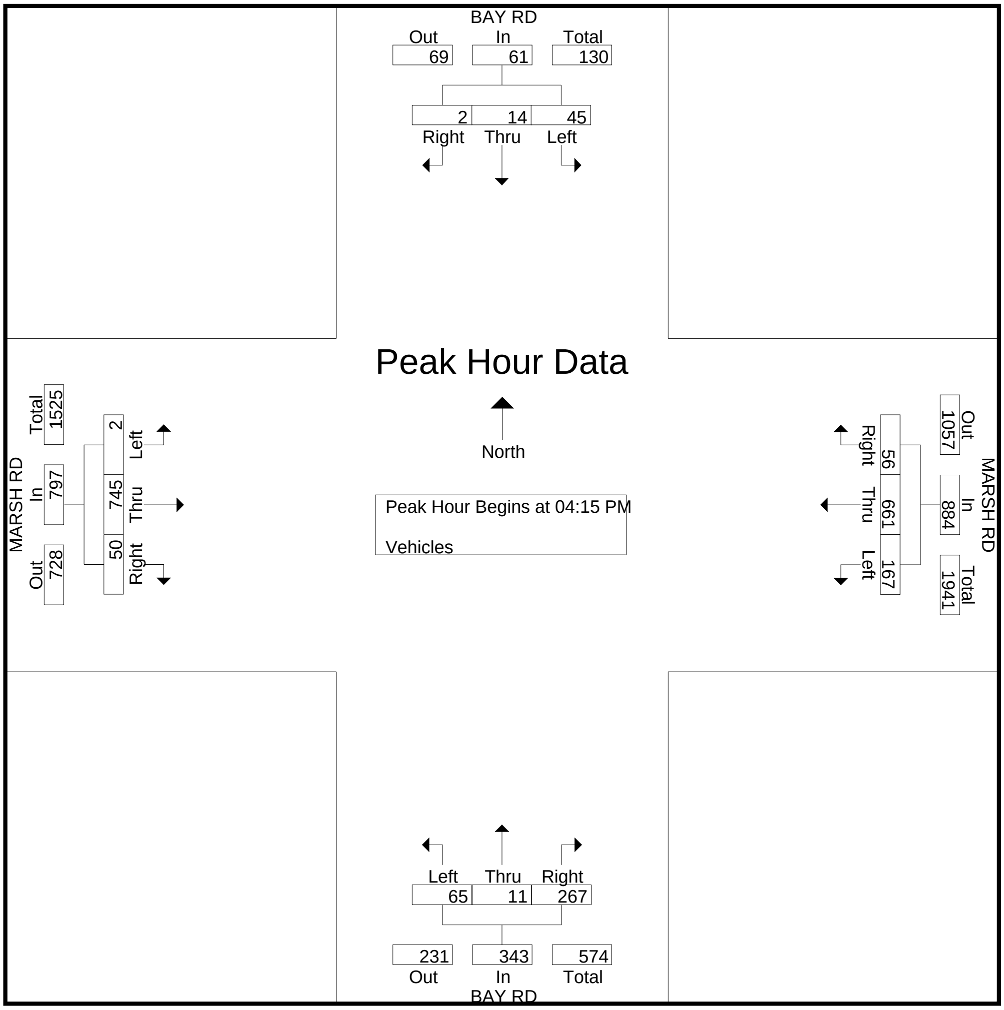
| | BAY RD Southbound | | | | | MARSH RD Westbound | | | | | BAY RD Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 3 | 12 | 0 | 15 | 6 | 153 | 31 | 7 | 197 | 32 | 0 | 15 | 0 | 47 | 14 | 195 | 0 | 0 | 209 | 468 |
| 04:15 PM | 1 | 5 | 11 | 1 | 18 | 12 | 152 | 32 | 2 | 198 | 47 | 5 | 18 | 0 | 70 | 18 | 209 | 0 | 0 | 227 | 513 |
| 04:30 PM | 0 | 3 | 16 | 0 | 19 | 12 | 154 | 37 | 4 | 207 | 53 | 1 | 14 | 0 | 68 | 16 | 176 | 1 | 0 | 193 | 487 |
| 04:45 PM | 1 | 2 | 12 | 5 | 20 | 15 | 153 | 40 | 3 | 211 | 57 | 4 | 18 | 0 | 79 | 9 | 200 | 1 | 0 | 210 | 520 |
| Total | 2 | 13 | 51 | 6 | 72 | 45 | 612 | 140 | 16 | 813 | 189 | 10 | 65 | 0 | 264 | 57 | 780 | 2 | 0 | 839 | 1988 |
| 05:00 PM | 0 | 4 | 6 | 0 | 10 | 17 | 202 | 58 | 3 | 280 | 110 | 1 | 15 | 0 | 126 | 7 | 160 | 0 | 0 | 167 | 583 |
| 05:15 PM | 0 | 7 | 21 | 0 | 28 | 6 | 181 | 31 | 2 | 220 | 53 | 8 | 14 | 0 | 75 | 21 | 129 | 0 | 0 | 150 | 473 |
| 05:30 PM | 1 | 7 | 14 | 0 | 22 | 11 | 197 | 57 | 4 | 269 | 40 | 4 | 13 | 0 | 57 | 15 | 143 | 1 | 0 | 159 | 507 |
| 05:45 PM | 2 | 6 | 16 | 2 | 26 | 12 | 212 | 68 | 6 | 298 | 35 | 4 | 11 | 0 | 50 | 11 | 148 | 0 | 0 | 159 | 533 |
| Total | 3 | 24 | 57 | 2 | 86 | 46 | 792 | 214 | 15 | 1067 | 238 | 17 | 53 | 0 | 308 | 54 | 580 | 1 | 0 | 635 | 2096 |
| 06:00 PM | 1 | 4 | 16 | 2 | 23 | 11 | 212 | 47 | 4 | 274 | 41 | 4 | 14 | 0 | 59 | 14 | 184 | 0 | 0 | 198 | 554 |
| 06:15 PM | 2 | 1 | 10 | 1 | 14 | 10 | 175 | 32 | 4 | 221 | 38 | 1 | 5 | 0 | 44 | 17 | 164 | 2 | 0 | 183 | 462 |
| 06:30 PM | 1 | 1 | 10 | 6 | 18 | 19 | 197 | 35 | 2 | 253 | 30 | 4 | 7 | 0 | 41 | 4 | 182 | 0 | 0 | 186 | 498 |
| 06:45 PM | 1 | 1 | 12 | 0 | 14 | 15 | 194 | 27 | 3 | 239 | 32 | 1 | 7 | 0 | 40 | 9 | 192 | 0 | 0 | 201 | 494 |
| Total | 5 | 7 | 48 | 9 | 69 | 55 | 778 | 141 | 13 | 987 | 141 | 10 | 33 | 0 | 184 | 44 | 722 | 2 | 0 | 768 | 2008 |
| Grand Total | 10 | 44 | 156 | 17 | 227 | 146 | 2182 | 495 | 44 | 2867 | 568 | 37 | 151 | 0 | 756 | 155 | 2082 | 5 | 0 | 2242 | 6092 |
| Apprch % | 4.4 | 19.4 | 68.7 | 7.5 | | 5.1 | 76.1 | 17.3 | 1.5 | | 75.1 | 4.9 | 20 | 0 | | 6.9 | 92.9 | 0.2 | 0 | | |
| Total % | 0.2 | 0.7 | 2.6 | 0.3 | 3.7 | 2.4 | 35.8 | 8.1 | 0.7 | 47.1 | 9.3 | 0.6 | 2.5 | 0 | 12.4 | 2.5 | 34.2 | 0.1 | 0 | 36.8 | |

| | BAY RD Southbound | | | | MARSH RD Westbound | | | | BAY RD Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | **1** | **5** | 11 | 17 | 12 | 152 | 32 | 196 | 47 | **5** | **18** | 70 | **18** | **209** | 0 | **227** | 510 |
| 04:30 PM | 0 | 3 | **16** | **19** | 12 | 154 | 37 | 203 | 53 | 1 | 14 | 68 | 16 | 176 | **1** | 193 | 483 |
| 04:45 PM | 1 | 2 | 12 | 15 | 15 | 153 | 40 | 208 | 57 | 4 | 18 | 79 | 9 | 200 | 1 | 210 | 512 |
| 05:00 PM | 0 | 4 | 6 | 10 | **17** | **202** | **58** | **277** | **110** | 1 | 15 | **126** | 7 | 160 | 0 | 167 | **580** |
| Total Volume | 2 | 14 | 45 | 61 | 56 | 661 | 167 | 884 | 267 | 11 | 65 | 343 | 50 | 745 | 2 | 797 | 2085 |
| % App. Total | 3.3 | 23 | 73.8 | | 6.3 | 74.8 | 18.9 | | 77.8 | 3.2 | 19 | | 6.3 | 93.5 | 0.3 | | |
| PHF | .500 | .700 | .703 | .803 | .824 | .818 | .720 | .798 | .607 | .550 | .903 | .681 | .694 | .891 | .500 | .878 | .899 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20PM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 20PM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

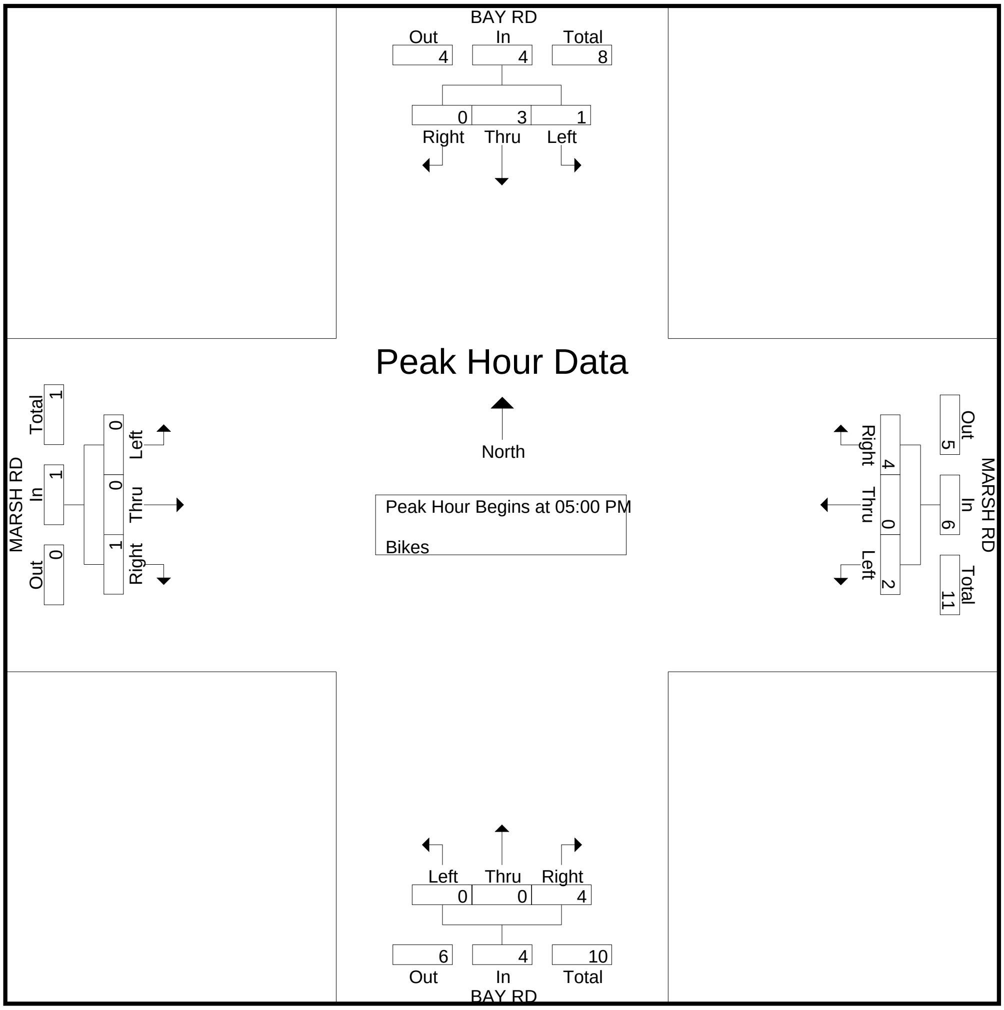
| | BAY RD Southbound | | | | | MARSH RD Westbound | | | | | BAY RD Northbound | | | | | MARSH RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:45 PM | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| 05:15 PM | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:45 PM | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 3 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| Total | 0 | 3 | 1 | 0 | 4 | 4 | 0 | 2 | 0 | 6 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 15 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 7 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 8 | 1 | 0 | 9 | 4 | 1 | 2 | 0 | 7 | 9 | 2 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 1 | 28 |
| Apprch % | 0 | 88.9 | 11.1 | 0 | | 57.1 | 14.3 | 28.6 | 0 | | 81.8 | 18.2 | 0 | 0 | | 100 | 0 | 0 | 0 | | |
| Total % | 0 | 28.6 | 3.6 | 0 | 32.1 | 14.3 | 3.6 | 7.1 | 0 | 25 | 32.1 | 7.1 | 0 | 0 | 39.3 | 3.6 | 0 | 0 | 0 | 3.6 | |

| | BAY RD Southbound | | | | MARSH RD Westbound | | | | BAY RD Northbound | | | | MARSH RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** | 2 |
| 05:15 PM | 0 | 0 | **1** | 1 | **2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | **2** | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 3 |
| 05:45 PM | 0 | **2** | 0 | **2** | 2 | 0 | 1 | **3** | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **7** |
| Total Volume | 0 | 3 | 1 | 4 | 4 | 0 | 2 | 6 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 1 | 15 |
| % App. Total | 0 | 75 | 25 | | 66.7 | 0 | 33.3 | | 100 | 0 | 0 | | 100 | 0 | 0 | | |
| PHF | .000 | .375 | .250 | .500 | .500 | .000 | .500 | .500 | .500 | .000 | .000 | .500 | .250 | .000 | .000 | .250 | .536 |

# Traffic Data Service

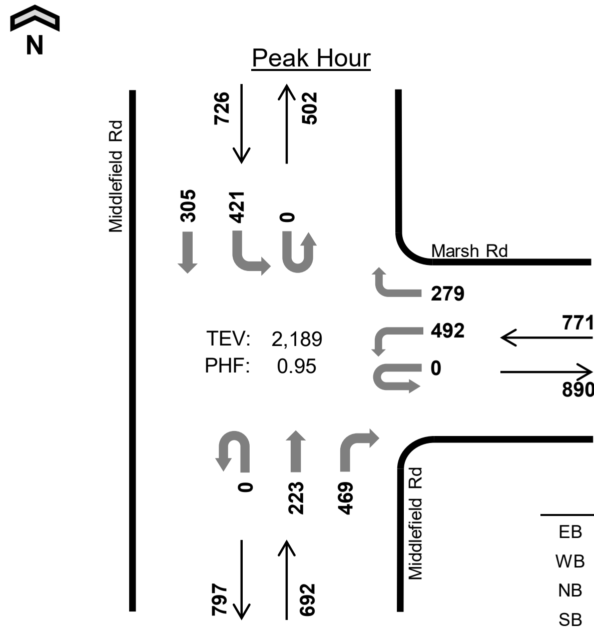
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

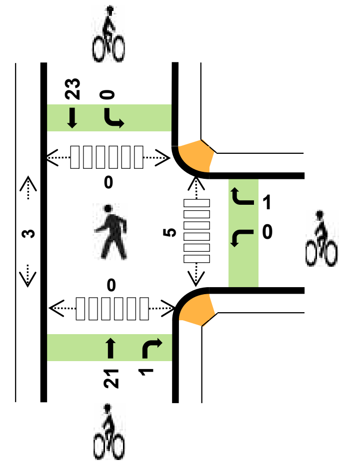
File Name : 20PM FINAL
Site Code : 00000020
Start Date : 3/21/2019
Page No : 2



# Middlefield Rd
# Marsh Rd

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 4.9% | 0.97 |
| NB | 1.9% | 0.89 |
| SB | 1.8% | 0.93 |
| TOTAL | 2.9% | 0.95 |

**Three-Hour Count Summaries**

| Interval Start | | n/a | | | | Marsh Rd | | | | Middlefield Rd | | | | Middlefield Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 103 | 0 | 73 | 0 | 0 | 53 | 124 | 0 | 97 | 66 | 0 | 516 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 116 | 0 | 82 | 0 | 0 | 52 | 143 | 0 | 105 | 79 | 0 | 577 | 0 |
| 8:30 AM | | 0 | 0 | 0 | 0 | 0 | 130 | 0 | 68 | 0 | 0 | 48 | 113 | 0 | 113 | 82 | 0 | 554 | 0 |
| 8:45 AM | | 0 | 0 | 0 | 0 | 0 | 143 | 0 | 56 | 0 | 0 | 70 | 89 | 0 | 106 | 78 | 0 | 542 | 2,189 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 492 | 0 | 279 | 0 | 0 | 223 | 469 | 0 | 421 | 305 | 0 | 2,189 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 9 | 0 | 0 | 3 | 10 | 0 | 7 | 6 | 0 | 64 | 0 |
| | HV% | - | - | - | - | - | 6% | - | 3% | - | - | 1% | 2% | - | 2% | 2% | - | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 8:00 AM | 0 | 14 | 4 | 4 | *22* | 0 | 0 | 4 | 5 | *9* | 1 | 0 | 0 | 0 | *1* |
| 8:15 AM | 0 | 12 | 3 | 3 | *18* | 0 | 0 | 6 | 6 | *12* | 1 | 1 | 0 | 0 | *2* |
| 8:30 AM | 0 | 6 | 4 | 4 | *14* | 0 | 0 | 4 | 4 | *8* | 1 | 0 | 0 | 0 | *1* |
| 8:45 AM | 0 | 6 | 2 | 2 | *10* | 0 | 1 | 8 | 8 | *17* | 2 | 2 | 0 | 0 | *4* |
| Peak Hour | 0 | 38 | 13 | 13 | *64* | 0 | 1 | 22 | 23 | *46* | 5 | 3 | 0 | 0 | *8* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | Marsh Rd Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 136 | 0 | 80 | 0 | 0 | 11 | 62 | 0 | 53 | 55 | 0 | 397 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 136 | 0 | 84 | 0 | 0 | 23 | 72 | 0 | 66 | 66 | 0 | 447 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 135 | 0 | 94 | 0 | 0 | 43 | 86 | 0 | 76 | 110 | 0 | 544 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 88 | 0 | 0 | 47 | 108 | 0 | 94 | 80 | 0 | 510 | 1,898 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **103** | **0** | **73** | **0** | **0** | **53** | **124** | **0** | **97** | **66** | **0** | **516** | 2,017 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **116** | **0** | **82** | **0** | **0** | **52** | **143** | **0** | **105** | **79** | **0** | **577** | 2,147 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **130** | **0** | **68** | **0** | **0** | **48** | **113** | **0** | **113** | **82** | **0** | **554** | 2,157 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **143** | **0** | **56** | **0** | **0** | **70** | **89** | **0** | **106** | **78** | **0** | **542** | **2,189** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 108 | 0 | 65 | 0 | 0 | 62 | 88 | 0 | 86 | 69 | 0 | 478 | 2,151 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 57 | 0 | 0 | 80 | 109 | 0 | 75 | 50 | 0 | 499 | 2,073 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 110 | 0 | 62 | 0 | 0 | 63 | 80 | 0 | 73 | 55 | 0 | 443 | 1,962 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 119 | 0 | 60 | 0 | 0 | 63 | 104 | 0 | 72 | 58 | 0 | 476 | 1,896 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 1,457 | 0 | 869 | 0 | 0 | 615 | 1,178 | 0 | 1,016 | 848 | 0 | 5,983 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **492** | **0** | **279** | **0** | **0** | **223** | **469** | **0** | **421** | **305** | **0** | **2,189** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **29** | **0** | **9** | **0** | **0** | **3** | **10** | **0** | **7** | **6** | **0** | **64** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **6%** | **-** | **3%** | **-** | **-** | **1%** | **2%** | **-** | **2%** | **2%** | **-** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 4 | 1 | *6* | 0 | 1 | 2 | 4 | *7* | 1 | 0 | 0 | 0 | *1* |
| 7:15 AM | 0 | 5 | 3 | 1 | *9* | 0 | 1 | 1 | 3 | *5* | 2 | 1 | 0 | 0 | *3* |
| 7:30 AM | 0 | 6 | 7 | 4 | *17* | 0 | 0 | 2 | 11 | *13* | 6 | 0 | 0 | 0 | *6* |
| 7:45 AM | 0 | 3 | 5 | 3 | *11* | 0 | 1 | 4 | 10 | *15* | 0 | 1 | 0 | 0 | *1* |
| **8:00 AM** | **0** | **14** | **4** | **4** | ***22*** | **0** | **0** | **4** | **5** | ***9*** | **1** | **0** | **0** | **0** | *1* |
| **8:15 AM** | **0** | **12** | **3** | **3** | ***18*** | **0** | **0** | **6** | **6** | ***12*** | **1** | **1** | **0** | **0** | *2* |
| **8:30 AM** | **0** | **6** | **4** | **4** | ***14*** | **0** | **0** | **4** | **4** | ***8*** | **1** | **0** | **0** | **0** | *1* |
| **8:45 AM** | **0** | **6** | **2** | **2** | ***10*** | **0** | **1** | **8** | **8** | ***17*** | **2** | **2** | **0** | **0** | ***4*** |
| 9:00 AM | 0 | 6 | 6 | 3 | *15* | 0 | 1 | 7 | 12 | *20* | 1 | 0 | 0 | 0 | *1* |
| 9:15 AM | 0 | 4 | 9 | 6 | *19* | 0 | 0 | 3 | 4 | *7* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 0 | 10 | 6 | 3 | *19* | 0 | 0 | 1 | 5 | *6* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 0 | 3 | 4 | 2 | *9* | 0 | 0 | 0 | 3 | *3* | 1 | 0 | 0 | 0 | *1* |
| Count Total | 0 | 76 | 57 | 36 | *169* | 0 | 5 | 42 | 75 | *122* | 16 | 5 | 0 | 0 | *21* |
| **Peak Hr** | **0** | **38** | **13** | **13** | ***64*** | **0** | **1** | **22** | **23** | ***46*** | **5** | **3** | **0** | **0** | ***8*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Marsh Rd | | | | Middlefield Rd | | | | Middlefield Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 0 | 6 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 9 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 3 | 4 | 0 | 3 | 1 | 0 | 17 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 3 | 0 | 11 | 43 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **12** | **0** | **2** | **0** | **0** | **0** | **4** | **0** | **3** | **1** | **0** | **22** | 59 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **5** | **0** | **0** | **1** | **2** | **0** | **1** | **2** | **0** | **18** | 68 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **1** | **0** | **0** | **1** | **3** | **0** | **2** | **2** | **0** | **14** | 65 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **1** | **0** | **0** | **1** | **1** | **0** | **1** | **1** | **0** | **10** | **64** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 2 | 4 | 0 | 2 | 1 | 0 | 15 | 57 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 4 | 5 | 0 | 3 | 3 | 0 | 19 | 58 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 2 | 0 | 0 | 1 | 5 | 0 | 2 | 1 | 0 | 19 | 63 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 9 | 62 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 61 | 0 | 15 | 0 | 0 | 17 | 40 | 0 | 18 | 18 | 0 | 169 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **29** | **0** | **9** | **0** | **0** | **3** | **10** | **0** | **7** | **6** | **0** | **64** | **0** |

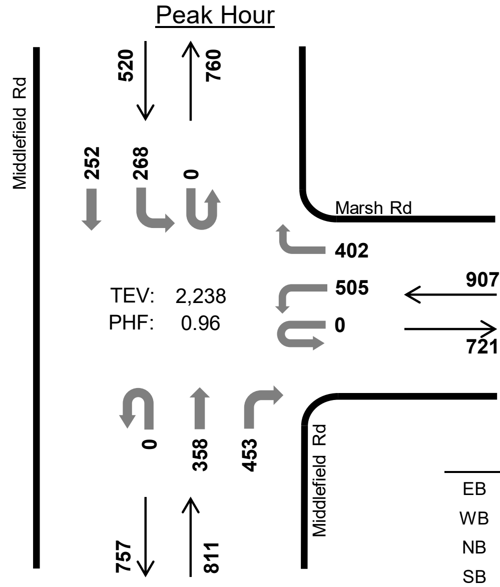
## Three-Hour Count Summaries - Bikes

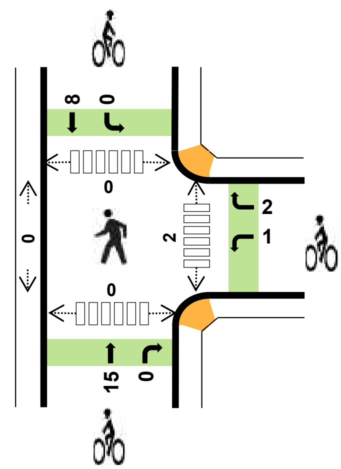
| Interval Start | n/a | | | Marsh Rd | | | Middlefield Rd | | | Middlefield Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 7 | 0 |
| 7:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 5 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 11 | 0 | 13 | 0 |
| 7:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 10 | 0 | 15 | 40 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **5** | **0** | **9** | 42 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **6** | **0** | **12** | 49 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **1** | **0** | **4** | **0** | **8** | 44 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **8** | **0** | **0** | **8** | **0** | **17** | **46** |
| 9:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 0 | 0 | 12 | 0 | 20 | 57 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 7 | 52 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 6 | 50 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 36 |
| Count Total | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 41 | 1 | 0 | 75 | 0 | 122 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **21** | **1** | **0** | **23** | **0** | **46** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Middlefield Rd
# Marsh Rd

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 5:30 PM to 6:30 PM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 0.7% | 0.94 |
| NB | 1.8% | 0.91 |
| SB | 1.7% | 0.98 |
| TOTAL | 1.3% | 0.96 |

## Three-Hour Count Summaries

| Interval Start | | n/a Eastbound UT | LT | TH | RT | Marsh Rd Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:30 PM | | 0 | 0 | 0 | 0 | 0 | 139 | 0 | 101 | 0 | 0 | 86 | 96 | 0 | 67 | 62 | 0 | 551 | 0 |
| 5:45 PM | | 0 | 0 | 0 | 0 | 0 | 106 | 0 | 111 | 0 | 0 | 103 | 109 | 0 | 64 | 69 | 0 | 562 | 0 |
| 6:00 PM | | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 92 | 0 | 0 | 89 | 105 | 0 | 78 | 54 | 0 | 541 | 0 |
| 6:15 PM | | 0 | 0 | 0 | 0 | 0 | 137 | 0 | 98 | 0 | 0 | 80 | 143 | 0 | 59 | 67 | 0 | 584 | 2,238 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 505 | 0 | 402 | 0 | 0 | 358 | 453 | 0 | 268 | 252 | 0 | 2,238 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 11 | 0 | 3 | 6 | 0 | 30 | 0 |
| | HV% | - | - | - | - | - | 1% | - | 0% | - | - | 1% | 2% | - | 1% | 2% | - | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:30 PM | 0 | 2 | 5 | 3 | *10* | 0 | 1 | 2 | 3 | *6* | 1 | 0 | 0 | 0 | *1* |
| 5:45 PM | 0 | 0 | 5 | 3 | *8* | 0 | 1 | 5 | 0 | *6* | 0 | 0 | 0 | 0 | *0* |
| 6:00 PM | 0 | 2 | 1 | 0 | *3* | 0 | 1 | 4 | 2 | *7* | 1 | 0 | 0 | 0 | *1* |
| 6:15 PM | 0 | 2 | 4 | 3 | *9* | 0 | 0 | 4 | 3 | *7* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 0 | 6 | 15 | 9 | *30* | 0 | 3 | 15 | 8 | *26* | 2 | 0 | 0 | 0 | *2* |

**Project Manager:** (415) 310-6469 project.manager.ca@idaxdata.com

## Three-Hour Count Summaries

| Interval Start | n/a | | | | Marsh Rd | | | | Middlefield Rd | | | | Middlefield Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 95 | 0 | 0 | 100 | 100 | 0 | 86 | 72 | 0 | 543 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 77 | 0 | 0 | 88 | 123 | 0 | 97 | 69 | 0 | 536 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 95 | 0 | 95 | 0 | 0 | 100 | 98 | 0 | 81 | 65 | 0 | 534 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 98 | 0 | 93 | 0 | 0 | 98 | 96 | 0 | 75 | 63 | 0 | 523 | 2,136 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 112 | 0 | 88 | 0 | 0 | 101 | 88 | 0 | 81 | 78 | 0 | 548 | 2,141 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 153 | 0 | 117 | 0 | 0 | 77 | 89 | 0 | 66 | 61 | 0 | 563 | 2,168 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **139** | **0** | **101** | **0** | **0** | **86** | **96** | **0** | **67** | **62** | **0** | **551** | 2,185 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **106** | **0** | **111** | **0** | **0** | **103** | **109** | **0** | **64** | **69** | **0** | **562** | 2,224 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **123** | **0** | **92** | **0** | **0** | **89** | **105** | **0** | **78** | **54** | **0** | **541** | 2,217 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **137** | **0** | **98** | **0** | **0** | **80** | **143** | **0** | **59** | **67** | **0** | **584** | **2,238** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 93 | 0 | 0 | 72 | 98 | 0 | 67 | 56 | 0 | 479 | 2,166 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 115 | 0 | 87 | 0 | 0 | 71 | 100 | 0 | 76 | 49 | 0 | 498 | 2,102 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 1,343 | 0 | 1,147 | 0 | 0 | 1,065 | 1,245 | 0 | 897 | 765 | 0 | 6,462 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **505** | **0** | **402** | **0** | **0** | **358** | **453** | **0** | **268** | **252** | **0** | **2,238** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **4** | **11** | **0** | **3** | **6** | **0** | **30** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **1%** | **-** | **0%** | **-** | **-** | **1%** | **2%** | **-** | **1%** | **2%** | **-** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 0 | 2 | 4 | 2 | *8* | 0 | 0 | 1 | 3 | *4* | 1 | 0 | 0 | 0 | *1* |
| 4:15 PM | 0 | 1 | 5 | 1 | *7* | 0 | 0 | 0 | 5 | *5* | 2 | 3 | 0 | 0 | *5* |
| 4:30 PM | 0 | 0 | 2 | 3 | *5* | 0 | 0 | 6 | 5 | *11* | 1 | 0 | 0 | 0 | *1* |
| 4:45 PM | 0 | 1 | 2 | 1 | *4* | 0 | 0 | 6 | 4 | *10* | 1 | 0 | 0 | 0 | *1* |
| 5:00 PM | 0 | 3 | 2 | 3 | *8* | 0 | 0 | 4 | 5 | *9* | 2 | 0 | 0 | 0 | *2* |
| 5:15 PM | 0 | 2 | 2 | 1 | *5* | 0 | 0 | 6 | 4 | *10* | 2 | 0 | 0 | 0 | *2* |
| **5:30 PM** | **0** | **2** | **5** | **3** | ***10*** | **0** | **1** | **2** | **3** | ***6*** | **1** | **0** | **0** | **0** | *1* |
| **5:45 PM** | **0** | **0** | **5** | **3** | ***8*** | **0** | **1** | **5** | **0** | ***6*** | **0** | **0** | **0** | **0** | *0* |
| **6:00 PM** | **0** | **2** | **1** | **0** | ***3*** | **0** | **1** | **4** | **2** | ***7*** | **1** | **0** | **0** | **0** | *1* |
| **6:15 PM** | **0** | **2** | **4** | **3** | ***9*** | **0** | **0** | **4** | **3** | ***7*** | **0** | **0** | **0** | **0** | ***0*** |
| 6:30 PM | 0 | 0 | 7 | 1 | *8* | 0 | 0 | 9 | 1 | *10* | 2 | 0 | 0 | 0 | *2* |
| 6:45 PM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 4 | 2 | *6* | 1 | 0 | 0 | 0 | *1* |
| Count Total | 0 | 15 | 41 | 23 | *79* | 0 | 3 | 51 | 37 | *91* | 14 | 3 | 0 | 0 | *17* |
| **Peak Hr** | **0** | **6** | **15** | **9** | ***30*** | **0** | **3** | **15** | **8** | ***26*** | **2** | **0** | **0** | **0** | ***2*** |

### Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Marsh Rd | | | | Middlefield Rd | | | | Middlefield Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 8 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 0 | 1 | 0 | 7 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 5 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 4 | 24 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 8 | 24 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 5 | 22 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **1** | **4** | **0** | **2** | **1** | **0** | **10** | 27 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **3** | **0** | **1** | **2** | **0** | **8** | 31 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** | 26 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **3** | **0** | **9** | **30** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 0 | 1 | 0 | 8 | 28 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 4 | 24 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 1 | 0 | 0 | 14 | 27 | 0 | 9 | 14 | 0 | 79 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **4** | **11** | **0** | **3** | **6** | **0** | **30** | **0** |

### Three-Hour Count Summaries - Bikes

| Interval Start | n/a | | | Marsh Rd | | | Middlefield Rd | | | Middlefield Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 4 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 5 | 0 | 11 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 10 | 30 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 5 | 0 | 9 | 35 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 10 | 40 |
| **5:30 PM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **3** | **0** | **6** | 35 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **5** | **0** | **0** | **0** | **0** | **6** | 31 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **0** | **0** | **2** | **0** | **7** | 29 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **3** | **0** | **7** | **26** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 10 | 30 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 6 | 30 |
| Count Total | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 50 | 1 | 0 | 37 | 0 | 91 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **1** | **0** | **2** | **0** | **15** | **0** | **0** | **8** | **0** | **26** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 41AM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

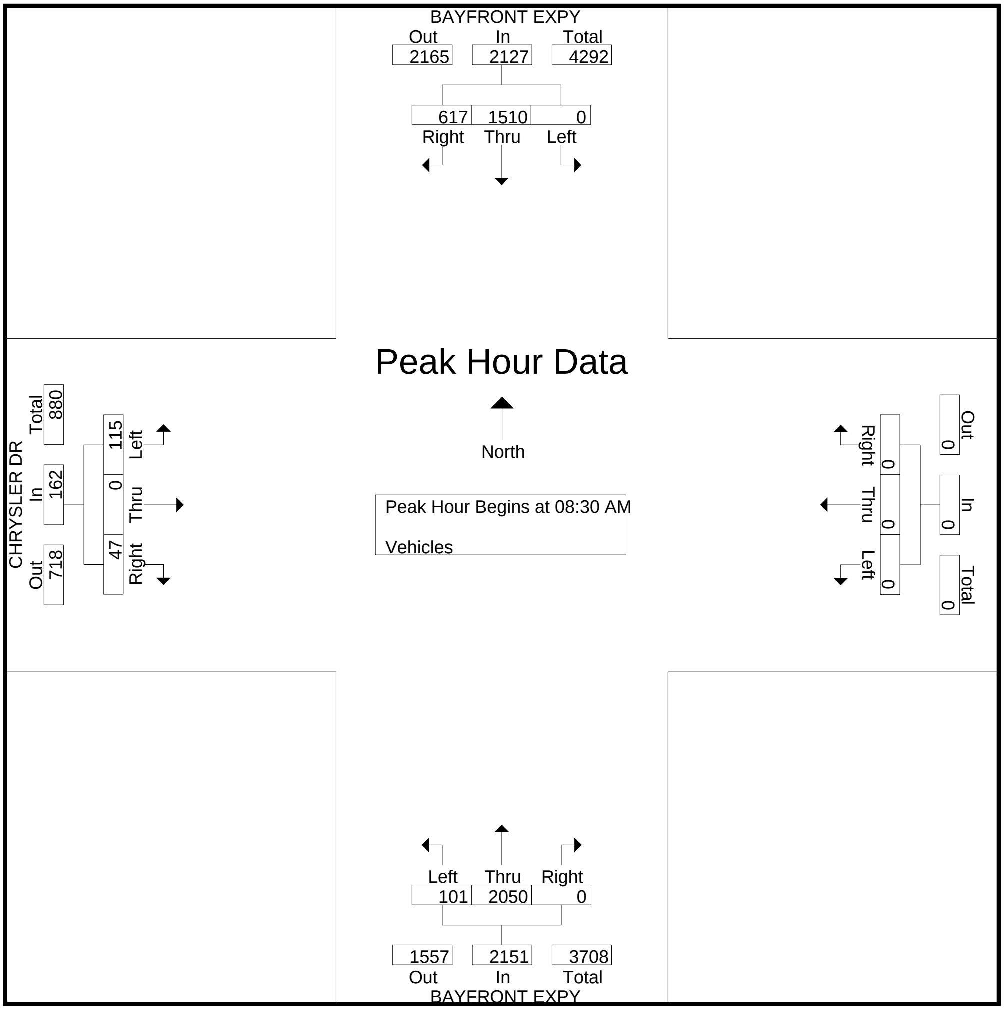
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 116 | 177 | 0 | 0 | 293 | 0 | 0 | 0 | 0 | 0 | 0 | 540 | 14 | 1 | 555 | 4 | 0 | 37 | 0 | 41 | 889 |
| 07:15 AM | 164 | 215 | 0 | 0 | 379 | 0 | 0 | 0 | 0 | 0 | 0 | 514 | 15 | 2 | 531 | 7 | 0 | 25 | 0 | 32 | 942 |
| 07:30 AM | 153 | 208 | 0 | 0 | 361 | 0 | 0 | 0 | 0 | 0 | 0 | 504 | 11 | 8 | 523 | 13 | 0 | 53 | 0 | 66 | 950 |
| 07:45 AM | 188 | 239 | 0 | 0 | 427 | 0 | 0 | 0 | 0 | 0 | 0 | 492 | 23 | 5 | 520 | 8 | 0 | 45 | 0 | 53 | 1000 |
| Total | 621 | 839 | 0 | 0 | 1460 | 0 | 0 | 0 | 0 | 0 | 0 | 2050 | 63 | 16 | 2129 | 32 | 0 | 160 | 0 | 192 | 3781 |
| 08:00 AM | 211 | 293 | 0 | 0 | 504 | 0 | 0 | 0 | 0 | 0 | 0 | 495 | 7 | 6 | 508 | 18 | 0 | 35 | 0 | 53 | 1065 |
| 08:15 AM | 202 | 305 | 0 | 0 | 507 | 0 | 0 | 0 | 0 | 0 | 0 | 431 | 9 | 5 | 445 | 19 | 0 | 35 | 0 | 54 | 1006 |
| 08:30 AM | 166 | 337 | 0 | 0 | 503 | 0 | 0 | 0 | 0 | 0 | 0 | 576 | 20 | 3 | 599 | 15 | 0 | 22 | 0 | 37 | 1139 |
| 08:45 AM | 142 | 371 | 0 | 0 | 513 | 0 | 0 | 0 | 0 | 0 | 0 | 548 | 16 | 1 | 565 | 12 | 0 | 27 | 0 | 39 | 1117 |
| Total | 721 | 1306 | 0 | 0 | 2027 | 0 | 0 | 0 | 0 | 0 | 0 | 2050 | 52 | 15 | 2117 | 64 | 0 | 119 | 0 | 183 | 4327 |
| 09:00 AM | 174 | 433 | 0 | 0 | 607 | 0 | 0 | 0 | 0 | 0 | 0 | 454 | 28 | 0 | 482 | 7 | 0 | 38 | 0 | 45 | 1134 |
| 09:15 AM | 135 | 369 | 0 | 0 | 504 | 0 | 0 | 0 | 0 | 0 | 0 | 472 | 37 | 0 | 509 | 13 | 0 | 28 | 0 | 41 | 1054 |
| 09:30 AM | 146 | 395 | 0 | 0 | 541 | 0 | 0 | 0 | 0 | 0 | 0 | 487 | 29 | 3 | 519 | 15 | 0 | 40 | 0 | 55 | 1115 |
| 09:45 AM | 157 | 379 | 0 | 1 | 537 | 0 | 0 | 0 | 0 | 0 | 0 | 499 | 29 | 0 | 528 | 11 | 0 | 35 | 0 | 46 | 1111 |
| Total | 612 | 1576 | 0 | 1 | 2189 | 0 | 0 | 0 | 0 | 0 | 0 | 1912 | 123 | 3 | 2038 | 46 | 0 | 141 | 0 | 187 | 4414 |
| Grand Total | 1954 | 3721 | 0 | 1 | 5676 | 0 | 0 | 0 | 0 | 0 | 0 | 6012 | 238 | 34 | 6284 | 142 | 0 | 420 | 0 | 562 | 12522 |
| Apprch % | 34.4 | 65.6 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 95.7 | 3.8 | 0.5 | | 25.3 | 0 | 74.7 | 0 | | |
| Total % | 15.6 | 29.7 | 0 | 0 | 45.3 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 1.9 | 0.3 | 50.2 | 1.1 | 0 | 3.4 | 0 | 4.5 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:30 AM | | | | | | | | | | | | | | | | | |
| 08:30 AM | 166 | 337 | 0 | 503 | 0 | 0 | 0 | 0 | 0 | **576** | 20 | **596** | **15** | 0 | 22 | 37 | **1136** |
| 08:45 AM | 142 | 371 | 0 | 513 | 0 | 0 | 0 | 0 | 0 | 548 | 16 | 564 | 12 | 0 | 27 | 39 | 1116 |
| 09:00 AM | **174** | **433** | 0 | **607** | 0 | 0 | 0 | 0 | 0 | 454 | 28 | 482 | 7 | 0 | **38** | **45** | 1134 |
| 09:15 AM | 135 | 369 | 0 | 504 | 0 | 0 | 0 | 0 | 0 | 472 | **37** | 509 | 13 | 0 | 28 | 41 | 1054 |
| Total Volume | 617 | 1510 | 0 | 2127 | 0 | 0 | 0 | 0 | 0 | 2050 | 101 | 2151 | 47 | 0 | 115 | 162 | 4440 |
| % App. Total | 29 | 71 | 0 | | 0 | 0 | 0 | | 0 | 95.3 | 4.7 | | 29 | 0 | 71 | | |
| PHF | .886 | .872 | .000 | .876 | .000 | .000 | .000 | .000 | .000 | .890 | .682 | .902 | .783 | .000 | .757 | .900 | .977 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41AM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41AM FINAL
Site Code : 00000041
Start Date : 4/16/2019


Groups Printed- Bikes

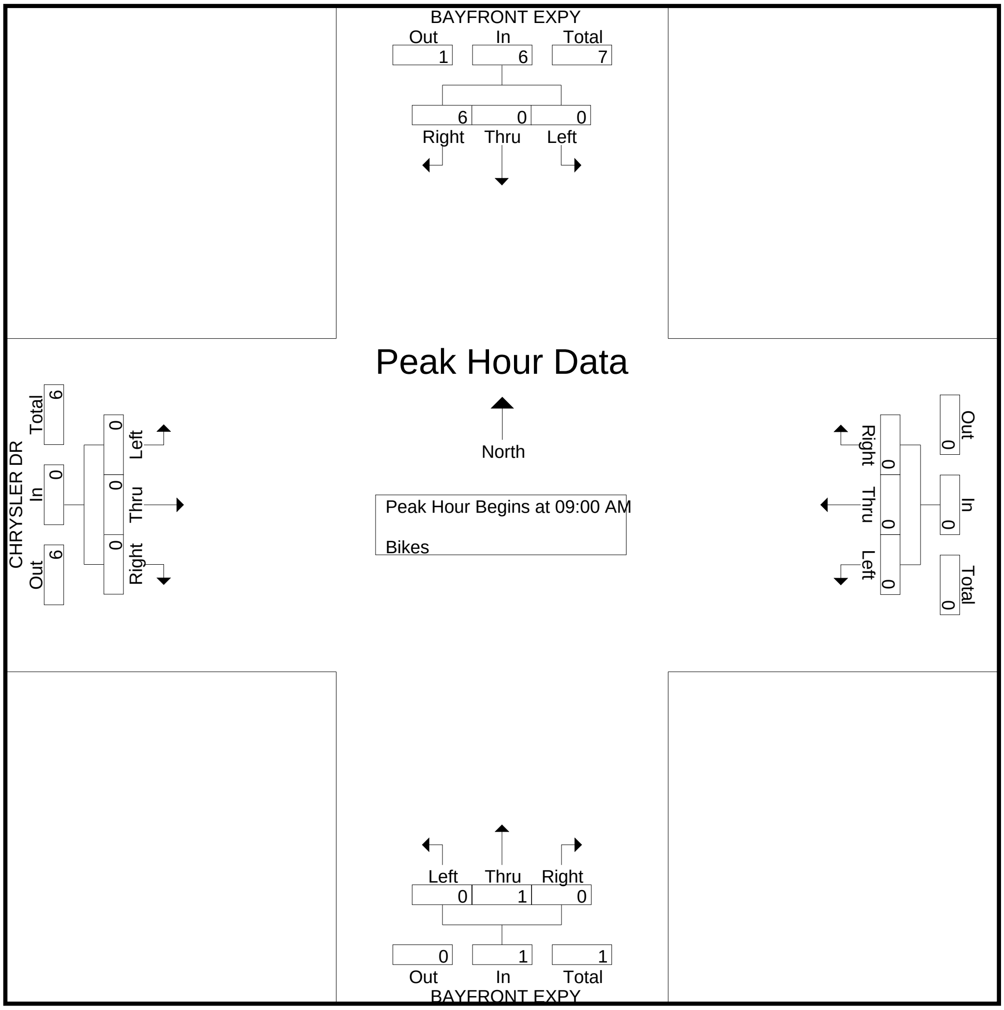
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| 09:45 AM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| Grand Total | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| Apprch % | 100 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | |
| Total % | 87.5 | 0 | 0 | 0 | 87.5 | 0 | 0 | 0 | 0 | 0 | 0 | 12.5 | 0 | 0 | 12.5 | 0 | 0 | 0 | 0 | 0 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 09:00 AM | | | | | | | | | | | | | | | | | |
| 09:00 AM | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **4** |
| 09:45 AM | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total Volume | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 7 |
| % App. Total | 100 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .500 | .000 | .000 | .500 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | .438 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41AM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41PM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

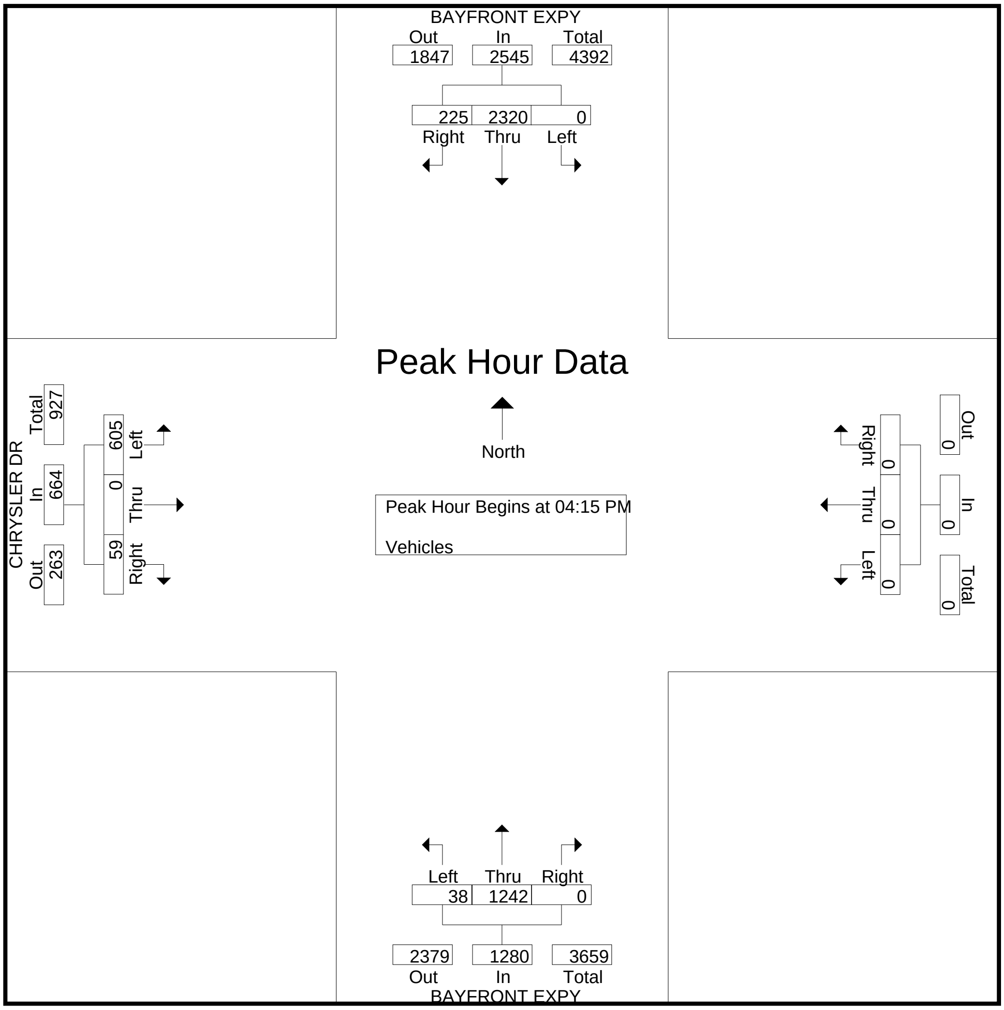
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 40 | 578 | 0 | 0 | 618 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 10 | 5 | 296 | 21 | 0 | 126 | 0 | 147 | 1061 |
| 04:15 PM | 47 | 627 | 0 | 0 | 674 | 0 | 0 | 0 | 0 | 0 | 0 | 282 | 11 | 1 | 294 | 11 | 0 | 163 | 0 | 174 | 1142 |
| 04:30 PM | 52 | 571 | 0 | 0 | 623 | 0 | 0 | 0 | 0 | 0 | 0 | 314 | 9 | 7 | 330 | 13 | 0 | 182 | 0 | 195 | 1148 |
| 04:45 PM | 57 | 574 | 0 | 0 | 631 | 0 | 0 | 0 | 0 | 0 | 0 | 302 | 8 | 2 | 312 | 17 | 0 | 151 | 0 | 168 | 1111 |
| Total | 196 | 2350 | 0 | 0 | 2546 | 0 | 0 | 0 | 0 | 0 | 0 | 1179 | 38 | 15 | 1232 | 62 | 0 | 622 | 0 | 684 | 4462 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 69 | 548 | 0 | 0 | 617 | 0 | 0 | 0 | 0 | 0 | 0 | 344 | 10 | 2 | 356 | 18 | 0 | 109 | 0 | 127 | 1100 |
| 05:15 PM | 94 | 449 | 0 | 0 | 543 | 0 | 0 | 0 | 0 | 0 | 0 | 374 | 14 | 5 | 393 | 4 | 0 | 136 | 0 | 140 | 1076 |
| 05:30 PM | 82 | 482 | 0 | 0 | 564 | 0 | 0 | 0 | 0 | 0 | 0 | 320 | 8 | 0 | 328 | 11 | 0 | 162 | 0 | 173 | 1065 |
| 05:45 PM | 69 | 461 | 0 | 0 | 530 | 0 | 0 | 0 | 0 | 0 | 0 | 314 | 10 | 3 | 327 | 15 | 0 | 124 | 0 | 139 | 996 |
| Total | 314 | 1940 | 0 | 0 | 2254 | 0 | 0 | 0 | 0 | 0 | 0 | 1352 | 42 | 10 | 1404 | 48 | 0 | 531 | 0 | 579 | 4237 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 60 | 412 | 0 | 2 | 474 | 0 | 0 | 0 | 0 | 0 | 0 | 320 | 17 | 0 | 337 | 14 | 0 | 167 | 0 | 181 | 992 |
| 06:15 PM | 47 | 394 | 0 | 0 | 441 | 0 | 0 | 0 | 0 | 0 | 0 | 318 | 9 | 5 | 332 | 13 | 0 | 169 | 1 | 183 | 956 |
| 06:30 PM | 30 | 394 | 0 | 0 | 424 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 13 | 1 | 295 | 16 | 0 | 149 | 0 | 165 | 884 |
| 06:45 PM | 35 | 334 | 0 | 0 | 369 | 0 | 0 | 0 | 0 | 0 | 0 | 257 | 11 | 5 | 273 | 7 | 0 | 105 | 0 | 112 | 754 |
| Total | 172 | 1534 | 0 | 2 | 1708 | 0 | 0 | 0 | 0 | 0 | 0 | 1176 | 50 | 11 | 1237 | 50 | 0 | 590 | 1 | 641 | 3586 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 682 | 5824 | 0 | 2 | 6508 | 0 | 0 | 0 | 0 | 0 | 0 | 3707 | 130 | 36 | 3873 | 160 | 0 | 1743 | 1 | 1904 | 12285 |
| Apprch % | 10.5 | 89.5 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 95.7 | 3.4 | 0.9 | | 8.4 | 0 | 91.5 | 0.1 | | |
| Total % | 5.6 | 47.4 | 0 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 0 | 30.2 | 1.1 | 0.3 | 31.5 | 1.3 | 0 | 14.2 | 0 | 15.5 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 47 | **627** | 0 | **674** | 0 | 0 | 0 | 0 | 0 | 282 | **11** | 293 | 11 | 0 | 163 | 174 | **1141** |
| 04:30 PM | 52 | 571 | 0 | 623 | 0 | 0 | 0 | 0 | 0 | 314 | 9 | 323 | 13 | 0 | **182** | **195** | 1141 |
| 04:45 PM | 57 | 574 | 0 | 631 | 0 | 0 | 0 | 0 | 0 | 302 | 8 | 310 | 17 | 0 | 151 | 168 | 1109 |
| 05:00 PM | **69** | 548 | 0 | 617 | 0 | 0 | 0 | 0 | 0 | **344** | 10 | **354** | **18** | 0 | 109 | 127 | 1098 |
| Total Volume | 225 | 2320 | 0 | 2545 | 0 | 0 | 0 | 0 | 0 | 1242 | 38 | 1280 | 59 | 0 | 605 | 664 | 4489 |
| % App. Total | 8.8 | 91.2 | 0 | | 0 | 0 | 0 | | 0 | 97 | 3 | | 8.9 | 0 | 91.1 | | |
| PHF | .815 | .925 | .000 | .944 | .000 | .000 | .000 | .000 | .000 | .903 | .864 | .904 | .819 | .000 | .831 | .851 | .984 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41PM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41PM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

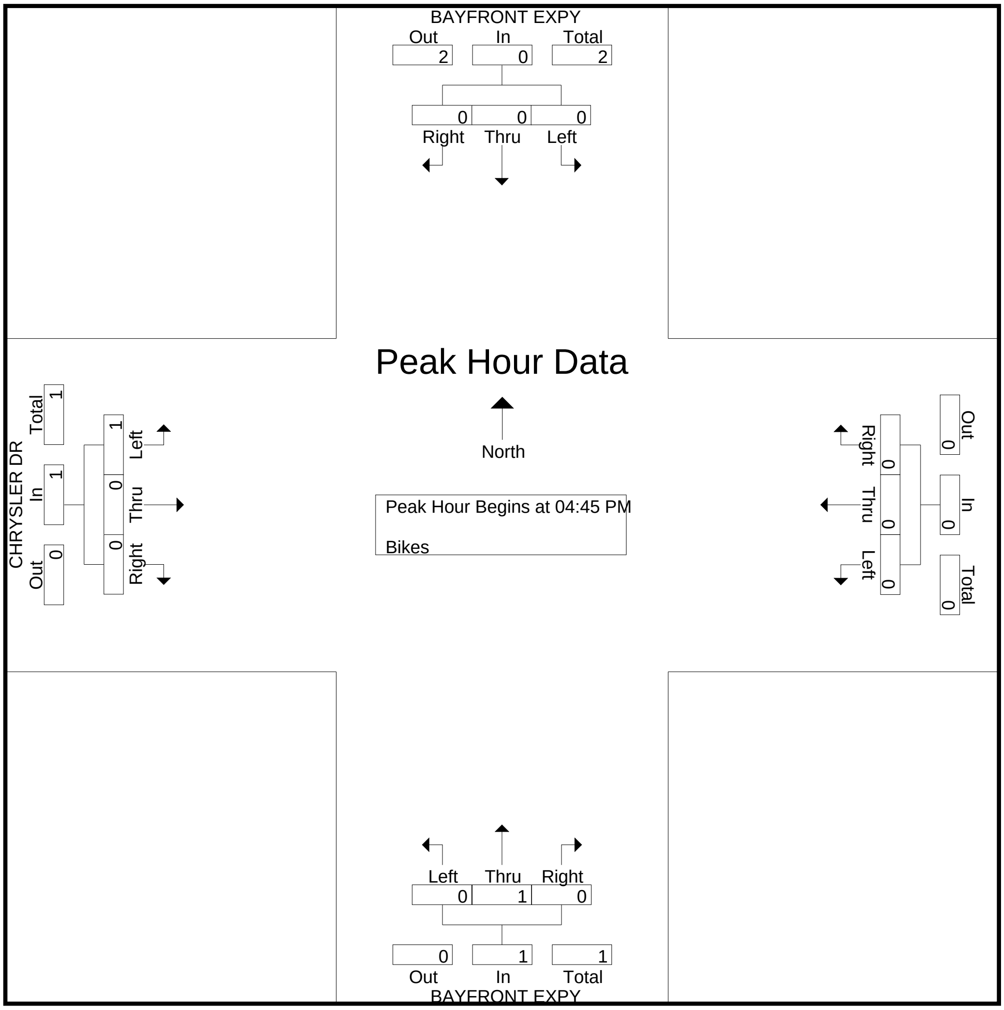
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 3 | 4 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 100 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 25 | 0 | 0 | 75 | 0 | 75 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **1** |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 100 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .250 | .250 | .500 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 41PM FINAL
Site Code : 00000041
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40AM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

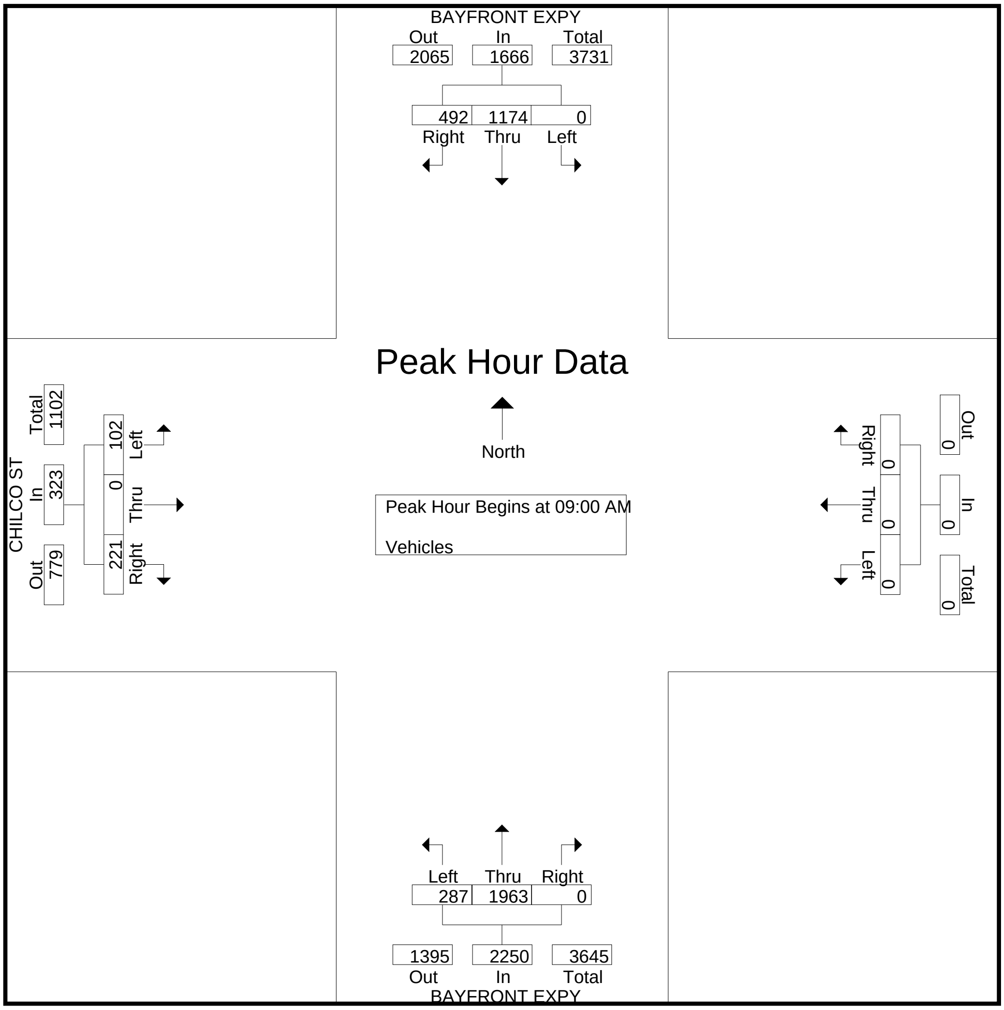
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 29 | 134 | 0 | 0 | 163 | 0 | 0 | 0 | 0 | 0 | 0 | 484 | 35 | 3 | 522 | 12 | 0 | 43 | 0 | 55 | 740 |
| 07:15 AM | 36 | 216 | 0 | 2 | 254 | 0 | 0 | 0 | 0 | 0 | 0 | 480 | 37 | 0 | 517 | 18 | 0 | 28 | 0 | 46 | 817 |
| 07:30 AM | 36 | 162 | 0 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 0 | 532 | 34 | 5 | 571 | 33 | 0 | 48 | 0 | 81 | 850 |
| 07:45 AM | 60 | 246 | 0 | 1 | 307 | 0 | 0 | 0 | 0 | 0 | 0 | 544 | 56 | 7 | 607 | 24 | 0 | 42 | 0 | 66 | 980 |
| Total | 161 | 758 | 0 | 3 | 922 | 0 | 0 | 0 | 0 | 0 | 0 | 2040 | 162 | 15 | 2217 | 87 | 0 | 161 | 0 | 248 | 3387 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 76 | 211 | 0 | 1 | 288 | 0 | 0 | 0 | 0 | 0 | 0 | 461 | 63 | 4 | 528 | 23 | 0 | 24 | 0 | 47 | 863 |
| 08:15 AM | 84 | 157 | 0 | 2 | 243 | 0 | 0 | 0 | 0 | 0 | 0 | 481 | 47 | 4 | 532 | 40 | 0 | 26 | 0 | 66 | 841 |
| 08:30 AM | 96 | 156 | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 0 | 0 | 485 | 60 | 1 | 546 | 44 | 0 | 34 | 1 | 79 | 877 |
| 08:45 AM | 96 | 158 | 0 | 1 | 255 | 0 | 0 | 0 | 0 | 0 | 0 | 498 | 83 | 3 | 584 | 37 | 0 | 28 | 0 | 65 | 904 |
| Total | 352 | 682 | 0 | 4 | 1038 | 0 | 0 | 0 | 0 | 0 | 0 | 1925 | 253 | 12 | 2190 | 144 | 0 | 112 | 1 | 257 | 3485 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 155 | 322 | 0 | 3 | 480 | 0 | 0 | 0 | 0 | 0 | 0 | 455 | 69 | 4 | 528 | 49 | 0 | 23 | 0 | 72 | 1080 |
| 09:15 AM | 121 | 254 | 0 | 4 | 379 | 0 | 0 | 0 | 0 | 0 | 0 | 489 | 70 | 3 | 562 | 52 | 0 | 21 | 0 | 73 | 1014 |
| 09:30 AM | 131 | 297 | 0 | 0 | 428 | 0 | 0 | 0 | 0 | 0 | 0 | 511 | 83 | 1 | 595 | 61 | 0 | 31 | 0 | 92 | 1115 |
| 09:45 AM | 85 | 301 | 0 | 2 | 388 | 0 | 0 | 0 | 0 | 0 | 0 | 508 | 65 | 3 | 576 | 59 | 0 | 27 | 0 | 86 | 1050 |
| Total | 492 | 1174 | 0 | 9 | 1675 | 0 | 0 | 0 | 0 | 0 | 0 | 1963 | 287 | 11 | 2261 | 221 | 0 | 102 | 0 | 323 | 4259 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 1005 | 2614 | 0 | 16 | 3635 | 0 | 0 | 0 | 0 | 0 | 0 | 5928 | 702 | 38 | 6668 | 452 | 0 | 375 | 1 | 828 | 11131 |
| Apprch % | 27.6 | 71.9 | 0 | 0.4 | | 0 | 0 | 0 | 0 | | 0 | 88.9 | 10.5 | 0.6 | | 54.6 | 0 | 45.3 | 0.1 | | |
| Total % | 9 | 23.5 | 0 | 0.1 | 32.7 | 0 | 0 | 0 | 0 | 0 | 0 | 53.3 | 6.3 | 0.3 | 59.9 | 4.1 | 0 | 3.4 | 0 | 7.4 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 09:00 AM | | | | | | | | | | | | | | | | | |
| 09:00 AM | **155** | **322** | 0 | **477** | 0 | 0 | 0 | 0 | 0 | 455 | 69 | 524 | 49 | 0 | 23 | 72 | 1073 |
| 09:15 AM | 121 | 254 | 0 | 375 | 0 | 0 | 0 | 0 | 0 | 489 | 70 | 559 | 52 | 0 | 21 | 73 | 1007 |
| 09:30 AM | 131 | 297 | 0 | 428 | 0 | 0 | 0 | 0 | 0 | **511** | **83** | **594** | **61** | 0 | **31** | **92** | **1114** |
| 09:45 AM | 85 | 301 | 0 | 386 | 0 | 0 | 0 | 0 | 0 | 508 | 65 | 573 | 59 | 0 | 27 | 86 | 1045 |
| Total Volume | 492 | 1174 | 0 | 1666 | 0 | 0 | 0 | 0 | 0 | 1963 | 287 | 2250 | 221 | 0 | 102 | 323 | 4239 |
| % App. Total | 29.5 | 70.5 | 0 | | 0 | 0 | 0 | | 0 | 87.2 | 12.8 | | 68.4 | 0 | 31.6 | | |
| PHF | .794 | .911 | .000 | .873 | .000 | .000 | .000 | .000 | .000 | .960 | .864 | .947 | .906 | .000 | .823 | .878 | .951 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40AM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 40AM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

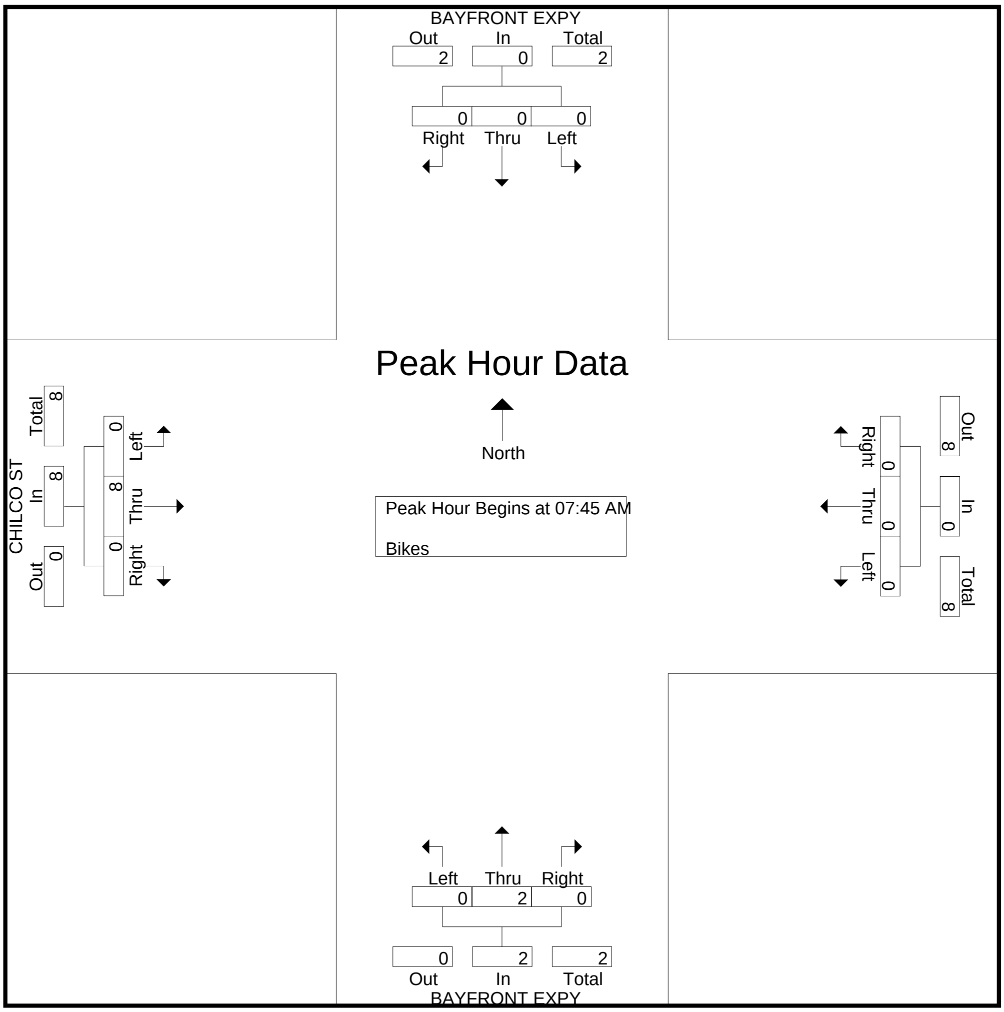
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 5 | 6 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 8 | 0 | 0 | 8 | 10 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 8 | 8 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 17 | 2 | 0 | 19 | 21 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 89.5 | 10.5 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.5 | 0 | 0 | 9.5 | 0 | 81 | 9.5 | 0 | 90.5 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | **5** | 0 | **5** | **6** |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 2 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 8 | 0 | 8 | 10 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .500 | .000 | .500 | .000 | .400 | .000 | .400 | .417 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 40AM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40PM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

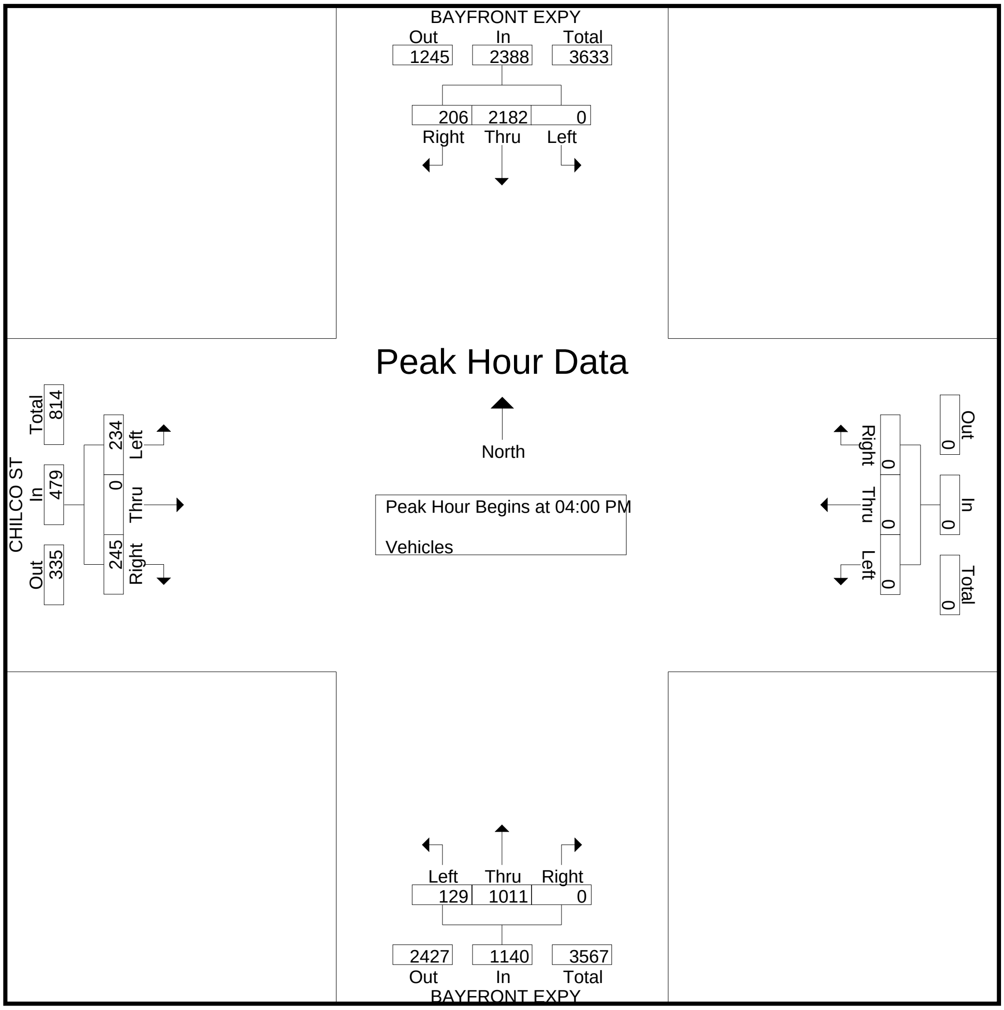
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 40 | 533 | 0 | 0 | 573 | 0 | 0 | 0 | 0 | 0 | 0 | 240 | 33 | 0 | 273 | 63 | 0 | 49 | 0 | 112 | 958 |
| 04:15 PM | 52 | 615 | 0 | 0 | 667 | 0 | 0 | 0 | 0 | 0 | 0 | 247 | 35 | 1 | 283 | 63 | 0 | 59 | 0 | 122 | 1072 |
| 04:30 PM | 51 | 511 | 0 | 0 | 562 | 0 | 0 | 0 | 0 | 0 | 0 | 266 | 29 | 2 | 297 | 69 | 0 | 56 | 0 | 125 | 984 |
| 04:45 PM | 63 | 523 | 0 | 0 | 586 | 0 | 0 | 0 | 0 | 0 | 0 | 258 | 32 | 2 | 292 | 50 | 0 | 70 | 0 | 120 | 998 |
| Total | 206 | 2182 | 0 | 0 | 2388 | 0 | 0 | 0 | 0 | 0 | 0 | 1011 | 129 | 5 | 1145 | 245 | 0 | 234 | 0 | 479 | 4012 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 63 | 391 | 0 | 1 | 455 | 0 | 0 | 0 | 0 | 0 | 0 | 288 | 36 | 6 | 330 | 85 | 0 | 74 | 0 | 159 | 944 |
| 05:15 PM | 46 | 463 | 0 | 3 | 512 | 0 | 0 | 0 | 0 | 0 | 0 | 299 | 31 | 1 | 331 | 75 | 0 | 88 | 0 | 163 | 1006 |
| 05:30 PM | 47 | 525 | 0 | 2 | 574 | 0 | 0 | 0 | 0 | 0 | 0 | 235 | 21 | 8 | 264 | 53 | 0 | 75 | 0 | 128 | 966 |
| 05:45 PM | 56 | 456 | 0 | 1 | 513 | 0 | 0 | 0 | 0 | 0 | 0 | 272 | 32 | 3 | 307 | 43 | 0 | 62 | 0 | 105 | 925 |
| Total | 212 | 1835 | 0 | 7 | 2054 | 0 | 0 | 0 | 0 | 0 | 0 | 1094 | 120 | 18 | 1232 | 256 | 0 | 299 | 0 | 555 | 3841 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 53 | 351 | 0 | 3 | 407 | 0 | 0 | 0 | 0 | 0 | 0 | 239 | 37 | 4 | 280 | 57 | 0 | 80 | 0 | 137 | 824 |
| 06:15 PM | 51 | 377 | 0 | 1 | 429 | 0 | 0 | 0 | 0 | 0 | 0 | 255 | 29 | 4 | 288 | 46 | 0 | 73 | 0 | 119 | 836 |
| 06:30 PM | 54 | 363 | 0 | 0 | 417 | 0 | 0 | 0 | 0 | 0 | 0 | 235 | 21 | 0 | 256 | 38 | 0 | 49 | 0 | 87 | 760 |
| 06:45 PM | 38 | 295 | 0 | 1 | 334 | 0 | 0 | 0 | 0 | 0 | 0 | 223 | 30 | 0 | 253 | 42 | 0 | 65 | 0 | 107 | 694 |
| Total | 196 | 1386 | 0 | 5 | 1587 | 0 | 0 | 0 | 0 | 0 | 0 | 952 | 117 | 8 | 1077 | 183 | 0 | 267 | 0 | 450 | 3114 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 614 | 5403 | 0 | 12 | 6029 | 0 | 0 | 0 | 0 | 0 | 0 | 3057 | 366 | 31 | 3454 | 684 | 0 | 800 | 0 | 1484 | 10967 |
| Apprch % | 10.2 | 89.6 | 0 | 0.2 | | 0 | 0 | 0 | 0 | | 0 | 88.5 | 10.6 | 0.9 | | 46.1 | 0 | 53.9 | 0 | | |
| Total % | 5.6 | 49.3 | 0 | 0.1 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 27.9 | 3.3 | 0.3 | 31.5 | 6.2 | 0 | 7.3 | 0 | 13.5 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 40 | 533 | 0 | 573 | 0 | 0 | 0 | 0 | 0 | 240 | 33 | 273 | 63 | 0 | 49 | 112 | 958 |
| 04:15 PM | 52 | **615** | 0 | **667** | 0 | 0 | 0 | 0 | 0 | 247 | **35** | 282 | 63 | 0 | 59 | 122 | **1071** |
| 04:30 PM | 51 | 511 | 0 | 562 | 0 | 0 | 0 | 0 | 0 | **266** | 29 | **295** | **69** | 0 | 56 | **125** | 982 |
| 04:45 PM | **63** | 523 | 0 | 586 | 0 | 0 | 0 | 0 | 0 | 258 | 32 | 290 | 50 | 0 | **70** | 120 | 996 |
| Total Volume | 206 | 2182 | 0 | 2388 | 0 | 0 | 0 | 0 | 0 | 1011 | 129 | 1140 | 245 | 0 | 234 | 479 | 4007 |
| % App. Total | 8.6 | 91.4 | 0 | | 0 | 0 | 0 | | 0 | 88.7 | 11.3 | | 51.1 | 0 | 48.9 | | |
| PHF | .817 | .887 | .000 | .895 | .000 | .000 | .000 | .000 | .000 | .950 | .921 | .966 | .888 | .000 | .836 | .958 | .935 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40PM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40PM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

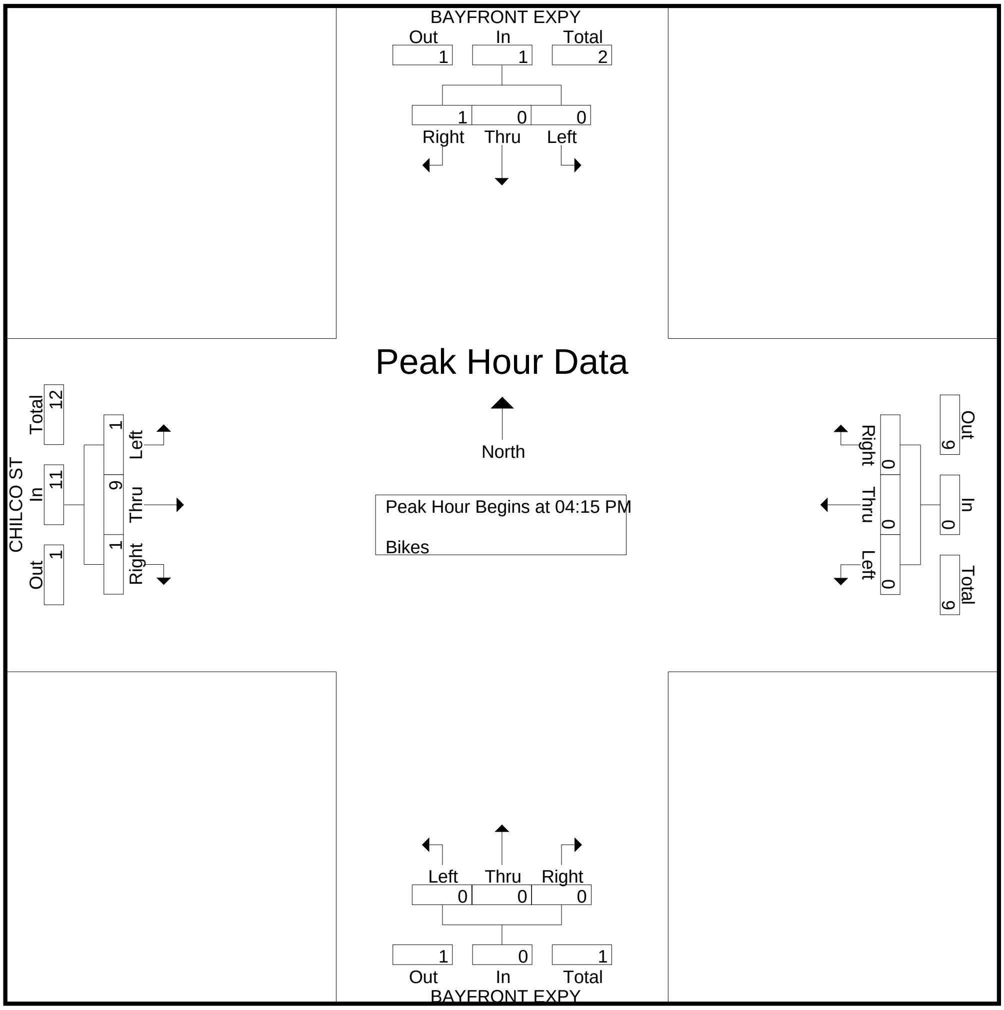
| | BAYFRONT EXPY Southbound | | | | | Westbound | | | | | BAYFRONT EXPY Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 3 |
| 04:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 4 | 4 |
| Total | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 1 | 0 | 8 | 9 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 9 | 9 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 4 |
| Grand Total | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 16 | 1 | 0 | 19 | 22 |
| Apprch % | 100 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 10.5 | 84.2 | 5.3 | 0 | | |
| Total % | 4.5 | 0 | 0 | 0 | 4.5 | 0 | 0 | 0 | 0 | 0 | 0 | 9.1 | 0 | 0 | 9.1 | 9.1 | 72.7 | 4.5 | 0 | 86.4 | |

| | BAYFRONT EXPY Southbound | | | | Westbound | | | | BAYFRONT EXPY Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 2 | 0 | 3 | 3 |
| 04:30 PM | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** | **1** | **4** | **4** |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 3 |
| Total Volume | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 1 | 11 | 12 |
| % App. Total | 100 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 9.1 | 81.8 | 9.1 | | |
| PHF | .250 | .000 | .000 | .250 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .750 | .250 | .688 | .750 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 40PM FINAL
Site Code : 00000040
Start Date : 4/16/2019
Page No : 2

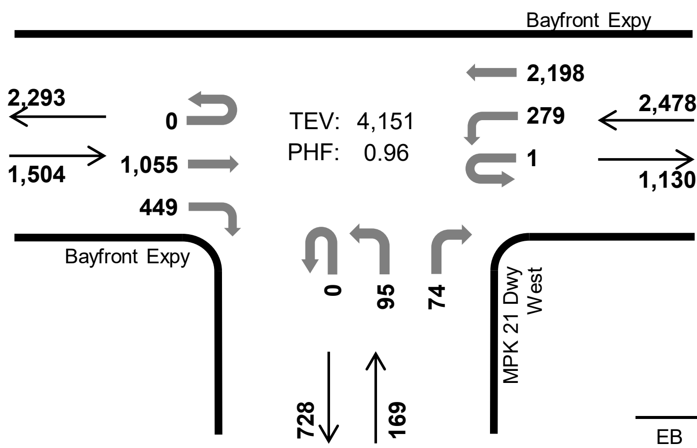


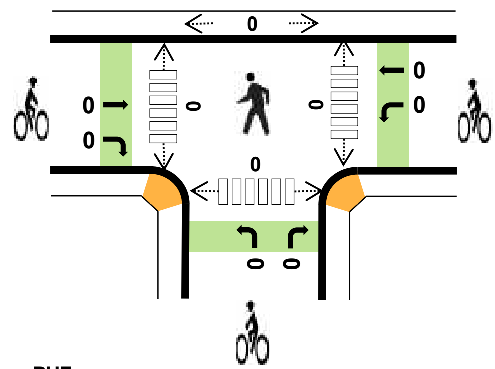
# MPK 21 Dwy West
# Bayfront Expy

N

Peak Hour

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 9:00 AM to 10:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | 11.6% | 0.95 |
| WB | 4.4% | 0.97 |
| NB | 35.5% | 0.77 |
| SB | - | - |
| TOTAL | 8.3% | 0.96 |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound UT | LT | TH | RT | Bayfront Expy Westbound UT | LT | TH | RT | MPK 21 Dwy West Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:00 AM | | 0 | 0 | 253 | 114 | 0 | 69 | 515 | 0 | 0 | 23 | 0 | 12 | 0 | 0 | 0 | 0 | 986 | 0 |
| 9:15 AM | | 0 | 0 | 266 | 130 | 1 | 70 | 550 | 0 | 0 | 18 | 0 | 25 | 0 | 0 | 0 | 0 | 1,060 | 0 |
| 9:30 AM | | 0 | 0 | 244 | 112 | 0 | 63 | 574 | 0 | 0 | 22 | 0 | 14 | 0 | 0 | 0 | 0 | 1,029 | 0 |
| 9:45 AM | | 0 | 0 | 292 | 93 | 0 | 77 | 559 | 0 | 0 | 32 | 0 | 23 | 0 | 0 | 0 | 0 | 1,076 | 4,151 |
| Peak Hour | All | 0 | 0 | 1,055 | 449 | 1 | 279 | 2,198 | 0 | 0 | 95 | 0 | 74 | 0 | 0 | 0 | 0 | 4,151 | 0 |
| | HV | 0 | 0 | 119 | 55 | 0 | 6 | 104 | 0 | 0 | 42 | 0 | 18 | 0 | 0 | 0 | 0 | 344 | 0 |
| | HV% | - | - | 11% | 12% | 0% | 2% | 5% | - | - | 44% | - | 24% | - | - | - | - | 8% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:00 AM | 50 | 28 | 10 | 0 | *88* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:15 AM | 39 | 28 | 14 | 0 | *81* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 36 | 31 | 14 | 0 | *81* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 49 | 23 | 22 | 0 | *94* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 174 | 110 | 60 | 0 | *344* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound UT | LT | TH | RT | Bayfront Expy Westbound UT | LT | TH | RT | MPK 21 Dwy West Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | 0 | 0 | 206 | 14 | 0 | 18 | 594 | 0 | 0 | 9 | 0 | 6 | 0 | 0 | 0 | 0 | 847 | 0 |
| 7:15 AM | | 0 | 0 | 203 | 32 | 0 | 10 | 669 | 0 | 0 | 6 | 0 | 7 | 0 | 0 | 0 | 0 | 927 | 0 |
| 7:30 AM | | 0 | 0 | 239 | 45 | 1 | 21 | 547 | 0 | 0 | 9 | 0 | 6 | 0 | 0 | 0 | 0 | 868 | 0 |
| 7:45 AM | | 0 | 0 | 286 | 36 | 0 | 36 | 468 | 0 | 0 | 8 | 0 | 14 | 0 | 0 | 0 | 0 | 848 | 3,490 |
| 8:00 AM | | 0 | 0 | 235 | 66 | 0 | 29 | 464 | 0 | 0 | 3 | 0 | 9 | 0 | 0 | 0 | 0 | 806 | 3,449 |
| 8:15 AM | | 0 | 0 | 235 | 66 | 0 | 40 | 491 | 0 | 0 | 15 | 0 | 10 | 0 | 0 | 0 | 0 | 857 | 3,379 |
| 8:30 AM | | 0 | 0 | 286 | 103 | 1 | 34 | 523 | 0 | 0 | 17 | 0 | 12 | 0 | 0 | 0 | 0 | 976 | 3,487 |
| 8:45 AM | | 0 | 0 | 252 | 83 | 1 | 74 | 518 | 0 | 0 | 26 | 0 | 13 | 0 | 0 | 0 | 0 | 967 | 3,606 |
| **9:00 AM** | | **0** | **0** | **253** | **114** | **0** | **69** | **515** | **0** | **0** | **23** | **0** | **12** | **0** | **0** | **0** | **0** | **986** | 3,786 |
| **9:15 AM** | | **0** | **0** | **266** | **130** | **1** | **70** | **550** | **0** | **0** | **18** | **0** | **25** | **0** | **0** | **0** | **0** | **1,060** | 3,989 |
| **9:30 AM** | | **0** | **0** | **244** | **112** | **0** | **63** | **574** | **0** | **0** | **22** | **0** | **14** | **0** | **0** | **0** | **0** | **1,029** | 4,042 |
| **9:45 AM** | | **0** | **0** | **292** | **93** | **0** | **77** | **559** | **0** | **0** | **32** | **0** | **23** | **0** | **0** | **0** | **0** | **1,076** | **4,151** |
| Count Total | | 0 | 0 | 2,997 | 894 | 4 | 541 | 6,472 | 0 | 0 | 188 | 0 | 151 | 0 | 0 | 0 | 0 | 11,247 | 0 |
| **Peak Hour** | **All** | **0** | **0** | **1,055** | **449** | **1** | **279** | **2,198** | **0** | **0** | **95** | **0** | **74** | **0** | **0** | **0** | **0** | **4,151** | **0** |
| | **HV** | **0** | **0** | **119** | **55** | **0** | **6** | **104** | **0** | **0** | **42** | **0** | **18** | **0** | **0** | **0** | **0** | **344** | **0** |
| | **HV%** | **-** | **-** | **11%** | **12%** | **0%** | **2%** | **5%** | **-** | **-** | **44%** | **-** | **24%** | **-** | **-** | **-** | **-** | **8%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 15 | 38 | 5 | 0 | *58* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:15 AM | 20 | 25 | 5 | 0 | *50* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 32 | 32 | 3 | 0 | *67* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:45 AM | 29 | 33 | 10 | 0 | *72* | 0 | 0 | 0 | 0 | *0* | 1 | 0 | 0 | 0 | *1* |
| 8:00 AM | 26 | 34 | 4 | 0 | *64* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:15 AM | 28 | 37 | 12 | 0 | *77* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 40 | 25 | 8 | 0 | *73* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:45 AM | 35 | 31 | 16 | 0 | *82* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| **9:00 AM** | **50** | **28** | **10** | **0** | ***88*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:15 AM** | **39** | **28** | **14** | **0** | ***81*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:30 AM** | **36** | **31** | **14** | **0** | ***81*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:45 AM** | **49** | **23** | **22** | **0** | ***94*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |
| Count Total | 399 | 365 | 123 | 0 | *887* | 0 | 0 | 0 | 0 | *0* | 1 | 0 | 0 | 0 | *1* |
| **Peak Hr** | **174** | **110** | **60** | **0** | ***344*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bayfront Expy | | | | Bayfront Expy | | | | MPK 21 Dwy West | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 14 | 1 | 0 | 1 | 37 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 58 | 0 |
| 7:15 AM | 0 | 0 | 19 | 1 | 0 | 1 | 24 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 50 | 0 |
| 7:30 AM | 0 | 0 | 24 | 8 | 0 | 1 | 31 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 0 |
| 7:45 AM | 0 | 0 | 25 | 4 | 0 | 2 | 31 | 0 | 0 | 6 | 0 | 4 | 0 | 0 | 0 | 0 | 72 | 247 |
| 8:00 AM | 0 | 0 | 18 | 8 | 0 | 1 | 33 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 64 | 253 |
| 8:15 AM | 0 | 0 | 24 | 4 | 0 | 1 | 36 | 0 | 0 | 9 | 0 | 3 | 0 | 0 | 0 | 0 | 77 | 280 |
| 8:30 AM | 0 | 0 | 26 | 14 | 0 | 1 | 24 | 0 | 0 | 6 | 0 | 2 | 0 | 0 | 0 | 0 | 73 | 286 |
| 8:45 AM | 0 | 0 | 25 | 10 | 0 | 4 | 27 | 0 | 0 | 10 | 0 | 6 | 0 | 0 | 0 | 0 | 82 | 296 |
| **9:00 AM** | **0** | **0** | **32** | **18** | **0** | **1** | **27** | **0** | **0** | **6** | **0** | **4** | **0** | **0** | **0** | **0** | **88** | 320 |
| **9:15 AM** | **0** | **0** | **27** | **12** | **0** | **1** | **27** | **0** | **0** | **10** | **0** | **4** | **0** | **0** | **0** | **0** | **81** | 324 |
| **9:30 AM** | **0** | **0** | **22** | **14** | **0** | **2** | **29** | **0** | **0** | **10** | **0** | **4** | **0** | **0** | **0** | **0** | **81** | 332 |
| **9:45 AM** | **0** | **0** | **38** | **11** | **0** | **2** | **21** | **0** | **0** | **16** | **0** | **6** | **0** | **0** | **0** | **0** | **94** | **344** |
| Count Total | 0 | 0 | 294 | 105 | 0 | 18 | 347 | 0 | 0 | 86 | 0 | 37 | 0 | 0 | 0 | 0 | 887 | 0 |
| **Peak Hour** | **0** | **0** | **119** | **55** | **0** | **6** | **104** | **0** | **0** | **42** | **0** | **18** | **0** | **0** | **0** | **0** | **344** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Bayfront Expy | | | Bayfront Expy | | | MPK 21 Dwy West | | | n/a | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

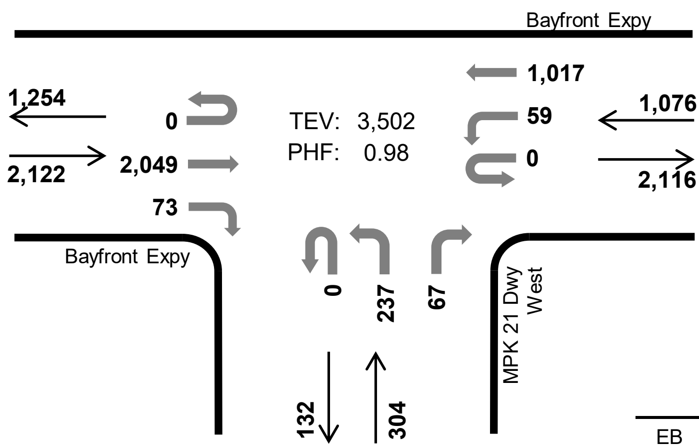
www.idaxdata.com

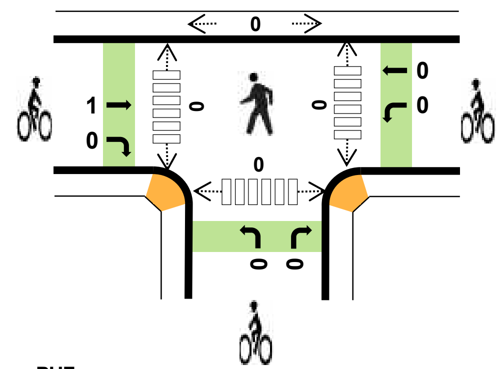
# MPK 21 Dwy West
# Bayfront Expy

N

Peak Hour

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM




| | HV %: | PHF |
|---|---|---|
| EB | 4.1% | 0.95 |
| WB | 5.1% | 0.89 |
| NB | 14.8% | 0.82 |
| SB | - | - |
| TOTAL | 5.4% | 0.98 |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound | | | | Bayfront Expy Westbound | | | | MPK 21 Dwy West Northbound | | | | n/a Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 0 | 543 | 18 | 0 | 15 | 256 | 0 | 0 | 47 | 0 | 8 | 0 | 0 | 0 | 0 | 887 | 0 |
| 4:15 PM | | 0 | 0 | 506 | 14 | 0 | 19 | 283 | 0 | 0 | 57 | 0 | 18 | 0 | 0 | 0 | 0 | 897 | 0 |
| 4:30 PM | | 0 | 0 | 515 | 17 | 0 | 14 | 238 | 0 | 0 | 65 | 0 | 28 | 0 | 0 | 0 | 0 | 877 | 0 |
| 4:45 PM | | 0 | 0 | 485 | 24 | 0 | 11 | 240 | 0 | 0 | 68 | 0 | 13 | 0 | 0 | 0 | 0 | 841 | 3,502 |
| Peak Hour | All | 0 | 0 | 2,049 | 73 | 0 | 59 | 1,017 | 0 | 0 | 237 | 0 | 67 | 0 | 0 | 0 | 0 | 3,502 | 0 |
| | HV | 0 | 0 | 80 | 8 | 0 | 5 | 50 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 188 | 0 |
| | HV% | - | - | 4% | 11% | - | 8% | 5% | - | - | 19% | - | 0% | - | - | - | - | 5% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 26 | 19 | 8 | 0 | *53* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 4:15 PM | 20 | 11 | 15 | 0 | *46* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:30 PM | 16 | 13 | 10 | 0 | *39* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 26 | 12 | 12 | 0 | *50* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 88 | 55 | 45 | 0 | *188* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |

## Three-Hour Count Summaries

| Interval Start | Bayfront Expy | | | | Bayfront Expy | | | | MPK 21 Dwy West | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **543** | **18** | **0** | **15** | **256** | **0** | **0** | **47** | **0** | **8** | **0** | **0** | **0** | **0** | **887** | 0 |
| **4:15 PM** | **0** | **0** | **506** | **14** | **0** | **19** | **283** | **0** | **0** | **57** | **0** | **18** | **0** | **0** | **0** | **0** | **897** | 0 |
| **4:30 PM** | **0** | **0** | **515** | **17** | **0** | **14** | **238** | **0** | **0** | **65** | **0** | **28** | **0** | **0** | **0** | **0** | **877** | 0 |
| **4:45 PM** | **0** | **0** | **485** | **24** | **0** | **11** | **240** | **0** | **0** | **68** | **0** | **13** | **0** | **0** | **0** | **0** | **841** | **3,502** |
| 5:00 PM | 0 | 0 | 437 | 18 | 0 | 6 | 232 | 0 | 0 | 72 | 0 | 26 | 0 | 0 | 0 | 0 | 791 | 3,406 |
| 5:15 PM | 0 | 0 | 417 | 9 | 0 | 15 | 261 | 0 | 0 | 87 | 0 | 27 | 0 | 0 | 0 | 0 | 816 | 3,325 |
| 5:30 PM | 0 | 0 | 391 | 28 | 0 | 15 | 234 | 0 | 0 | 86 | 0 | 18 | 0 | 0 | 0 | 0 | 772 | 3,220 |
| 5:45 PM | 0 | 0 | 419 | 22 | 0 | 13 | 247 | 0 | 0 | 76 | 0 | 17 | 0 | 0 | 0 | 0 | 794 | 3,173 |
| 6:00 PM | 0 | 0 | 420 | 19 | 0 | 13 | 205 | 0 | 0 | 84 | 0 | 10 | 0 | 0 | 0 | 0 | 751 | 3,133 |
| 6:15 PM | 0 | 0 | 438 | 15 | 0 | 11 | 234 | 0 | 0 | 86 | 0 | 11 | 0 | 0 | 0 | 0 | 795 | 3,112 |
| 6:30 PM | 0 | 0 | 410 | 21 | 0 | 9 | 217 | 0 | 0 | 81 | 0 | 16 | 0 | 0 | 0 | 0 | 754 | 3,094 |
| 6:45 PM | 0 | 0 | 366 | 17 | 0 | 9 | 192 | 0 | 0 | 70 | 0 | 36 | 0 | 0 | 0 | 0 | 690 | 2,990 |
| Count Total | 0 | 0 | 5,347 | 222 | 0 | 150 | 2,839 | 0 | 0 | 879 | 0 | 228 | 0 | 0 | 0 | 0 | 9,665 | 0 |
| **Peak Hour All** | **0** | **0** | **2,049** | **73** | **0** | **59** | **1,017** | **0** | **0** | **237** | **0** | **67** | **0** | **0** | **0** | **0** | **3,502** | **0** |
| **Peak Hour HV** | **0** | **0** | **80** | **8** | **0** | **5** | **50** | **0** | **0** | **45** | **0** | **0** | **0** | **0** | **0** | **0** | **188** | **0** |
| **Peak Hour HV%** | **-** | **-** | **4%** | **11%** | **-** | **8%** | **5%** | **-** | **-** | **19%** | **-** | **0%** | **-** | **-** | **-** | **-** | **5%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **4:00 PM** | **26** | **19** | **8** | **0** | ***53*** | **1** | **0** | **0** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **4:15 PM** | **20** | **11** | **15** | **0** | ***46*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **4:30 PM** | **16** | **13** | **10** | **0** | ***39*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **4:45 PM** | **26** | **12** | **12** | **0** | ***50*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:00 PM | 16 | 16 | 12 | 0 | *44* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 24 | 9 | 22 | 0 | *55* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 5:30 PM | 16 | 7 | 10 | 0 | *33* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:45 PM | 24 | 13 | 15 | 0 | *52* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:00 PM | 20 | 7 | 13 | 0 | *40* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 14 | 9 | 12 | 0 | *35* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 25 | 7 | 13 | 0 | *45* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 18 | 10 | 17 | 0 | *45* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 245 | 133 | 159 | 0 | *537* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| **Peak Hr** | **88** | **55** | **45** | **0** | ***188*** | **1** | **0** | **0** | **0** | ***1*** | **0** | **0** | **0** | **0** | ***0*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bayfront Expy | | | | Bayfront Expy | | | | MPK 21 Dwy West | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **22** | **4** | **0** | **1** | **18** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **0** | **0** | **53** | 0 |
| **4:15 PM** | **0** | **0** | **20** | **0** | **0** | **1** | **10** | **0** | **0** | **15** | **0** | **0** | **0** | **0** | **0** | **0** | **46** | 0 |
| **4:30 PM** | **0** | **0** | **14** | **2** | **0** | **1** | **12** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **39** | 0 |
| **4:45 PM** | **0** | **0** | **24** | **2** | **0** | **2** | **10** | **0** | **0** | **12** | **0** | **0** | **0** | **0** | **0** | **0** | **50** | **188** |
| 5:00 PM | 0 | 0 | 11 | 5 | 0 | 1 | 15 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 179 |
| 5:15 PM | 0 | 0 | 23 | 1 | 0 | 2 | 7 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 188 |
| 5:30 PM | 0 | 0 | 13 | 3 | 0 | 1 | 6 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 182 |
| 5:45 PM | 0 | 0 | 21 | 3 | 0 | 1 | 12 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 184 |
| 6:00 PM | 0 | 0 | 19 | 1 | 0 | 1 | 6 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 180 |
| 6:15 PM | 0 | 0 | 14 | 0 | 0 | 2 | 7 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 160 |
| 6:30 PM | 0 | 0 | 20 | 5 | 0 | 1 | 6 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 172 |
| 6:45 PM | 0 | 0 | 14 | 4 | 0 | 1 | 9 | 0 | 0 | 16 | 0 | 1 | 0 | 0 | 0 | 0 | 45 | 165 |
| Count Total | 0 | 0 | 215 | 30 | 0 | 15 | 118 | 0 | 0 | 158 | 0 | 1 | 0 | 0 | 0 | 0 | 537 | 0 |
| **Peak Hour** | **0** | **0** | **80** | **8** | **0** | **5** | **50** | **0** | **0** | **45** | **0** | **0** | **0** | **0** | **0** | **0** | **188** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Bayfront Expy | | | Bayfront Expy | | | MPK 21 Dwy West | | | n/a | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Count Total | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |

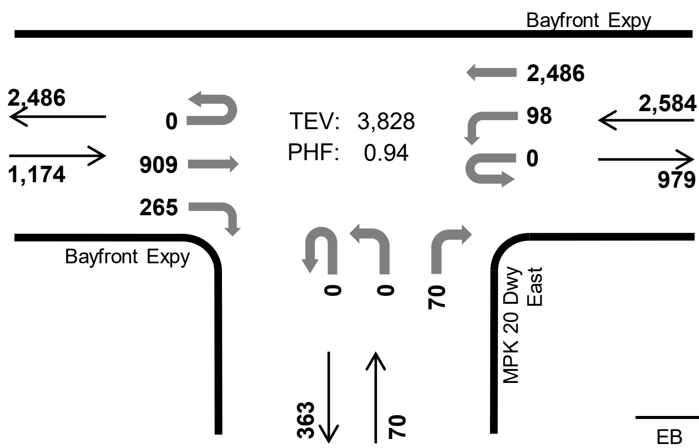
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

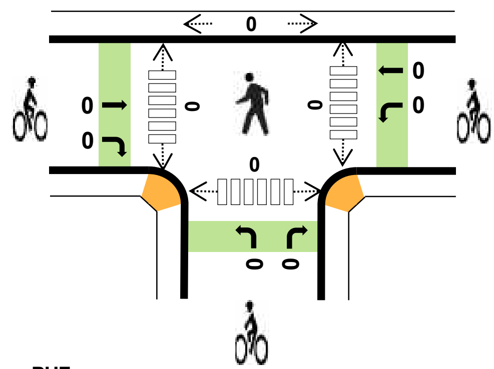
# MPK 20 Dwy East
# Bayfront Expy

N

Peak Hour

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 9:00 AM to 10:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | 11.7% | 0.90 |
| WB | 6.3% | 0.97 |
| NB | 88.6% | 0.92 |
| SB | - | - |
| TOTAL | 9.5% | 0.94 |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound UT | LT | TH | RT | Bayfront Expy Westbound UT | LT | TH | RT | MPK 20 Dwy East Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:00 AM | | 0 | 0 | 220 | 62 | 0 | 17 | 588 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 906 | 0 |
| 9:15 AM | | 0 | 0 | 234 | 63 | 0 | 29 | 634 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 976 | 0 |
| 9:30 AM | | 0 | 0 | 212 | 56 | 0 | 21 | 626 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 932 | 0 |
| 9:45 AM | | 0 | 0 | 243 | 84 | 0 | 31 | 638 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 1,014 | 3,828 |
| Peak Hour | All | 0 | 0 | 909 | 265 | 0 | 98 | 2,486 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 3,828 | 0 |
| | HV | 0 | 0 | 130 | 7 | 0 | 56 | 108 | 0 | 0 | 0 | 0 | 62 | 0 | 0 | 0 | 0 | 363 | 0 |
| | HV% | - | - | 14% | 3% | - | 57% | 4% | - | - | - | - | 89% | - | - | - | - | 9% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:00 AM | 35 | 39 | 16 | 0 | *90* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:15 AM | 30 | 41 | 16 | 0 | *87* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 27 | 41 | 13 | 0 | *81* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 45 | 43 | 17 | 0 | *105* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 137 | 164 | 62 | 0 | *363* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |

**Project Manager:** (415) 310-6469

project.manager.ca@idaxdata.com

## Three-Hour Count Summaries

| Interval Start | Bayfront Expy Eastbound UT | LT | TH | RT | Bayfront Expy Westbound UT | LT | TH | RT | MPK 20 Dwy East Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 207 | 6 | 0 | 5 | 652 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 872 | 0 |
| 7:15 AM | 0 | 0 | 214 | 7 | 0 | 4 | 687 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 916 | 0 |
| 7:30 AM | 0 | 0 | 243 | 11 | 0 | 12 | 607 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 884 | 0 |
| 7:45 AM | 0 | 0 | 297 | 18 | 2 | 19 | 509 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 852 | 3,524 |
| 8:00 AM | 0 | 0 | 204 | 32 | 0 | 9 | 453 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 706 | 3,358 |
| 8:15 AM | 0 | 0 | 222 | 30 | 0 | 19 | 532 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 810 | 3,252 |
| 8:30 AM | 0 | 0 | 261 | 41 | 0 | 17 | 571 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 903 | 3,271 |
| 8:45 AM | 0 | 0 | 212 | 51 | 0 | 24 | 595 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 897 | 3,316 |
| **9:00 AM** | **0** | **0** | **220** | **62** | **0** | **17** | **588** | **0** | **0** | **0** | **0** | **19** | **0** | **0** | **0** | **0** | **906** | 3,516 |
| **9:15 AM** | **0** | **0** | **234** | **63** | **0** | **29** | **634** | **0** | **0** | **0** | **0** | **16** | **0** | **0** | **0** | **0** | **976** | 3,682 |
| **9:30 AM** | **0** | **0** | **212** | **56** | **0** | **21** | **626** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **932** | 3,711 |
| **9:45 AM** | **0** | **0** | **243** | **84** | **0** | **31** | **638** | **0** | **0** | **0** | **0** | **18** | **0** | **0** | **0** | **0** | **1,014** | **3,828** |
| Count Total | 0 | 0 | 2,769 | 461 | 2 | 207 | 7,092 | 0 | 0 | 0 | 0 | 137 | 0 | 0 | 0 | 0 | 10,668 | 0 |
| **Peak Hour All** | **0** | **0** | **909** | **265** | **0** | **98** | **2,486** | **0** | **0** | **0** | **0** | **70** | **0** | **0** | **0** | **0** | **3,828** | **0** |
| **Peak Hour HV** | **0** | **0** | **130** | **7** | **0** | **56** | **108** | **0** | **0** | **0** | **0** | **62** | **0** | **0** | **0** | **0** | **363** | **0** |
| **Peak Hour HV%** | **-** | **-** | **14%** | **3%** | **-** | **57%** | **4%** | **-** | **-** | **-** | **-** | **89%** | **-** | **-** | **-** | **-** | **9%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 14 | 43 | 2 | 0 | *59* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:15 AM | 20 | 31 | 3 | 0 | *54* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 25 | 41 | 10 | 0 | *76* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:45 AM | 32 | 41 | 7 | 0 | *80* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:00 AM | 19 | 34 | 7 | 0 | *60* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:15 AM | 27 | 52 | 7 | 0 | *86* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 28 | 33 | 12 | 0 | *73* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:45 AM | 29 | 48 | 14 | 0 | *91* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| **9:00 AM** | **35** | **39** | **16** | **0** | ***90*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:15 AM** | **30** | **41** | **16** | **0** | ***87*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:30 AM** | **27** | **41** | **13** | **0** | ***81*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **9:45 AM** | **45** | **43** | **17** | **0** | ***105*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |
| Count Total | 331 | 487 | 124 | 0 | *942* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| **Peak Hr** | **137** | **164** | **62** | **0** | ***363*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bayfront Expy Eastbound | | | | Bayfront Expy Westbound | | | | MPK 20 Dwy East Northbound | | | | n/a Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 14 | 0 | 0 | 4 | 39 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 59 | 0 |
| 7:15 AM | 0 | 0 | 20 | 0 | 0 | 4 | 27 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 54 | 0 |
| 7:30 AM | 0 | 0 | 25 | 0 | 0 | 8 | 33 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 76 | 0 |
| 7:45 AM | 0 | 0 | 32 | 0 | 0 | 8 | 33 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 80 | 269 |
| 8:00 AM | 0 | 0 | 17 | 2 | 0 | 6 | 28 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 60 | 270 |
| 8:15 AM | 0 | 0 | 26 | 1 | 0 | 12 | 40 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 86 | 302 |
| 8:30 AM | 0 | 0 | 25 | 3 | 0 | 10 | 23 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 73 | 299 |
| 8:45 AM | 0 | 0 | 29 | 0 | 0 | 13 | 35 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 91 | 310 |
| **9:00 AM** | **0** | **0** | **33** | **2** | **0** | **9** | **30** | **0** | **0** | **0** | **0** | **16** | **0** | **0** | **0** | **0** | **90** | 340 |
| **9:15 AM** | **0** | **0** | **29** | **1** | **0** | **14** | **27** | **0** | **0** | **0** | **0** | **16** | **0** | **0** | **0** | **0** | **87** | 341 |
| **9:30 AM** | **0** | **0** | **25** | **2** | **0** | **13** | **28** | **0** | **0** | **0** | **0** | **13** | **0** | **0** | **0** | **0** | **81** | 349 |
| **9:45 AM** | **0** | **0** | **43** | **2** | **0** | **20** | **23** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **105** | **363** |
| Count Total | 0 | 0 | 318 | 13 | 0 | 121 | 366 | 0 | 0 | 0 | 0 | 124 | 0 | 0 | 0 | 0 | 942 | 0 |
| **Peak Hour** | **0** | **0** | **130** | **7** | **0** | **56** | **108** | **0** | **0** | **0** | **0** | **62** | **0** | **0** | **0** | **0** | **363** | **0** |

## Three-Hour Count Summaries - Bikes

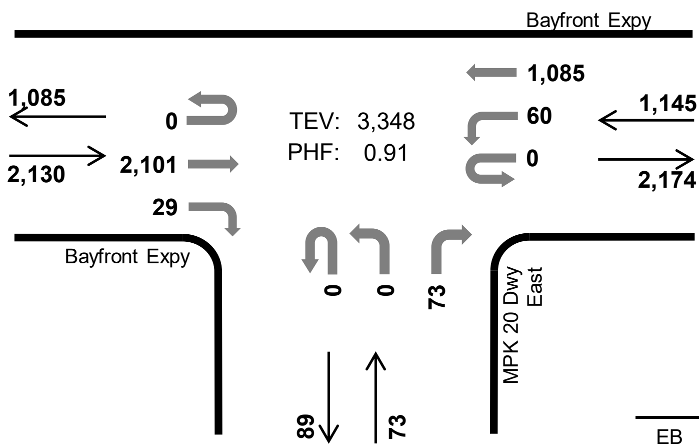
| Interval Start | Bayfront Expy Eastbound | | | Bayfront Expy Westbound | | | MPK 20 Dwy East Northbound | | | n/a Southbound | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **9:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

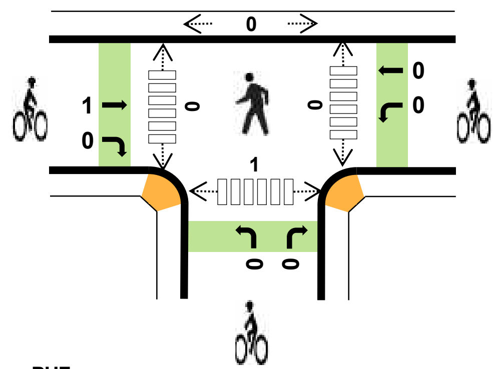
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# MPK 20 Dwy East
# Bayfront Expy

Peak Hour

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM




| | HV %: | PHF |
|---|---|---|
| EB | 3.8% | 0.90 |
| WB | 8.6% | 0.94 |
| NB | 19.2% | 0.83 |
| SB | - | - |
| TOTAL | 5.8% | 0.91 |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound | | | | Bayfront Expy Westbound | | | | MPK 20 Dwy East Northbound | | | | n/a Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 0 | 500 | 9 | 0 | 18 | 286 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 828 | 0 |
| 4:15 PM | | 0 | 0 | 580 | 10 | 0 | 13 | 292 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 917 | 0 |
| 4:30 PM | | 0 | 0 | 481 | 6 | 0 | 18 | 274 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 798 | 0 |
| 4:45 PM | | 0 | 0 | 540 | 4 | 0 | 11 | 233 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 805 | 3,348 |
| Peak Hour | All | 0 | 0 | 2,101 | 29 | 0 | 60 | 1,085 | 0 | 0 | 0 | 0 | 73 | 0 | 0 | 0 | 0 | 3,348 | 0 |
| | HV | 0 | 0 | 76 | 4 | 0 | 46 | 53 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 193 | 0 |
| | HV% | - | - | 4% | 14% | - | 77% | 5% | - | - | - | - | 19% | - | - | - | - | 6% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 22 | 33 | 5 | 0 | *60* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 1 | *1* |
| 4:15 PM | 22 | 20 | 2 | 0 | *44* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:30 PM | 12 | 27 | 4 | 0 | *43* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 24 | 19 | 3 | 0 | *46* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 80 | 99 | 14 | 0 | *193* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 1 | *1* |

## Three-Hour Count Summaries

| Interval Start | | Bayfront Expy Eastbound UT | LT | TH | RT | Bayfront Expy Westbound UT | LT | TH | RT | MPK 20 Dwy East Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | | **0** | **0** | **500** | **9** | **0** | **18** | **286** | **0** | **0** | **0** | **0** | **15** | **0** | **0** | **0** | **0** | **828** | 0 |
| **4:15 PM** | | **0** | **0** | **580** | **10** | **0** | **13** | **292** | **0** | **0** | **0** | **0** | **22** | **0** | **0** | **0** | **0** | **917** | 0 |
| **4:30 PM** | | **0** | **0** | **481** | **6** | **0** | **18** | **274** | **0** | **0** | **0** | **0** | **19** | **0** | **0** | **0** | **0** | **798** | 0 |
| **4:45 PM** | | **0** | **0** | **540** | **4** | **0** | **11** | **233** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **805** | **3,348** |
| 5:00 PM | | 0 | 0 | 417 | 4 | 0 | 22 | 245 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 715 | 3,235 |
| 5:15 PM | | 0 | 0 | 494 | 3 | 0 | 17 | 267 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 808 | 3,126 |
| 5:30 PM | | 0 | 0 | 403 | 4 | 0 | 19 | 270 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 714 | 3,042 |
| 5:45 PM | | 0 | 0 | 490 | 6 | 0 | 14 | 241 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 779 | 3,016 |
| 6:00 PM | | 0 | 0 | 409 | 8 | 0 | 15 | 232 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 680 | 2,981 |
| 6:15 PM | | 0 | 0 | 494 | 5 | 0 | 10 | 238 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 769 | 2,942 |
| 6:30 PM | | 0 | 0 | 433 | 3 | 0 | 21 | 235 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 716 | 2,944 |
| 6:45 PM | | 0 | 0 | 477 | 7 | 0 | 13 | 186 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 708 | 2,873 |
| Count Total | | 0 | 0 | 5,718 | 69 | 0 | 191 | 2,999 | 0 | 0 | 0 | 0 | 260 | 0 | 0 | 0 | 0 | 9,237 | 0 |
| **Peak Hour** | **All** | **0** | **0** | **2,101** | **29** | **0** | **60** | **1,085** | **0** | **0** | **0** | **0** | **73** | **0** | **0** | **0** | **0** | **3,348** | **0** |
| | **HV** | **0** | **0** | **76** | **4** | **0** | **46** | **53** | **0** | **0** | **0** | **0** | **14** | **0** | **0** | **0** | **0** | **193** | **0** |
| | **HV%** | **-** | **-** | **4%** | **14%** | **-** | **77%** | **5%** | **-** | **-** | **-** | **-** | **19%** | **-** | **-** | **-** | **-** | **6%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **22** | **33** | **5** | **0** | ***60*** | **1** | **0** | **0** | **0** | ***1*** | **0** | **0** | **0** | **1** | *1* |
| **4:15 PM** | **22** | **20** | **2** | **0** | ***44*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **4:30 PM** | **12** | **27** | **4** | **0** | ***43*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **4:45 PM** | **24** | **19** | **3** | **0** | ***46*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:00 PM | 12 | 34 | 3 | 0 | *49* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 23 | 20 | 8 | 0 | *51* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:30 PM | 10 | 19 | 4 | 0 | *33* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:45 PM | 21 | 23 | 4 | 0 | *48* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:00 PM | 16 | 21 | 2 | 0 | *39* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 17 | 17 | 6 | 0 | *40* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 13 | 27 | 3 | 0 | *43* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 20 | 23 | 8 | 0 | *51* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 212 | 283 | 52 | 0 | *547* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 1 | *1* |
| **Peak Hr** | **80** | **99** | **14** | **0** | ***193*** | **1** | **0** | **0** | **0** | ***1*** | **0** | **0** | **0** | **1** | ***1*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bayfront Expy | | | | Bayfront Expy | | | | MPK 20 Dwy East | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **21** | **1** | **0** | **15** | **18** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **0** | **0** | **60** | 0 |
| **4:15 PM** | **0** | **0** | **22** | **0** | **0** | **10** | **10** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **44** | 0 |
| **4:30 PM** | **0** | **0** | **11** | **1** | **0** | **12** | **15** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **43** | 0 |
| **4:45 PM** | **0** | **0** | **22** | **2** | **0** | **9** | **10** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **46** | **193** |
| 5:00 PM | 0 | 0 | 11 | 1 | 0 | 18 | 16 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 49 | 182 |
| 5:15 PM | 0 | 0 | 22 | 1 | 0 | 12 | 8 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 51 | 189 |
| 5:30 PM | 0 | 0 | 8 | 2 | 0 | 12 | 7 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 33 | 179 |
| 5:45 PM | 0 | 0 | 17 | 4 | 0 | 10 | 13 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 48 | 181 |
| 6:00 PM | 0 | 0 | 14 | 2 | 0 | 12 | 9 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 39 | 171 |
| 6:15 PM | 0 | 0 | 17 | 0 | 0 | 9 | 8 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 40 | 160 |
| 6:30 PM | 0 | 0 | 11 | 2 | 0 | 19 | 8 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 43 | 170 |
| 6:45 PM | 0 | 0 | 20 | 0 | 0 | 13 | 10 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 51 | 173 |
| Count Total | 0 | 0 | 196 | 16 | 0 | 151 | 132 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 547 | 0 |
| **Peak Hour** | **0** | **0** | **76** | **4** | **0** | **46** | **53** | **0** | **0** | **0** | **0** | **14** | **0** | **0** | **0** | **0** | **193** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Bayfront Expy | | | Bayfront Expy | | | MPK 20 Dwy East | | | n/a | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Count Total | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 59AM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

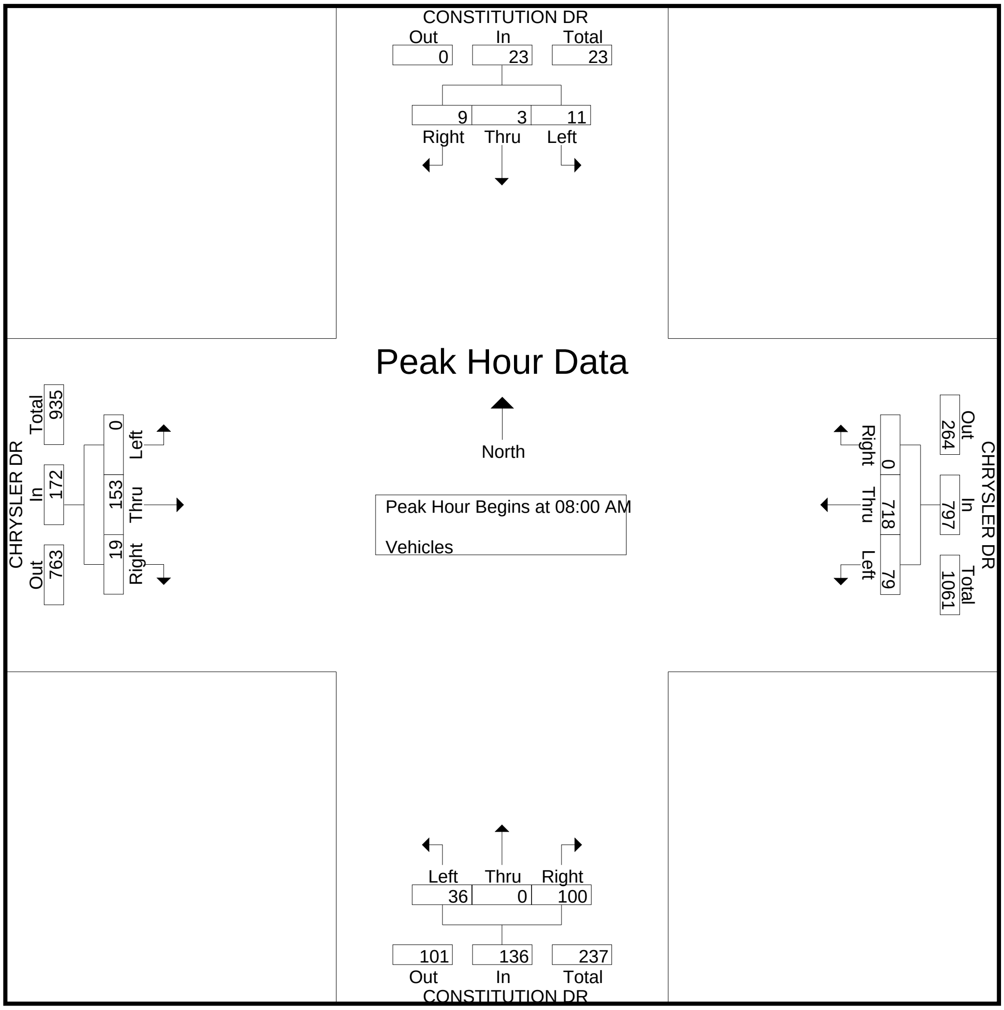
| | CONSTITUTION DR Southbound | | | | | CHRYSLER DR Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 1 | 8 | 4 | 13 | 0 | 98 | 26 | 0 | 124 | 14 | 0 | 7 | 1 | 22 | 1 | 15 | 0 | 5 | 21 | 180 |
| 07:15 AM | 1 | 0 | 2 | 0 | 3 | 1 | 97 | 24 | 0 | 122 | 19 | 0 | 5 | 1 | 25 | 4 | 13 | 0 | 2 | 19 | 169 |
| 07:30 AM | 0 | 0 | 5 | 0 | 5 | 0 | 141 | 24 | 0 | 165 | 31 | 0 | 13 | 2 | 46 | 3 | 23 | 0 | 1 | 27 | 243 |
| 07:45 AM | 1 | 0 | 3 | 0 | 4 | 0 | 157 | 27 | 0 | 184 | 39 | 0 | 16 | 3 | 58 | 3 | 31 | 0 | 1 | 35 | 281 |
| Total | 2 | 1 | 18 | 4 | 25 | 1 | 493 | 101 | 0 | 595 | 103 | 0 | 41 | 7 | 151 | 11 | 82 | 0 | 9 | 102 | 873 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 2 | 0 | 4 | 17 | 23 | 0 | 153 | 20 | 0 | 173 | 37 | 0 | 7 | 4 | 48 | 1 | 34 | 0 | 1 | 36 | 280 |
| 08:15 AM | 1 | 1 | 2 | 3 | 7 | 0 | 198 | 13 | 0 | 211 | 23 | 0 | 9 | 0 | 32 | 0 | 37 | 0 | 0 | 37 | 287 |
| 08:30 AM | 5 | 2 | 2 | 0 | 9 | 0 | 182 | 23 | 0 | 205 | 19 | 0 | 9 | 5 | 33 | 9 | 29 | 0 | 0 | 38 | 285 |
| 08:45 AM | 1 | 0 | 3 | 7 | 11 | 0 | 185 | 23 | 0 | 208 | 21 | 0 | 11 | 1 | 33 | 9 | 53 | 0 | 1 | 63 | 315 |
| Total | 9 | 3 | 11 | 27 | 50 | 0 | 718 | 79 | 0 | 797 | 100 | 0 | 36 | 10 | 146 | 19 | 153 | 0 | 2 | 174 | 1167 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 4 | 0 | 4 | 8 | 16 | 1 | 138 | 27 | 1 | 167 | 11 | 0 | 11 | 0 | 22 | 2 | 37 | 0 | 0 | 39 | 244 |
| 09:15 AM | 1 | 0 | 3 | 0 | 4 | 0 | 158 | 23 | 0 | 181 | 11 | 0 | 11 | 1 | 23 | 2 | 34 | 0 | 0 | 36 | 244 |
| 09:30 AM | 4 | 1 | 8 | 1 | 14 | 0 | 132 | 25 | 0 | 157 | 8 | 0 | 12 | 0 | 20 | 5 | 39 | 0 | 0 | 44 | 235 |
| 09:45 AM | 0 | 1 | 4 | 9 | 14 | 0 | 174 | 28 | 0 | 202 | 12 | 0 | 8 | 1 | 21 | 2 | 39 | 0 | 0 | 41 | 278 |
| Total | 9 | 2 | 19 | 18 | 48 | 1 | 602 | 103 | 1 | 707 | 42 | 0 | 42 | 2 | 86 | 11 | 149 | 0 | 0 | 160 | 1001 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 20 | 6 | 48 | 49 | 123 | 2 | 1813 | 283 | 1 | 2099 | 245 | 0 | 119 | 19 | 383 | 41 | 384 | 0 | 11 | 436 | 3041 |
| Apprch % | 16.3 | 4.9 | 39 | 39.8 | | 0.1 | 86.4 | 13.5 | 0 | | 64 | 0 | 31.1 | 5 | | 9.4 | 88.1 | 0 | 2.5 | | |
| Total % | 0.7 | 0.2 | 1.6 | 1.6 | 4 | 0.1 | 59.6 | 9.3 | 0 | 69 | 8.1 | 0 | 3.9 | 0.6 | 12.6 | 1.3 | 12.6 | 0 | 0.4 | 14.3 | |

| | CONSTITUTION DR Southbound | | | | CHRYSLER DR Westbound | | | | CONSTITUTION DR Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 2 | 0 | **4** | 6 | 0 | 153 | 20 | 173 | **37** | 0 | 7 | **44** | 1 | 34 | 0 | 35 | 258 |
| 08:15 AM | 1 | 1 | 2 | 4 | 0 | **198** | 13 | **211** | 23 | 0 | 9 | 32 | 0 | 37 | 0 | 37 | 284 |
| 08:30 AM | **5** | **2** | 2 | **9** | 0 | 182 | **23** | 205 | 19 | 0 | 9 | 28 | **9** | 29 | 0 | 38 | 280 |
| 08:45 AM | 1 | 0 | 3 | 4 | 0 | 185 | 23 | 208 | 21 | 0 | **11** | 32 | 9 | **53** | 0 | **62** | **306** |
| Total Volume | 9 | 3 | 11 | 23 | 0 | 718 | 79 | 797 | 100 | 0 | 36 | 136 | 19 | 153 | 0 | 172 | 1128 |
| % App. Total | 39.1 | 13 | 47.8 | | 0 | 90.1 | 9.9 | | 73.5 | 0 | 26.5 | | 11 | 89 | 0 | | |
| PHF | .450 | .375 | .688 | .639 | .000 | .907 | .859 | .944 | .676 | .000 | .818 | .773 | .528 | .722 | .000 | .694 | .922 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 59AM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 59AM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

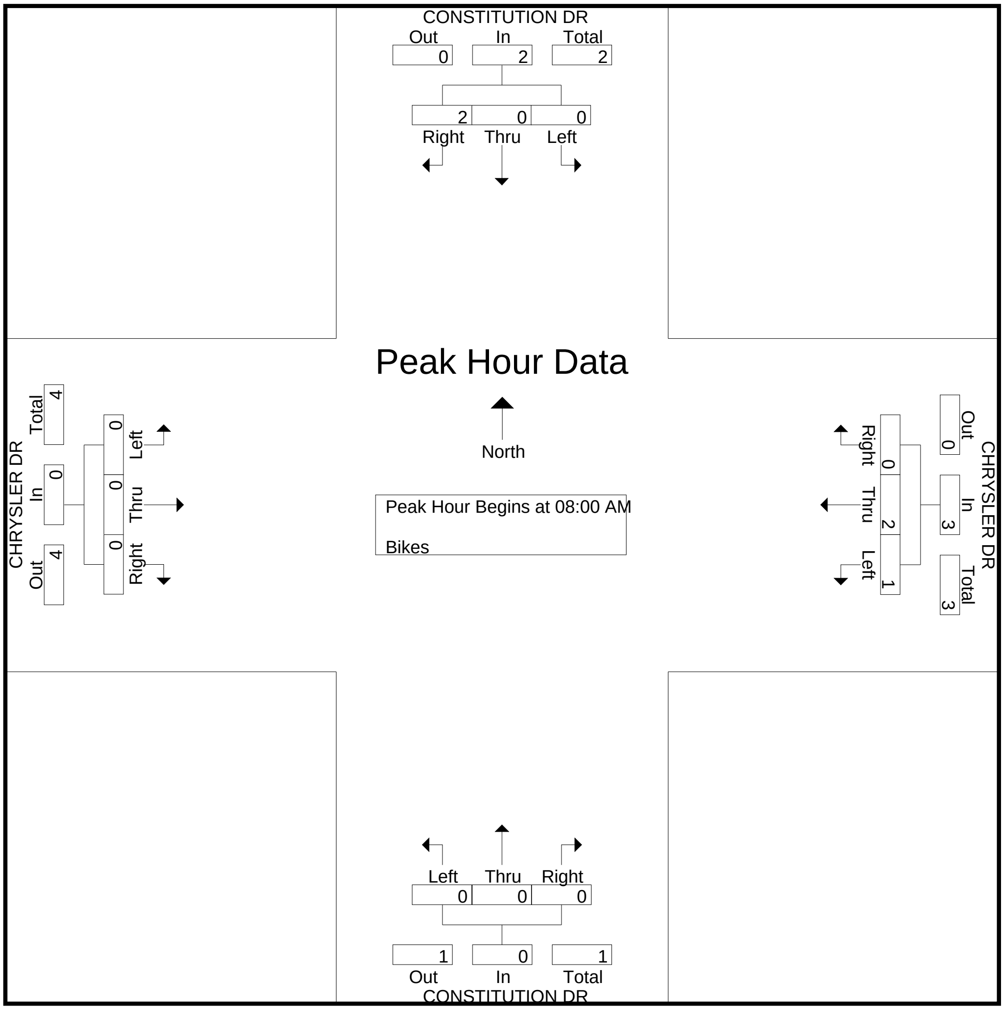
| | CONSTITUTION DR Southbound | | | | | CHRYSLER DR Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Grand Total | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| Apprch % | 100 | 0 | 0 | 0 | | 0 | 50 | 50 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | |
| Total % | 28.6 | 0 | 0 | 0 | 28.6 | 0 | 28.6 | 28.6 | 0 | 57.1 | 0 | 14.3 | 0 | 0 | 14.3 | 0 | 0 | 0 | 0 | 0 | |

| | CONSTITUTION DR Southbound | | | | CHRYSLER DR Westbound | | | | CONSTITUTION DR Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | **2** | 0 | 0 | **2** | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| Total Volume | 2 | 0 | 0 | 2 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 100 | 0 | 0 | | 0 | 66.7 | 33.3 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .000 | .000 | .250 | .000 | .250 | .250 | .375 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .313 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 59AM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 59PM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

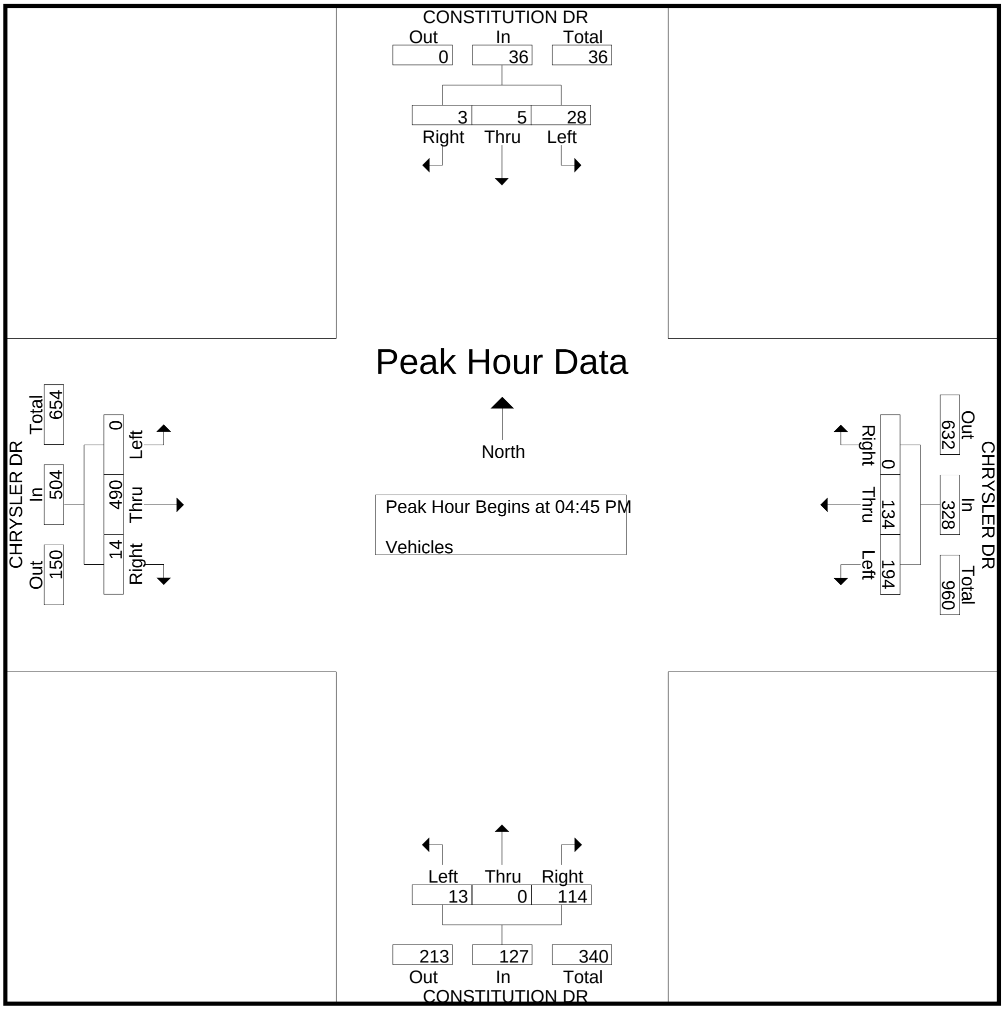
| | CONSTITUTION DR Southbound | | | | | CHRYSLER DR Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 3 | 13 | 0 | 16 | 0 | 41 | 25 | 0 | 66 | 31 | 0 | 5 | 3 | 39 | 4 | 142 | 0 | 0 | 146 | 267 |
| 04:15 PM | 0 | 0 | 7 | 0 | 7 | 0 | 39 | 24 | 0 | 63 | 32 | 0 | 8 | 6 | 46 | 1 | 115 | 0 | 0 | 116 | 232 |
| 04:30 PM | 0 | 0 | 9 | 0 | 9 | 0 | 38 | 30 | 0 | 68 | 36 | 0 | 2 | 7 | 45 | 1 | 94 | 0 | 0 | 95 | 217 |
| 04:45 PM | 0 | 0 | 15 | 0 | 15 | 0 | 39 | 40 | 0 | 79 | 22 | 0 | 3 | 4 | 29 | 4 | 130 | 0 | 0 | 134 | 257 |
| Total | 0 | 3 | 44 | 0 | 47 | 0 | 157 | 119 | 0 | 276 | 121 | 0 | 18 | 20 | 159 | 10 | 481 | 0 | 0 | 491 | 973 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 3 | 2 | 5 | 0 | 10 | 0 | 24 | 42 | 0 | 66 | 35 | 0 | 6 | 3 | 44 | 4 | 138 | 0 | 0 | 142 | 262 |
| 05:15 PM | 0 | 3 | 6 | 0 | 9 | 0 | 34 | 68 | 0 | 102 | 32 | 0 | 1 | 3 | 36 | 1 | 104 | 0 | 0 | 105 | 252 |
| 05:30 PM | 0 | 0 | 2 | 0 | 2 | 0 | 37 | 44 | 0 | 81 | 25 | 0 | 3 | 5 | 33 | 5 | 118 | 0 | 0 | 123 | 239 |
| 05:45 PM | 1 | 0 | 2 | 0 | 3 | 0 | 30 | 43 | 0 | 73 | 36 | 0 | 3 | 1 | 40 | 1 | 112 | 1 | 0 | 114 | 230 |
| Total | 4 | 5 | 15 | 0 | 24 | 0 | 125 | 197 | 0 | 322 | 128 | 0 | 13 | 12 | 153 | 11 | 472 | 1 | 0 | 484 | 983 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 1 | 12 | 0 | 13 | 0 | 39 | 52 | 0 | 91 | 26 | 0 | 2 | 3 | 31 | 5 | 104 | 0 | 0 | 109 | 244 |
| 06:15 PM | 0 | 0 | 5 | 0 | 5 | 0 | 42 | 58 | 0 | 100 | 31 | 0 | 9 | 3 | 43 | 4 | 103 | 0 | 0 | 107 | 255 |
| 06:30 PM | 0 | 0 | 7 | 0 | 7 | 0 | 39 | 17 | 0 | 56 | 26 | 0 | 1 | 3 | 30 | 1 | 105 | 0 | 0 | 106 | 199 |
| 06:45 PM | 0 | 0 | 3 | 0 | 3 | 0 | 37 | 13 | 0 | 50 | 27 | 0 | 6 | 2 | 35 | 0 | 109 | 0 | 0 | 109 | 197 |
| Total | 0 | 1 | 27 | 0 | 28 | 0 | 157 | 140 | 0 | 297 | 110 | 0 | 18 | 11 | 139 | 10 | 421 | 0 | 0 | 431 | 895 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 4 | 9 | 86 | 0 | 99 | 0 | 439 | 456 | 0 | 895 | 359 | 0 | 49 | 43 | 451 | 31 | 1374 | 1 | 0 | 1406 | 2851 |
| Apprch % | 4 | 9.1 | 86.9 | 0 | | 0 | 49.1 | 50.9 | 0 | | 79.6 | 0 | 10.9 | 9.5 | | 2.2 | 97.7 | 0.1 | 0 | | |
| Total % | 0.1 | 0.3 | 3 | 0 | 3.5 | 0 | 15.4 | 16 | 0 | 31.4 | 12.6 | 0 | 1.7 | 1.5 | 15.8 | 1.1 | 48.2 | 0 | 0 | 49.3 | |

| | CONSTITUTION DR Southbound | | | | CHRYSLER DR Westbound | | | | CONSTITUTION DR Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 0 | **15** | **15** | 0 | **39** | 40 | 79 | 22 | 0 | 3 | 25 | 4 | 130 | 0 | 134 | 253 |
| 05:00 PM | **3** | 2 | 5 | 10 | 0 | 24 | 42 | 66 | **35** | 0 | **6** | **41** | 4 | **138** | 0 | **142** | **259** |
| 05:15 PM | 0 | **3** | 6 | 9 | 0 | 34 | **68** | **102** | 32 | 0 | 1 | 33 | 1 | 104 | 0 | 105 | 249 |
| 05:30 PM | 0 | 0 | 2 | 2 | 0 | 37 | 44 | 81 | 25 | 0 | 3 | 28 | **5** | 118 | 0 | 123 | 234 |
| Total Volume | 3 | 5 | 28 | 36 | 0 | 134 | 194 | 328 | 114 | 0 | 13 | 127 | 14 | 490 | 0 | 504 | 995 |
| % App. Total | 8.3 | 13.9 | 77.8 | | 0 | 40.9 | 59.1 | | 89.8 | 0 | 10.2 | | 2.8 | 97.2 | 0 | | |
| PHF | .250 | .417 | .467 | .600 | .000 | .859 | .713 | .804 | .814 | .000 | .542 | .774 | .700 | .888 | .000 | .887 | .960 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 59PM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 59PM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

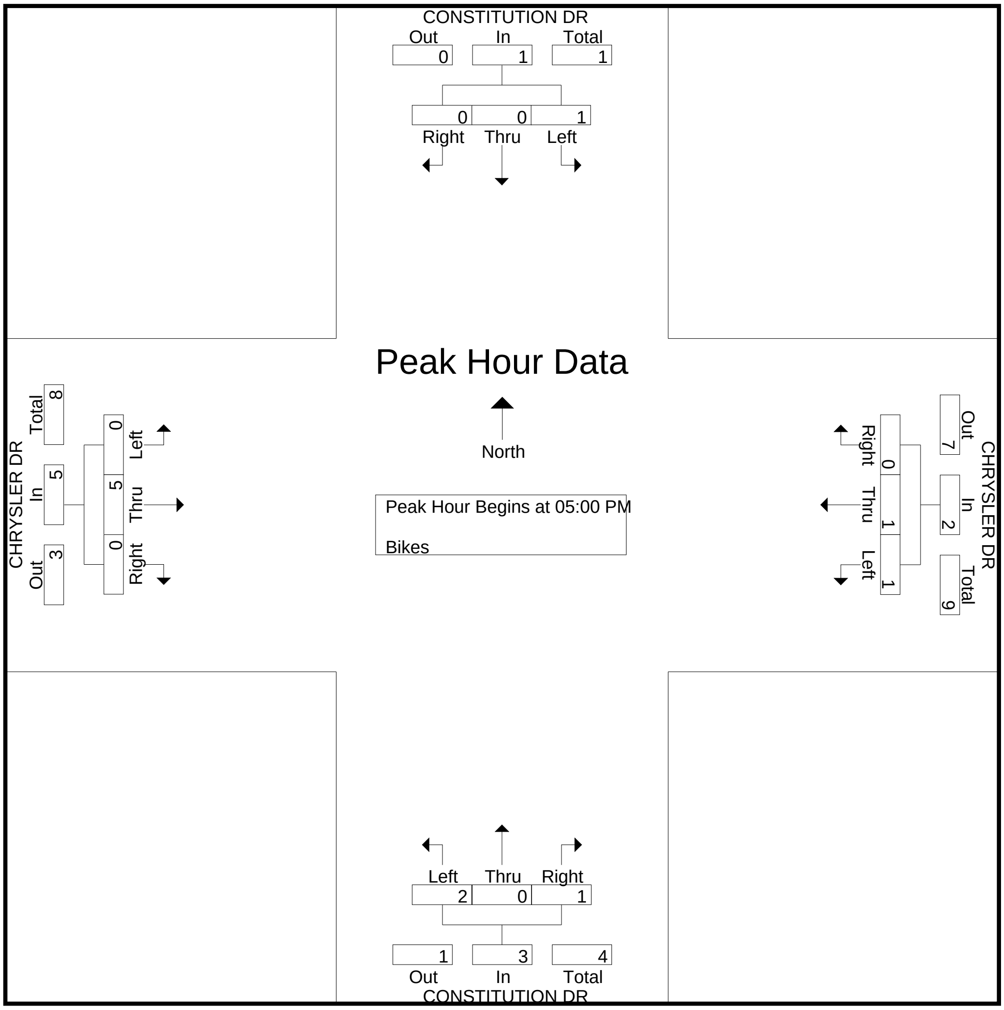
| | CONSTITUTION DR Southbound | | | | | CHRYSLER DR Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHRYSLER DR Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 6 |
| 05:45 PM | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| Total | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 0 | 5 | 0 | 0 | 5 | 11 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Grand Total | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 1 | 8 | 0 | 0 | 9 | 15 |
| Apprch % | 0 | 0 | 100 | 0 | | 0 | 50 | 50 | 0 | | 33.3 | 0 | 66.7 | 0 | | 11.1 | 88.9 | 0 | 0 | | |
| Total % | 0 | 0 | 6.7 | 0 | 6.7 | 0 | 6.7 | 6.7 | 0 | 13.3 | 6.7 | 0 | 13.3 | 0 | 20 | 6.7 | 53.3 | 0 | 0 | 60 | |

| | CONSTITUTION DR Southbound | | | | CHRYSLER DR Westbound | | | | CONSTITUTION DR Northbound | | | | CHRYSLER DR Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | **2** | **2** | 0 | **3** | 0 | **3** | **6** |
| 05:45 PM | 0 | 0 | **1** | **1** | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 4 |
| Total Volume | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 2 | 3 | 0 | 5 | 0 | 5 | 11 |
| % App. Total | 0 | 0 | 100 | | 0 | 50 | 50 | | 33.3 | 0 | 66.7 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .250 | .250 | .000 | .250 | .250 | .500 | .250 | .000 | .250 | .375 | .000 | .417 | .000 | .417 | .458 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 59PM FINAL
Site Code : 00000059
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service


San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 58AM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

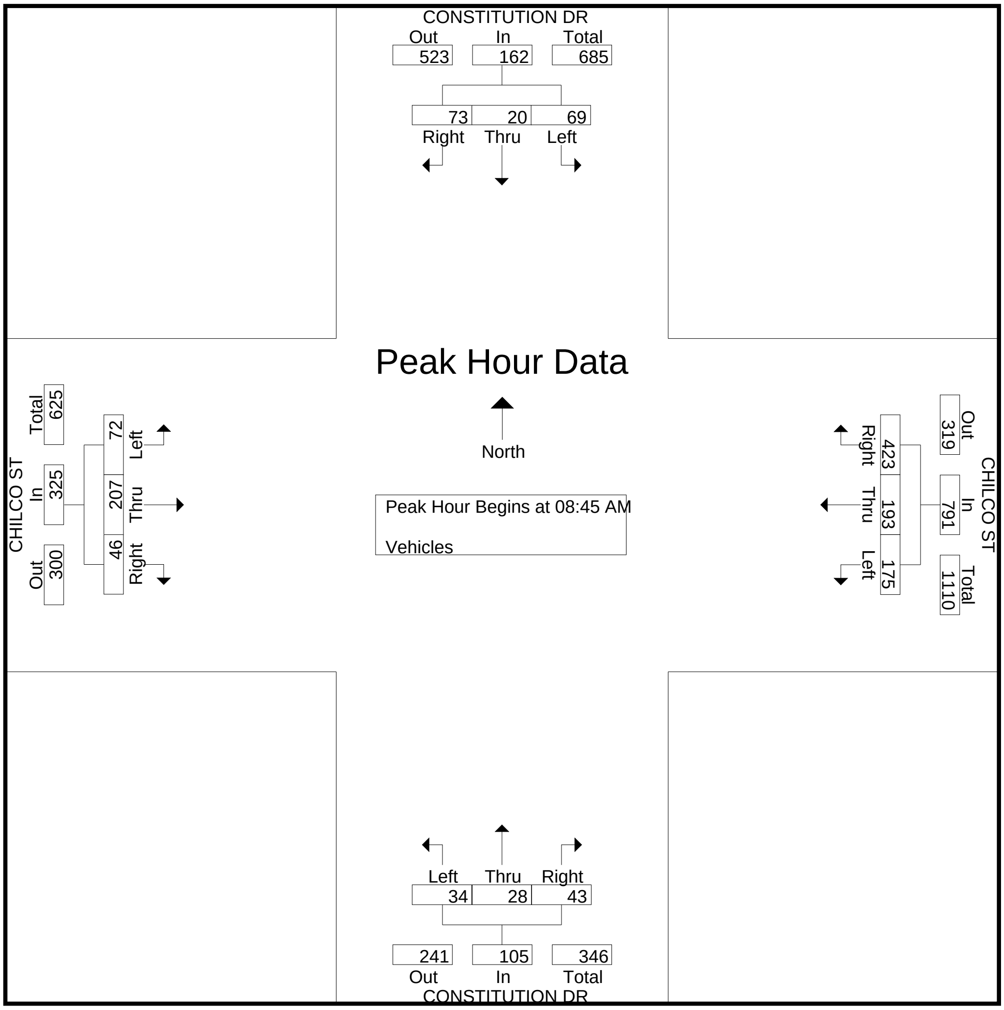
| | CONSTITUTION DR Southbound | | | | | CHILCO ST Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 4 | 5 | 3 | 0 | 12 | 27 | 23 | 12 | 0 | 62 | 13 | 5 | 7 | 2 | 27 | 6 | 31 | 12 | 0 | 49 | 150 |
| 07:15 AM | 8 | 2 | 11 | 0 | 21 | 34 | 20 | 19 | 0 | 73 | 7 | 3 | 4 | 9 | 23 | 5 | 42 | 20 | 4 | 71 | 188 |
| 07:30 AM | 20 | 1 | 18 | 0 | 39 | 34 | 32 | 15 | 2 | 83 | 6 | 1 | 6 | 8 | 21 | 3 | 70 | 38 | 0 | 111 | 254 |
| 07:45 AM | 6 | 5 | 18 | 0 | 29 | 48 | 49 | 34 | 0 | 131 | 4 | 1 | 6 | 5 | 16 | 5 | 49 | 46 | 2 | 102 | 278 |
| Total | 38 | 13 | 50 | 0 | 101 | 143 | 124 | 80 | 2 | 349 | 30 | 10 | 23 | 24 | 87 | 19 | 192 | 116 | 6 | 333 | 870 |
| 08:00 AM | 10 | 5 | 12 | 0 | 27 | 57 | 59 | 38 | 0 | 154 | 8 | 2 | 9 | 10 | 29 | 5 | 57 | 40 | 4 | 106 | 316 |
| 08:15 AM | 12 | 4 | 11 | 0 | 27 | 83 | 49 | 34 | 2 | 168 | 2 | 6 | 6 | 24 | 38 | 8 | 51 | 29 | 6 | 94 | 327 |
| 08:30 AM | 17 | 6 | 22 | 0 | 45 | 84 | 54 | 24 | 0 | 162 | 6 | 8 | 6 | 14 | 34 | 8 | 43 | 23 | 6 | 80 | 321 |
| 08:45 AM | 17 | 5 | 15 | 0 | 37 | 93 | 46 | 38 | 0 | 177 | 12 | 4 | 9 | 21 | 46 | 7 | 56 | 25 | 2 | 90 | 350 |
| Total | 56 | 20 | 60 | 0 | 136 | 317 | 208 | 134 | 2 | 661 | 28 | 20 | 30 | 69 | 147 | 28 | 207 | 117 | 18 | 370 | 1314 |
| 09:00 AM | 13 | 5 | 19 | 0 | 37 | 116 | 44 | 45 | 0 | 205 | 6 | 8 | 8 | 40 | 62 | 9 | 46 | 15 | 8 | 78 | 382 |
| 09:15 AM | 18 | 5 | 16 | 0 | 39 | 108 | 53 | 49 | 0 | 210 | 14 | 5 | 7 | 30 | 56 | 18 | 39 | 18 | 4 | 79 | 384 |
| 09:30 AM | 25 | 5 | 19 | 0 | 49 | 106 | 50 | 43 | 0 | 199 | 11 | 11 | 10 | 44 | 76 | 12 | 66 | 14 | 3 | 95 | 419 |
| 09:45 AM | 14 | 6 | 15 | 0 | 35 | 70 | 56 | 51 | 0 | 177 | 17 | 6 | 5 | 38 | 66 | 9 | 52 | 24 | 6 | 91 | 369 |
| Total | 70 | 21 | 69 | 0 | 160 | 400 | 203 | 188 | 0 | 791 | 48 | 30 | 30 | 152 | 260 | 48 | 203 | 71 | 21 | 343 | 1554 |
| Grand Total | 164 | 54 | 179 | 0 | 397 | 860 | 535 | 402 | 4 | 1801 | 106 | 60 | 83 | 245 | 494 | 95 | 602 | 304 | 45 | 1046 | 3738 |
| Apprch % | 41.3 | 13.6 | 45.1 | 0 | | 47.8 | 29.7 | 22.3 | 0.2 | | 21.5 | 12.1 | 16.8 | 49.6 | | 9.1 | 57.6 | 29.1 | 4.3 | | |
| Total % | 4.4 | 1.4 | 4.8 | 0 | 10.6 | 23 | 14.3 | 10.8 | 0.1 | 48.2 | 2.8 | 1.6 | 2.2 | 6.6 | 13.2 | 2.5 | 16.1 | 8.1 | 1.2 | 28 | |

| | CONSTITUTION DR Southbound | | | | CHILCO ST Westbound | | | | CONSTITUTION DR Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | 17 | **5** | 15 | 37 | 93 | 46 | 38 | 177 | 12 | 4 | 9 | 25 | 7 | 56 | **25** | 88 | 327 |
| 09:00 AM | 13 | 5 | **19** | 37 | **116** | 44 | 45 | 205 | 6 | 8 | 8 | 22 | 9 | 46 | 15 | 70 | 334 |
| 09:15 AM | 18 | 5 | 16 | 39 | 108 | **53** | **49** | **210** | **14** | 5 | 7 | 26 | **18** | 39 | 18 | 75 | 350 |
| 09:30 AM | **25** | 5 | 19 | **49** | 106 | 50 | 43 | 199 | 11 | **11** | **10** | **32** | 12 | **66** | 14 | **92** | **372** |
| Total Volume | 73 | 20 | 69 | 162 | 423 | 193 | 175 | 791 | 43 | 28 | 34 | 105 | 46 | 207 | 72 | 325 | 1383 |
| % App. Total | 45.1 | 12.3 | 42.6 | | 53.5 | 24.4 | 22.1 | | 41 | 26.7 | 32.4 | | 14.2 | 63.7 | 22.2 | | |
| PHF | .730 | 1.00 | .908 | .827 | .912 | .910 | .893 | .942 | .768 | .636 | .850 | .820 | .639 | .784 | .720 | .883 | .929 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 58AM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 58AM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

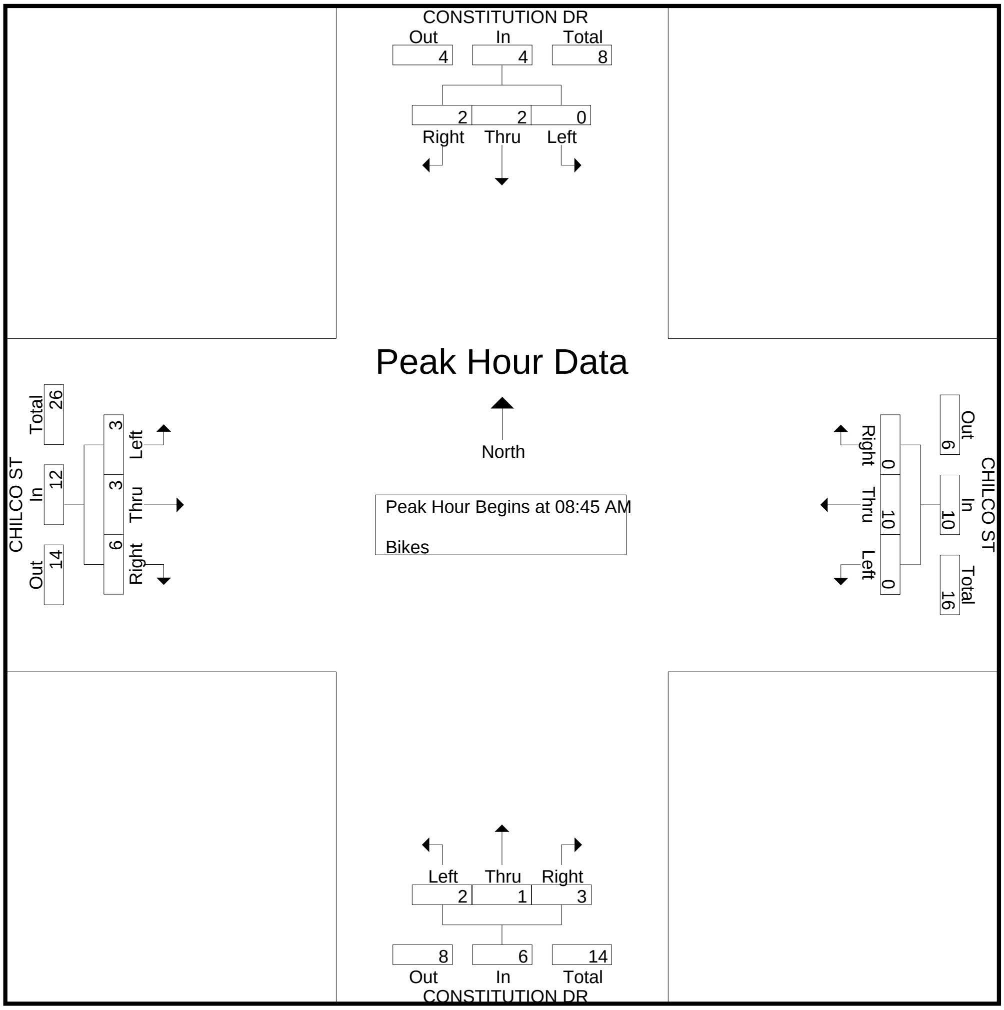
| | CONSTITUTION DR Southbound | | | | | CHILCO ST Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 4 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 3 | 9 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 2 | 1 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 6 | 11 |
| Total | 2 | 2 | 0 | 0 | 4 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 0 | 8 | 15 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 4 | 3 | 0 | 0 | 0 | 3 | 9 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 9 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 3 |
| 09:45 AM | 2 | 1 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| Total | 2 | 2 | 0 | 0 | 4 | 2 | 9 | 0 | 0 | 11 | 3 | 1 | 3 | 0 | 7 | 5 | 1 | 0 | 0 | 6 | 28 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 4 | 5 | 0 | 0 | 9 | 3 | 14 | 0 | 0 | 17 | 3 | 3 | 3 | 0 | 9 | 7 | 6 | 4 | 0 | 17 | 52 |
| Apprch % | 44.4 | 55.6 | 0 | 0 | | 17.6 | 82.4 | 0 | 0 | | 33.3 | 33.3 | 33.3 | 0 | | 41.2 | 35.3 | 23.5 | 0 | | |
| Total % | 7.7 | 9.6 | 0 | 0 | 17.3 | 5.8 | 26.9 | 0 | 0 | 32.7 | 5.8 | 5.8 | 5.8 | 0 | 17.3 | 13.5 | 11.5 | 7.7 | 0 | 32.7 | |

| | CONSTITUTION DR Southbound | | | | CHILCO ST Westbound | | | | CONSTITUTION DR Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | **2** | **1** | 0 | **3** | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | **2** | **3** | **6** | **11** |
| 09:00 AM | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | **2** | **1** | **1** | **4** | **3** | 0 | 0 | 3 | 9 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | **7** | 0 | **7** | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 9 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 3 |
| Total Volume | 2 | 2 | 0 | 4 | 0 | 10 | 0 | 10 | 3 | 1 | 2 | 6 | 6 | 3 | 3 | 12 | 32 |
| % App. Total | 50 | 50 | 0 | | 0 | 100 | 0 | | 50 | 16.7 | 33.3 | | 50 | 25 | 25 | | |
| PHF | .250 | .500 | .000 | .333 | .000 | .357 | .000 | .357 | .375 | .250 | .500 | .375 | .500 | .375 | .250 | .500 | .727 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 58AM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 58PM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 1

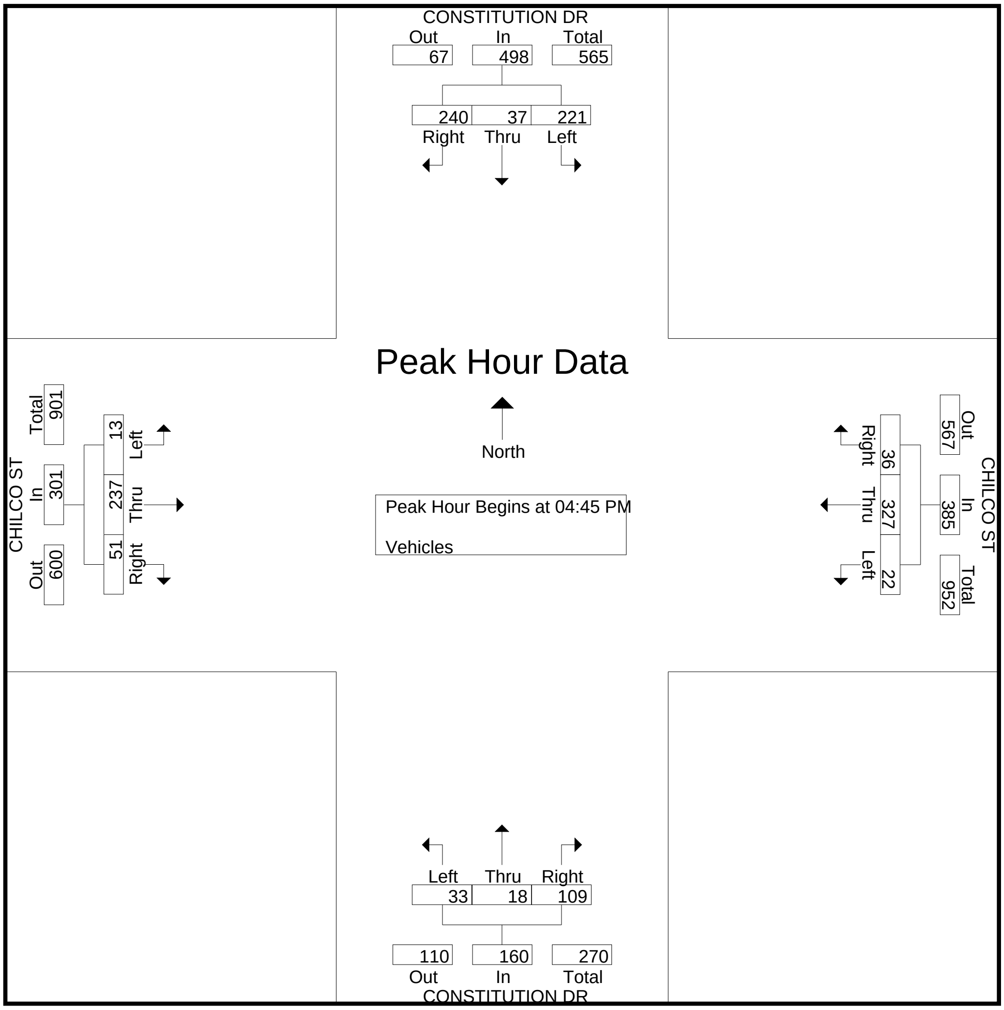
Groups Printed- Vehicles

| | CONSTITUTION DR Southbound | | | | | CHILCO ST Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 33 | 10 | 58 | 0 | 101 | 12 | 79 | 10 | 0 | 101 | 17 | 8 | 9 | 5 | 39 | 10 | 51 | 8 | 5 | 74 | 315 |
| 04:15 PM | 27 | 11 | 42 | 0 | 80 | 15 | 95 | 11 | 0 | 121 | 24 | 8 | 8 | 7 | 47 | 12 | 49 | 7 | 2 | 70 | 318 |
| 04:30 PM | 25 | 11 | 60 | 0 | 96 | 7 | 63 | 2 | 0 | 72 | 18 | 10 | 7 | 18 | 53 | 13 | 47 | 1 | 10 | 71 | 292 |
| 04:45 PM | 63 | 13 | 58 | 0 | 134 | 14 | 79 | 5 | 0 | 98 | 16 | 4 | 8 | 20 | 48 | 10 | 44 | 3 | 6 | 63 | 343 |
| Total | 148 | 45 | 218 | 0 | 411 | 48 | 316 | 28 | 0 | 392 | 75 | 30 | 32 | 50 | 187 | 45 | 191 | 19 | 23 | 278 | 1268 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 58 | 9 | 60 | 0 | 127 | 5 | 81 | 6 | 0 | 92 | 29 | 4 | 7 | 31 | 71 | 13 | 62 | 2 | 13 | 90 | 380 |
| 05:15 PM | 68 | 7 | 59 | 0 | 134 | 7 | 74 | 4 | 0 | 85 | 33 | 3 | 13 | 17 | 66 | 11 | 74 | 2 | 10 | 97 | 382 |
| 05:30 PM | 51 | 8 | 44 | 0 | 103 | 10 | 93 | 7 | 0 | 110 | 31 | 7 | 5 | 12 | 55 | 17 | 57 | 6 | 9 | 89 | 357 |
| 05:45 PM | 54 | 7 | 33 | 0 | 94 | 4 | 77 | 10 | 0 | 91 | 30 | 10 | 6 | 19 | 65 | 13 | 48 | 6 | 7 | 74 | 324 |
| Total | 231 | 31 | 196 | 0 | 458 | 26 | 325 | 27 | 0 | 378 | 123 | 24 | 31 | 79 | 257 | 54 | 241 | 16 | 39 | 350 | 1443 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 45 | 9 | 49 | 0 | 103 | 8 | 63 | 6 | 0 | 77 | 28 | 9 | 7 | 22 | 66 | 12 | 53 | 7 | 20 | 92 | 338 |
| 06:15 PM | 50 | 16 | 51 | 0 | 117 | 8 | 83 | 6 | 0 | 97 | 21 | 7 | 13 | 22 | 63 | 10 | 39 | 6 | 6 | 61 | 338 |
| 06:30 PM | 20 | 10 | 36 | 0 | 66 | 11 | 66 | 12 | 0 | 89 | 30 | 8 | 5 | 25 | 68 | 8 | 54 | 4 | 17 | 83 | 306 |
| 06:45 PM | 17 | 5 | 47 | 0 | 69 | 12 | 79 | 8 | 0 | 99 | 33 | 5 | 12 | 26 | 76 | 6 | 53 | 2 | 17 | 78 | 322 |
| Total | 132 | 40 | 183 | 0 | 355 | 39 | 291 | 32 | 0 | 362 | 112 | 29 | 37 | 95 | 273 | 36 | 199 | 19 | 60 | 314 | 1304 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 511 | 116 | 597 | 0 | 1224 | 113 | 932 | 87 | 0 | 1132 | 310 | 83 | 100 | 224 | 717 | 135 | 631 | 54 | 122 | 942 | 4015 |
| Apprch % | 41.7 | 9.5 | 48.8 | 0 | | 10 | 82.3 | 7.7 | 0 | | 43.2 | 11.6 | 13.9 | 31.2 | | 14.3 | 67 | 5.7 | 13 | | |
| Total % | 12.7 | 2.9 | 14.9 | 0 | 30.5 | 2.8 | 23.2 | 2.2 | 0 | 28.2 | 7.7 | 2.1 | 2.5 | 5.6 | 17.9 | 3.4 | 15.7 | 1.3 | 3 | 23.5 | |

| | CONSTITUTION DR Southbound | | | | CHILCO ST Westbound | | | | CONSTITUTION DR Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 63 | **13** | 58 | **134** | **14** | 79 | 5 | 98 | 16 | 4 | 8 | 28 | 10 | 44 | 3 | 57 | 317 |
| 05:00 PM | 58 | 9 | **60** | 127 | 5 | 81 | 6 | 92 | 29 | 4 | 7 | 40 | 13 | 62 | 2 | 77 | 336 |
| 05:15 PM | **68** | 7 | 59 | 134 | 7 | 74 | 4 | 85 | **33** | 3 | **13** | **49** | 11 | **74** | 2 | **87** | **355** |
| 05:30 PM | 51 | 8 | 44 | 103 | 10 | **93** | **7** | **110** | 31 | **7** | 5 | 43 | **17** | 57 | **6** | 80 | 336 |
| Total Volume | 240 | 37 | 221 | 498 | 36 | 327 | 22 | 385 | 109 | 18 | 33 | 160 | 51 | 237 | 13 | 301 | 1344 |
| % App. Total | 48.2 | 7.4 | 44.4 | | 9.4 | 84.9 | 5.7 | | 68.1 | 11.2 | 20.6 | | 16.9 | 78.7 | 4.3 | | |
| PHF | .882 | .712 | .921 | .929 | .643 | .879 | .786 | .875 | .826 | .643 | .635 | .816 | .750 | .801 | .542 | .865 | .946 |

# Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 58PM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 58PM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

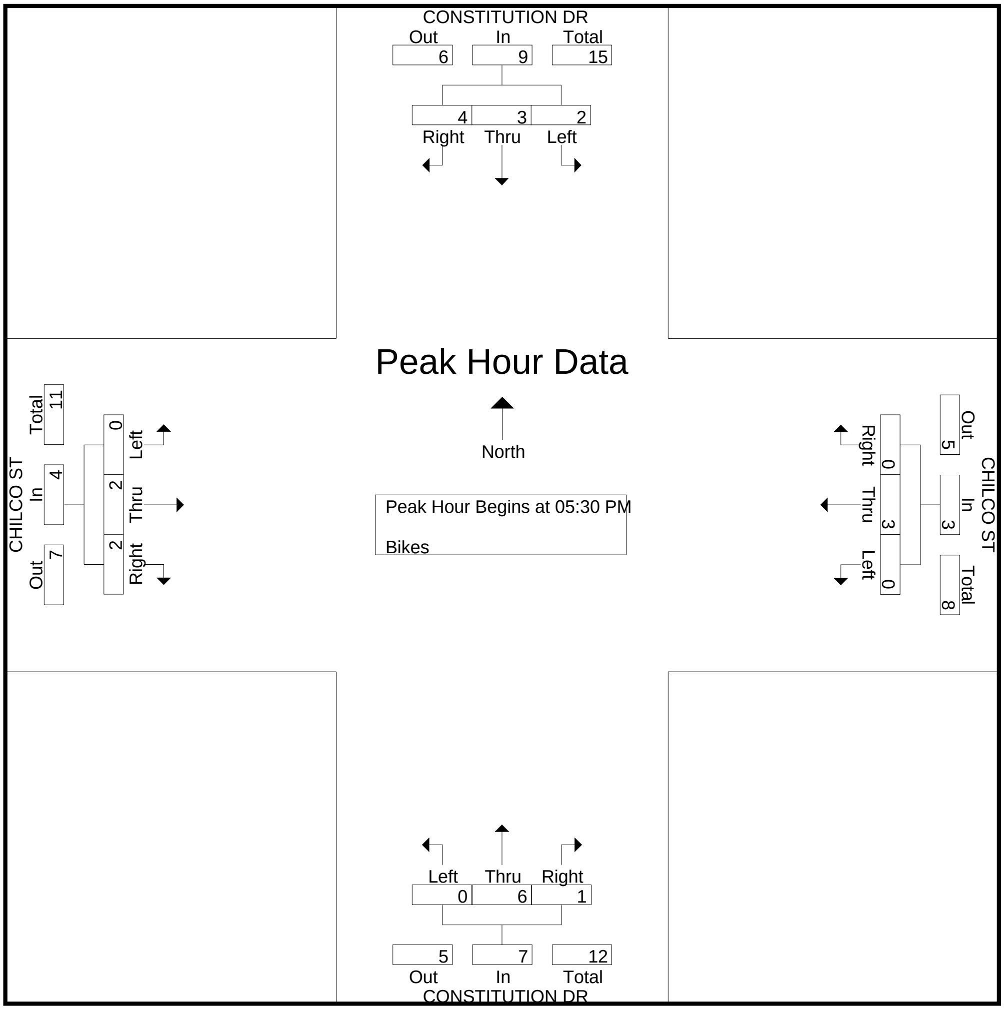
| | CONSTITUTION DR Southbound | | | | | CHILCO ST Westbound | | | | | CONSTITUTION DR Northbound | | | | | CHILCO ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 04:15 PM | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:30 PM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:45 PM | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 6 |
| Total | 2 | 6 | 2 | 0 | 10 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 15 |
| 05:00 PM | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| 05:15 PM | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 2 | 7 |
| 05:45 PM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 4 | 2 | 0 | 0 | 6 | 1 | 2 | 3 | 0 | 6 | 0 | 4 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 2 | 18 |
| 06:00 PM | 2 | 2 | 1 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 8 |
| 06:15 PM | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 6 |
| 06:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:45 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 2 | 4 | 2 | 0 | 8 | 0 | 2 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 16 |
| Grand Total | 8 | 12 | 4 | 0 | 24 | 1 | 5 | 3 | 0 | 9 | 1 | 8 | 1 | 0 | 10 | 4 | 2 | 0 | 0 | 6 | 49 |
| Apprch % | 33.3 | 50 | 16.7 | 0 | | 11.1 | 55.6 | 33.3 | 0 | | 10 | 80 | 10 | 0 | | 66.7 | 33.3 | 0 | 0 | | |
| Total % | 16.3 | 24.5 | 8.2 | 0 | 49 | 2 | 10.2 | 6.1 | 0 | 18.4 | 2 | 16.3 | 2 | 0 | 20.4 | 8.2 | 4.1 | 0 | 0 | 12.2 | |

| | CONSTITUTION DR Southbound | | | | CHILCO ST Westbound | | | | CONSTITUTION DR Northbound | | | | CHILCO ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:30 PM | | | | | | | | | | | | | | | | | |
| 05:30 PM | 0 | 1 | 0 | 1 | 0 | **1** | 0 | **1** | 0 | **3** | 0 | **3** | **2** | 0 | 0 | **2** | 7 |
| 05:45 PM | **2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:00 PM | 2 | **2** | **1** | **5** | 0 | 1 | 0 | 1 | **1** | 0 | 0 | 1 | 0 | **1** | 0 | 1 | **8** |
| 06:15 PM | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 6 |
| Total Volume | 4 | 3 | 2 | 9 | 0 | 3 | 0 | 3 | 1 | 6 | 0 | 7 | 2 | 2 | 0 | 4 | 23 |
| % App. Total | 44.4 | 33.3 | 22.2 | | 0 | 100 | 0 | | 14.3 | 85.7 | 0 | | 50 | 50 | 0 | | |
| PHF | .500 | .375 | .500 | .450 | .000 | .750 | .000 | .750 | .250 | .500 | .000 | .583 | .250 | .500 | .000 | .500 | .719 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 58PM FINAL
Site Code : 00000058
Start Date : 3/21/2019
Page No : 2



agon_Data\Active\Menlo Park\Facebook Willow Campus EIR-18GB08\Vistro\Existing Conditions_AM.vistro

ulation Help Scenario: 16 Existing AM (2019 vols) Intersection: 131 Chilco Street/Hamilton ...

42

## Intersection Setup

Enter text to search...

| | ↑ | | | ↓ | | | → | | | ← | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | 131 | | | | | | | | | | | |
| Intersection | **Chilco Street/Hamilton Avenue** | | | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| Control Type | All-way stop | | | | | | | | | | | |
| Analysis Method | HCM 6th Edition | | | | | | | | | | | |
| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
| Show Name | ☑ | | | ☑ | | | ☑ | | | ☑ | | |
| Approach | *Northbound* | | | *Southbound* | | | *Eastbound* | | | *Westbound* | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* |
| Base Volume Input [veh/h] | 13 | 88 | 10 | 50 | 79 | 15 | 37 | 41 | 16 | 22 | 51 | 131 |
| Total Analysis Volume [veh/h] | *14* | *92* | *10* | *63* | *99* | *19* | *47* | *52* | *20* | *24* | *56* | *144* |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

lexagon_Data\Active\Menlo Park\Facebook Willow Campus EIR-18GB08\Vistro\Existing Conditions_PM.vistro

Simulation Help

Scenario: 16 Existing PM (2019 vols)

Intersection: 131 Chilco Street/Hamilton ...

## Intersection Setup

Enter text to search...

| | ↑ | | | ↓ | | | → | | | ← | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | 131 | | | | | | | | | | | |
| Intersection | **Chilco Street/Hamilton Avenue** | | | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| Control Type | All-way stop | | | | | | | | | | | |
| Analysis Method | HCM 6th Edition | | | | | | | | | | | |
| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
| Show Name | ☑ | | | ☑ | | | ☑ | | | ☑ | | |
| Approach | *Northbound* | | | *Southbound* | | | *Eastbound* | | | *Westbound* | | |
| Lane Configuration | ✛ | | | ✛ | | | ✛ | | | ✛ | | |
| Turning Movement | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* | *Left* | *Thru* | *Right* |
| Base Volume Input [veh/h] | 19 | 63 | 18 | 71 | 407 | 36 | 21 | 124 | 21 | 7 | 16 | 47 |
| Total Analysis Volume [veh/h] | *21* | *68* | *19* | *77* | *440* | *39* | *24* | *140* | *24* | *8* | *17* | *51* |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 14AM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

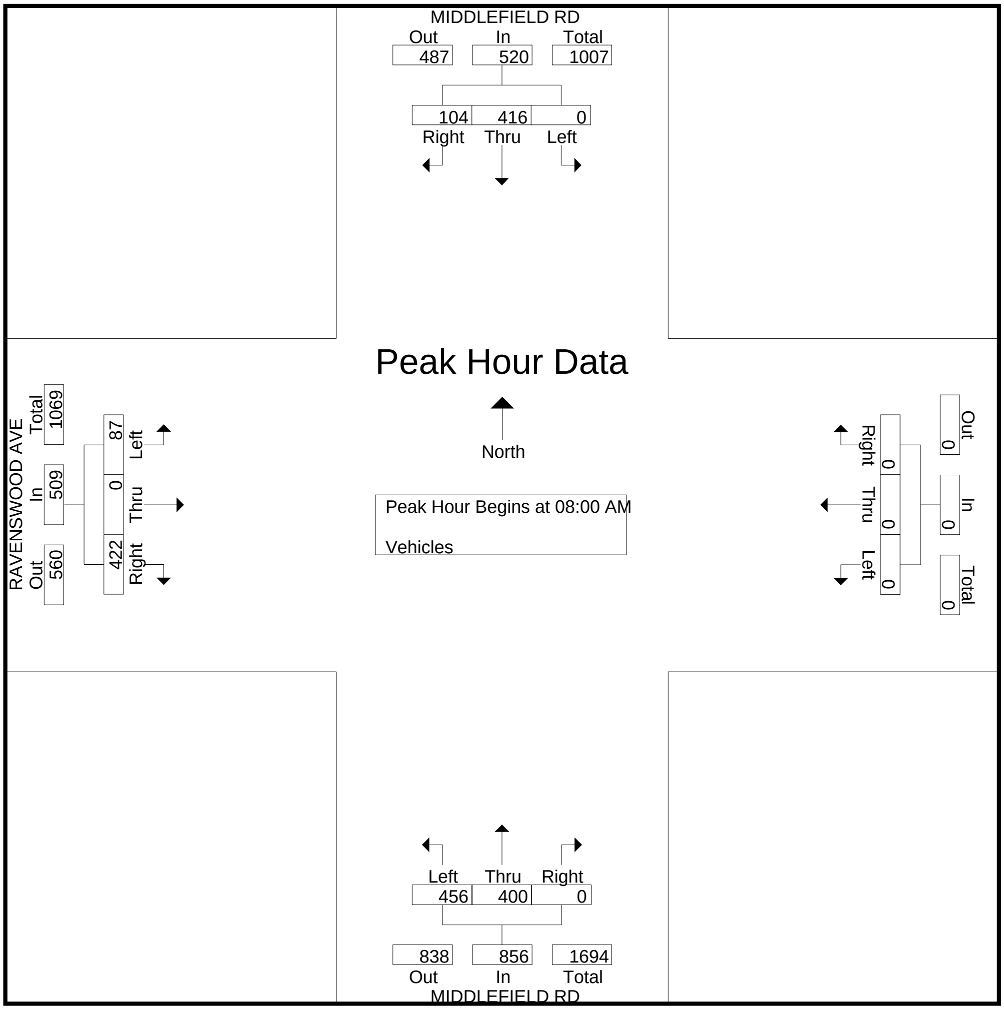
| | MIDDLEFIELD RD Southbound | | | | | Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | RAVENSWOOD AVE Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 14 | 50 | 0 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 83 | 1 | 127 | 34 | 0 | 10 | 1 | 45 | 236 |
| 07:15 AM | 25 | 59 | 0 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 88 | 0 | 172 | 38 | 0 | 12 | 1 | 51 | 307 |
| 07:30 AM | 24 | 65 | 0 | 0 | 89 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 114 | 9 | 236 | 46 | 0 | 19 | 9 | 74 | 399 |
| 07:45 AM | 18 | 89 | 0 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 0 | 132 | 109 | 7 | 248 | 77 | 0 | 22 | 5 | 104 | 459 |
| Total | 81 | 263 | 0 | 0 | 344 | 0 | 0 | 0 | 0 | 0 | 0 | 372 | 394 | 17 | 783 | 195 | 0 | 63 | 16 | 274 | 1401 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 19 | 111 | 0 | 0 | 130 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 103 | 11 | 225 | 101 | 0 | 25 | 14 | 140 | 495 |
| 08:15 AM | 37 | 105 | 0 | 0 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | 101 | 116 | 1 | 218 | 85 | 0 | 27 | 1 | 113 | 473 |
| 08:30 AM | 28 | 98 | 0 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 117 | 4 | 214 | 117 | 0 | 13 | 4 | 134 | 474 |
| 08:45 AM | 20 | 102 | 0 | 1 | 123 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 120 | 18 | 233 | 119 | 0 | 22 | 2 | 143 | 499 |
| Total | 104 | 416 | 0 | 1 | 521 | 0 | 0 | 0 | 0 | 0 | 0 | 400 | 456 | 34 | 890 | 422 | 0 | 87 | 21 | 530 | 1941 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 24 | 91 | 0 | 0 | 115 | 0 | 0 | 0 | 0 | 0 | 0 | 92 | 96 | 5 | 193 | 101 | 0 | 23 | 1 | 125 | 433 |
| 09:15 AM | 19 | 85 | 0 | 0 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 84 | 6 | 175 | 67 | 0 | 26 | 1 | 94 | 373 |
| 09:30 AM | 23 | 60 | 0 | 0 | 83 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 86 | 6 | 175 | 72 | 0 | 32 | 2 | 106 | 364 |
| 09:45 AM | 22 | 77 | 0 | 0 | 99 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 92 | 6 | 173 | 74 | 0 | 14 | 0 | 88 | 360 |
| Total | 88 | 313 | 0 | 0 | 401 | 0 | 0 | 0 | 0 | 0 | 0 | 335 | 358 | 23 | 716 | 314 | 0 | 95 | 4 | 413 | 1530 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 273 | 992 | 0 | 1 | 1266 | 0 | 0 | 0 | 0 | 0 | 0 | 1107 | 1208 | 74 | 2389 | 931 | 0 | 245 | 41 | 1217 | 4872 |
| Apprch % | 21.6 | 78.4 | 0 | 0.1 | | 0 | 0 | 0 | 0 | | 0 | 46.3 | 50.6 | 3.1 | | 76.5 | 0 | 20.1 | 3.4 | | |
| Total % | 5.6 | 20.4 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 22.7 | 24.8 | 1.5 | 49 | 19.1 | 0 | 5 | 0.8 | 25 | |

| | MIDDLEFIELD RD Southbound | | | | Westbound | | | | MIDDLEFIELD RD Northbound | | | | RAVENSWOOD AVE Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 19 | **111** | 0 | 130 | 0 | 0 | 0 | 0 | 0 | **111** | 103 | 214 | 101 | 0 | 25 | 126 | 470 |
| 08:15 AM | **37** | 105 | 0 | **142** | 0 | 0 | 0 | 0 | 0 | 101 | 116 | **217** | 85 | 0 | **27** | 112 | 471 |
| 08:30 AM | 28 | 98 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 93 | 117 | 210 | 117 | 0 | 13 | 130 | 466 |
| 08:45 AM | 20 | 102 | 0 | 122 | 0 | 0 | 0 | 0 | 0 | 95 | **120** | 215 | **119** | 0 | 22 | **141** | **478** |
| Total Volume | 104 | 416 | 0 | 520 | 0 | 0 | 0 | 0 | 0 | 400 | 456 | 856 | 422 | 0 | 87 | 509 | 1885 |
| % App. Total | 20 | 80 | 0 | | 0 | 0 | 0 | | 0 | 46.7 | 53.3 | | 82.9 | 0 | 17.1 | | |
| PHF | .703 | .937 | .000 | .915 | .000 | .000 | .000 | .000 | .000 | .901 | .950 | .986 | .887 | .000 | .806 | .902 | .986 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14AM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 14AM FINAL
Site Code : 00000014
Start Date : 3/19/2019


Groups Printed- Bikes

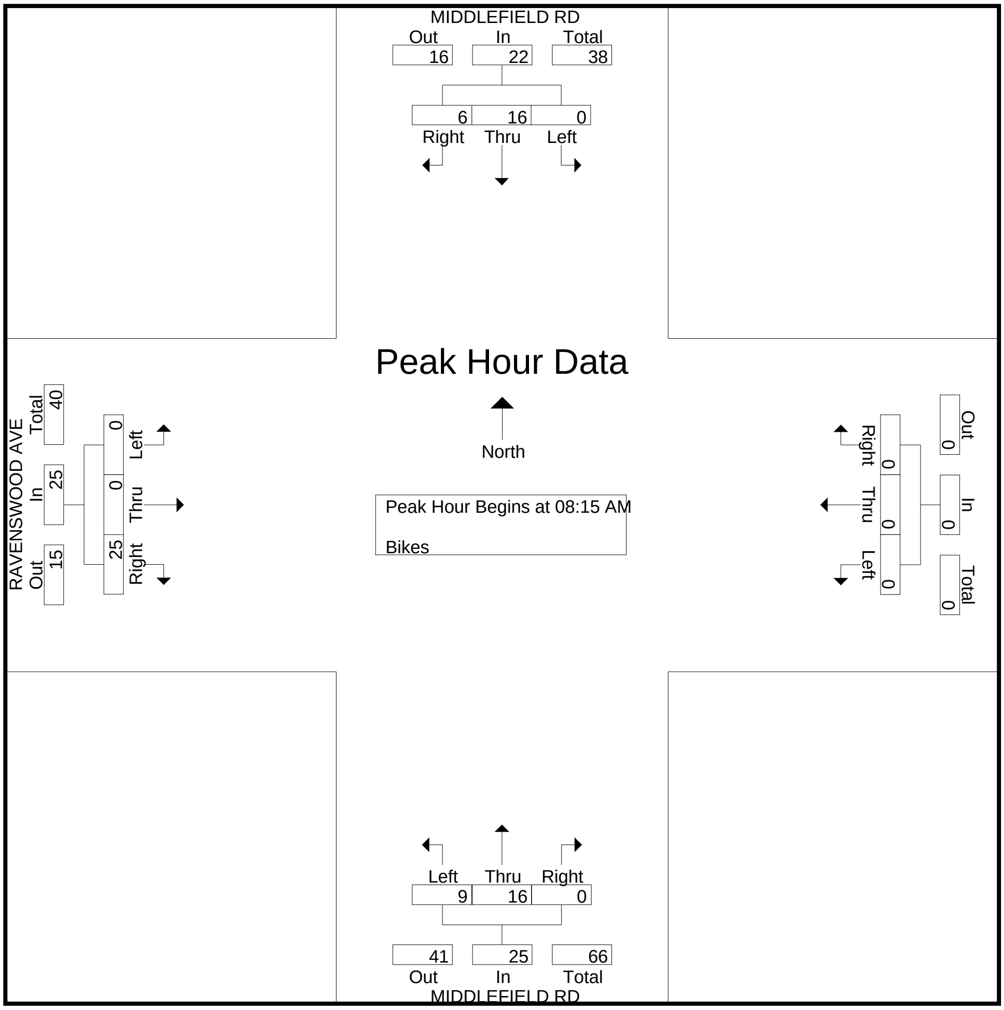
| | MIDDLEFIELD RD Southbound | | | | | Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | RAVENSWOOD AVE Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 4 |
| 07:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 4 |
| 07:30 AM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 0 | 10 | 4 | 0 | 0 | 0 | 4 | 16 |
| 07:45 AM | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 13 |
| Total | 1 | 8 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 13 | 0 | 22 | 5 | 0 | 1 | 0 | 6 | 37 |
| 08:00 AM | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 4 | 3 | 0 | 0 | 0 | 3 | 13 |
| 08:15 AM | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 0 | 9 | 6 | 0 | 0 | 0 | 6 | 18 |
| 08:30 AM | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 10 | 0 | 0 | 0 | 10 | 19 |
| 08:45 AM | 1 | 6 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 3 | 12 |
| Total | 9 | 13 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 7 | 0 | 18 | 22 | 0 | 0 | 0 | 22 | 62 |
| 09:00 AM | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 0 | 11 | 6 | 0 | 0 | 0 | 6 | 23 |
| 09:15 AM | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 5 | 4 | 0 | 1 | 0 | 5 | 16 |
| 09:30 AM | 2 | 4 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 5 | 0 | 0 | 0 | 5 | 14 |
| 09:45 AM | 2 | 4 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 8 | 1 | 0 | 1 | 0 | 2 | 16 |
| Total | 7 | 17 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 13 | 0 | 27 | 16 | 0 | 2 | 0 | 18 | 69 |
| Grand Total | 17 | 38 | 0 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 33 | 0 | 67 | 43 | 0 | 3 | 0 | 46 | 168 |
| Apprch % | 30.9 | 69.1 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 50.7 | 49.3 | 0 | | 93.5 | 0 | 6.5 | 0 | | |
| Total % | 10.1 | 22.6 | 0 | 0 | 32.7 | 0 | 0 | 0 | 0 | 0 | 0 | 20.2 | 19.6 | 0 | 39.9 | 25.6 | 0 | 1.8 | 0 | 27.4 | |

| | MIDDLEFIELD RD Southbound | | | | Westbound | | | | MIDDLEFIELD RD Northbound | | | | RAVENSWOOD AVE Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:15 AM | | | | | | | | | | | | | | | | | |
| 08:15 AM | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | **6** | 3 | 9 | 6 | 0 | 0 | 6 | 18 |
| 08:30 AM | **3** | 3 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | **10** | 0 | 0 | **10** | 19 |
| 08:45 AM | 1 | **6** | 0 | **7** | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 3 | 12 |
| 09:00 AM | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | **5** | **11** | 6 | 0 | 0 | 6 | **23** |
| Total Volume | 6 | 16 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 16 | 9 | 25 | 25 | 0 | 0 | 25 | 72 |
| % App. Total | 27.3 | 72.7 | 0 | | 0 | 0 | 0 | | 0 | 64 | 36 | | 100 | 0 | 0 | | |
| PHF | .500 | .667 | .000 | .786 | .000 | .000 | .000 | .000 | .000 | .667 | .450 | .568 | .625 | .000 | .000 | .625 | .783 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14AM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

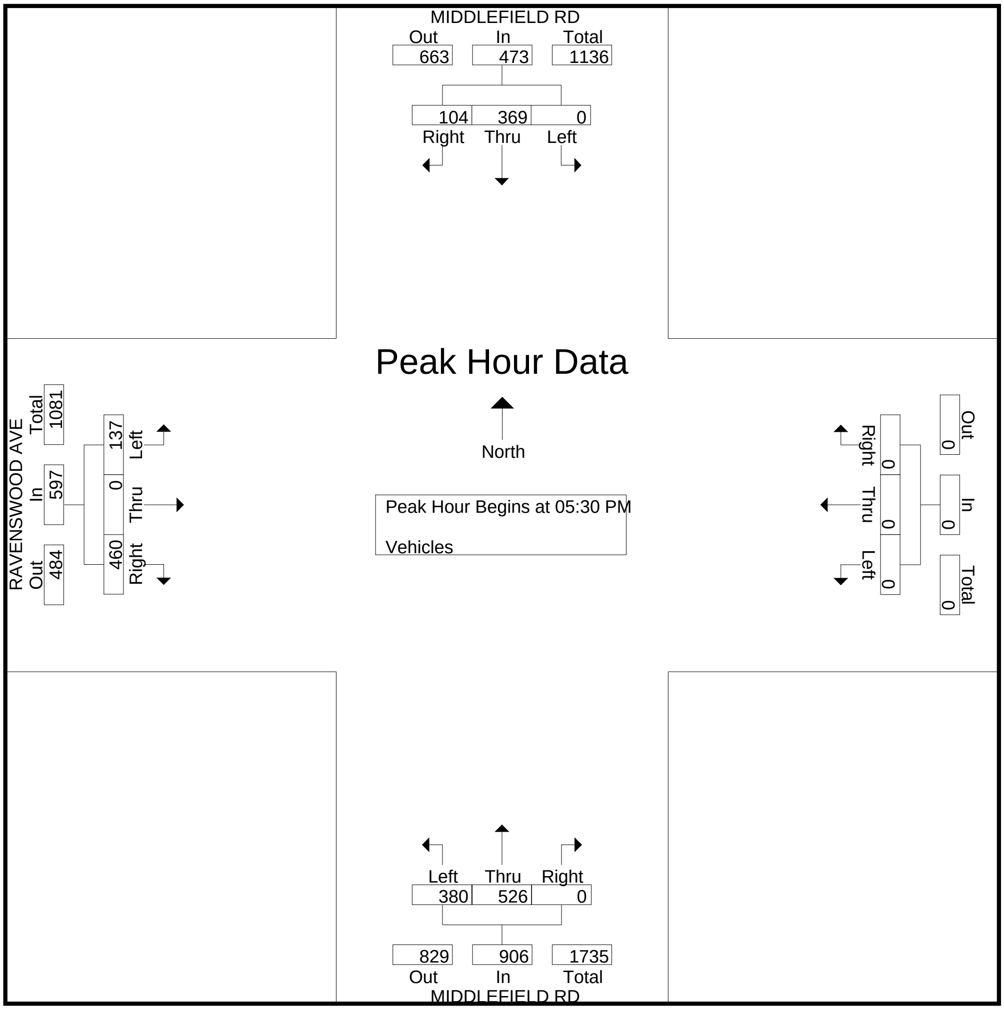
| | MIDDLEFIELD RD Southbound | | | | | Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | RAVENSWOOD AVE Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 25 | 96 | 0 | 0 | 121 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 78 | 26 | 229 | 124 | 0 | 35 | 1 | 160 | 510 |
| 04:15 PM | 20 | 84 | 0 | 0 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 138 | 75 | 6 | 219 | 115 | 0 | 35 | 1 | 151 | 474 |
| 04:30 PM | 25 | 99 | 0 | 0 | 124 | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 71 | 15 | 198 | 108 | 0 | 36 | 3 | 147 | 469 |
| 04:45 PM | 29 | 97 | 0 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 147 | 83 | 1 | 231 | 104 | 0 | 48 | 1 | 153 | 510 |
| Total | 99 | 376 | 0 | 0 | 475 | 0 | 0 | 0 | 0 | 0 | 0 | 522 | 307 | 48 | 877 | 451 | 0 | 154 | 6 | 611 | 1963 |
| 05:00 PM | 18 | 98 | 0 | 1 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 82 | 3 | 215 | 110 | 0 | 41 | 1 | 152 | 484 |
| 05:15 PM | 24 | 79 | 0 | 0 | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 153 | 82 | 9 | 244 | 93 | 0 | 41 | 1 | 135 | 482 |
| 05:30 PM | 20 | 97 | 0 | 0 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 154 | 83 | 6 | 243 | 113 | 0 | 32 | 4 | 149 | 509 |
| 05:45 PM | 20 | 92 | 0 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 0 | 135 | 82 | 8 | 225 | 131 | 0 | 36 | 2 | 169 | 506 |
| Total | 82 | 366 | 0 | 1 | 449 | 0 | 0 | 0 | 0 | 0 | 0 | 572 | 329 | 26 | 927 | 447 | 0 | 150 | 8 | 605 | 1981 |
| 06:00 PM | 34 | 102 | 0 | 0 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 107 | 4 | 237 | 114 | 0 | 20 | 4 | 138 | 511 |
| 06:15 PM | 30 | 78 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 108 | 5 | 224 | 102 | 0 | 49 | 1 | 152 | 484 |
| 06:30 PM | 33 | 74 | 0 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 0 | 97 | 71 | 3 | 171 | 95 | 0 | 32 | 2 | 129 | 407 |
| 06:45 PM | 17 | 80 | 0 | 0 | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 65 | 1 | 166 | 95 | 0 | 35 | 0 | 130 | 393 |
| Total | 114 | 334 | 0 | 0 | 448 | 0 | 0 | 0 | 0 | 0 | 0 | 434 | 351 | 13 | 798 | 406 | 0 | 136 | 7 | 549 | 1795 |
| Grand Total | 295 | 1076 | 0 | 1 | 1372 | 0 | 0 | 0 | 0 | 0 | 0 | 1528 | 987 | 87 | 2602 | 1304 | 0 | 440 | 21 | 1765 | 5739 |
| Apprch % | 21.5 | 78.4 | 0 | 0.1 | | 0 | 0 | 0 | 0 | | 0 | 58.7 | 37.9 | 3.3 | | 73.9 | 0 | 24.9 | 1.2 | | |
| Total % | 5.1 | 18.7 | 0 | 0 | 23.9 | 0 | 0 | 0 | 0 | 0 | 0 | 26.6 | 17.2 | 1.5 | 45.3 | 22.7 | 0 | 7.7 | 0.4 | 30.8 | |

| | MIDDLEFIELD RD Southbound | | | | Westbound | | | | MIDDLEFIELD RD Northbound | | | | RAVENSWOOD AVE Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:30 PM | | | | | | | | | | | | | | | | | |
| 05:30 PM | 20 | 97 | 0 | 117 | 0 | 0 | 0 | 0 | 0 | **154** | 83 | **237** | 113 | 0 | 32 | 145 | 499 |
| 05:45 PM | 20 | 92 | 0 | 112 | 0 | 0 | 0 | 0 | 0 | 135 | 82 | 217 | **131** | 0 | 36 | **167** | 496 |
| 06:00 PM | **34** | **102** | 0 | **136** | 0 | 0 | 0 | 0 | 0 | 126 | 107 | 233 | 114 | 0 | 20 | 134 | **503** |
| 06:15 PM | 30 | 78 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 111 | **108** | 219 | 102 | 0 | **49** | 151 | 478 |
| Total Volume | 104 | 369 | 0 | 473 | 0 | 0 | 0 | 0 | 0 | 526 | 380 | 906 | 460 | 0 | 137 | 597 | 1976 |
| % App. Total | 22 | 78 | 0 | | 0 | 0 | 0 | | 0 | 58.1 | 41.9 | | 77.1 | 0 | 22.9 | | |
| PHF | .765 | .904 | .000 | .869 | .000 | .000 | .000 | .000 | .000 | .854 | .880 | .956 | .878 | .000 | .699 | .894 | .982 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

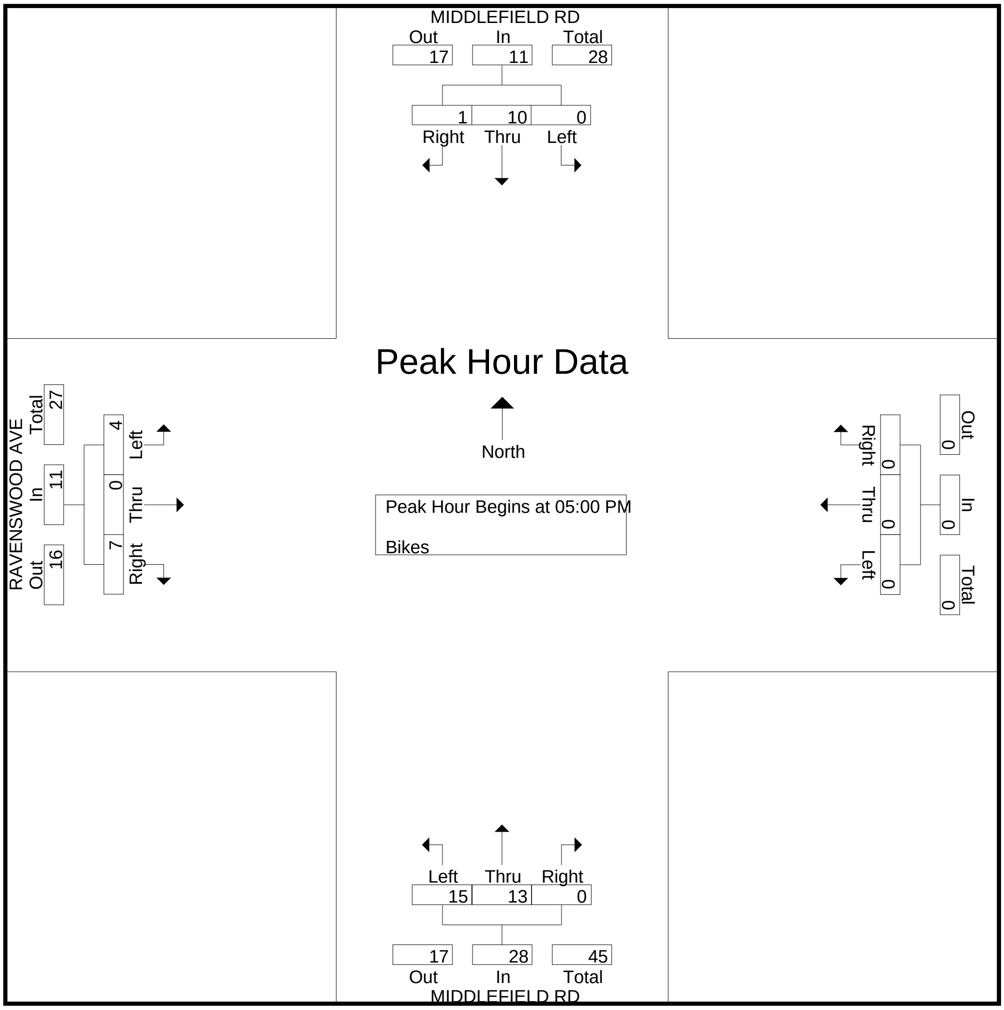
| | MIDDLEFIELD RD Southbound | | | | | Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | RAVENSWOOD AVE Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 4 |
| 04:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 7 |
| 04:30 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 4 | 2 | 0 | 0 | 0 | 2 | 8 |
| 04:45 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 2 | 0 | 1 | 0 | 3 | 7 |
| Total | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 8 | 0 | 14 | 6 | 0 | 1 | 0 | 7 | 26 |
| 05:00 PM | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 8 |
| 05:15 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 3 | 0 | 0 | 0 | 3 | 12 |
| 05:30 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 6 | 0 | 13 | 1 | 0 | 2 | 0 | 3 | 18 |
| 05:45 PM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 7 | 1 | 0 | 2 | 0 | 3 | 12 |
| Total | 1 | 10 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 15 | 0 | 28 | 7 | 0 | 4 | 0 | 11 | 50 |
| 06:00 PM | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 1 | 0 | 4 | 8 |
| 06:15 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 9 |
| 06:30 PM | 2 | 4 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 3 | 0 | 12 | 2 | 0 | 0 | 0 | 2 | 20 |
| 06:45 PM | 2 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 5 | 2 | 0 | 0 | 0 | 2 | 11 |
| Total | 6 | 9 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 11 | 0 | 24 | 8 | 0 | 1 | 0 | 9 | 48 |
| Grand Total | 7 | 24 | 0 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 34 | 0 | 66 | 21 | 0 | 6 | 0 | 27 | 124 |
| Apprch % | 22.6 | 77.4 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 48.5 | 51.5 | 0 | | 77.8 | 0 | 22.2 | 0 | | |
| Total % | 5.6 | 19.4 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 25.8 | 27.4 | 0 | 53.2 | 16.9 | 0 | 4.8 | 0 | 21.8 | |

| | MIDDLEFIELD RD Southbound | | | | Westbound | | | | MIDDLEFIELD RD Northbound | | | | RAVENSWOOD AVE Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | **5** | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 8 |
| 05:15 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | **7** | 7 | **3** | 0 | 0 | **3** | 12 |
| 05:30 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **7** | 6 | **13** | 1 | 0 | **2** | 3 | **18** |
| 05:45 PM | **1** | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 7 | 1 | 0 | 2 | 3 | 12 |
| Total Volume | 1 | 10 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 13 | 15 | 28 | 7 | 0 | 4 | 11 | 50 |
| % App. Total | 9.1 | 90.9 | 0 | | 0 | 0 | 0 | | 0 | 46.4 | 53.6 | | 63.6 | 0 | 36.4 | | |
| PHF | .250 | .500 | .000 | .550 | .000 | .000 | .000 | .000 | .000 | .464 | .536 | .538 | .583 | .000 | .500 | .917 | .694 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15AM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 1

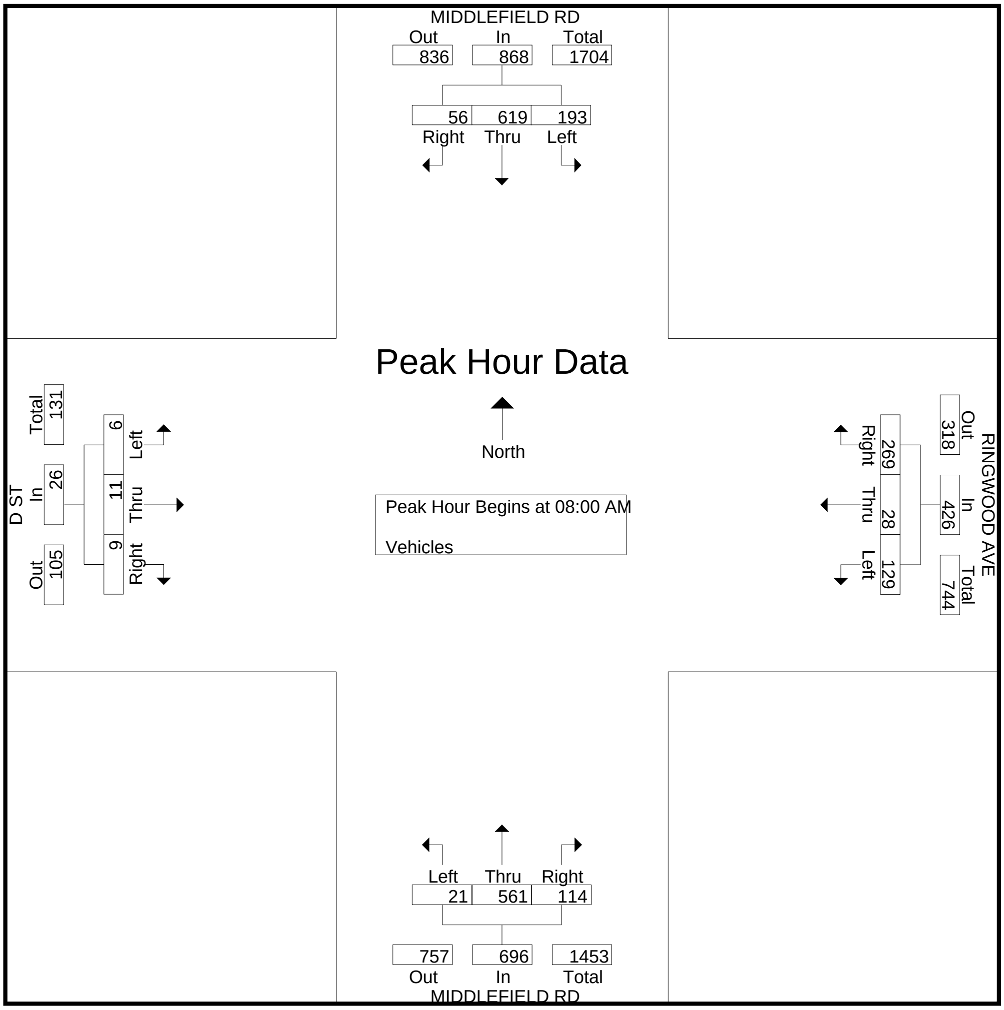
Groups Printed- Vehicles

| | MIDDLEFIELD RD Southbound | | | | | RINGWOOD AVE Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | D ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 6 | 70 | 9 | 1 | 86 | 25 | 12 | 5 | 1 | 43 | 2 | 78 | 9 | 0 | 89 | 1 | 0 | 1 | 2 | 4 | 222 |
| 07:15 AM | 8 | 77 | 6 | 1 | 92 | 42 | 8 | 13 | 5 | 68 | 10 | 125 | 3 | 0 | 138 | 0 | 0 | 2 | 1 | 3 | 301 |
| 07:30 AM | 14 | 89 | 16 | 1 | 120 | 60 | 7 | 20 | 22 | 109 | 17 | 164 | 5 | 1 | 187 | 2 | 0 | 2 | 2 | 6 | 422 |
| 07:45 AM | 8 | 142 | 32 | 2 | 184 | 84 | 7 | 29 | 24 | 144 | 22 | 143 | 6 | 0 | 171 | 0 | 0 | 2 | 1 | 3 | 502 |
| Total | 36 | 378 | 63 | 5 | 482 | 211 | 34 | 67 | 52 | 364 | 51 | 510 | 23 | 1 | 585 | 3 | 0 | 7 | 6 | 16 | 1447 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 13 | 166 | 29 | 2 | 210 | 90 | 11 | 21 | 2 | 124 | 23 | 148 | 5 | 0 | 176 | 5 | 0 | 0 | 4 | 9 | 519 |
| 08:15 AM | 9 | 142 | 46 | 1 | 198 | 54 | 7 | 19 | 13 | 93 | 17 | 140 | 6 | 1 | 164 | 2 | 0 | 2 | 5 | 9 | 464 |
| 08:30 AM | 16 | 140 | 79 | 2 | 237 | 55 | 7 | 40 | 34 | 136 | 27 | 122 | 3 | 2 | 154 | 1 | 6 | 2 | 2 | 11 | 538 |
| 08:45 AM | 18 | 171 | 39 | 6 | 234 | 70 | 3 | 49 | 32 | 154 | 47 | 151 | 7 | 0 | 205 | 1 | 5 | 2 | 6 | 14 | 607 |
| Total | 56 | 619 | 193 | 11 | 879 | 269 | 28 | 129 | 81 | 507 | 114 | 561 | 21 | 3 | 699 | 9 | 11 | 6 | 17 | 43 | 2128 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 18 | 146 | 41 | 1 | 206 | 58 | 6 | 29 | 5 | 98 | 8 | 109 | 8 | 0 | 125 | 0 | 1 | 0 | 0 | 1 | 430 |
| 09:15 AM | 11 | 134 | 26 | 0 | 171 | 42 | 11 | 10 | 6 | 69 | 7 | 128 | 7 | 2 | 144 | 1 | 0 | 1 | 1 | 3 | 387 |
| 09:30 AM | 13 | 107 | 31 | 1 | 152 | 35 | 7 | 18 | 2 | 62 | 7 | 125 | 5 | 2 | 139 | 3 | 0 | 1 | 2 | 6 | 359 |
| 09:45 AM | 12 | 118 | 32 | 1 | 163 | 52 | 9 | 20 | 7 | 88 | 10 | 126 | 4 | 0 | 140 | 2 | 2 | 4 | 0 | 8 | 399 |
| Total | 54 | 505 | 130 | 3 | 692 | 187 | 33 | 77 | 20 | 317 | 32 | 488 | 24 | 4 | 548 | 6 | 3 | 6 | 3 | 18 | 1575 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 146 | 1502 | 386 | 19 | 2053 | 667 | 95 | 273 | 153 | 1188 | 197 | 1559 | 68 | 8 | 1832 | 18 | 14 | 19 | 26 | 77 | 5150 |
| Apprch % | 7.1 | 73.2 | 18.8 | 0.9 | | 56.1 | 8 | 23 | 12.9 | | 10.8 | 85.1 | 3.7 | 0.4 | | 23.4 | 18.2 | 24.7 | 33.8 | | |
| Total % | 2.8 | 29.2 | 7.5 | 0.4 | 39.9 | 13 | 1.8 | 5.3 | 3 | 23.1 | 3.8 | 30.3 | 1.3 | 0.2 | 35.6 | 0.3 | 0.3 | 0.4 | 0.5 | 1.5 | |

| | MIDDLEFIELD RD Southbound | | | | RINGWOOD AVE Westbound | | | | MIDDLEFIELD RD Northbound | | | | D ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 13 | 166 | 29 | 208 | **90** | **11** | 21 | **122** | 23 | 148 | 5 | 176 | **5** | 0 | 0 | 5 | 511 |
| 08:15 AM | 9 | 142 | 46 | 197 | 54 | 7 | 19 | 80 | 17 | 140 | 6 | 163 | 2 | 0 | **2** | 4 | 444 |
| 08:30 AM | 16 | 140 | **79** | **235** | 55 | 7 | 40 | 102 | 27 | 122 | 3 | 152 | 1 | **6** | 2 | **9** | 498 |
| 08:45 AM | **18** | **171** | 39 | 228 | 70 | 3 | **49** | 122 | **47** | **151** | **7** | **205** | 1 | 5 | 2 | 8 | **563** |
| Total Volume | 56 | 619 | 193 | 868 | 269 | 28 | 129 | 426 | 114 | 561 | 21 | 696 | 9 | 11 | 6 | 26 | 2016 |
| % App. Total | 6.5 | 71.3 | 22.2 | | 63.1 | 6.6 | 30.3 | | 16.4 | 80.6 | 3 | | 34.6 | 42.3 | 23.1 | | |
| PHF | .778 | .905 | .611 | .923 | .747 | .636 | .658 | .873 | .606 | .929 | .750 | .849 | .450 | .458 | .750 | .722 | .895 |

Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15AM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15AM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

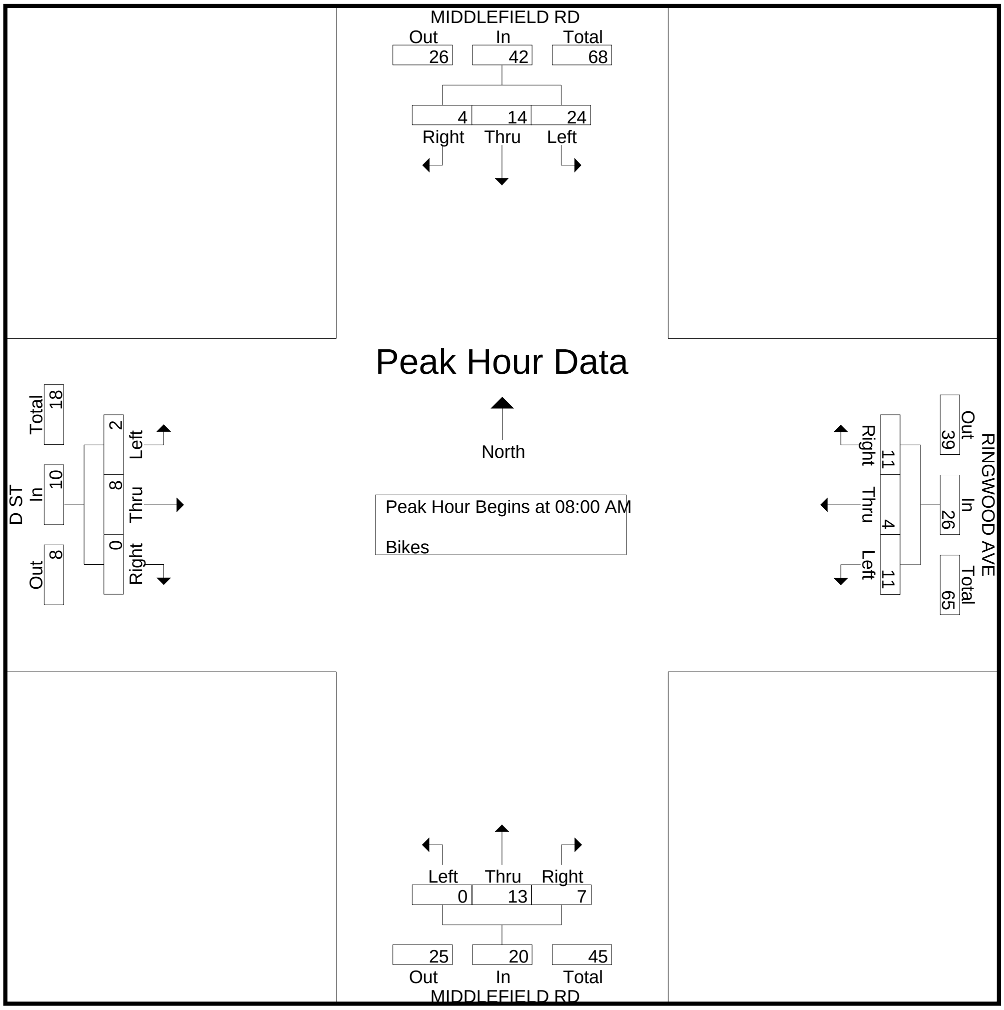
| | MIDDLEFIELD RD Southbound | | | | | RINGWOOD AVE Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | D ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 2 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 8 |
| 07:15 AM | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 5 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 07:30 AM | 0 | 4 | 6 | 0 | 10 | 5 | 0 | 2 | 0 | 7 | 0 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 25 |
| 07:45 AM | 0 | 2 | 3 | 0 | 5 | 5 | 0 | 3 | 0 | 8 | 0 | 5 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 19 |
| Total | 0 | 8 | 11 | 0 | 19 | 12 | 2 | 11 | 0 | 25 | 0 | 17 | 0 | 0 | 17 | 0 | 1 | 0 | 0 | 1 | 62 |
| 08:00 AM | 1 | 0 | 3 | 0 | 4 | 2 | 0 | 1 | 0 | 3 | 0 | 5 | 0 | 0 | 5 | 0 | 1 | 1 | 0 | 2 | 14 |
| 08:15 AM | 0 | 5 | 10 | 0 | 15 | 4 | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 21 |
| 08:30 AM | 2 | 6 | 6 | 0 | 14 | 5 | 4 | 6 | 0 | 15 | 6 | 3 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 1 | 39 |
| 08:45 AM | 1 | 3 | 5 | 0 | 9 | 0 | 0 | 3 | 0 | 3 | 1 | 4 | 0 | 0 | 5 | 0 | 6 | 1 | 0 | 7 | 24 |
| Total | 4 | 14 | 24 | 0 | 42 | 11 | 4 | 11 | 0 | 26 | 7 | 13 | 0 | 0 | 20 | 0 | 8 | 2 | 0 | 10 | 98 |
| 09:00 AM | 0 | 3 | 4 | 0 | 7 | 2 | 1 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 13 |
| 09:15 AM | 0 | 1 | 3 | 0 | 4 | 1 | 0 | 6 | 0 | 7 | 4 | 4 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 19 |
| 09:30 AM | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| 09:45 AM | 1 | 1 | 1 | 0 | 3 | 0 | 1 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| Total | 1 | 5 | 10 | 0 | 16 | 4 | 2 | 9 | 0 | 15 | 5 | 10 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 46 |
| Grand Total | 5 | 27 | 45 | 0 | 77 | 27 | 8 | 31 | 0 | 66 | 12 | 40 | 0 | 0 | 52 | 0 | 9 | 2 | 0 | 11 | 206 |
| Apprch % | 6.5 | 35.1 | 58.4 | 0 | | 40.9 | 12.1 | 47 | 0 | | 23.1 | 76.9 | 0 | 0 | | 0 | 81.8 | 18.2 | 0 | | |
| Total % | 2.4 | 13.1 | 21.8 | 0 | 37.4 | 13.1 | 3.9 | 15 | 0 | 32 | 5.8 | 19.4 | 0 | 0 | 25.2 | 0 | 4.4 | 1 | 0 | 5.3 | |

| | MIDDLEFIELD RD Southbound | | | | RINGWOOD AVE Westbound | | | | MIDDLEFIELD RD Northbound | | | | D ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 1 | 0 | 3 | 4 | 2 | 0 | 1 | 3 | 0 | **5** | 0 | 5 | 0 | 1 | **1** | 2 | 14 |
| 08:15 AM | 0 | 5 | **10** | **15** | 4 | 0 | 1 | 5 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 21 |
| 08:30 AM | **2** | **6** | 6 | 14 | **5** | **4** | **6** | **15** | **6** | 3 | 0 | **9** | 0 | 1 | 0 | 1 | **39** |
| 08:45 AM | 1 | 3 | 5 | 9 | 0 | 0 | 3 | 3 | 1 | 4 | 0 | 5 | 0 | **6** | 1 | **7** | 24 |
| Total Volume | 4 | 14 | 24 | 42 | 11 | 4 | 11 | 26 | 7 | 13 | 0 | 20 | 0 | 8 | 2 | 10 | 98 |
| % App. Total | 9.5 | 33.3 | 57.1 | | 42.3 | 15.4 | 42.3 | | 35 | 65 | 0 | | 0 | 80 | 20 | | |
| PHF | .500 | .583 | .600 | .700 | .550 | .250 | .458 | .433 | .292 | .650 | .000 | .556 | .000 | .333 | .500 | .357 | .628 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15AM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15PM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 1

Groups Printed- Vehicles

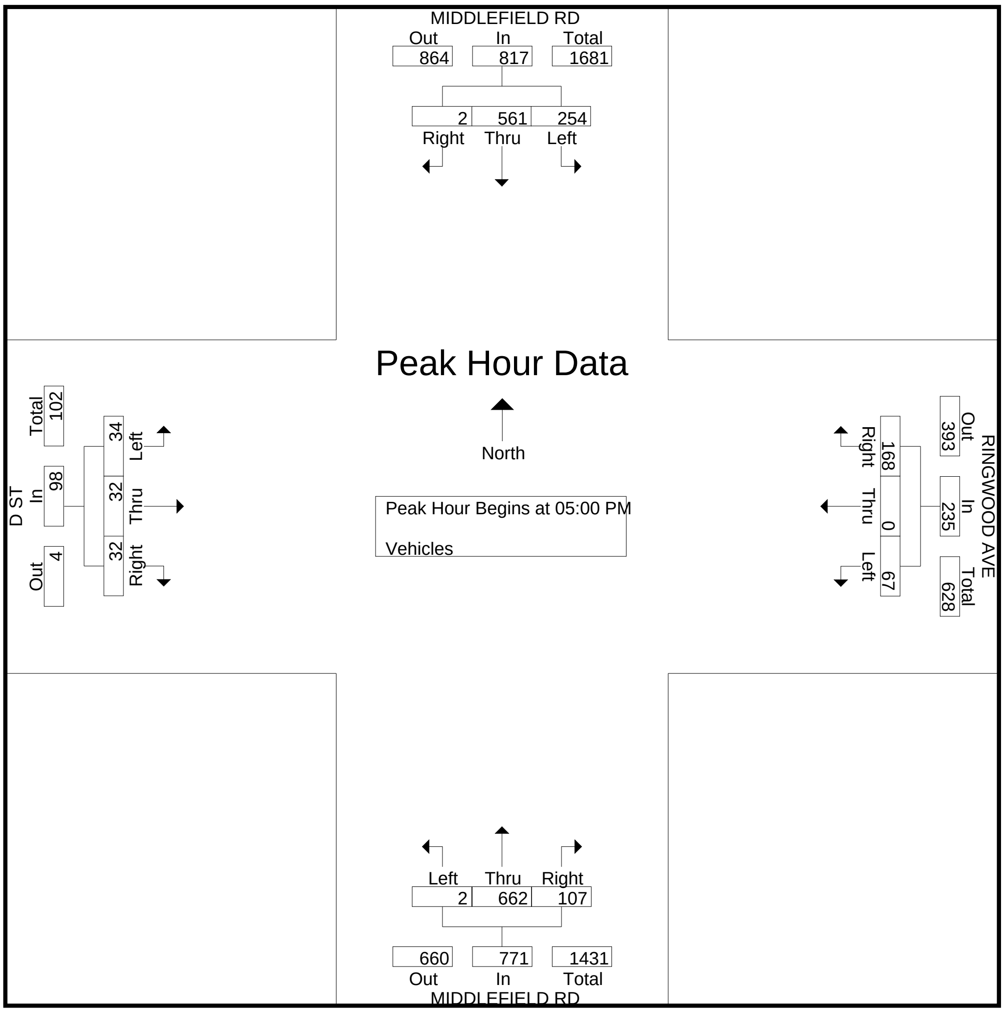
| | MIDDLEFIELD RD Southbound | | | | | RINGWOOD AVE Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | D ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 115 | 61 | 3 | 179 | 32 | 0 | 10 | 0 | 42 | 20 | 117 | 1 | 2 | 140 | 16 | 4 | 15 | 2 | 37 | 398 |
| 04:15 PM | 1 | 155 | 61 | 1 | 218 | 25 | 0 | 17 | 2 | 44 | 23 | 163 | 0 | 1 | 187 | 9 | 4 | 11 | 3 | 27 | 476 |
| 04:30 PM | 3 | 120 | 67 | 0 | 190 | 31 | 0 | 18 | 0 | 49 | 25 | 171 | 1 | 2 | 199 | 5 | 11 | 13 | 4 | 33 | 471 |
| 04:45 PM | 2 | 120 | 89 | 2 | 213 | 33 | 1 | 15 | 1 | 50 | 30 | 173 | 0 | 2 | 205 | 7 | 9 | 9 | 2 | 27 | 495 |
| Total | 6 | 510 | 278 | 6 | 800 | 121 | 1 | 60 | 3 | 185 | 98 | 624 | 2 | 7 | 731 | 37 | 28 | 48 | 11 | 124 | 1840 |
| 05:00 PM | 2 | 147 | 77 | 0 | 226 | 43 | 0 | 10 | 0 | 53 | 28 | 151 | 1 | 5 | 185 | 11 | 12 | 12 | 7 | 42 | 506 |
| 05:15 PM | 0 | 132 | 46 | 0 | 178 | 36 | 0 | 14 | 1 | 51 | 23 | 179 | 0 | 2 | 204 | 10 | 7 | 9 | 2 | 28 | 461 |
| 05:30 PM | 0 | 138 | 73 | 0 | 211 | 38 | 0 | 24 | 2 | 64 | 21 | 159 | 0 | 3 | 183 | 7 | 6 | 8 | 3 | 24 | 482 |
| 05:45 PM | 0 | 144 | 58 | 1 | 203 | 51 | 0 | 19 | 0 | 70 | 35 | 173 | 1 | 2 | 211 | 4 | 7 | 5 | 3 | 19 | 503 |
| Total | 2 | 561 | 254 | 1 | 818 | 168 | 0 | 67 | 3 | 238 | 107 | 662 | 2 | 12 | 783 | 32 | 32 | 34 | 15 | 113 | 1952 |
| 06:00 PM | 1 | 119 | 82 | 0 | 202 | 34 | 0 | 24 | 1 | 59 | 26 | 151 | 0 | 1 | 178 | 5 | 1 | 9 | 0 | 15 | 454 |
| 06:15 PM | 2 | 113 | 76 | 0 | 191 | 49 | 0 | 14 | 2 | 65 | 16 | 108 | 1 | 0 | 125 | 6 | 4 | 6 | 1 | 17 | 398 |
| 06:30 PM | 1 | 114 | 57 | 1 | 173 | 30 | 0 | 8 | 2 | 40 | 15 | 142 | 0 | 1 | 158 | 4 | 1 | 6 | 2 | 13 | 384 |
| 06:45 PM | 1 | 135 | 62 | 1 | 199 | 41 | 0 | 4 | 0 | 45 | 12 | 113 | 1 | 1 | 127 | 5 | 2 | 5 | 0 | 12 | 383 |
| Total | 5 | 481 | 277 | 2 | 765 | 154 | 0 | 50 | 5 | 209 | 69 | 514 | 2 | 3 | 588 | 20 | 8 | 26 | 3 | 57 | 1619 |
| Grand Total | 13 | 1552 | 809 | 9 | 2383 | 443 | 1 | 177 | 11 | 632 | 274 | 1800 | 6 | 22 | 2102 | 89 | 68 | 108 | 29 | 294 | 5411 |
| Apprch % | 0.5 | 65.1 | 33.9 | 0.4 | | 70.1 | 0.2 | 28 | 1.7 | | 13 | 85.6 | 0.3 | 1 | | 30.3 | 23.1 | 36.7 | 9.9 | | |
| Total % | 0.2 | 28.7 | 15 | 0.2 | 44 | 8.2 | 0 | 3.3 | 0.2 | 11.7 | 5.1 | 33.3 | 0.1 | 0.4 | 38.8 | 1.6 | 1.3 | 2 | 0.5 | 5.4 | |

| | MIDDLEFIELD RD Southbound | | | | RINGWOOD AVE Westbound | | | | MIDDLEFIELD RD Northbound | | | | D ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | **2** | **147** | **77** | **226** | 43 | 0 | 10 | 53 | 28 | 151 | **1** | 180 | **11** | **12** | **12** | **35** | 494 |
| 05:15 PM | 0 | 132 | 46 | 178 | 36 | 0 | 14 | 50 | 23 | **179** | 0 | 202 | 10 | 7 | 9 | 26 | 456 |
| 05:30 PM | 0 | 138 | 73 | 211 | 38 | 0 | **24** | 62 | 21 | 159 | 0 | 180 | 7 | 6 | 8 | 21 | 474 |
| 05:45 PM | 0 | 144 | 58 | 202 | **51** | 0 | 19 | **70** | **35** | 173 | 1 | **209** | 4 | 7 | 5 | 16 | **497** |
| Total Volume | 2 | 561 | 254 | 817 | 168 | 0 | 67 | 235 | 107 | 662 | 2 | 771 | 32 | 32 | 34 | 98 | 1921 |
| % App. Total | 0.2 | 68.7 | 31.1 | | 71.5 | 0 | 28.5 | | 13.9 | 85.9 | 0.3 | | 32.7 | 32.7 | 34.7 | | |
| PHF | .250 | .954 | .825 | .904 | .824 | .000 | .698 | .839 | .764 | .925 | .500 | .922 | .727 | .667 | .708 | .700 | .966 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15PM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15PM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

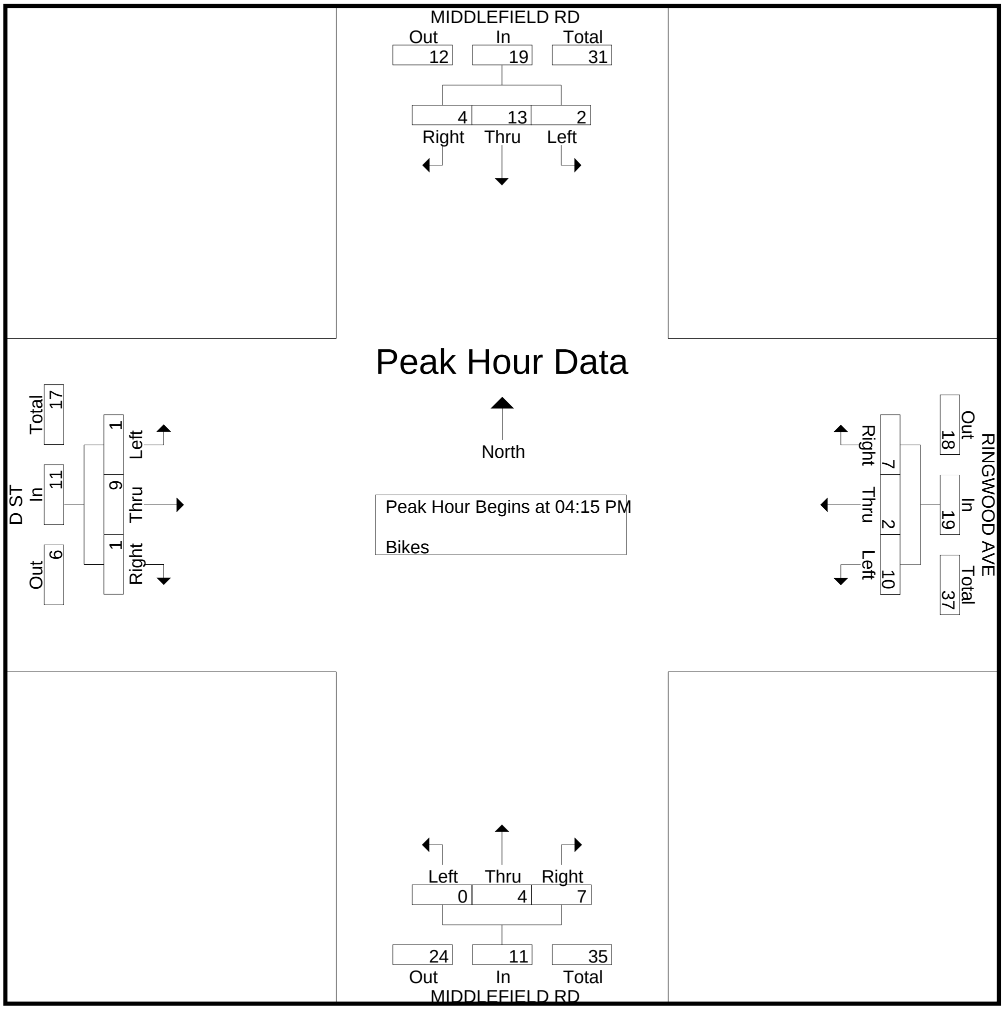
| | MIDDLEFIELD RD Southbound | | | | | RINGWOOD AVE Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | D ST Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 2 | 1 | 0 | 3 | 4 | 0 | 0 | 0 | 4 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 11 |
| 04:15 PM | 1 | 2 | 2 | 0 | 5 | 1 | 0 | 2 | 0 | 3 | 3 | 2 | 0 | 0 | 5 | 1 | 3 | 1 | 0 | 5 | 18 |
| 04:30 PM | 1 | 2 | 0 | 0 | 3 | 4 | 0 | 3 | 0 | 7 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 13 |
| 04:45 PM | 2 | 0 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 5 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 10 |
| Total | 4 | 6 | 3 | 0 | 13 | 10 | 1 | 8 | 0 | 19 | 7 | 5 | 0 | 0 | 12 | 1 | 5 | 2 | 0 | 8 | 52 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 9 | 0 | 0 | 9 | 1 | 1 | 2 | 0 | 4 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 4 | 19 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 7 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 10 |
| 05:30 PM | 0 | 1 | 2 | 0 | 3 | 4 | 0 | 4 | 0 | 8 | 5 | 3 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 19 |
| 05:45 PM | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 4 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 10 |
| Total | 0 | 11 | 3 | 0 | 14 | 7 | 1 | 13 | 0 | 21 | 11 | 7 | 0 | 0 | 18 | 0 | 5 | 0 | 0 | 5 | 58 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 6 | 0 | 8 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 2 | 13 |
| 06:15 PM | 0 | 0 | 2 | 0 | 2 | 5 | 0 | 3 | 0 | 8 | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 16 |
| 06:30 PM | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 2 | 0 | 5 | 6 | 3 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 1 | 16 |
| 06:45 PM | 0 | 1 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 2 | 2 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 11 |
| Total | 0 | 2 | 5 | 0 | 7 | 13 | 0 | 11 | 0 | 24 | 12 | 9 | 0 | 0 | 21 | 0 | 3 | 1 | 0 | 4 | 56 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 4 | 19 | 11 | 0 | 34 | 30 | 2 | 32 | 0 | 64 | 30 | 21 | 0 | 0 | 51 | 1 | 13 | 3 | 0 | 17 | 166 |
| Apprch % | 11.8 | 55.9 | 32.4 | 0 | | 46.9 | 3.1 | 50 | 0 | | 58.8 | 41.2 | 0 | 0 | | 5.9 | 76.5 | 17.6 | 0 | | |
| Total % | 2.4 | 11.4 | 6.6 | 0 | 20.5 | 18.1 | 1.2 | 19.3 | 0 | 38.6 | 18.1 | 12.7 | 0 | 0 | 30.7 | 0.6 | 7.8 | 1.8 | 0 | 10.2 | |

| | MIDDLEFIELD RD Southbound | | | | RINGWOOD AVE Westbound | | | | MIDDLEFIELD RD Northbound | | | | D ST Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 1 | 2 | **2** | 5 | 1 | 0 | 2 | 3 | **3** | **2** | 0 | **5** | **1** | 3 | **1** | **5** | 18 |
| 04:30 PM | 1 | 2 | 0 | 3 | **4** | 0 | **3** | **7** | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 13 |
| 04:45 PM | **2** | 0 | 0 | 2 | 1 | **1** | 3 | 5 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 10 |
| 05:00 PM | 0 | **9** | 0 | **9** | 1 | 1 | 2 | 4 | 2 | 0 | 0 | 2 | 0 | **4** | 0 | 4 | **19** |
| Total Volume | 4 | 13 | 2 | 19 | 7 | 2 | 10 | 19 | 7 | 4 | 0 | 11 | 1 | 9 | 1 | 11 | 60 |
| % App. Total | 21.1 | 68.4 | 10.5 | | 36.8 | 10.5 | 52.6 | | 63.6 | 36.4 | 0 | | 9.1 | 81.8 | 9.1 | | |
| PHF | .500 | .361 | .250 | .528 | .438 | .500 | .833 | .679 | .583 | .500 | .000 | .550 | .250 | .563 | .250 | .550 | .789 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 15PM FINAL
Site Code : 00000015
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 37AM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 1

Groups Printed- Vehicles

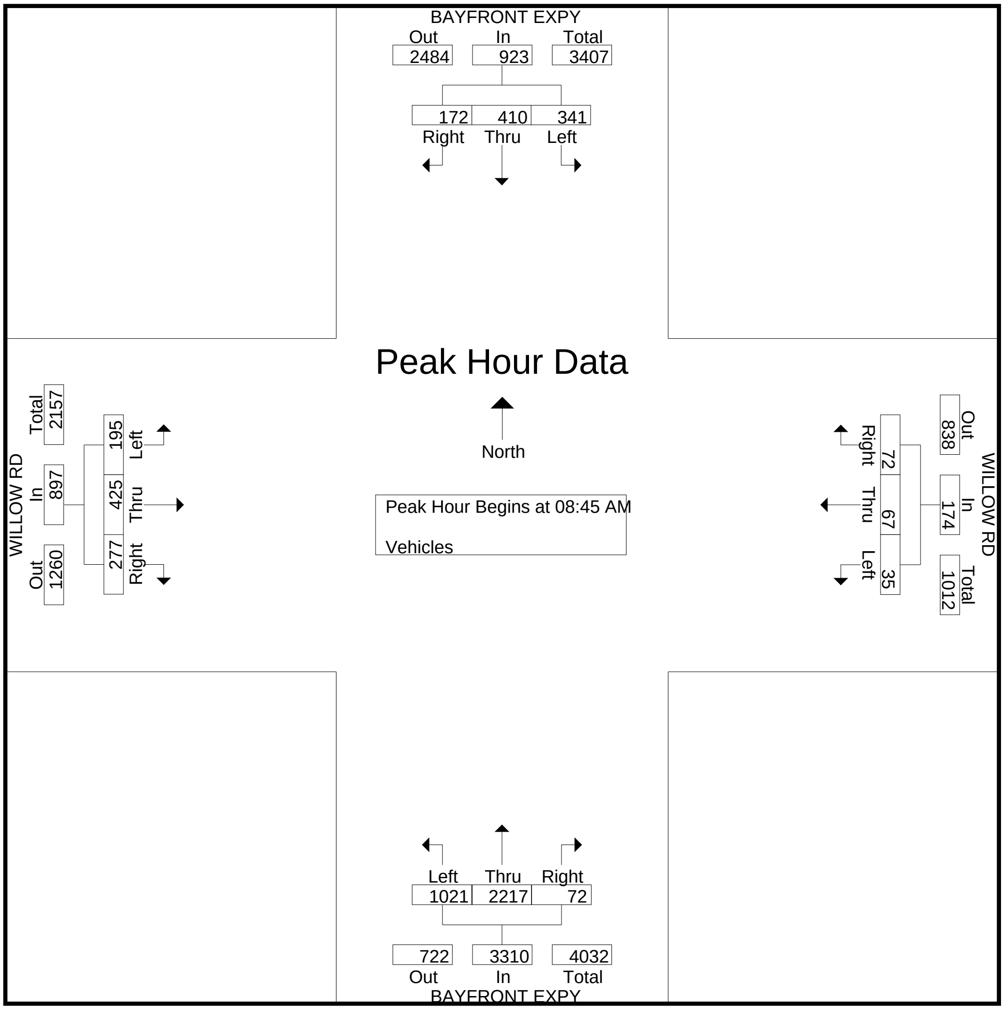
| | BAYFRONT EXPY Southbound | | | | | WILLOW RD Westbound | | | | | BAYFRONT EXPY Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 15 | 125 | 17 | 1 | 158 | 3 | 9 | 3 | 0 | 15 | 6 | 610 | 344 | 0 | 960 | 41 | 24 | 14 | 2 | 81 | 1214 |
| 07:15 AM | 21 | 166 | 32 | 2 | 221 | 5 | 10 | 2 | 1 | 18 | 10 | 653 | 289 | 1 | 953 | 72 | 45 | 32 | 2 | 151 | 1343 |
| 07:30 AM | 16 | 129 | 47 | 1 | 193 | 11 | 9 | 3 | 0 | 23 | 4 | 639 | 179 | 0 | 822 | 61 | 45 | 47 | 1 | 154 | 1192 |
| 07:45 AM | 28 | 157 | 65 | 1 | 251 | 18 | 15 | 10 | 0 | 43 | 13 | 498 | 76 | 0 | 587 | 79 | 65 | 40 | 2 | 186 | 1067 |
| Total | 80 | 577 | 161 | 5 | 823 | 37 | 43 | 18 | 1 | 99 | 33 | 2400 | 888 | 1 | 3322 | 253 | 179 | 133 | 7 | 572 | 4816 |
| 08:00 AM | 48 | 162 | 69 | 5 | 284 | 14 | 20 | 5 | 0 | 39 | 9 | 352 | 229 | 0 | 590 | 91 | 57 | 43 | 2 | 193 | 1106 |
| 08:15 AM | 45 | 129 | 70 | 5 | 249 | 9 | 10 | 5 | 1 | 25 | 9 | 385 | 201 | 0 | 595 | 81 | 76 | 38 | 7 | 202 | 1071 |
| 08:30 AM | 25 | 118 | 66 | 2 | 211 | 23 | 15 | 6 | 2 | 46 | 15 | 466 | 278 | 4 | 763 | 70 | 101 | 48 | 1 | 220 | 1240 |
| 08:45 AM | 49 | 131 | 95 | 0 | 275 | 19 | 14 | 8 | 0 | 41 | 16 | 553 | 255 | 0 | 824 | 69 | 105 | 43 | 2 | 219 | 1359 |
| Total | 167 | 540 | 300 | 12 | 1019 | 65 | 59 | 24 | 3 | 151 | 49 | 1756 | 963 | 4 | 2772 | 311 | 339 | 172 | 12 | 834 | 4776 |
| 09:00 AM | 30 | 103 | 89 | 2 | 224 | 10 | 16 | 6 | 0 | 32 | 16 | 587 | 267 | 0 | 870 | 75 | 98 | 50 | 1 | 224 | 1350 |
| 09:15 AM | 54 | 83 | 76 | 1 | 214 | 29 | 18 | 7 | 0 | 54 | 21 | 533 | 268 | 0 | 822 | 68 | 113 | 46 | 3 | 230 | 1320 |
| 09:30 AM | 39 | 93 | 81 | 2 | 215 | 14 | 19 | 14 | 0 | 47 | 19 | 544 | 231 | 0 | 794 | 65 | 109 | 56 | 1 | 231 | 1287 |
| 09:45 AM | 36 | 119 | 80 | 1 | 236 | 21 | 14 | 17 | 0 | 52 | 22 | 553 | 242 | 0 | 817 | 53 | 87 | 50 | 5 | 195 | 1300 |
| Total | 159 | 398 | 326 | 6 | 889 | 74 | 67 | 44 | 0 | 185 | 78 | 2217 | 1008 | 0 | 3303 | 261 | 407 | 202 | 10 | 880 | 5257 |
| Grand Total | 406 | 1515 | 787 | 23 | 2731 | 176 | 169 | 86 | 4 | 435 | 160 | 6373 | 2859 | 5 | 9397 | 825 | 925 | 507 | 29 | 2286 | 14849 |
| Apprch % | 14.9 | 55.5 | 28.8 | 0.8 | | 40.5 | 38.9 | 19.8 | 0.9 | | 1.7 | 67.8 | 30.4 | 0.1 | | 36.1 | 40.5 | 22.2 | 1.3 | | |
| Total % | 2.7 | 10.2 | 5.3 | 0.2 | 18.4 | 1.2 | 1.1 | 0.6 | 0 | 2.9 | 1.1 | 42.9 | 19.3 | 0 | 63.3 | 5.6 | 6.2 | 3.4 | 0.2 | 15.4 | |

| | BAYFRONT EXPY Southbound | | | | WILLOW RD Westbound | | | | BAYFRONT EXPY Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | 49 | **131** | **95** | **275** | 19 | 14 | 8 | 41 | 16 | 553 | 255 | 824 | 69 | 105 | 43 | 217 | **1357** |
| 09:00 AM | 30 | 103 | 89 | 222 | 10 | 16 | 6 | 32 | 16 | **587** | 267 | **870** | **75** | 98 | 50 | 223 | 1347 |
| 09:15 AM | **54** | 83 | 76 | 213 | **29** | 18 | 7 | **54** | **21** | 533 | **268** | 822 | 68 | **113** | 46 | 227 | 1316 |
| 09:30 AM | 39 | 93 | 81 | 213 | 14 | **19** | **14** | 47 | 19 | 544 | 231 | 794 | 65 | 109 | **56** | **230** | 1284 |
| Total Volume | 172 | 410 | 341 | 923 | 72 | 67 | 35 | 174 | 72 | 2217 | 1021 | 3310 | 277 | 425 | 195 | 897 | 5304 |
| % App. Total | 18.6 | 44.4 | 36.9 | | 41.4 | 38.5 | 20.1 | | 2.2 | 67 | 30.8 | | 30.9 | 47.4 | 21.7 | | |
| PHF | .796 | .782 | .897 | .839 | .621 | .882 | .625 | .806 | .857 | .944 | .952 | .951 | .923 | .940 | .871 | .975 | .977 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 37AM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 37AM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

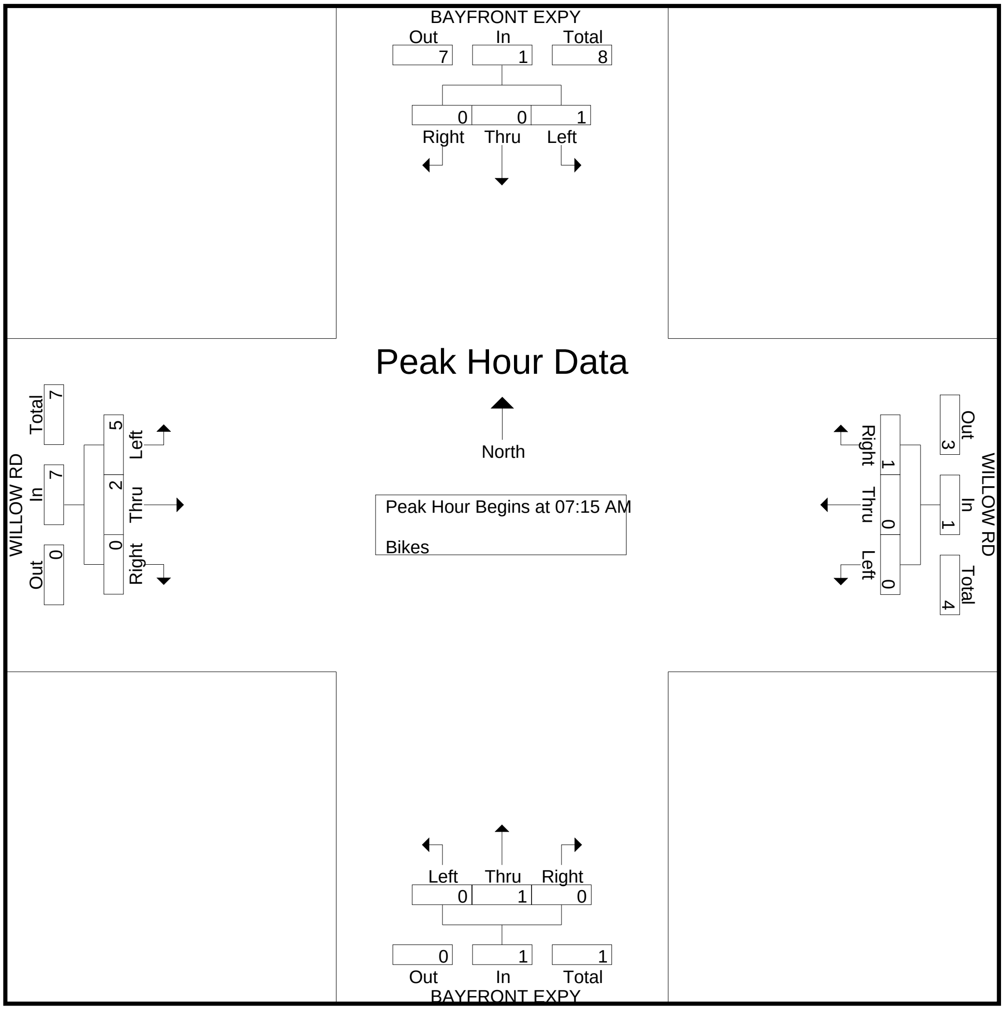
| | BAYFRONT EXPY Southbound | | | | | WILLOW RD Westbound | | | | | BAYFRONT EXPY Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 4 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 4 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 5 | 0 | 6 | 8 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 3 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 4 | 7 |
| Grand Total | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 0 | 7 | 5 | 0 | 12 | 18 |
| Apprch % | 0 | 0 | 100 | 0 | | 100 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 58.3 | 41.7 | 0 | | |
| Total % | 0 | 0 | 5.6 | 0 | 5.6 | 5.6 | 0 | 0 | 0 | 5.6 | 0 | 22.2 | 0 | 0 | 22.2 | 0 | 38.9 | 27.8 | 0 | 66.7 | |

| | BAYFRONT EXPY Southbound | | | | WILLOW RD Westbound | | | | BAYFRONT EXPY Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | | | | | | | | |
| 07:15 AM | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** | **3** | **4** |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | **1** | 2 | 3 | 4 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| Total Volume | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 5 | 7 | 10 |
| % App. Total | 0 | 0 | 100 | | 100 | 0 | 0 | | 0 | 100 | 0 | | 0 | 28.6 | 71.4 | | |
| PHF | .000 | .000 | .250 | .250 | .250 | .000 | .000 | .250 | .000 | .250 | .000 | .250 | .000 | .500 | .417 | .583 | .625 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 37AM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 37PM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 1

Groups Printed- Vehicles

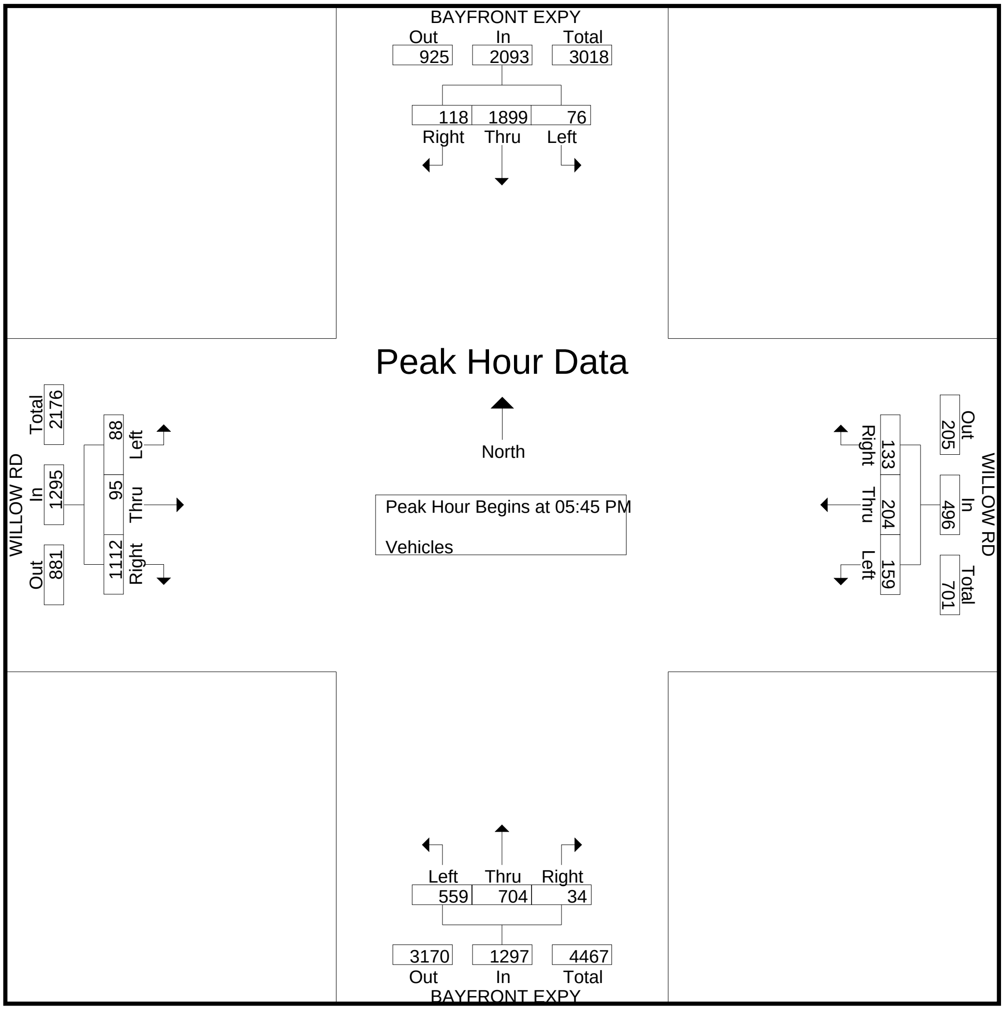
| | BAYFRONT EXPY Southbound | | | | | WILLOW RD Westbound | | | | | BAYFRONT EXPY Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 23 | 506 | 15 | 2 | 546 | 22 | 45 | 32 | 0 | 99 | 9 | 194 | 85 | 0 | 288 | 273 | 19 | 27 | 0 | 319 | 1252 |
| 04:15 PM | 21 | 426 | 16 | 0 | 463 | 18 | 30 | 44 | 1 | 93 | 5 | 178 | 125 | 0 | 308 | 276 | 14 | 30 | 0 | 320 | 1184 |
| 04:30 PM | 28 | 526 | 15 | 4 | 573 | 28 | 41 | 40 | 0 | 109 | 6 | 194 | 102 | 0 | 302 | 263 | 23 | 21 | 0 | 307 | 1291 |
| 04:45 PM | 30 | 430 | 8 | 3 | 471 | 37 | 31 | 41 | 0 | 109 | 7 | 187 | 127 | 0 | 321 | 267 | 15 | 21 | 2 | 305 | 1206 |
| Total | 102 | 1888 | 54 | 9 | 2053 | 105 | 147 | 157 | 1 | 410 | 27 | 753 | 439 | 0 | 1219 | 1079 | 71 | 99 | 2 | 1251 | 4933 |
| 05:00 PM | 17 | 514 | 13 | 1 | 545 | 40 | 36 | 39 | 1 | 116 | 14 | 193 | 114 | 0 | 321 | 295 | 13 | 28 | 1 | 337 | 1319 |
| 05:15 PM | 21 | 440 | 8 | 7 | 476 | 34 | 44 | 54 | 1 | 133 | 7 | 225 | 137 | 0 | 369 | 264 | 15 | 26 | 7 | 312 | 1290 |
| 05:30 PM | 15 | 522 | 23 | 12 | 572 | 23 | 32 | 38 | 0 | 93 | 10 | 212 | 106 | 0 | 328 | 279 | 24 | 24 | 4 | 331 | 1324 |
| 05:45 PM | 25 | 441 | 15 | 2 | 483 | 33 | 48 | 49 | 0 | 130 | 7 | 204 | 152 | 0 | 363 | 253 | 22 | 29 | 2 | 306 | 1282 |
| Total | 78 | 1917 | 59 | 22 | 2076 | 130 | 160 | 180 | 2 | 472 | 38 | 834 | 509 | 0 | 1381 | 1091 | 74 | 107 | 14 | 1286 | 5215 |
| 06:00 PM | 24 | 500 | 15 | 12 | 551 | 32 | 53 | 36 | 0 | 121 | 4 | 162 | 141 | 0 | 307 | 288 | 29 | 20 | 6 | 343 | 1322 |
| 06:15 PM | 32 | 413 | 22 | 2 | 469 | 38 | 59 | 43 | 0 | 140 | 14 | 160 | 149 | 0 | 323 | 302 | 20 | 26 | 6 | 354 | 1286 |
| 06:30 PM | 37 | 545 | 24 | 6 | 612 | 30 | 44 | 31 | 1 | 106 | 9 | 178 | 117 | 1 | 305 | 269 | 24 | 13 | 2 | 308 | 1331 |
| 06:45 PM | 29 | 355 | 16 | 1 | 401 | 35 | 27 | 34 | 0 | 96 | 8 | 134 | 107 | 0 | 249 | 296 | 17 | 13 | 3 | 329 | 1075 |
| Total | 122 | 1813 | 77 | 21 | 2033 | 135 | 183 | 144 | 1 | 463 | 35 | 634 | 514 | 1 | 1184 | 1155 | 90 | 72 | 17 | 1334 | 5014 |
| Grand Total | 302 | 5618 | 190 | 52 | 6162 | 370 | 490 | 481 | 4 | 1345 | 100 | 2221 | 1462 | 1 | 3784 | 3325 | 235 | 278 | 33 | 3871 | 15162 |
| Apprch % | 4.9 | 91.2 | 3.1 | 0.8 | | 27.5 | 36.4 | 35.8 | 0.3 | | 2.6 | 58.7 | 38.6 | 0 | | 85.9 | 6.1 | 7.2 | 0.9 | | |
| Total % | 2 | 37.1 | 1.3 | 0.3 | 40.6 | 2.4 | 3.2 | 3.2 | 0 | 8.9 | 0.7 | 14.6 | 9.6 | 0 | 25 | 21.9 | 1.5 | 1.8 | 0.2 | 25.5 | |

| | BAYFRONT EXPY Southbound | | | | WILLOW RD Westbound | | | | BAYFRONT EXPY Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:45 PM | | | | | | | | | | | | | | | | | |
| 05:45 PM | 25 | 441 | 15 | 481 | 33 | 48 | **49** | 130 | 7 | **204** | **152** | **363** | 253 | 22 | **29** | 304 | 1278 |
| 06:00 PM | 24 | 500 | 15 | 539 | 32 | 53 | 36 | 121 | 4 | 162 | 141 | 307 | 288 | **29** | 20 | 337 | 1304 |
| 06:15 PM | 32 | 413 | 22 | 467 | **38** | **59** | 43 | **140** | **14** | 160 | 149 | 323 | **302** | 20 | 26 | **348** | 1278 |
| 06:30 PM | **37** | **545** | **24** | **606** | 30 | 44 | 31 | 105 | 9 | 178 | 117 | 304 | 269 | 24 | 13 | 306 | **1321** |
| Total Volume | 118 | 1899 | 76 | 2093 | 133 | 204 | 159 | 496 | 34 | 704 | 559 | 1297 | 1112 | 95 | 88 | 1295 | 5181 |
| % App. Total | 5.6 | 90.7 | 3.6 | | 26.8 | 41.1 | 32.1 | | 2.6 | 54.3 | 43.1 | | 85.9 | 7.3 | 6.8 | | |
| PHF | .797 | .871 | .792 | .863 | .875 | .864 | .811 | .886 | .607 | .863 | .919 | .893 | .921 | .819 | .759 | .930 | .981 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 37PM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 37PM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

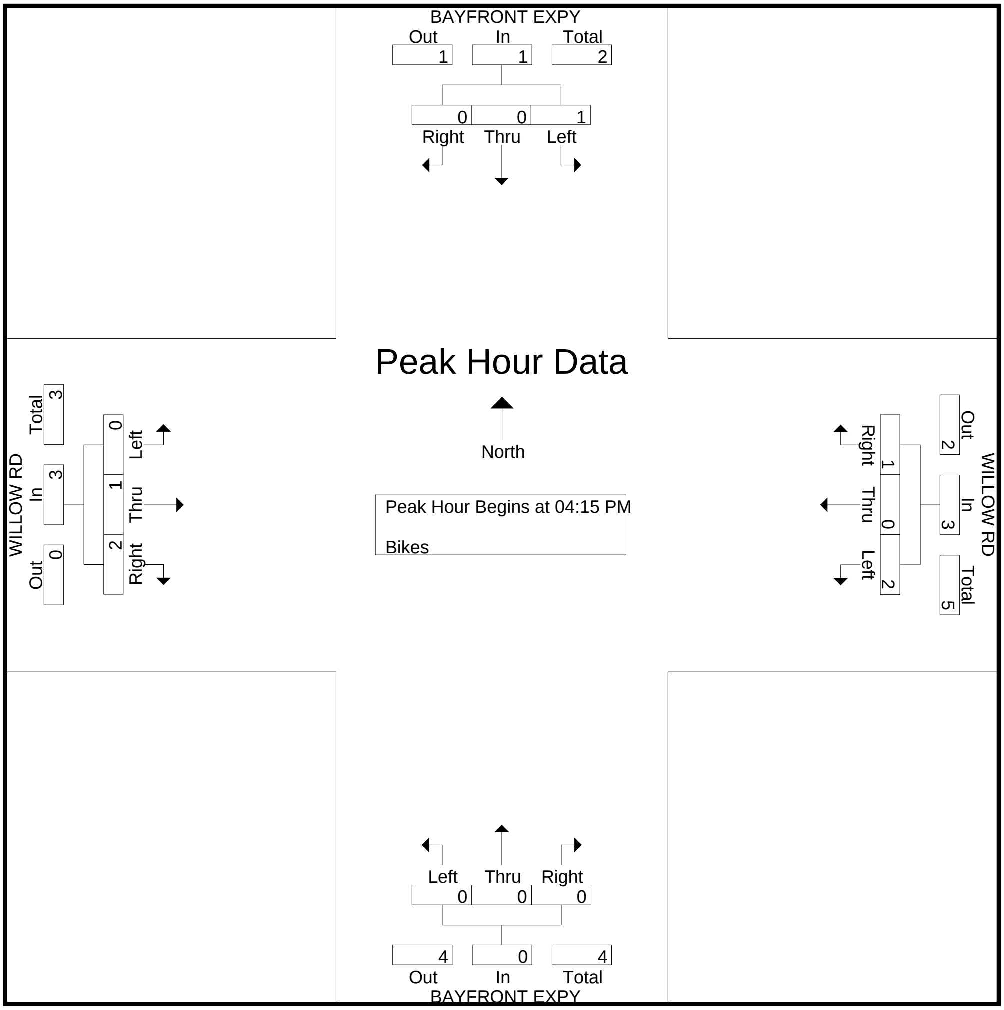
| | BAYFRONT EXPY Southbound | | | | | WILLOW RD Westbound | | | | | BAYFRONT EXPY Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 6 |
| 05:15 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 7 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 5 |
| Grand Total | 0 | 0 | 2 | 0 | 2 | 1 | 1 | 4 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 5 | 13 |
| Apprch % | 0 | 0 | 100 | 0 | | 16.7 | 16.7 | 66.7 | 0 | | 0 | 0 | 0 | 0 | | 40 | 20 | 20 | 20 | | |
| Total % | 0 | 0 | 15.4 | 0 | 15.4 | 7.7 | 7.7 | 30.8 | 0 | 46.2 | 0 | 0 | 0 | 0 | 0 | 15.4 | 7.7 | 7.7 | 7.7 | 38.5 | |

| | BAYFRONT EXPY Southbound | | | | WILLOW RD Westbound | | | | BAYFRONT EXPY Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | **1** | **1** | 0 | 0 | **2** | **2** | 0 | 0 | 0 | 0 | **2** | **1** | 0 | **3** | **6** |
| Total Volume | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 7 |
| % App. Total | 0 | 0 | 100 | | 33.3 | 0 | 66.7 | | 0 | 0 | 0 | | 66.7 | 33.3 | 0 | | |
| PHF | .000 | .000 | .250 | .250 | .250 | .000 | .250 | .375 | .000 | .000 | .000 | .000 | .250 | .250 | .000 | .250 | .292 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 37PM FINAL
Site Code : 00000037
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36AM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

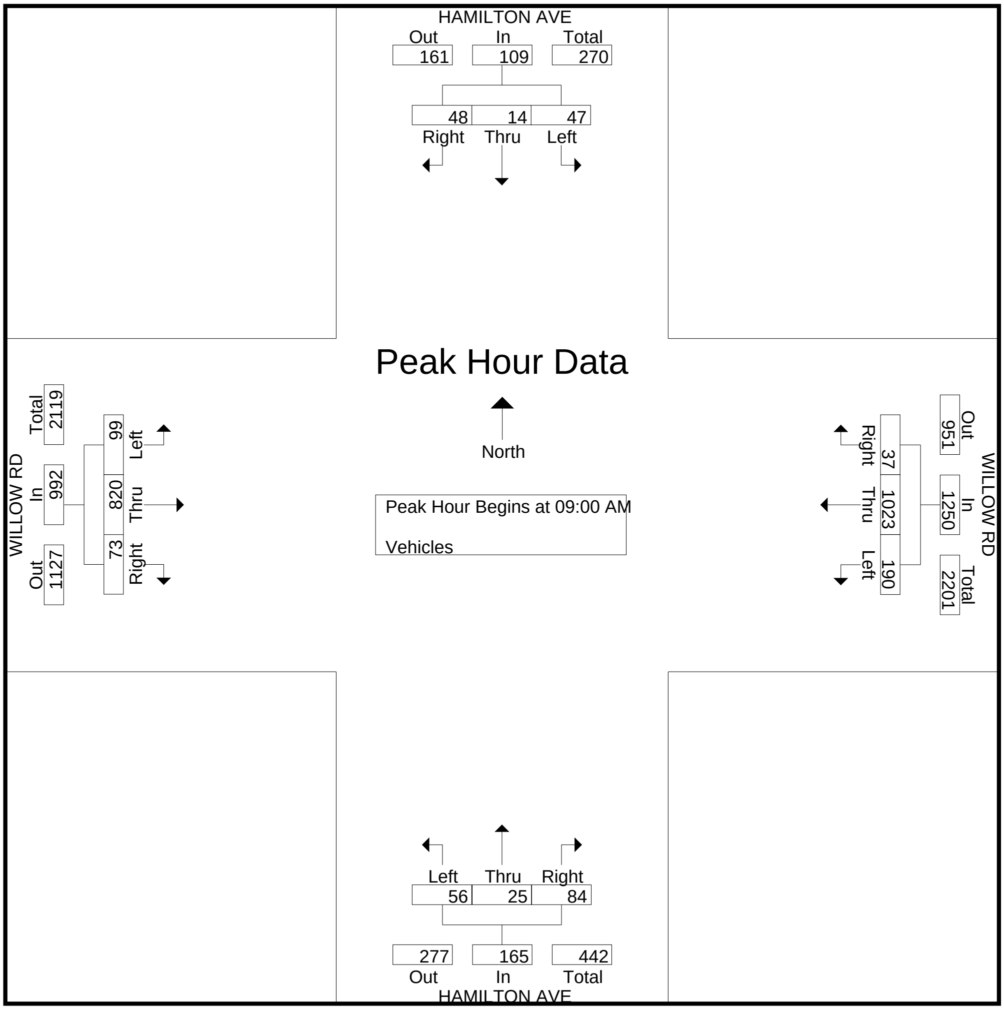
| | HAMILTON AVE Southbound | | | | | WILLOW RD Westbound | | | | | HAMILTON AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 13 | 5 | 15 | 2 | 35 | 13 | 288 | 19 | 4 | 324 | 16 | 4 | 7 | 2 | 29 | 8 | 92 | 18 | 2 | 120 | 508 |
| 07:15 AM | 15 | 7 | 22 | 3 | 47 | 18 | 321 | 24 | 8 | 371 | 15 | 1 | 5 | 3 | 24 | 20 | 113 | 28 | 0 | 161 | 603 |
| 07:30 AM | 14 | 14 | 34 | 3 | 65 | 17 | 242 | 49 | 7 | 315 | 25 | 9 | 5 | 2 | 41 | 28 | 139 | 24 | 1 | 192 | 613 |
| 07:45 AM | 17 | 12 | 25 | 1 | 55 | 14 | 171 | 48 | 7 | 240 | 21 | 8 | 10 | 0 | 39 | 19 | 169 | 29 | 2 | 219 | 553 |
| Total | 59 | 38 | 96 | 9 | 202 | 62 | 1022 | 140 | 26 | 1250 | 77 | 22 | 27 | 7 | 133 | 75 | 513 | 99 | 5 | 692 | 2277 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 6 | 13 | 20 | 2 | 41 | 13 | 116 | 38 | 22 | 189 | 9 | 18 | 5 | 3 | 35 | 18 | 159 | 33 | 2 | 212 | 477 |
| 08:15 AM | 11 | 21 | 15 | 4 | 51 | 22 | 157 | 53 | 13 | 245 | 14 | 6 | 10 | 4 | 34 | 21 | 180 | 33 | 3 | 237 | 567 |
| 08:30 AM | 8 | 7 | 16 | 9 | 40 | 22 | 139 | 39 | 15 | 215 | 15 | 13 | 4 | 4 | 36 | 17 | 207 | 32 | 4 | 260 | 551 |
| 08:45 AM | 9 | 10 | 22 | 11 | 52 | 17 | 164 | 74 | 20 | 275 | 27 | 10 | 33 | 4 | 74 | 27 | 180 | 32 | 5 | 244 | 645 |
| Total | 34 | 51 | 73 | 26 | 184 | 74 | 576 | 204 | 70 | 924 | 65 | 47 | 52 | 15 | 179 | 83 | 726 | 130 | 14 | 953 | 2240 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 13 | 4 | 16 | 5 | 38 | 8 | 241 | 61 | 17 | 327 | 34 | 9 | 20 | 4 | 67 | 20 | 193 | 30 | 1 | 244 | 676 |
| 09:15 AM | 17 | 5 | 13 | 11 | 46 | 4 | 241 | 46 | 24 | 315 | 18 | 5 | 10 | 4 | 37 | 23 | 220 | 27 | 3 | 273 | 671 |
| 09:30 AM | 10 | 3 | 6 | 13 | 32 | 13 | 283 | 47 | 37 | 380 | 19 | 6 | 12 | 1 | 38 | 17 | 186 | 23 | 4 | 230 | 680 |
| 09:45 AM | 8 | 2 | 12 | 7 | 29 | 12 | 258 | 36 | 36 | 342 | 13 | 5 | 14 | 2 | 34 | 13 | 221 | 19 | 3 | 256 | 661 |
| Total | 48 | 14 | 47 | 36 | 145 | 37 | 1023 | 190 | 114 | 1364 | 84 | 25 | 56 | 11 | 176 | 73 | 820 | 99 | 11 | 1003 | 2688 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 141 | 103 | 216 | 71 | 531 | 173 | 2621 | 534 | 210 | 3538 | 226 | 94 | 135 | 33 | 488 | 231 | 2059 | 328 | 30 | 2648 | 7205 |
| Apprch % | 26.6 | 19.4 | 40.7 | 13.4 | | 4.9 | 74.1 | 15.1 | 5.9 | | 46.3 | 19.3 | 27.7 | 6.8 | | 8.7 | 77.8 | 12.4 | 1.1 | | |
| Total % | 2 | 1.4 | 3 | 1 | 7.4 | 2.4 | 36.4 | 7.4 | 2.9 | 49.1 | 3.1 | 1.3 | 1.9 | 0.5 | 6.8 | 3.2 | 28.6 | 4.6 | 0.4 | 36.8 | |

| | HAMILTON AVE Southbound | | | | WILLOW RD Westbound | | | | HAMILTON AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 09:00 AM | | | | | | | | | | | | | | | | | |
| 09:00 AM | 13 | 4 | **16** | 33 | 8 | 241 | **61** | 310 | **34** | **9** | **20** | **63** | 20 | 193 | **30** | 243 | **649** |
| 09:15 AM | **17** | **5** | 13 | **35** | 4 | 241 | 46 | 291 | 18 | 5 | 10 | 33 | **23** | 220 | 27 | **270** | 629 |
| 09:30 AM | 10 | 3 | 6 | 19 | **13** | **283** | 47 | **343** | 19 | 6 | 12 | 37 | 17 | 186 | 23 | 226 | 625 |
| 09:45 AM | 8 | 2 | 12 | 22 | 12 | 258 | 36 | 306 | 13 | 5 | 14 | 32 | 13 | **221** | 19 | 253 | 613 |
| Total Volume | 48 | 14 | 47 | 109 | 37 | 1023 | 190 | 1250 | 84 | 25 | 56 | 165 | 73 | 820 | 99 | 992 | 2516 |
| % App. Total | 44 | 12.8 | 43.1 | | 3 | 81.8 | 15.2 | | 50.9 | 15.2 | 33.9 | | 7.4 | 82.7 | 10 | | |
| PHF | .706 | .700 | .734 | .779 | .712 | .904 | .779 | .911 | .618 | .694 | .700 | .655 | .793 | .928 | .825 | .919 | .969 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36AM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 36AM FINAL
Site Code : 00000036
Start Date : 3/21/2019


Groups Printed- Bikes

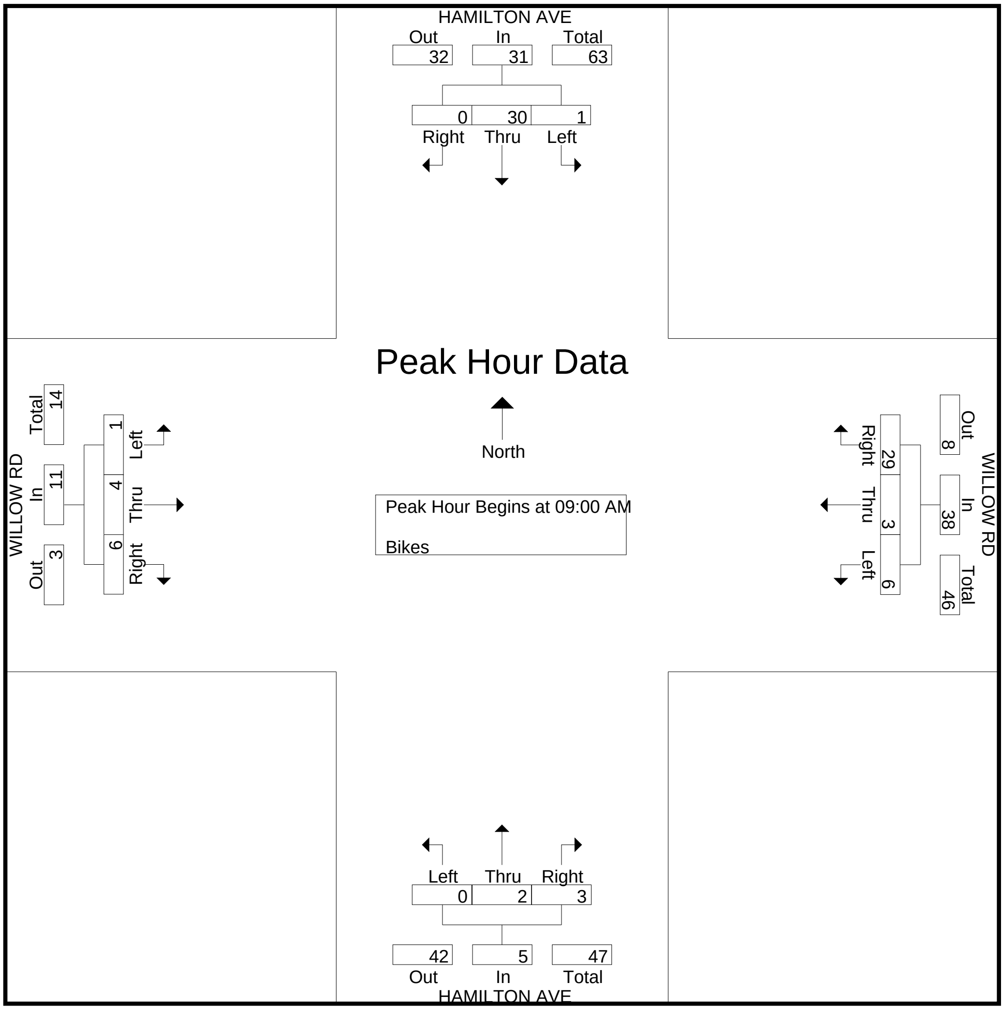
| | HAMILTON AVE Southbound | | | | | WILLOW RD Westbound | | | | | HAMILTON AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 5 |
| 07:15 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 4 |
| 07:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 07:45 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 0 | 5 | 1 | 0 | 6 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 2 | 1 | 0 | 0 | 3 | 13 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 08:15 AM | 0 | 6 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 08:30 AM | 0 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 10 |
| 08:45 AM | 0 | 7 | 0 | 0 | 7 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 10 |
| Total | 0 | 22 | 0 | 0 | 22 | 2 | 2 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 2 | 30 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 4 | 0 | 0 | 4 | 6 | 0 | 4 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 15 |
| 09:15 AM | 0 | 9 | 0 | 0 | 9 | 11 | 2 | 1 | 0 | 14 | 2 | 1 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 2 | 28 |
| 09:30 AM | 0 | 7 | 0 | 0 | 7 | 8 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 19 |
| 09:45 AM | 0 | 10 | 1 | 0 | 11 | 4 | 0 | 1 | 0 | 5 | 1 | 1 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 5 | 23 |
| Total | 0 | 30 | 1 | 0 | 31 | 29 | 3 | 6 | 0 | 38 | 3 | 2 | 0 | 0 | 5 | 6 | 4 | 1 | 0 | 11 | 85 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 57 | 2 | 0 | 59 | 31 | 5 | 7 | 0 | 43 | 4 | 5 | 1 | 0 | 10 | 9 | 5 | 2 | 0 | 16 | 128 |
| Apprch % | 0 | 96.6 | 3.4 | 0 | | 72.1 | 11.6 | 16.3 | 0 | | 40 | 50 | 10 | 0 | | 56.2 | 31.2 | 12.5 | 0 | | |
| Total % | 0 | 44.5 | 1.6 | 0 | 46.1 | 24.2 | 3.9 | 5.5 | 0 | 33.6 | 3.1 | 3.9 | 0.8 | 0 | 7.8 | 7 | 3.9 | 1.6 | 0 | 12.5 | |

| | HAMILTON AVE Southbound | | | | WILLOW RD Westbound | | | | HAMILTON AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 09:00 AM | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 4 | 0 | 4 | 6 | 0 | **4** | 10 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 15 |
| 09:15 AM | 0 | 9 | 0 | 9 | **11** | **2** | 1 | **14** | **2** | **1** | 0 | **3** | **2** | 0 | 0 | 2 | **28** |
| 09:30 AM | 0 | 7 | 0 | 7 | 8 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 19 |
| 09:45 AM | 0 | **10** | **1** | **11** | 4 | 0 | 1 | 5 | 1 | 1 | 0 | 2 | 2 | **3** | 0 | **5** | 23 |
| Total Volume | 0 | 30 | 1 | 31 | 29 | 3 | 6 | 38 | 3 | 2 | 0 | 5 | 6 | 4 | 1 | 11 | 85 |
| % App. Total | 0 | 96.8 | 3.2 | | 76.3 | 7.9 | 15.8 | | 60 | 40 | 0 | | 54.5 | 36.4 | 9.1 | | |
| PHF | .000 | .750 | .250 | .705 | .659 | .375 | .375 | .679 | .375 | .500 | .000 | .417 | .750 | .333 | .250 | .550 | .759 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36AM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 36PM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

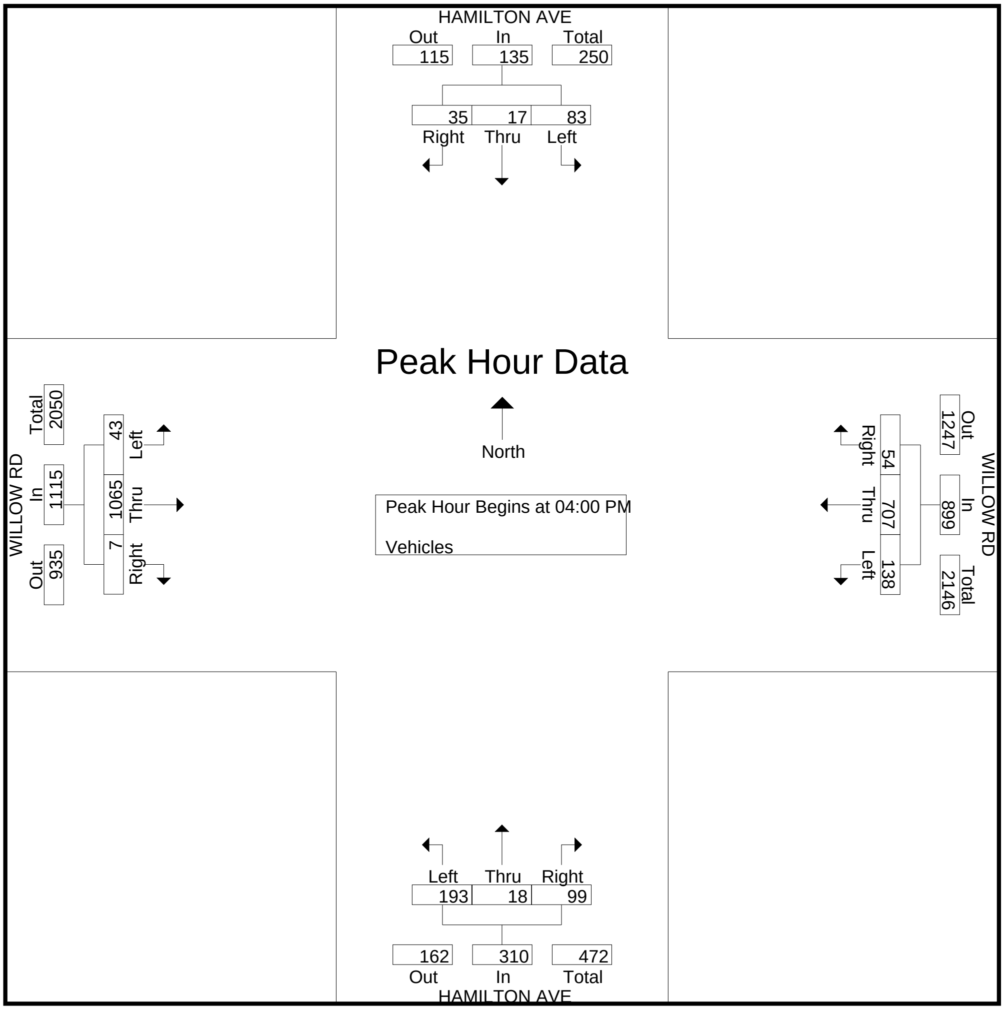
| | HAMILTON AVE Southbound | | | | | WILLOW RD Westbound | | | | | HAMILTON AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 10 | 8 | 19 | 8 | 45 | 11 | 158 | 31 | 64 | 264 | 25 | 3 | 52 | 4 | 84 | 1 | 277 | 10 | 4 | 292 | 685 |
| 04:15 PM | 13 | 3 | 19 | 5 | 40 | 14 | 166 | 43 | 39 | 262 | 22 | 9 | 52 | 7 | 90 | 2 | 288 | 10 | 3 | 303 | 695 |
| 04:30 PM | 8 | 3 | 21 | 11 | 43 | 16 | 186 | 36 | 29 | 267 | 23 | 2 | 45 | 5 | 75 | 0 | 270 | 13 | 7 | 290 | 675 |
| 04:45 PM | 4 | 3 | 24 | 4 | 35 | 13 | 197 | 28 | 39 | 277 | 29 | 4 | 44 | 10 | 87 | 4 | 230 | 10 | 9 | 253 | 652 |
| Total | 35 | 17 | 83 | 28 | 163 | 54 | 707 | 138 | 171 | 1070 | 99 | 18 | 193 | 26 | 336 | 7 | 1065 | 43 | 23 | 1138 | 2707 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 3 | 7 | 31 | 7 | 48 | 13 | 190 | 36 | 37 | 276 | 17 | 1 | 36 | 2 | 56 | 2 | 231 | 9 | 5 | 247 | 627 |
| 05:15 PM | 4 | 3 | 24 | 3 | 34 | 14 | 217 | 28 | 36 | 295 | 24 | 3 | 54 | 4 | 85 | 2 | 238 | 7 | 1 | 248 | 662 |
| 05:30 PM | 4 | 4 | 45 | 2 | 55 | 14 | 229 | 30 | 25 | 298 | 25 | 6 | 34 | 2 | 67 | 4 | 233 | 15 | 4 | 256 | 676 |
| 05:45 PM | 4 | 6 | 21 | 6 | 37 | 11 | 218 | 30 | 33 | 292 | 12 | 2 | 25 | 2 | 41 | 2 | 203 | 9 | 4 | 218 | 588 |
| Total | 15 | 20 | 121 | 18 | 174 | 52 | 854 | 124 | 131 | 1161 | 78 | 12 | 149 | 10 | 249 | 10 | 905 | 40 | 14 | 969 | 2553 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 7 | 25 | 1 | 33 | 11 | 248 | 27 | 17 | 303 | 24 | 5 | 20 | 1 | 50 | 3 | 263 | 5 | 4 | 275 | 661 |
| 06:15 PM | 11 | 7 | 26 | 4 | 48 | 10 | 206 | 24 | 39 | 279 | 13 | 11 | 18 | 10 | 52 | 4 | 223 | 7 | 3 | 237 | 616 |
| 06:30 PM | 12 | 4 | 30 | 4 | 50 | 12 | 235 | 25 | 26 | 298 | 21 | 4 | 27 | 2 | 54 | 4 | 257 | 18 | 0 | 279 | 681 |
| 06:45 PM | 6 | 6 | 23 | 2 | 37 | 22 | 218 | 32 | 18 | 290 | 10 | 0 | 14 | 2 | 26 | 1 | 244 | 8 | 2 | 255 | 608 |
| Total | 29 | 24 | 104 | 11 | 168 | 55 | 907 | 108 | 100 | 1170 | 68 | 20 | 79 | 15 | 182 | 12 | 987 | 38 | 9 | 1046 | 2566 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 79 | 61 | 308 | 57 | 505 | 161 | 2468 | 370 | 402 | 3401 | 245 | 50 | 421 | 51 | 767 | 29 | 2957 | 121 | 46 | 3153 | 7826 |
| Apprch % | 15.6 | 12.1 | 61 | 11.3 | | 4.7 | 72.6 | 10.9 | 11.8 | | 31.9 | 6.5 | 54.9 | 6.6 | | 0.9 | 93.8 | 3.8 | 1.5 | | |
| Total % | 1 | 0.8 | 3.9 | 0.7 | 6.5 | 2.1 | 31.5 | 4.7 | 5.1 | 43.5 | 3.1 | 0.6 | 5.4 | 0.7 | 9.8 | 0.4 | 37.8 | 1.5 | 0.6 | 40.3 | |

| | HAMILTON AVE Southbound | | | | WILLOW RD Westbound | | | | HAMILTON AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 10 | **8** | 19 | **37** | 11 | 158 | 31 | 200 | 25 | 3 | **52** | 80 | 1 | 277 | 10 | 288 | 605 |
| 04:15 PM | **13** | 3 | 19 | 35 | 14 | 166 | **43** | 223 | 22 | **9** | 52 | **83** | 2 | **288** | 10 | **300** | **641** |
| 04:30 PM | 8 | 3 | 21 | 32 | **16** | 186 | 36 | **238** | 23 | 2 | 45 | 70 | 0 | 270 | **13** | 283 | 623 |
| 04:45 PM | 4 | 3 | **24** | 31 | 13 | **197** | 28 | 238 | **29** | 4 | 44 | 77 | **4** | 230 | 10 | 244 | 590 |
| Total Volume | 35 | 17 | 83 | 135 | 54 | 707 | 138 | 899 | 99 | 18 | 193 | 310 | 7 | 1065 | 43 | 1115 | 2459 |
| % App. Total | 25.9 | 12.6 | 61.5 | | 6 | 78.6 | 15.4 | | 31.9 | 5.8 | 62.3 | | 0.6 | 95.5 | 3.9 | | |
| PHF | .673 | .531 | .865 | .912 | .844 | .897 | .802 | .944 | .853 | .500 | .928 | .934 | .438 | .924 | .827 | .929 | .959 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36PM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36PM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

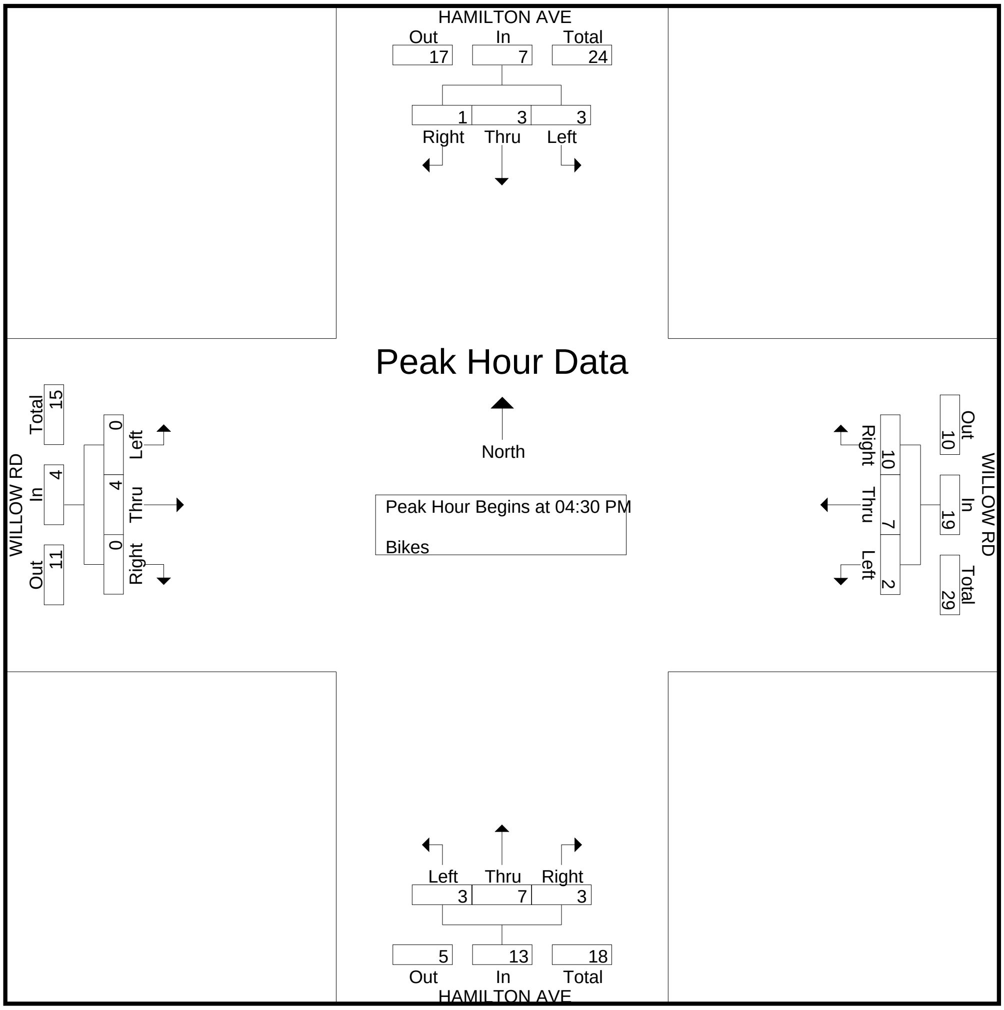
| | HAMILTON AVE Southbound | | | | | WILLOW RD Westbound | | | | | HAMILTON AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 4 | 4 | 1 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 10 |
| 04:15 PM | 2 | 2 | 0 | 0 | 4 | 4 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 04:30 PM | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 9 |
| 04:45 PM | 0 | 1 | 1 | 0 | 2 | 3 | 3 | 1 | 0 | 7 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 13 |
| Total | 3 | 3 | 1 | 0 | 7 | 11 | 6 | 1 | 0 | 18 | 7 | 6 | 2 | 0 | 15 | 0 | 1 | 0 | 0 | 1 | 41 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| 05:15 PM | 0 | 1 | 2 | 0 | 3 | 4 | 2 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 14 |
| 05:30 PM | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 7 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 9 |
| Total | 0 | 3 | 2 | 0 | 5 | 12 | 7 | 1 | 0 | 20 | 0 | 4 | 2 | 0 | 6 | 0 | 4 | 0 | 0 | 4 | 35 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:15 PM | 0 | 1 | 1 | 0 | 2 | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 |
| 06:30 PM | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 6 |
| 06:45 PM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total | 0 | 6 | 1 | 0 | 7 | 5 | 3 | 1 | 0 | 9 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 19 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 3 | 12 | 4 | 0 | 19 | 28 | 16 | 3 | 0 | 47 | 7 | 11 | 4 | 0 | 22 | 0 | 6 | 1 | 0 | 7 | 95 |
| Apprch % | 15.8 | 63.2 | 21.1 | 0 | | 59.6 | 34 | 6.4 | 0 | | 31.8 | 50 | 18.2 | 0 | | 0 | 85.7 | 14.3 | 0 | | |
| Total % | 3.2 | 12.6 | 4.2 | 0 | 20 | 29.5 | 16.8 | 3.2 | 0 | 49.5 | 7.4 | 11.6 | 4.2 | 0 | 23.2 | 0 | 6.3 | 1.1 | 0 | 7.4 | |

| | HAMILTON AVE Southbound | | | | WILLOW RD Westbound | | | | HAMILTON AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **1** | 0 | 0 | 1 | 1 | 1 | 0 | 2 | **3** | **3** | 0 | **6** | 0 | 0 | 0 | 0 | 9 |
| 04:45 PM | 0 | **1** | 1 | 2 | 3 | **3** | **1** | **7** | 0 | 2 | 1 | 3 | 0 | 1 | 0 | 1 | 13 |
| 05:00 PM | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 4 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 7 |
| 05:15 PM | 0 | 1 | **2** | **3** | **4** | 2 | 0 | 6 | 0 | 0 | **2** | 2 | 0 | **3** | 0 | **3** | **14** |
| Total Volume | 1 | 3 | 3 | 7 | 10 | 7 | 2 | 19 | 3 | 7 | 3 | 13 | 0 | 4 | 0 | 4 | 43 |
| % App. Total | 14.3 | 42.9 | 42.9 | | 52.6 | 36.8 | 10.5 | | 23.1 | 53.8 | 23.1 | | 0 | 100 | 0 | | |
| PHF | .250 | .750 | .375 | .583 | .625 | .583 | .500 | .679 | .250 | .583 | .375 | .542 | .000 | .333 | .000 | .333 | .768 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 36PM FINAL
Site Code : 00000036
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35AM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

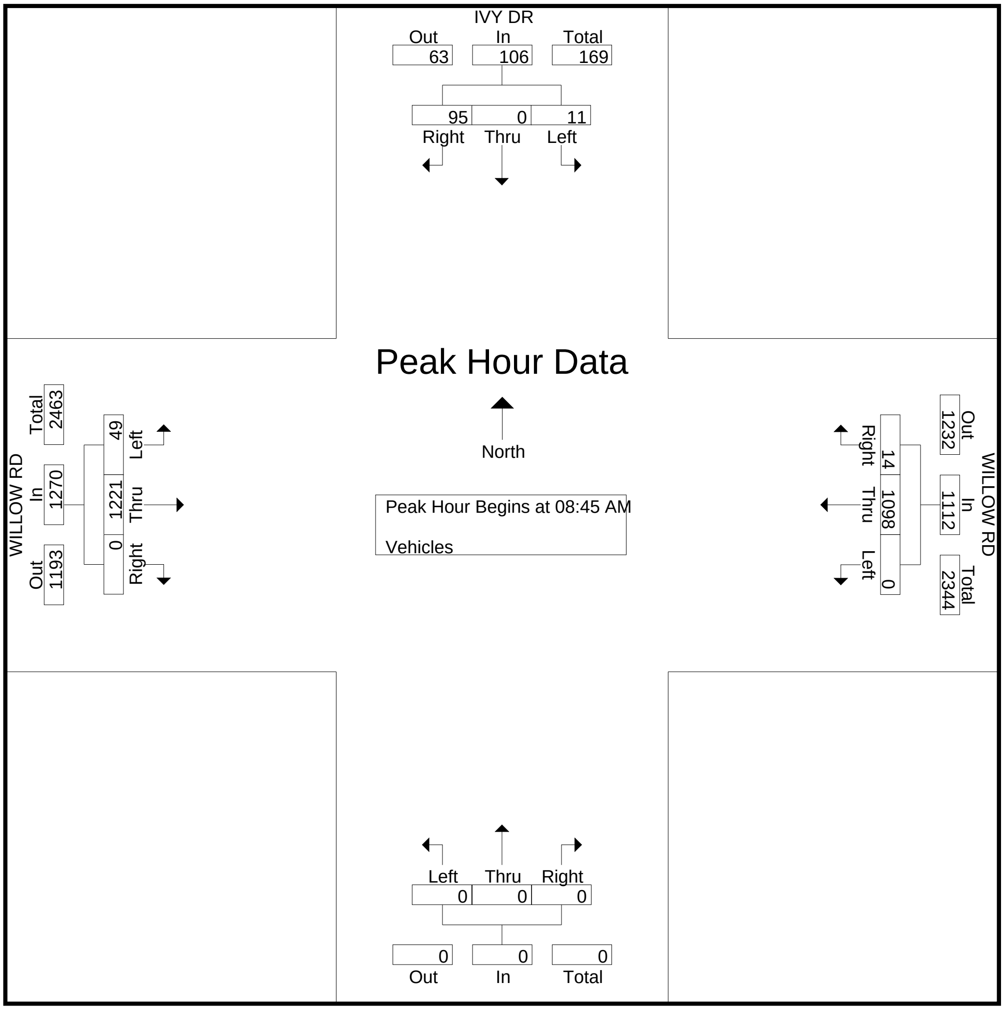
| | IVY DR Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 40 | 0 | 3 | 0 | 43 | 2 | 324 | 0 | 1 | 327 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | 4 | 1 | 138 | 508 |
| 07:15 AM | 30 | 0 | 4 | 1 | 35 | 4 | 301 | 0 | 1 | 306 | 0 | 0 | 0 | 0 | 0 | 0 | 182 | 13 | 1 | 196 | 537 |
| 07:30 AM | 38 | 0 | 3 | 0 | 41 | 2 | 308 | 0 | 2 | 312 | 0 | 0 | 0 | 0 | 0 | 0 | 199 | 7 | 0 | 206 | 559 |
| 07:45 AM | 42 | 0 | 3 | 1 | 46 | 2 | 167 | 0 | 4 | 173 | 0 | 0 | 0 | 0 | 0 | 0 | 239 | 17 | 1 | 257 | 476 |
| Total | 150 | 0 | 13 | 2 | 165 | 10 | 1100 | 0 | 8 | 1118 | 0 | 0 | 0 | 0 | 0 | 0 | 753 | 41 | 3 | 797 | 2080 |
| 08:00 AM | 29 | 0 | 3 | 0 | 32 | 5 | 130 | 0 | 0 | 135 | 0 | 0 | 0 | 0 | 0 | 0 | 253 | 19 | 2 | 274 | 441 |
| 08:15 AM | 23 | 0 | 3 | 4 | 30 | 4 | 153 | 0 | 0 | 157 | 0 | 0 | 0 | 0 | 0 | 0 | 269 | 22 | 3 | 294 | 481 |
| 08:30 AM | 37 | 0 | 7 | 4 | 48 | 4 | 154 | 0 | 1 | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 303 | 25 | 1 | 329 | 536 |
| 08:45 AM | 25 | 0 | 4 | 0 | 29 | 3 | 247 | 0 | 3 | 253 | 0 | 0 | 0 | 0 | 0 | 0 | 312 | 16 | 0 | 328 | 610 |
| Total | 114 | 0 | 17 | 8 | 139 | 16 | 684 | 0 | 4 | 704 | 0 | 0 | 0 | 0 | 0 | 0 | 1137 | 82 | 6 | 1225 | 2068 |
| 09:00 AM | 26 | 0 | 2 | 2 | 30 | 5 | 288 | 0 | 11 | 304 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 15 | 1 | 342 | 676 |
| 09:15 AM | 17 | 0 | 3 | 1 | 21 | 1 | 269 | 0 | 4 | 274 | 0 | 0 | 0 | 0 | 0 | 0 | 337 | 10 | 3 | 350 | 645 |
| 09:30 AM | 27 | 0 | 2 | 1 | 30 | 5 | 294 | 0 | 0 | 299 | 0 | 0 | 0 | 0 | 0 | 0 | 246 | 8 | 3 | 257 | 586 |
| 09:45 AM | 15 | 0 | 2 | 1 | 18 | 2 | 304 | 0 | 1 | 307 | 0 | 0 | 0 | 0 | 0 | 0 | 241 | 11 | 1 | 253 | 578 |
| Total | 85 | 0 | 9 | 5 | 99 | 13 | 1155 | 0 | 16 | 1184 | 0 | 0 | 0 | 0 | 0 | 0 | 1150 | 44 | 8 | 1202 | 2485 |
| Grand Total | 349 | 0 | 39 | 15 | 403 | 39 | 2939 | 0 | 28 | 3006 | 0 | 0 | 0 | 0 | 0 | 0 | 3040 | 167 | 17 | 3224 | 6633 |
| Apprch % | 86.6 | 0 | 9.7 | 3.7 | | 1.3 | 97.8 | 0 | 0.9 | | 0 | 0 | 0 | 0 | | 0 | 94.3 | 5.2 | 0.5 | | |
| Total % | 5.3 | 0 | 0.6 | 0.2 | 6.1 | 0.6 | 44.3 | 0 | 0.4 | 45.3 | 0 | 0 | 0 | 0 | 0 | 0 | 45.8 | 2.5 | 0.3 | 48.6 | |

| | IVY DR Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | 25 | 0 | **4** | **29** | 3 | 247 | 0 | 250 | 0 | 0 | 0 | 0 | 0 | 312 | **16** | 328 | 607 |
| 09:00 AM | 26 | 0 | 2 | 28 | **5** | 288 | 0 | 293 | 0 | 0 | 0 | 0 | 0 | 326 | 15 | 341 | **662** |
| 09:15 AM | 17 | 0 | 3 | 20 | 1 | 269 | 0 | 270 | 0 | 0 | 0 | 0 | 0 | **337** | 10 | **347** | 637 |
| 09:30 AM | **27** | 0 | 2 | 29 | 5 | **294** | 0 | **299** | 0 | 0 | 0 | 0 | 0 | 246 | 8 | 254 | 582 |
| Total Volume | 95 | 0 | 11 | 106 | 14 | 1098 | 0 | 1112 | 0 | 0 | 0 | 0 | 0 | 1221 | 49 | 1270 | 2488 |
| % App. Total | 89.6 | 0 | 10.4 | | 1.3 | 98.7 | 0 | | 0 | 0 | 0 | | 0 | 96.1 | 3.9 | | |
| PHF | .880 | .000 | .688 | .914 | .700 | .934 | .000 | .930 | .000 | .000 | .000 | .000 | .000 | .906 | .766 | .915 | .940 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35AM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35AM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

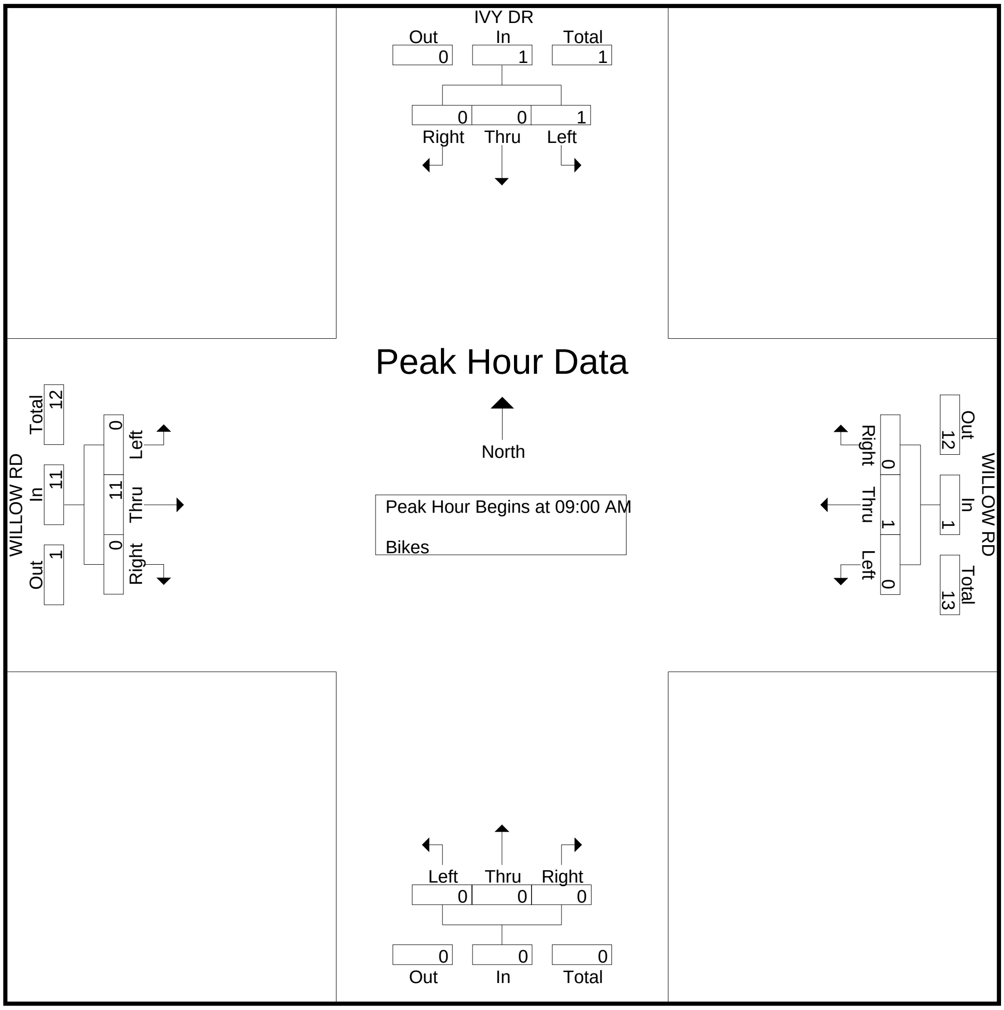
| | IVY DR Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 09:00 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 4 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 4 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 3 |
| Total | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 11 | 13 |
| Grand Total | 0 | 0 | 2 | 0 | 2 | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 11 | 17 |
| Apprch % | 0 | 0 | 100 | 0 | | 25 | 75 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 11.8 | 0 | 11.8 | 5.9 | 17.6 | 0 | 0 | 23.5 | 0 | 0 | 0 | 0 | 0 | 0 | 64.7 | 0 | 0 | 64.7 | |

| | IVY DR Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 09:00 AM | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** | 0 | **3** | **4** |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 4 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 3 |
| Total Volume | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 11 | 13 |
| % App. Total | 0 | 0 | 100 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .250 | .250 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | .000 | .917 | .000 | .917 | .813 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35AM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35PM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

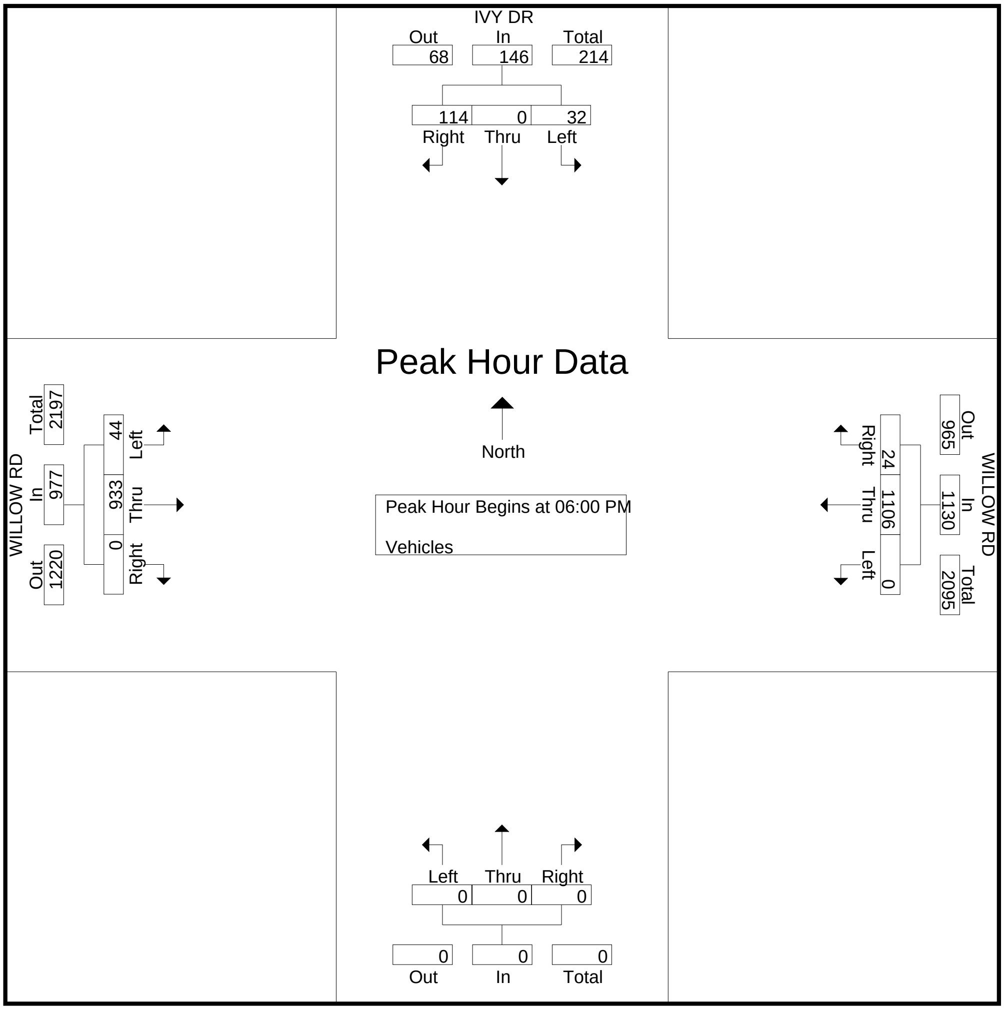
| | IVY DR Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 25 | 0 | 5 | 2 | 32 | 9 | 242 | 0 | 4 | 255 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 13 | 0 | 243 | 530 |
| 04:15 PM | 27 | 0 | 3 | 1 | 31 | 5 | 236 | 0 | 1 | 242 | 0 | 0 | 0 | 0 | 0 | 0 | 272 | 6 | 0 | 278 | 551 |
| 04:30 PM | 26 | 0 | 12 | 1 | 39 | 5 | 265 | 0 | 1 | 271 | 0 | 0 | 0 | 0 | 0 | 0 | 227 | 10 | 1 | 238 | 548 |
| 04:45 PM | 25 | 0 | 17 | 3 | 45 | 3 | 258 | 0 | 1 | 262 | 0 | 0 | 0 | 0 | 0 | 0 | 214 | 7 | 0 | 221 | 528 |
| Total | 103 | 0 | 37 | 7 | 147 | 22 | 1001 | 0 | 7 | 1030 | 0 | 0 | 0 | 0 | 0 | 0 | 943 | 36 | 1 | 980 | 2157 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 40 | 0 | 9 | 0 | 49 | 3 | 257 | 0 | 0 | 260 | 0 | 0 | 0 | 0 | 0 | 0 | 221 | 10 | 0 | 231 | 540 |
| 05:15 PM | 36 | 0 | 16 | 5 | 57 | 5 | 295 | 0 | 2 | 302 | 0 | 0 | 0 | 0 | 0 | 0 | 183 | 8 | 2 | 193 | 552 |
| 05:30 PM | 21 | 0 | 8 | 2 | 31 | 4 | 291 | 0 | 1 | 296 | 0 | 0 | 0 | 0 | 0 | 0 | 226 | 5 | 1 | 232 | 559 |
| 05:45 PM | 31 | 0 | 4 | 0 | 35 | 4 | 256 | 0 | 2 | 262 | 0 | 0 | 0 | 0 | 0 | 0 | 200 | 11 | 0 | 211 | 508 |
| Total | 128 | 0 | 37 | 7 | 172 | 16 | 1099 | 0 | 5 | 1120 | 0 | 0 | 0 | 0 | 0 | 0 | 830 | 34 | 3 | 867 | 2159 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 34 | 0 | 5 | 0 | 39 | 10 | 306 | 0 | 10 | 326 | 0 | 0 | 0 | 0 | 0 | 0 | 226 | 15 | 0 | 241 | 606 |
| 06:15 PM | 35 | 0 | 13 | 2 | 50 | 4 | 247 | 0 | 2 | 253 | 0 | 0 | 0 | 0 | 0 | 0 | 241 | 10 | 2 | 253 | 556 |
| 06:30 PM | 24 | 0 | 9 | 2 | 35 | 6 | 305 | 0 | 0 | 311 | 0 | 0 | 0 | 0 | 0 | 0 | 240 | 8 | 0 | 248 | 594 |
| 06:45 PM | 21 | 0 | 5 | 2 | 28 | 4 | 248 | 0 | 1 | 253 | 0 | 0 | 0 | 0 | 0 | 0 | 226 | 11 | 3 | 240 | 521 |
| Total | 114 | 0 | 32 | 6 | 152 | 24 | 1106 | 0 | 13 | 1143 | 0 | 0 | 0 | 0 | 0 | 0 | 933 | 44 | 5 | 982 | 2277 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 345 | 0 | 106 | 20 | 471 | 62 | 3206 | 0 | 25 | 3293 | 0 | 0 | 0 | 0 | 0 | 0 | 2706 | 114 | 9 | 2829 | 6593 |
| Apprch % | 73.2 | 0 | 22.5 | 4.2 | | 1.9 | 97.4 | 0 | 0.8 | | 0 | 0 | 0 | 0 | | 0 | 95.7 | 4 | 0.3 | | |
| Total % | 5.2 | 0 | 1.6 | 0.3 | 7.1 | 0.9 | 48.6 | 0 | 0.4 | 49.9 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 1.7 | 0.1 | 42.9 | |

| | IVY DR Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 06:00 PM | | | | | | | | | | | | | | | | | |
| 06:00 PM | 34 | 0 | 5 | 39 | **10** | **306** | 0 | **316** | 0 | 0 | 0 | 0 | 0 | 226 | **15** | 241 | **596** |
| 06:15 PM | **35** | 0 | **13** | **48** | 4 | 247 | 0 | 251 | 0 | 0 | 0 | 0 | 0 | **241** | 10 | **251** | 550 |
| 06:30 PM | 24 | 0 | 9 | 33 | 6 | 305 | 0 | 311 | 0 | 0 | 0 | 0 | 0 | 240 | 8 | 248 | 592 |
| 06:45 PM | 21 | 0 | 5 | 26 | 4 | 248 | 0 | 252 | 0 | 0 | 0 | 0 | 0 | 226 | 11 | 237 | 515 |
| Total Volume | 114 | 0 | 32 | 146 | 24 | 1106 | 0 | 1130 | 0 | 0 | 0 | 0 | 0 | 933 | 44 | 977 | 2253 |
| % App. Total | 78.1 | 0 | 21.9 | | 2.1 | 97.9 | 0 | | 0 | 0 | 0 | | 0 | 95.5 | 4.5 | | |
| PHF | .814 | .000 | .615 | .760 | .600 | .904 | .000 | .894 | .000 | .000 | .000 | .000 | .000 | .968 | .733 | .973 | .945 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35PM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35PM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

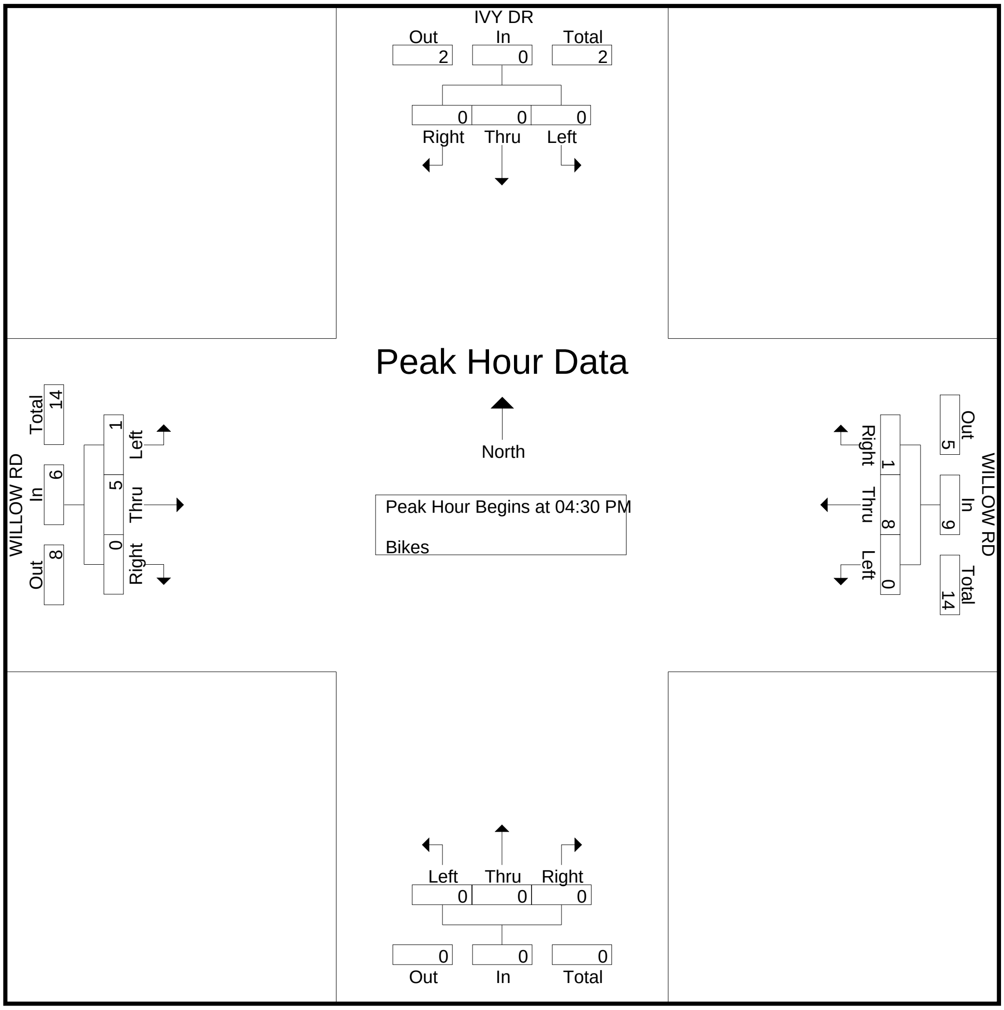
| | IVY DR Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 04:15 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 6 |
| Total | 1 | 0 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 13 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 5 |
| 05:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| Total | 1 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 10 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:15 PM | 2 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 4 | 0 | 0 | 0 | 4 | 2 | 17 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 7 | 30 |
| Apprch % | 100 | 0 | 0 | 0 | | 10.5 | 89.5 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 85.7 | 14.3 | 0 | | |
| Total % | 13.3 | 0 | 0 | 0 | 13.3 | 6.7 | 56.7 | 0 | 0 | 63.3 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 3.3 | 0 | 23.3 | |

| | IVY DR Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | **4** | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 1 | **1** | 2 | **6** |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:15 PM | 0 | 0 | 0 | 0 | **1** | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **3** | 0 | **3** | 5 |
| Total Volume | 0 | 0 | 0 | 0 | 1 | 8 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 6 | 15 |
| % App. Total | 0 | 0 | 0 | | 11.1 | 88.9 | 0 | | 0 | 0 | 0 | | 0 | 83.3 | 16.7 | | |
| PHF | .000 | .000 | .000 | .000 | .250 | .500 | .000 | .563 | .000 | .000 | .000 | .000 | .000 | .417 | .250 | .500 | .625 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 35PM FINAL
Site Code : 00000035
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 34AM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

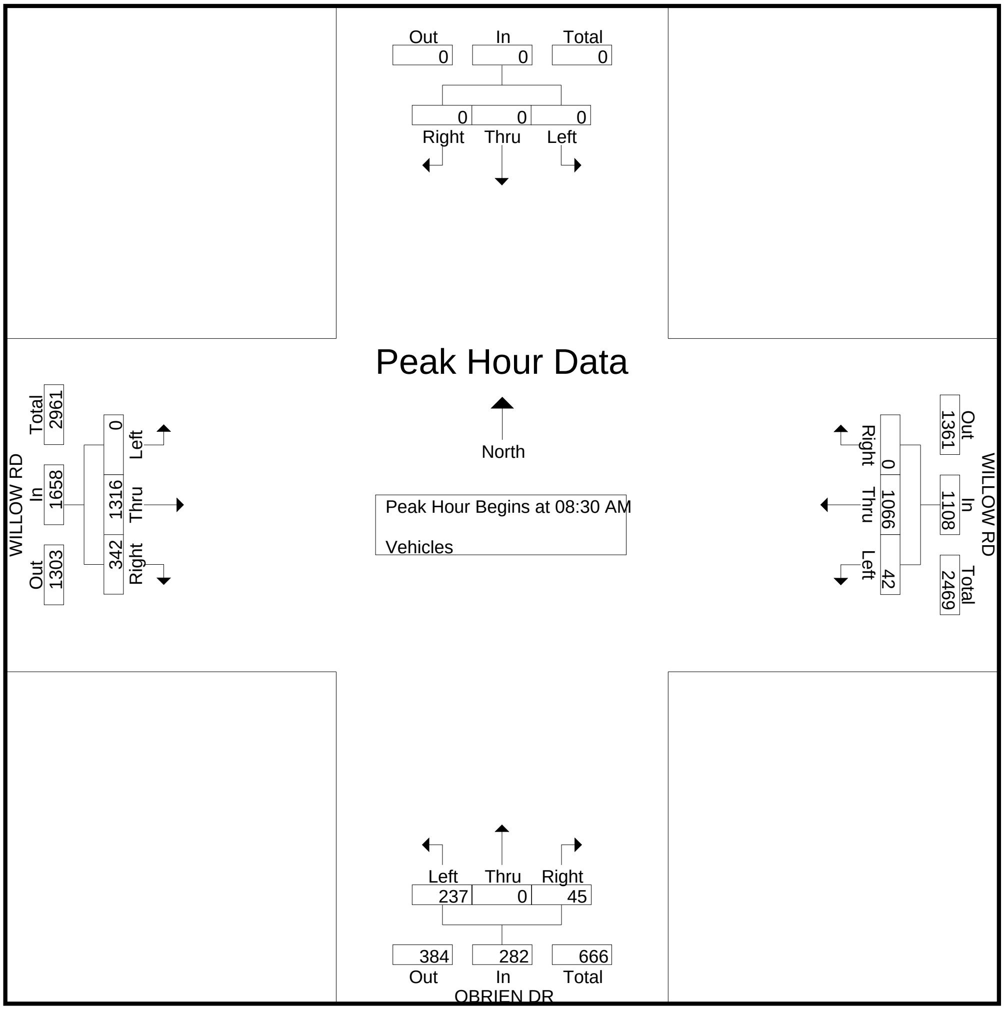
| | Southbound | | | | | WILLOW RD Westbound | | | | | OBRIEN DR Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 372 | 6 | 0 | 378 | 6 | 0 | 38 | 2 | 46 | 50 | 133 | 0 | 0 | 183 | 607 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 318 | 6 | 0 | 324 | 7 | 0 | 51 | 1 | 59 | 55 | 183 | 0 | 0 | 238 | 621 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 351 | 8 | 0 | 359 | 10 | 0 | 75 | 1 | 86 | 53 | 194 | 0 | 0 | 247 | 692 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 205 | 10 | 0 | 215 | 10 | 0 | 96 | 1 | 107 | 81 | 244 | 0 | 0 | 325 | 647 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1246 | 30 | 0 | 1276 | 33 | 0 | 260 | 5 | 298 | 239 | 754 | 0 | 0 | 993 | 2567 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 152 | 4 | 0 | 156 | 10 | 0 | 76 | 6 | 92 | 83 | 272 | 0 | 0 | 355 | 603 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 172 | 11 | 0 | 183 | 17 | 0 | 78 | 1 | 96 | 99 | 291 | 0 | 0 | 390 | 669 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 179 | 9 | 0 | 188 | 13 | 0 | 81 | 3 | 97 | 80 | 329 | 0 | 0 | 409 | 694 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 272 | 14 | 0 | 286 | 14 | 0 | 66 | 3 | 83 | 91 | 337 | 0 | 0 | 428 | 797 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 775 | 38 | 0 | 813 | 54 | 0 | 301 | 13 | 368 | 353 | 1229 | 0 | 0 | 1582 | 2763 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 319 | 13 | 0 | 332 | 9 | 0 | 53 | 5 | 67 | 91 | 324 | 0 | 0 | 415 | 814 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 296 | 6 | 1 | 303 | 9 | 0 | 37 | 16 | 62 | 80 | 326 | 0 | 0 | 406 | 771 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 310 | 7 | 0 | 317 | 3 | 0 | 27 | 1 | 31 | 70 | 241 | 0 | 0 | 311 | 659 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 290 | 11 | 0 | 301 | 11 | 0 | 35 | 0 | 46 | 74 | 235 | 0 | 0 | 309 | 656 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1215 | 37 | 1 | 1253 | 32 | 0 | 152 | 22 | 206 | 315 | 1126 | 0 | 0 | 1441 | 2900 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 3236 | 105 | 1 | 3342 | 119 | 0 | 713 | 40 | 872 | 907 | 3109 | 0 | 0 | 4016 | 8230 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 96.8 | 3.1 | 0 | | 13.6 | 0 | 81.8 | 4.6 | | 22.6 | 77.4 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 39.3 | 1.3 | 0 | 40.6 | 1.4 | 0 | 8.7 | 0.5 | 10.6 | 11 | 37.8 | 0 | 0 | 48.8 | |

| | Southbound | | | | WILLOW RD Westbound | | | | OBRIEN DR Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:30 AM | | | | | | | | | | | | | | | | | |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 179 | 9 | 188 | 13 | 0 | **81** | **94** | 80 | 329 | 0 | 409 | 691 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 272 | **14** | 286 | **14** | 0 | 66 | 80 | **91** | **337** | 0 | **428** | 794 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | **319** | 13 | **332** | 9 | 0 | 53 | 62 | 91 | 324 | 0 | 415 | **809** |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 296 | 6 | 302 | 9 | 0 | 37 | 46 | 80 | 326 | 0 | 406 | 754 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 1066 | 42 | 1108 | 45 | 0 | 237 | 282 | 342 | 1316 | 0 | 1658 | 3048 |
| % App. Total | 0 | 0 | 0 | | 0 | 96.2 | 3.8 | | 16 | 0 | 84 | | 20.6 | 79.4 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .835 | .750 | .834 | .804 | .000 | .731 | .750 | .940 | .976 | .000 | .968 | .942 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 34AM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 34AM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

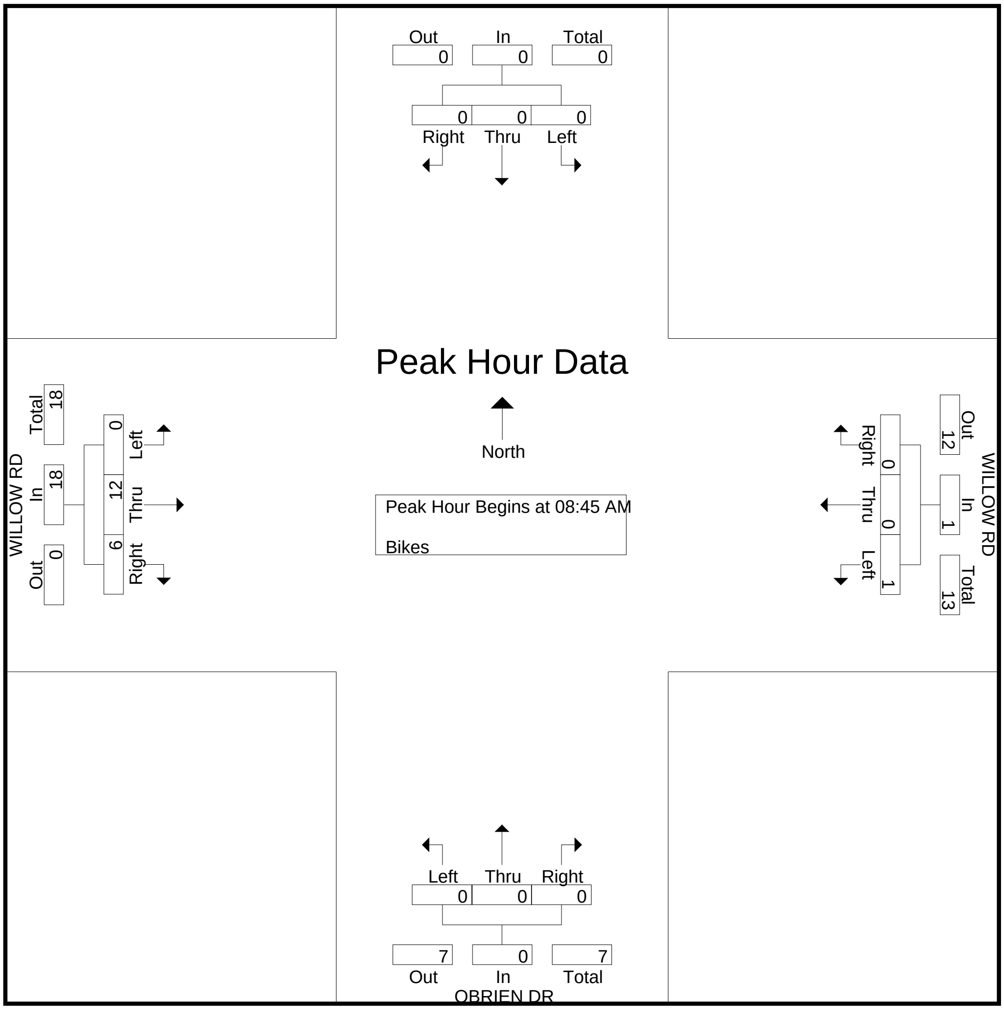
| | Southbound | | | | | WILLOW RD Westbound | | | | | OBRIEN DR Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 6 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 5 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 6 | 0 | 0 | 9 | 10 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 3 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 6 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 5 | 5 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 4 | 4 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 11 | 0 | 0 | 17 | 18 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 11 | 20 | 0 | 0 | 31 | 34 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 100 | 0 | | 0 | 0 | 100 | 0 | | 35.5 | 64.5 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.9 | 0 | 5.9 | 0 | 0 | 2.9 | 0 | 2.9 | 32.4 | 58.8 | 0 | 0 | 91.2 | |

| | Southbound | | | | WILLOW RD Westbound | | | | OBRIEN DR Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** | 3 | 0 | **5** | 5 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 5 | **6** |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **4** | 0 | 5 | 5 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 6 | 12 | 0 | 18 | 19 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 33.3 | 66.7 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .750 | .750 | .000 | .900 | .792 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 34AM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 34PM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

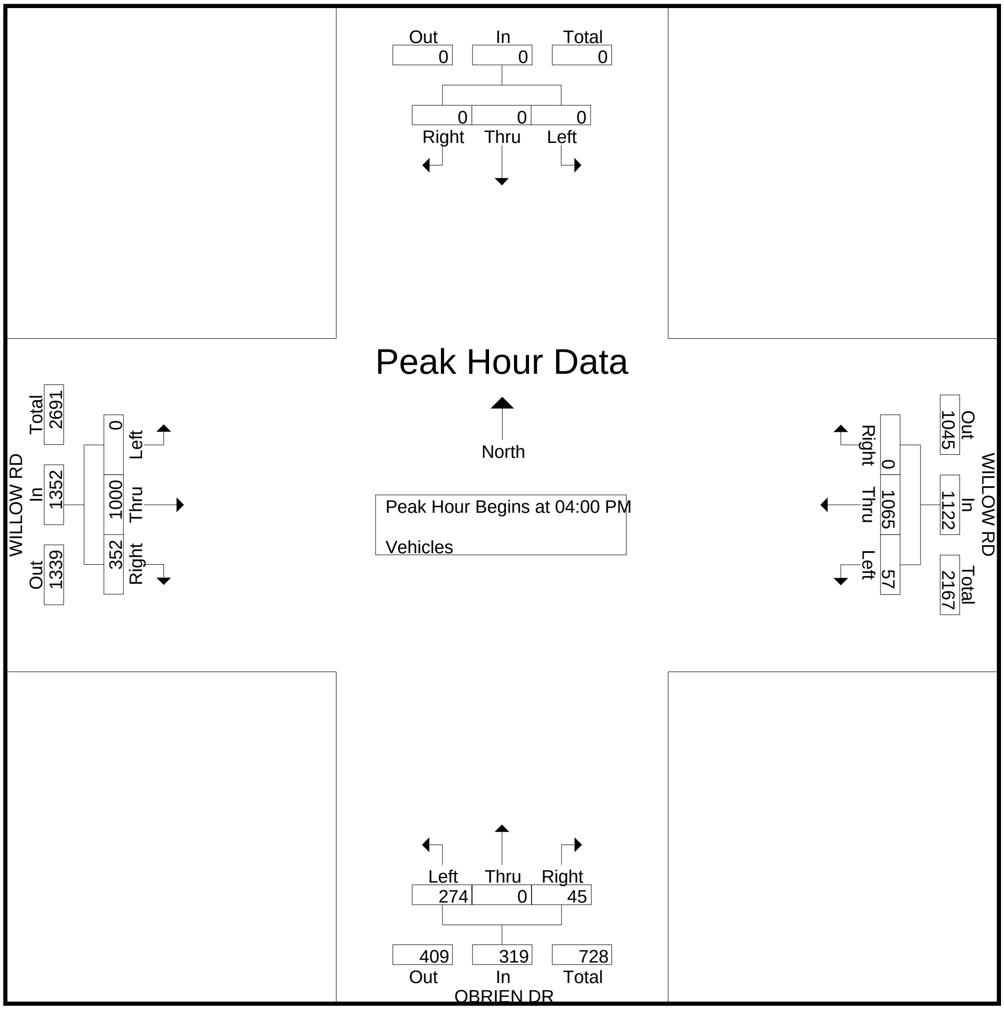
| | Southbound | | | | | WILLOW RD Westbound | | | | | OBRIEN DR Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 253 | 15 | 0 | 268 | 10 | 0 | 93 | 1 | 104 | 124 | 253 | 0 | 0 | 377 | 749 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 259 | 13 | 0 | 272 | 7 | 0 | 59 | 1 | 67 | 80 | 288 | 0 | 0 | 368 | 707 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 18 | 0 | 299 | 10 | 0 | 65 | 3 | 78 | 83 | 252 | 0 | 0 | 335 | 712 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 272 | 11 | 0 | 283 | 18 | 0 | 57 | 5 | 80 | 65 | 207 | 0 | 0 | 272 | 635 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1065 | 57 | 0 | 1122 | 45 | 0 | 274 | 10 | 329 | 352 | 1000 | 0 | 0 | 1352 | 2803 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 274 | 20 | 0 | 294 | 8 | 0 | 76 | 1 | 85 | 102 | 220 | 0 | 0 | 322 | 701 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 312 | 23 | 0 | 335 | 12 | 0 | 100 | 3 | 115 | 89 | 188 | 0 | 0 | 277 | 727 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 292 | 20 | 0 | 312 | 11 | 0 | 64 | 2 | 77 | 95 | 226 | 0 | 0 | 321 | 710 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 279 | 11 | 0 | 290 | 13 | 0 | 53 | 2 | 68 | 81 | 199 | 0 | 0 | 280 | 638 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1157 | 74 | 0 | 1231 | 44 | 0 | 293 | 8 | 345 | 367 | 833 | 0 | 0 | 1200 | 2776 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 325 | 12 | 0 | 337 | 11 | 0 | 45 | 3 | 59 | 76 | 244 | 0 | 0 | 320 | 716 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 268 | 23 | 0 | 291 | 9 | 0 | 37 | 2 | 48 | 71 | 240 | 0 | 0 | 311 | 650 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 303 | 15 | 0 | 318 | 7 | 0 | 36 | 2 | 45 | 64 | 261 | 0 | 0 | 325 | 688 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 270 | 9 | 0 | 279 | 8 | 0 | 21 | 1 | 30 | 69 | 251 | 1 | 0 | 321 | 630 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1166 | 59 | 0 | 1225 | 35 | 0 | 139 | 8 | 182 | 280 | 996 | 1 | 0 | 1277 | 2684 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 3388 | 190 | 0 | 3578 | 124 | 0 | 706 | 26 | 856 | 999 | 2829 | 1 | 0 | 3829 | 8263 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 94.7 | 5.3 | 0 | | 14.5 | 0 | 82.5 | 3 | | 26.1 | 73.9 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 2.3 | 0 | 43.3 | 1.5 | 0 | 8.5 | 0.3 | 10.4 | 12.1 | 34.2 | 0 | 0 | 46.3 | |

| | Southbound | | | | WILLOW RD Westbound | | | | OBRIEN DR Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 253 | 15 | 268 | 10 | 0 | **93** | **103** | **124** | 253 | 0 | **377** | **748** |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 259 | 13 | 272 | 7 | 0 | 59 | 66 | 80 | **288** | 0 | 368 | 706 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | **281** | **18** | **299** | 10 | 0 | 65 | 75 | 83 | 252 | 0 | 335 | 709 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 272 | 11 | 283 | **18** | 0 | 57 | 75 | 65 | 207 | 0 | 272 | 630 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 1065 | 57 | 1122 | 45 | 0 | 274 | 319 | 352 | 1000 | 0 | 1352 | 2793 |
| % App. Total | 0 | 0 | 0 | | 0 | 94.9 | 5.1 | | 14.1 | 0 | 85.9 | | 26 | 74 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .948 | .792 | .938 | .625 | .000 | .737 | .774 | .710 | .868 | .000 | .897 | .933 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 34PM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 34PM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

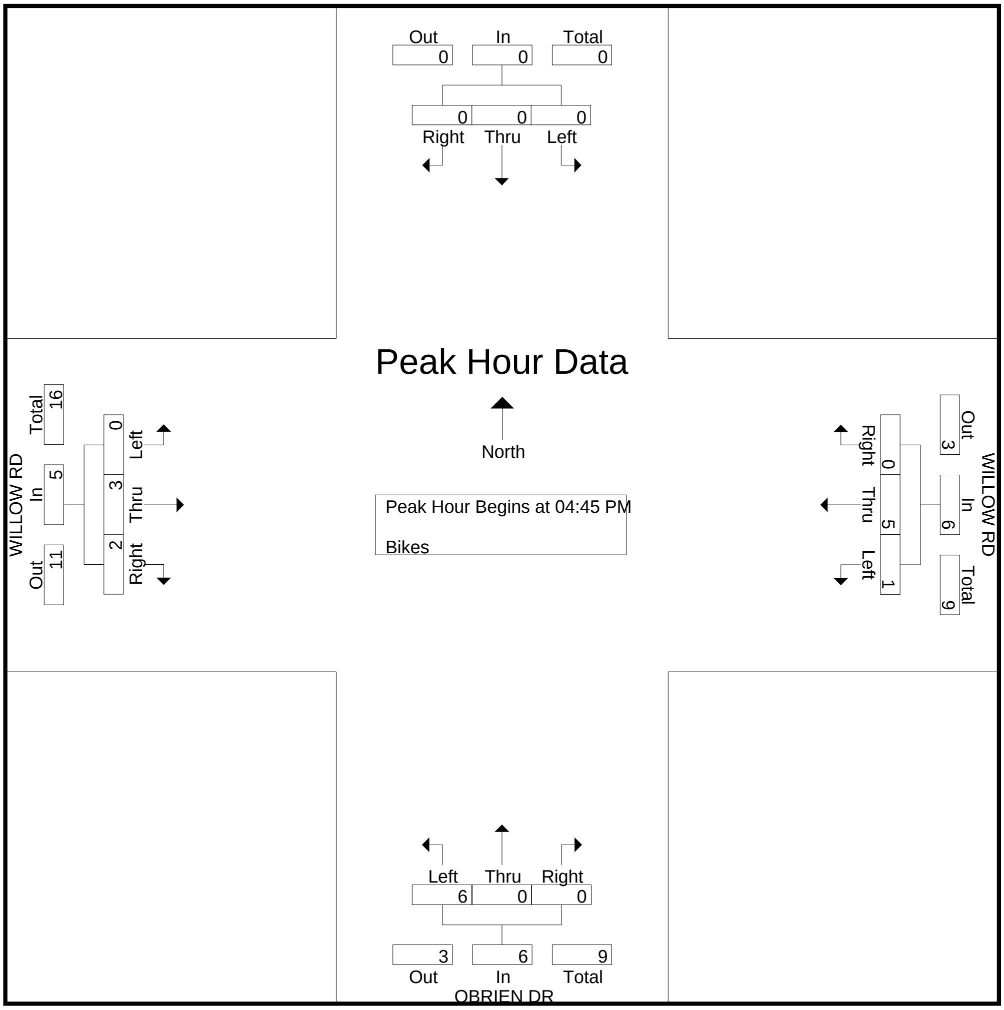
| | Southbound | | | | | WILLOW RD Westbound | | | | | OBRIEN DR Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 4 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 2 | 1 | 2 | 0 | 0 | 3 | 11 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 4 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 3 | 1 | 1 | 0 | 0 | 2 | 6 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 5 | 0 | 0 | 6 | 0 | 6 | 1 | 2 | 0 | 0 | 3 | 14 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 5 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 7 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 7 | 0 | 0 | 4 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 12 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 3 | 0 | 18 | 0 | 0 | 12 | 0 | 12 | 3 | 4 | 0 | 0 | 7 | 37 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 83.3 | 16.7 | 0 | | 0 | 0 | 100 | 0 | | 42.9 | 57.1 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 40.5 | 8.1 | 0 | 48.6 | 0 | 0 | 32.4 | 0 | 32.4 | 8.1 | 10.8 | 0 | 0 | 18.9 | |

| | Southbound | | | | WILLOW RD Westbound | | | | OBRIEN DR Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | **1** | **1** | 0 | **2** | 4 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | **3** | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **3** | **3** | 1 | 1 | 0 | 2 | **6** |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 6 | 0 | 0 | 6 | 6 | 2 | 3 | 0 | 5 | 17 |
| % App. Total | 0 | 0 | 0 | | 0 | 83.3 | 16.7 | | 0 | 0 | 100 | | 40 | 60 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .417 | .250 | .500 | .000 | .000 | .500 | .500 | .500 | .750 | .000 | .625 | .708 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 34PM FINAL
Site Code : 00000034
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33AM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

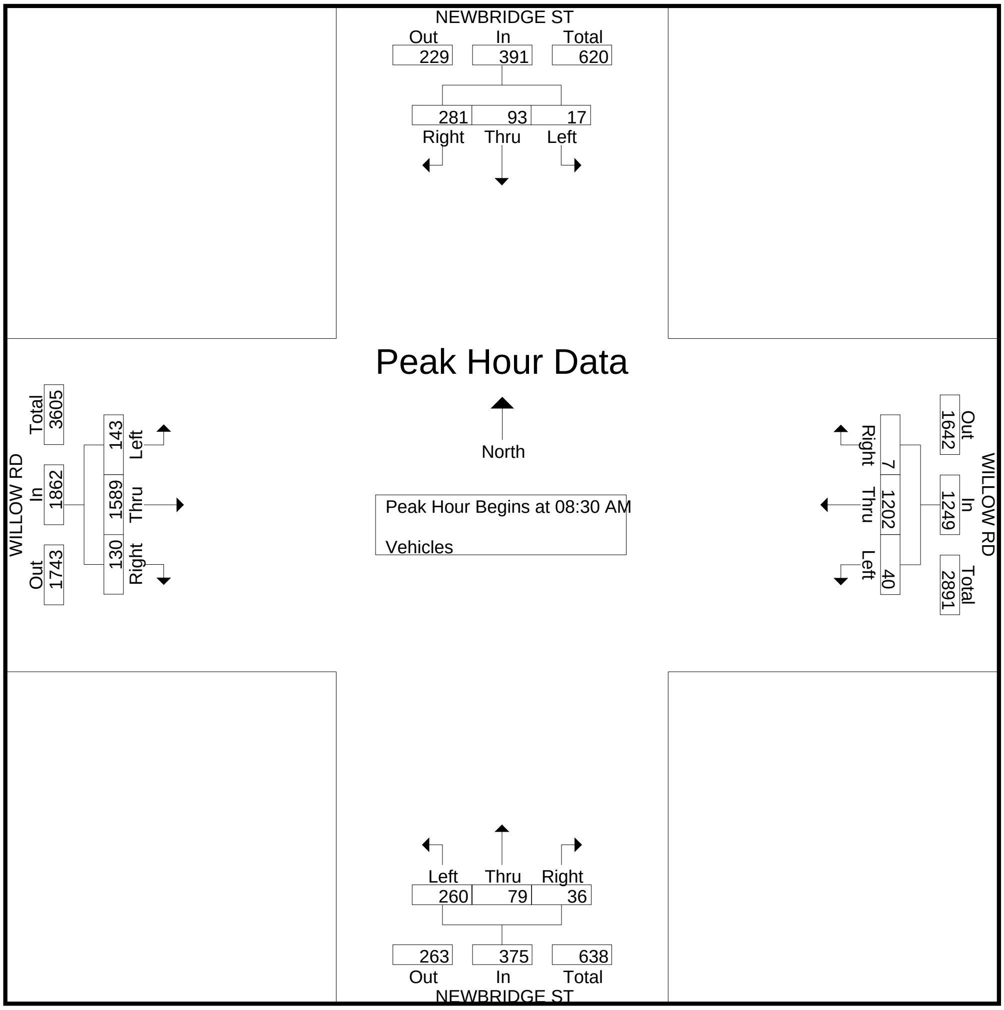
| | NEWBRIDGE ST Southbound | | | | | WILLOW RD Westbound | | | | | NEWBRIDGE ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 77 | 32 | 5 | 0 | 114 | 2 | 381 | 7 | 6 | 396 | 10 | 32 | 78 | 0 | 120 | 23 | 167 | 20 | 3 | 213 | 843 |
| 07:15 AM | 92 | 34 | 6 | 0 | 132 | 2 | 381 | 9 | 7 | 399 | 7 | 20 | 68 | 1 | 96 | 29 | 219 | 25 | 0 | 273 | 900 |
| 07:30 AM | 115 | 31 | 5 | 0 | 151 | 2 | 338 | 9 | 7 | 356 | 5 | 22 | 105 | 2 | 134 | 27 | 224 | 34 | 5 | 290 | 931 |
| 07:45 AM | 94 | 47 | 9 | 1 | 151 | 0 | 298 | 5 | 10 | 313 | 7 | 20 | 84 | 7 | 118 | 45 | 293 | 27 | 3 | 368 | 950 |
| Total | 378 | 144 | 25 | 1 | 548 | 6 | 1398 | 30 | 30 | 1464 | 29 | 94 | 335 | 10 | 468 | 124 | 903 | 106 | 11 | 1144 | 3624 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 81 | 36 | 11 | 2 | 130 | 0 | 220 | 5 | 9 | 234 | 7 | 30 | 86 | 2 | 125 | 45 | 347 | 36 | 4 | 432 | 921 |
| 08:15 AM | 96 | 44 | 10 | 1 | 151 | 7 | 200 | 5 | 16 | 228 | 3 | 40 | 72 | 0 | 115 | 36 | 346 | 41 | 1 | 424 | 918 |
| 08:30 AM | 65 | 27 | 2 | 1 | 95 | 1 | 253 | 7 | 3 | 264 | 6 | 23 | 58 | 0 | 87 | 27 | 407 | 31 | 6 | 471 | 917 |
| 08:45 AM | 93 | 31 | 6 | 1 | 131 | 1 | 282 | 8 | 6 | 297 | 7 | 25 | 97 | 1 | 130 | 34 | 384 | 28 | 5 | 451 | 1009 |
| Total | 335 | 138 | 29 | 5 | 507 | 9 | 955 | 25 | 34 | 1023 | 23 | 118 | 313 | 3 | 457 | 142 | 1484 | 136 | 16 | 1778 | 3765 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 64 | 24 | 6 | 1 | 95 | 2 | 349 | 17 | 11 | 379 | 8 | 18 | 72 | 4 | 102 | 32 | 392 | 23 | 4 | 451 | 1027 |
| 09:15 AM | 59 | 11 | 3 | 2 | 75 | 3 | 318 | 8 | 3 | 332 | 15 | 13 | 33 | 0 | 61 | 37 | 406 | 61 | 0 | 504 | 972 |
| 09:30 AM | 77 | 9 | 2 | 2 | 90 | 5 | 301 | 12 | 6 | 324 | 9 | 13 | 37 | 1 | 60 | 39 | 304 | 49 | 3 | 395 | 869 |
| 09:45 AM | 76 | 13 | 1 | 4 | 94 | 3 | 334 | 15 | 9 | 361 | 8 | 13 | 41 | 0 | 62 | 33 | 290 | 47 | 0 | 370 | 887 |
| Total | 276 | 57 | 12 | 9 | 354 | 13 | 1302 | 52 | 29 | 1396 | 40 | 57 | 183 | 5 | 285 | 141 | 1392 | 180 | 7 | 1720 | 3755 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 989 | 339 | 66 | 15 | 1409 | 28 | 3655 | 107 | 93 | 3883 | 92 | 269 | 831 | 18 | 1210 | 407 | 3779 | 422 | 34 | 4642 | 11144 |
| Apprch % | 70.2 | 24.1 | 4.7 | 1.1 | | 0.7 | 94.1 | 2.8 | 2.4 | | 7.6 | 22.2 | 68.7 | 1.5 | | 8.8 | 81.4 | 9.1 | 0.7 | | |
| Total % | 8.9 | 3 | 0.6 | 0.1 | 12.6 | 0.3 | 32.8 | 1 | 0.8 | 34.8 | 0.8 | 2.4 | 7.5 | 0.2 | 10.9 | 3.7 | 33.9 | 3.8 | 0.3 | 41.7 | |

| | NEWBRIDGE ST Southbound | | | | WILLOW RD Westbound | | | | NEWBRIDGE ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:30 AM | | | | | | | | | | | | | | | | | |
| 08:30 AM | 65 | 27 | 2 | 94 | 1 | 253 | 7 | 261 | 6 | 23 | 58 | 87 | 27 | **407** | 31 | 465 | 907 |
| 08:45 AM | **93** | **31** | **6** | **130** | 1 | 282 | 8 | 291 | 7 | **25** | **97** | **129** | 34 | 384 | 28 | 446 | 996 |
| 09:00 AM | 64 | 24 | 6 | 94 | 2 | **349** | **17** | **368** | 8 | 18 | 72 | 98 | 32 | 392 | 23 | 447 | **1007** |
| 09:15 AM | 59 | 11 | 3 | 73 | **3** | 318 | 8 | 329 | **15** | 13 | 33 | 61 | **37** | 406 | **61** | **504** | 967 |
| Total Volume | 281 | 93 | 17 | 391 | 7 | 1202 | 40 | 1249 | 36 | 79 | 260 | 375 | 130 | 1589 | 143 | 1862 | 3877 |
| % App. Total | 71.9 | 23.8 | 4.3 | | 0.6 | 96.2 | 3.2 | | 9.6 | 21.1 | 69.3 | | 7 | 85.3 | 7.7 | | |
| PHF | .755 | .750 | .708 | .752 | .583 | .861 | .588 | .849 | .600 | .790 | .670 | .727 | .878 | .976 | .586 | .924 | .963 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33AM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33AM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

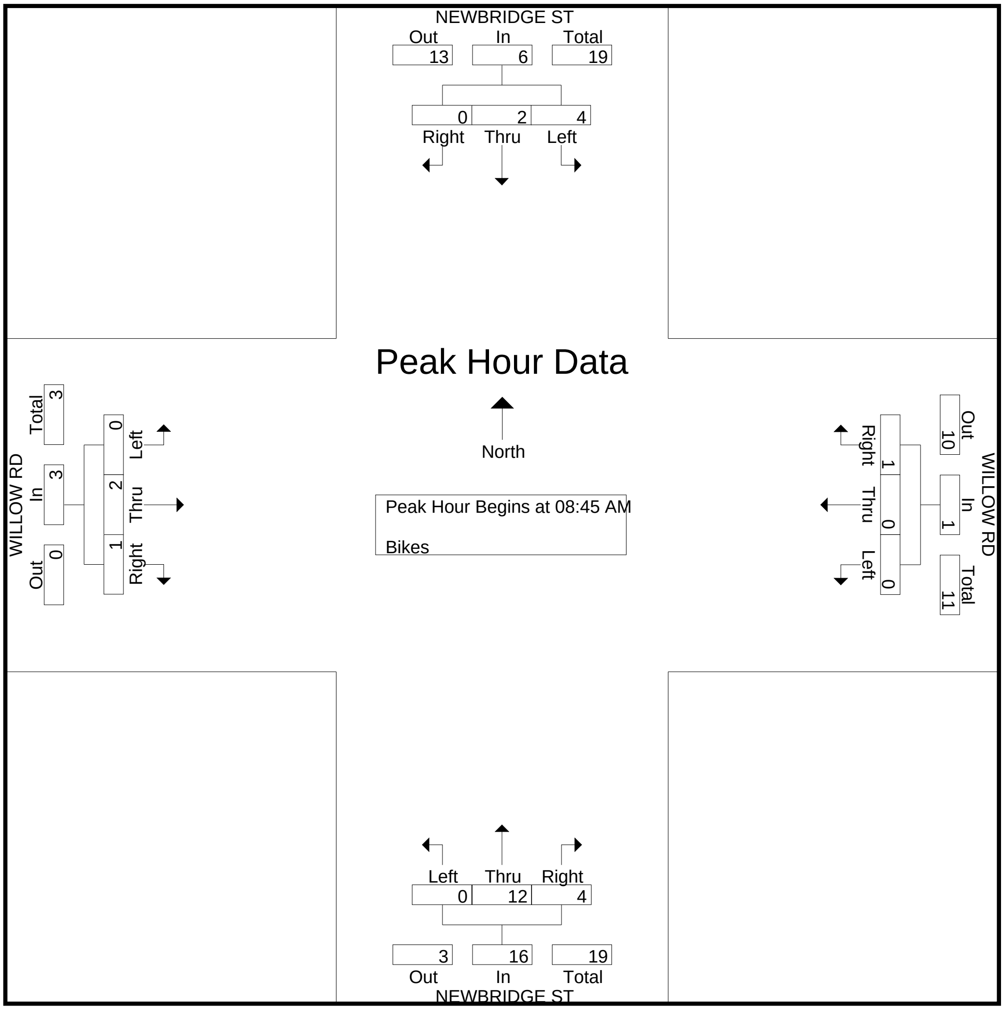
| | NEWBRIDGE ST Southbound | | | | | WILLOW RD Westbound | | | | | NEWBRIDGE ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 2 | 6 |
| 07:45 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 1 | 2 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 7 |
| Total | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 3 | 1 | 7 | 0 | 0 | 8 | 1 | 4 | 0 | 0 | 5 | 17 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 3 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 9 | 0 | 2 | 0 | 0 | 2 | 14 |
| Total | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 10 | 0 | 0 | 12 | 0 | 5 | 0 | 0 | 5 | 20 |
| 09:00 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| 09:15 AM | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| 09:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 4 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| Total | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 8 | 1 | 1 | 0 | 0 | 2 | 14 |
| Grand Total | 0 | 2 | 5 | 0 | 7 | 1 | 0 | 3 | 0 | 4 | 7 | 21 | 0 | 0 | 28 | 2 | 10 | 0 | 0 | 12 | 51 |
| Apprch % | 0 | 28.6 | 71.4 | 0 | | 25 | 0 | 75 | 0 | | 25 | 75 | 0 | 0 | | 16.7 | 83.3 | 0 | 0 | | |
| Total % | 0 | 3.9 | 9.8 | 0 | 13.7 | 2 | 0 | 5.9 | 0 | 7.8 | 13.7 | 41.2 | 0 | 0 | 54.9 | 3.9 | 19.6 | 0 | 0 | 23.5 | |

| | NEWBRIDGE ST Southbound | | | | WILLOW RD Westbound | | | | NEWBRIDGE ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | 0 | 0 | **2** | **2** | **1** | 0 | 0 | **1** | 0 | **9** | 0 | **9** | 0 | **2** | 0 | **2** | **14** |
| 09:00 AM | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 4 |
| 09:15 AM | 0 | **1** | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 4 |
| 09:30 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | **2** | 0 | 0 | 2 | **1** | 0 | 0 | 1 | 4 |
| Total Volume | 0 | 2 | 4 | 6 | 1 | 0 | 0 | 1 | 4 | 12 | 0 | 16 | 1 | 2 | 0 | 3 | 26 |
| % App. Total | 0 | 33.3 | 66.7 | | 100 | 0 | 0 | | 25 | 75 | 0 | | 33.3 | 66.7 | 0 | | |
| PHF | .000 | .500 | .500 | .750 | .250 | .000 | .000 | .250 | .500 | .333 | .000 | .444 | .250 | .250 | .000 | .375 | .464 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33AM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33PM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 1

Groups Printed- Vehicles

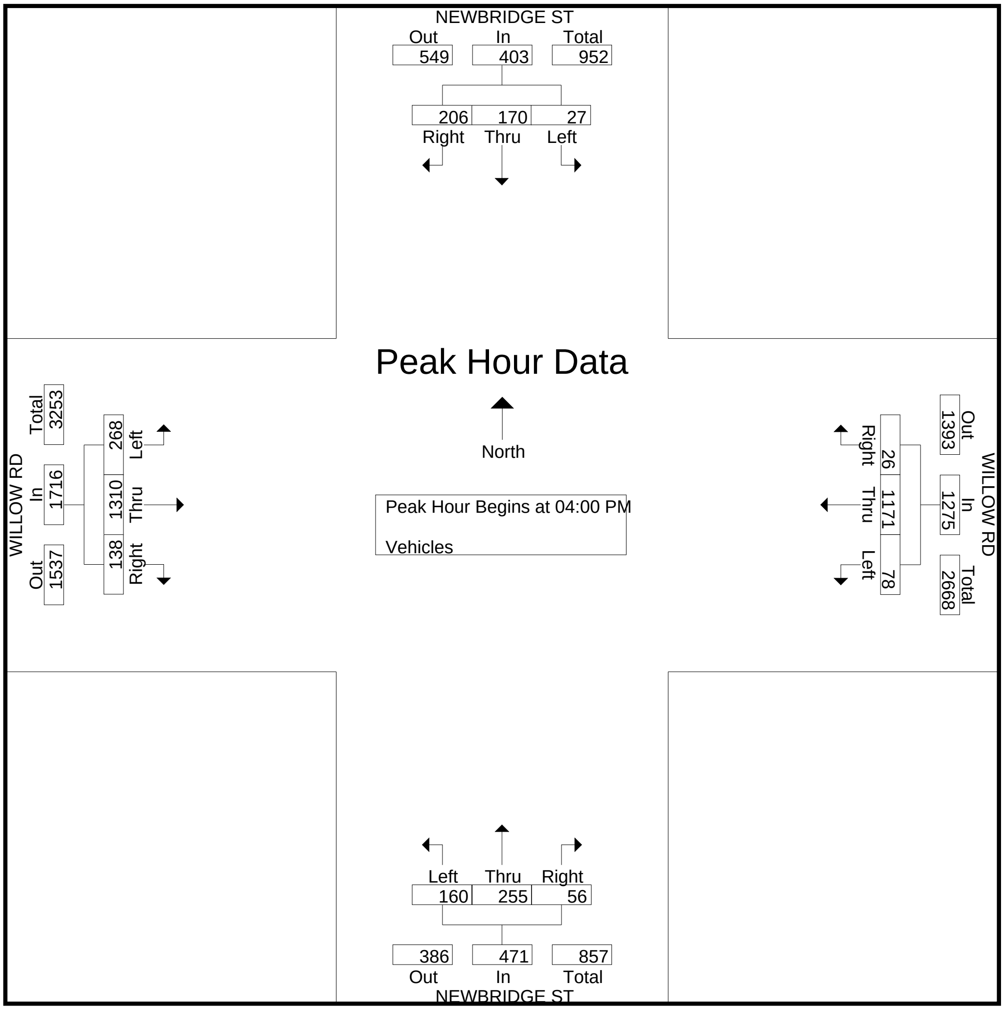
| | NEWBRIDGE ST Southbound | | | | | WILLOW RD Westbound | | | | | NEWBRIDGE ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 53 | 43 | 8 | 3 | 107 | 10 | 298 | 18 | 9 | 335 | 12 | 74 | 45 | 1 | 132 | 43 | 389 | 55 | 3 | 490 | 1064 |
| 04:15 PM | 53 | 52 | 4 | 2 | 111 | 6 | 282 | 23 | 19 | 330 | 20 | 60 | 39 | 3 | 122 | 36 | 343 | 63 | 7 | 449 | 1012 |
| 04:30 PM | 51 | 39 | 9 | 5 | 104 | 5 | 276 | 19 | 5 | 305 | 12 | 52 | 38 | 1 | 103 | 35 | 348 | 73 | 9 | 465 | 977 |
| 04:45 PM | 49 | 36 | 6 | 4 | 95 | 5 | 315 | 18 | 6 | 344 | 12 | 69 | 38 | 1 | 120 | 24 | 230 | 77 | 2 | 333 | 892 |
| Total | 206 | 170 | 27 | 14 | 417 | 26 | 1171 | 78 | 39 | 1314 | 56 | 255 | 160 | 6 | 477 | 138 | 1310 | 268 | 21 | 1737 | 3945 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 55 | 49 | 5 | 11 | 120 | 3 | 323 | 16 | 23 | 365 | 27 | 58 | 36 | 1 | 122 | 31 | 291 | 59 | 5 | 386 | 993 |
| 05:15 PM | 66 | 62 | 10 | 6 | 144 | 7 | 369 | 19 | 10 | 405 | 19 | 64 | 33 | 1 | 117 | 35 | 224 | 43 | 2 | 304 | 970 |
| 05:30 PM | 46 | 60 | 5 | 7 | 118 | 8 | 317 | 15 | 10 | 350 | 18 | 60 | 47 | 3 | 128 | 52 | 271 | 83 | 11 | 417 | 1013 |
| 05:45 PM | 43 | 55 | 8 | 3 | 109 | 5 | 327 | 23 | 9 | 364 | 16 | 53 | 40 | 2 | 111 | 45 | 223 | 82 | 9 | 359 | 943 |
| Total | 210 | 226 | 28 | 27 | 491 | 23 | 1336 | 73 | 52 | 1484 | 80 | 235 | 156 | 7 | 478 | 163 | 1009 | 267 | 27 | 1466 | 3919 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 59 | 49 | 6 | 0 | 114 | 5 | 284 | 29 | 20 | 338 | 18 | 70 | 29 | 3 | 120 | 45 | 328 | 67 | 4 | 444 | 1016 |
| 06:15 PM | 50 | 53 | 7 | 4 | 114 | 4 | 243 | 15 | 7 | 269 | 20 | 63 | 39 | 3 | 125 | 39 | 278 | 81 | 6 | 404 | 912 |
| 06:30 PM | 38 | 29 | 7 | 0 | 74 | 1 | 193 | 16 | 15 | 225 | 11 | 54 | 46 | 0 | 111 | 69 | 293 | 56 | 5 | 423 | 833 |
| 06:45 PM | 54 | 41 | 5 | 0 | 100 | 7 | 205 | 19 | 6 | 237 | 23 | 54 | 47 | 2 | 126 | 55 | 254 | 77 | 9 | 395 | 858 |
| Total | 201 | 172 | 25 | 4 | 402 | 17 | 925 | 79 | 48 | 1069 | 72 | 241 | 161 | 8 | 482 | 208 | 1153 | 281 | 24 | 1666 | 3619 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 617 | 568 | 80 | 45 | 1310 | 66 | 3432 | 230 | 139 | 3867 | 208 | 731 | 477 | 21 | 1437 | 509 | 3472 | 816 | 72 | 4869 | 11483 |
| Apprch % | 47.1 | 43.4 | 6.1 | 3.4 | | 1.7 | 88.8 | 5.9 | 3.6 | | 14.5 | 50.9 | 33.2 | 1.5 | | 10.5 | 71.3 | 16.8 | 1.5 | | |
| Total % | 5.4 | 4.9 | 0.7 | 0.4 | 11.4 | 0.6 | 29.9 | 2 | 1.2 | 33.7 | 1.8 | 6.4 | 4.2 | 0.2 | 12.5 | 4.4 | 30.2 | 7.1 | 0.6 | 42.4 | |

| | NEWBRIDGE ST Southbound | | | | WILLOW RD Westbound | | | | NEWBRIDGE ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | **53** | 43 | 8 | 104 | **10** | 298 | 18 | 326 | 12 | **74** | **45** | **131** | **43** | **389** | 55 | **487** | **1048** |
| 04:15 PM | 53 | **52** | 4 | **109** | 6 | 282 | **23** | 311 | **20** | 60 | 39 | 119 | 36 | 343 | 63 | 442 | 981 |
| 04:30 PM | 51 | 39 | **9** | 99 | 5 | 276 | 19 | 300 | 12 | 52 | 38 | 102 | 35 | 348 | 73 | 456 | 957 |
| 04:45 PM | 49 | 36 | 6 | 91 | 5 | **315** | 18 | **338** | 12 | 69 | 38 | 119 | 24 | 230 | **77** | 331 | 879 |
| Total Volume | 206 | 170 | 27 | 403 | 26 | 1171 | 78 | 1275 | 56 | 255 | 160 | 471 | 138 | 1310 | 268 | 1716 | 3865 |
| % App. Total | 51.1 | 42.2 | 6.7 | | 2 | 91.8 | 6.1 | | 11.9 | 54.1 | 34 | | 8 | 76.3 | 15.6 | | |
| PHF | .972 | .817 | .750 | .924 | .650 | .929 | .848 | .943 | .700 | .861 | .889 | .899 | .802 | .842 | .870 | .881 | .922 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 33PM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 33PM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 1

Groups Printed- Bikes

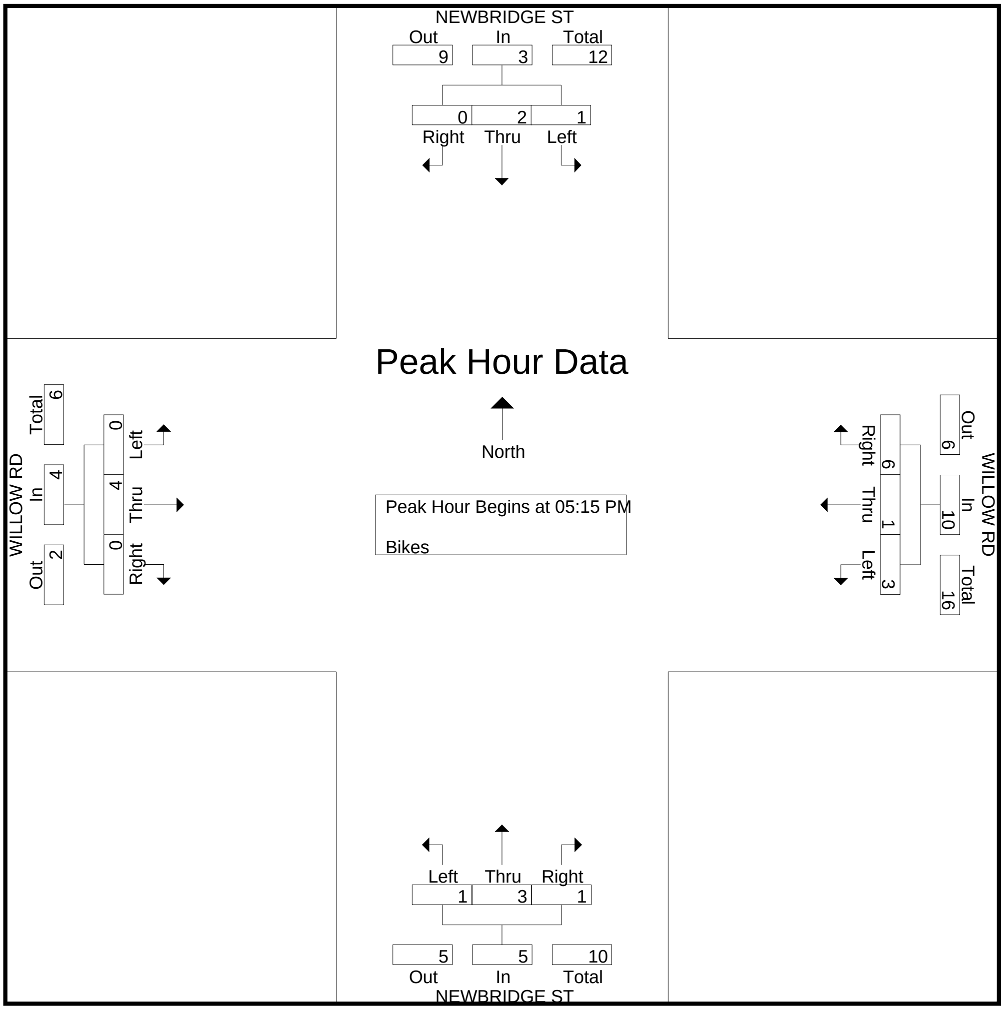
| | NEWBRIDGE ST Southbound | | | | | WILLOW RD Westbound | | | | | NEWBRIDGE ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| 04:15 PM | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| 04:30 PM | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 2 | 2 | 0 | 0 | 4 | 2 | 3 | 0 | 0 | 5 | 1 | 3 | 2 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 15 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 4 |
| 05:15 PM | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 7 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 5 |
| 05:45 PM | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total | 0 | 2 | 1 | 0 | 3 | 5 | 1 | 2 | 0 | 8 | 2 | 2 | 1 | 0 | 5 | 1 | 3 | 0 | 0 | 4 | 20 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 6 |
| 06:15 PM | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 8 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 6 | 0 | 9 | 1 | 4 | 0 | 0 | 5 | 0 | 2 | 0 | 0 | 2 | 18 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 2 | 6 | 1 | 0 | 9 | 10 | 4 | 8 | 0 | 22 | 4 | 9 | 3 | 0 | 16 | 1 | 5 | 0 | 0 | 6 | 53 |
| Apprch % | 22.2 | 66.7 | 11.1 | 0 | | 45.5 | 18.2 | 36.4 | 0 | | 25 | 56.2 | 18.8 | 0 | | 16.7 | 83.3 | 0 | 0 | | |
| Total % | 3.8 | 11.3 | 1.9 | 0 | 17 | 18.9 | 7.5 | 15.1 | 0 | 41.5 | 7.5 | 17 | 5.7 | 0 | 30.2 | 1.9 | 9.4 | 0 | 0 | 11.3 | |

| | NEWBRIDGE ST Southbound | | | | WILLOW RD Westbound | | | | NEWBRIDGE ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:15 PM | | | | | | | | | | | | | | | | | |
| 05:15 PM | 0 | **1** | 0 | **1** | **2** | **1** | 0 | **3** | 0 | **1** | 0 | 1 | 0 | **2** | 0 | **2** | **7** |
| 05:30 PM | 0 | 0 | 0 | 0 | 2 | 0 | **1** | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 5 |
| 05:45 PM | 0 | 0 | **1** | 1 | 1 | 0 | 1 | 2 | 0 | 0 | **1** | 1 | 0 | 0 | 0 | 0 | 4 |
| 06:00 PM | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | **1** | 1 | 0 | **2** | 0 | 1 | 0 | 1 | 6 |
| Total Volume | 0 | 2 | 1 | 3 | 6 | 1 | 3 | 10 | 1 | 3 | 1 | 5 | 0 | 4 | 0 | 4 | 22 |
| % App. Total | 0 | 66.7 | 33.3 | | 60 | 10 | 30 | | 20 | 60 | 20 | | 0 | 100 | 0 | | |
| PHF | .000 | .500 | .250 | .750 | .750 | .250 | .750 | .833 | .250 | .750 | .250 | .625 | .000 | .500 | .000 | .500 | .786 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

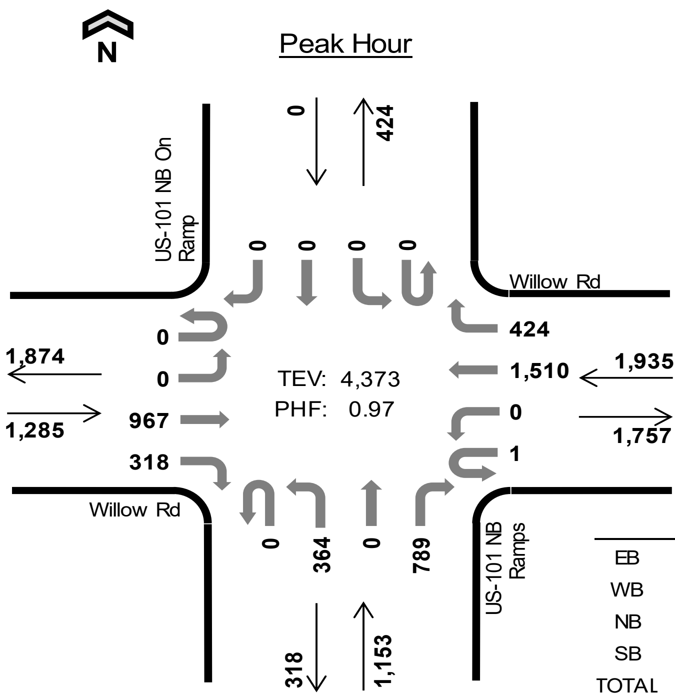
File Name : 33PM FINAL
Site Code : 00000033
Start Date : 3/21/2019
Page No : 2

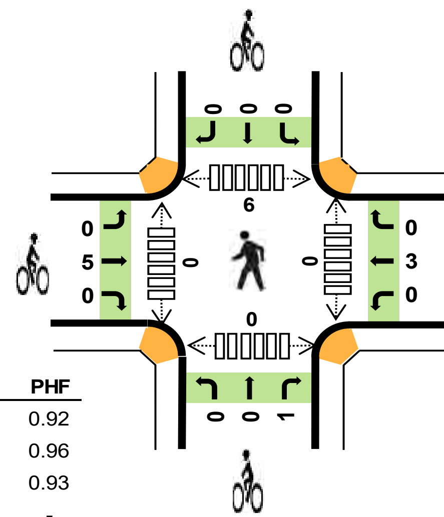


# US-101 NB Ramps
# Willow Rd

Date: 03-13-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 8:15 AM to 9:15 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 3.7% | 0.92 |
| WB | 7.9% | 0.96 |
| NB | 4.7% | 0.93 |
| SB | - | - |
| TOTAL | 5.8% | 0.97 |

## Three-Hour Count Summaries

| Interval Start | | Willow Rd Eastbound UT | LT | TH | RT | Willow Rd Westbound UT | LT | TH | RT | US-101 NB Ramps Northbound UT | LT | TH | RT | US-101 NB On Ramp Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | | 0 | 0 | 246 | 81 | 1 | 0 | 359 | 116 | 0 | 101 | 0 | 153 | 0 | 0 | 0 | 0 | 1,057 | 0 |
| 8:30 AM | | 0 | 0 | 242 | 77 | 0 | 0 | 378 | 97 | 0 | 85 | 0 | 207 | 0 | 0 | 0 | 0 | 1,086 | 0 |
| 8:45 AM | | 0 | 0 | 262 | 87 | 0 | 0 | 370 | 108 | 0 | 91 | 0 | 205 | 0 | 0 | 0 | 0 | 1,123 | 0 |
| 9:00 AM | | 0 | 0 | 217 | 73 | 0 | 0 | 403 | 103 | 0 | 87 | 0 | 224 | 0 | 0 | 0 | 0 | 1,107 | 4,373 |
| Peak Hour | All | 0 | 0 | 967 | 318 | 1 | 0 | 1,510 | 424 | 0 | 364 | 0 | 789 | 0 | 0 | 0 | 0 | 4,373 | 0 |
| | HV | 0 | 0 | 42 | 5 | 0 | 0 | 104 | 48 | 0 | 9 | 0 | 45 | 0 | 0 | 0 | 0 | 253 | 0 |
| | HV% | - | - | 4% | 2% | 0% | - | 7% | 11% | - | 2% | - | 6% | - | - | - | - | 6% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | 14 | 26 | 14 | 0 | *54* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 1 | 0 | *1* |
| 8:30 AM | 13 | 26 | 17 | 0 | *56* | 2 | 2 | 0 | 0 | *4* | 0 | 0 | 3 | 0 | *3* |
| 8:45 AM | 9 | 25 | 10 | 0 | *44* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 1 | 0 | *1* |
| 9:00 AM | 11 | 75 | 13 | 0 | *99* | 1 | 1 | 0 | 0 | *2* | 0 | 0 | 1 | 0 | *1* |
| Peak Hour | 47 | 152 | 54 | 0 | *253* | 5 | 3 | 1 | 0 | *9* | 0 | 0 | 6 | 0 | *6* |

## Three-Hour Count Summaries

| Interval Start | Willow Rd Eastbound UT | LT | TH | RT | Willow Rd Westbound UT | LT | TH | RT | US-101 NB Ramps Northbound UT | LT | TH | RT | US-101 NB On Ramp Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 137 | 44 | 0 | 0 | 445 | 111 | 0 | 89 | 0 | 93 | 0 | 0 | 0 | 0 | 919 | 0 |
| 7:15 AM | 0 | 0 | 134 | 81 | 0 | 0 | 399 | 136 | 0 | 131 | 0 | 155 | 0 | 0 | 0 | 0 | 1,036 | 0 |
| 7:30 AM | 0 | 0 | 186 | 70 | 0 | 0 | 370 | 125 | 0 | 126 | 0 | 138 | 0 | 0 | 0 | 1 | 1,016 | 0 |
| 7:45 AM | 2 | 0 | 225 | 61 | 0 | 0 | 389 | 126 | 0 | 102 | 0 | 176 | 0 | 0 | 0 | 0 | 1,081 | 4,052 |
| 8:00 AM | 0 | 0 | 229 | 85 | 0 | 0 | 280 | 102 | 0 | 123 | 0 | 160 | 0 | 0 | 0 | 0 | 979 | 4,112 |
| **8:15 AM** | **0** | **0** | **246** | **81** | **1** | **0** | **359** | **116** | **0** | **101** | **0** | **153** | **0** | **0** | **0** | **0** | **1,057** | 4,133 |
| **8:30 AM** | **0** | **0** | **242** | **77** | **0** | **0** | **378** | **97** | **0** | **85** | **0** | **207** | **0** | **0** | **0** | **0** | **1,086** | 4,203 |
| **8:45 AM** | **0** | **0** | **262** | **87** | **0** | **0** | **370** | **108** | **0** | **91** | **0** | **205** | **0** | **0** | **0** | **0** | **1,123** | 4,245 |
| **9:00 AM** | **0** | **0** | **217** | **73** | **0** | **0** | **403** | **103** | **0** | **87** | **0** | **224** | **0** | **0** | **0** | **0** | **1,107** | **4,373** |
| 9:15 AM | 0 | 0 | 246 | 63 | 0 | 0 | 375 | 77 | 0 | 84 | 0 | 207 | 0 | 0 | 0 | 0 | 1,052 | 4,368 |
| 9:30 AM | 0 | 1 | 207 | 61 | 0 | 0 | 337 | 75 | 0 | 79 | 0 | 159 | 0 | 0 | 0 | 1 | 920 | 4,202 |
| 9:45 AM | 0 | 0 | 209 | 93 | 0 | 0 | 382 | 83 | 0 | 78 | 0 | 170 | 0 | 0 | 0 | 0 | 1,015 | 4,094 |
| Count Total | 2 | 1 | 2,540 | 876 | 1 | 0 | 4,487 | 1,259 | 0 | 1,176 | 0 | 2,047 | 0 | 0 | 0 | 2 | 12,391 | 0 |
| **Peak Hour All** | **0** | **0** | **967** | **318** | **1** | **0** | **1,510** | **424** | **0** | **364** | **0** | **789** | **0** | **0** | **0** | **0** | **4,373** | **0** |
| **Peak Hour HV** | **0** | **0** | **42** | **5** | **0** | **0** | **104** | **48** | **0** | **9** | **0** | **45** | **0** | **0** | **0** | **0** | **253** | **0** |
| **Peak Hour HV%** | **-** | **-** | **4%** | **2%** | **0%** | **-** | **7%** | **11%** | **-** | **2%** | **-** | **6%** | **-** | **-** | **-** | **-** | **6%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 9 | 28 | 11 | 0 | *48* | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 0 | 0 | *1* |
| 7:15 AM | 7 | 27 | 11 | 0 | *45* | 2 | 0 | 0 | 0 | *2* | 3 | 2 | 4 | 0 | *9* |
| 7:30 AM | 9 | 16 | 15 | 1 | *41* | 0 | 3 | 0 | 0 | *3* | 1 | 0 | 1 | 0 | *2* |
| 7:45 AM | 13 | 18 | 16 | 0 | *47* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 8:00 AM | 12 | 30 | 20 | 0 | *62* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 1 | 0 | *1* |
| **8:15 AM** | **14** | **26** | **14** | **0** | ***54*** | **0** | **0** | **1** | **0** | ***1*** | **0** | **0** | **1** | **0** | *1* |
| **8:30 AM** | **13** | **26** | **17** | **0** | ***56*** | **2** | **2** | **0** | **0** | ***4*** | **0** | **0** | **3** | **0** | *3* |
| **8:45 AM** | **9** | **25** | **10** | **0** | ***44*** | **2** | **0** | **0** | **0** | ***2*** | **0** | **0** | **1** | **0** | *1* |
| **9:00 AM** | **11** | **75** | **13** | **0** | ***99*** | **1** | **1** | **0** | **0** | ***2*** | **0** | **0** | **1** | **0** | ***1*** |
| 9:15 AM | 15 | 21 | 19 | 0 | *55* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 4 | 0 | *4* |
| 9:30 AM | 14 | 20 | 26 | 0 | *60* | 1 | 2 | 1 | 0 | *4* | 1 | 2 | 3 | 0 | *6* |
| 9:45 AM | 13 | 33 | 11 | 0 | *57* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 1 | 0 | *1* |
| Count Total | 139 | 345 | 183 | 1 | *668* | 15 | 8 | 2 | 0 | *25* | 5 | 5 | 20 | 0 | *30* |
| **Peak Hour** | **47** | **152** | **54** | **0** | ***253*** | **5** | **3** | **1** | **0** | ***9*** | **0** | **0** | **6** | **0** | ***6*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 NB Ramps | | | | US-101 NB On Ramp | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 9 | 0 | 0 | 0 | 25 | 3 | 0 | 3 | 0 | 8 | 0 | 0 | 0 | 0 | 48 | 0 |
| 7:15 AM | 0 | 0 | 5 | 2 | 0 | 0 | 22 | 5 | 0 | 4 | 0 | 7 | 0 | 0 | 0 | 0 | 45 | 0 |
| 7:30 AM | 0 | 0 | 9 | 0 | 0 | 0 | 13 | 3 | 0 | 3 | 0 | 12 | 0 | 0 | 0 | 1 | 41 | 0 |
| 7:45 AM | 0 | 0 | 12 | 1 | 0 | 0 | 13 | 5 | 0 | 3 | 0 | 13 | 0 | 0 | 0 | 0 | 47 | 181 |
| 8:00 AM | 0 | 0 | 11 | 1 | 0 | 0 | 25 | 5 | 0 | 6 | 0 | 14 | 0 | 0 | 0 | 0 | 62 | 195 |
| **8:15 AM** | **0** | **0** | **13** | **1** | **0** | **0** | **17** | **9** | **0** | **4** | **0** | **10** | **0** | **0** | **0** | **0** | **54** | 204 |
| **8:30 AM** | **0** | **0** | **13** | **0** | **0** | **0** | **22** | **4** | **0** | **2** | **0** | **15** | **0** | **0** | **0** | **0** | **56** | 219 |
| **8:45 AM** | **0** | **0** | **7** | **2** | **0** | **0** | **20** | **5** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **44** | 216 |
| **9:00 AM** | **0** | **0** | **9** | **2** | **0** | **0** | **45** | **30** | **0** | **3** | **0** | **10** | **0** | **0** | **0** | **0** | **99** | **253** |
| 9:15 AM | 0 | 0 | 12 | 3 | 0 | 0 | 12 | 9 | 0 | 2 | 0 | 17 | 0 | 0 | 0 | 0 | 55 | 254 |
| 9:30 AM | 0 | 1 | 11 | 2 | 0 | 0 | 13 | 7 | 0 | 3 | 0 | 23 | 0 | 0 | 0 | 0 | 60 | 258 |
| 9:45 AM | 0 | 0 | 10 | 3 | 0 | 0 | 21 | 12 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 57 | 271 |
| Count Total | 0 | 1 | 121 | 17 | 0 | 0 | 248 | 97 | 0 | 33 | 0 | 150 | 0 | 0 | 0 | 1 | 668 | 0 |
| **Peak Hour** | **0** | **0** | **42** | **5** | **0** | **0** | **104** | **48** | **0** | **9** | **0** | **45** | **0** | **0** | **0** | **0** | **253** | **0** |

## Three-Hour Count Summaries - Bikes

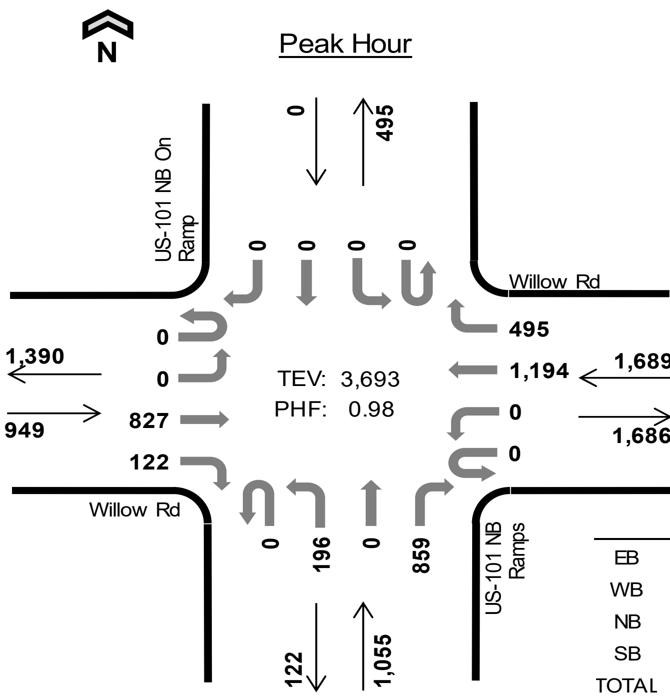
| Interval Start | Willow Rd | | | Willow Rd | | | US-101 NB Ramps | | | US-101 NB On Ramp | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 7:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 |
| 8:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | 8 |
| **8:30 AM** | **0** | **2** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | 9 |
| **8:45 AM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 9 |
| **9:00 AM** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **9** |
| 9:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 |
| 9:30 AM | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 9 |
| 9:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 |
| Count Total | 0 | 15 | 0 | 0 | 8 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 25 | 0 |
| **Peak Hour** | **0** | **5** | **0** | **0** | **3** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **9** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

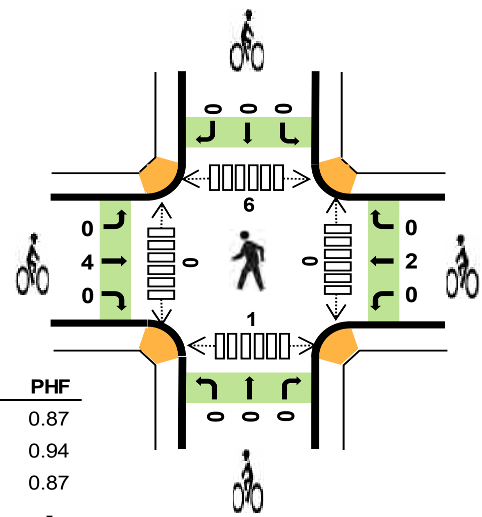
# US-101 NB Ramps
# Willow Rd

Date: 03-13-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 5:00 PM to 6:00 PM

Peak Hour




| | HV % | PHF |
|---|---|---|
| EB | 3.1% | 0.87 |
| WB | 2.8% | 0.94 |
| NB | 4.2% | 0.87 |
| SB | - | - |
| TOTAL | 3.3% | 0.98 |




## Three-Hour Count Summaries

| Interval Start | | Willow Rd Eastbound UT | LT | TH | RT | Willow Rd Westbound UT | LT | TH | RT | US-101 NB Ramps Northbound UT | LT | TH | RT | US-101 NB On Ramp Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:00 PM | | 0 | 0 | 183 | 30 | 0 | 0 | 285 | 139 | 0 | 36 | 0 | 268 | 0 | 0 | 0 | 0 | 941 | 0 |
| 5:15 PM | | 0 | 0 | 223 | 20 | 0 | 0 | 312 | 135 | 0 | 43 | 0 | 194 | 0 | 0 | 0 | 0 | 927 | 0 |
| 5:30 PM | | 0 | 0 | 235 | 38 | 0 | 0 | 315 | 117 | 0 | 49 | 0 | 171 | 0 | 0 | 0 | 0 | 925 | 0 |
| 5:45 PM | | 0 | 0 | 186 | 34 | 0 | 0 | 282 | 104 | 0 | 68 | 0 | 226 | 0 | 0 | 0 | 0 | 900 | 3,693 |
| Peak Hour | All | 0 | 0 | 827 | 122 | 0 | 0 | 1,194 | 495 | 0 | 196 | 0 | 859 | 0 | 0 | 0 | 0 | 3,693 | 0 |
| | HV | 0 | 0 | 28 | 1 | 0 | 0 | 25 | 23 | 0 | 1 | 0 | 43 | 0 | 0 | 0 | 0 | 121 | 0 |
| | HV% | - | - | 3% | 1% | - | - | 2% | 5% | - | 1% | - | 5% | - | - | - | - | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:00 PM | 3 | 12 | 14 | 0 | *29* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 10 | 13 | 8 | 0 | *31* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 3 | 0 | *3* |
| 5:30 PM | 11 | 11 | 10 | 0 | *32* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 1 | *2* |
| 5:45 PM | 5 | 12 | 12 | 0 | *29* | 3 | 0 | 0 | 0 | *3* | 0 | 0 | 2 | 0 | *2* |
| Peak Hour | 29 | 48 | 44 | 0 | *121* | 4 | 2 | 0 | 0 | *6* | 0 | 0 | 6 | 1 | *7* |

## Three-Hour Count Summaries

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 NB Ramps | | | | US-101 NB On Ramp | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 232 | 41 | 0 | 0 | 226 | 127 | 0 | 54 | 0 | 258 | 0 | 0 | 0 | 0 | 938 | 0 |
| 4:15 PM | 0 | 0 | 277 | 63 | 0 | 0 | 254 | 111 | 0 | 41 | 0 | 151 | 0 | 0 | 0 | 0 | 897 | 0 |
| 4:30 PM | 0 | 0 | 176 | 42 | 0 | 0 | 209 | 134 | 0 | 47 | 0 | 223 | 0 | 0 | 0 | 0 | 831 | 0 |
| 4:45 PM | 0 | 0 | 94 | 10 | 0 | 0 | 282 | 102 | 0 | 33 | 0 | 231 | 0 | 0 | 0 | 0 | 752 | 3,418 |
| **5:00 PM** | **0** | **0** | **183** | **30** | **0** | **0** | **285** | **139** | **0** | **36** | **0** | **268** | **0** | **0** | **0** | **0** | **941** | 3,421 |
| **5:15 PM** | **0** | **0** | **223** | **20** | **0** | **0** | **312** | **135** | **0** | **43** | **0** | **194** | **0** | **0** | **0** | **0** | **927** | 3,451 |
| **5:30 PM** | **0** | **0** | **235** | **38** | **0** | **0** | **315** | **117** | **0** | **49** | **0** | **171** | **0** | **0** | **0** | **0** | **925** | 3,545 |
| **5:45 PM** | **0** | **0** | **186** | **34** | **0** | **0** | **282** | **104** | **0** | **68** | **0** | **226** | **0** | **0** | **0** | **0** | **900** | **3,693** |
| 6:00 PM | 0 | 0 | 181 | 20 | 0 | 0 | 253 | 104 | 0 | 66 | 0 | 252 | 0 | 0 | 0 | 0 | 876 | 3,628 |
| 6:15 PM | 0 | 0 | 214 | 26 | 0 | 0 | 274 | 90 | 0 | 66 | 0 | 277 | 0 | 0 | 0 | 0 | 947 | 3,648 |
| 6:30 PM | 0 | 0 | 157 | 50 | 0 | 0 | 290 | 107 | 0 | 73 | 0 | 216 | 0 | 0 | 0 | 0 | 893 | 3,616 |
| 6:45 PM | 0 | 0 | 168 | 41 | 0 | 0 | 253 | 68 | 0 | 72 | 0 | 230 | 0 | 0 | 0 | 0 | 832 | 3,548 |
| Count Total | 0 | 0 | 2,326 | 415 | 0 | 0 | 3,235 | 1,338 | 0 | 648 | 0 | 2,697 | 0 | 0 | 0 | 0 | 10,659 | 0 |
| **Peak Hour All** | **0** | **0** | **827** | **122** | **0** | **0** | **1,194** | **495** | **0** | **196** | **0** | **859** | **0** | **0** | **0** | **0** | **3,693** | **0** |
| **Peak Hour HV** | **0** | **0** | **28** | **1** | **0** | **0** | **25** | **23** | **0** | **1** | **0** | **43** | **0** | **0** | **0** | **0** | **121** | **0** |
| **Peak Hour HV%** | **-** | **-** | **3%** | **1%** | **-** | **-** | **2%** | **5%** | **-** | **1%** | **-** | **5%** | **-** | **-** | **-** | **-** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 4 | 13 | 13 | 0 | *30* | 1 | 2 | 0 | 0 | *3* | 0 | 0 | 2 | 0 | *2* |
| 4:15 PM | 9 | 13 | 11 | 0 | *33* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* |
| 4:30 PM | 6 | 11 | 13 | 0 | *30* | 0 | 3 | 0 | 0 | *3* | 0 | 0 | 3 | 0 | *3* |
| 4:45 PM | 2 | 9 | 8 | 0 | *19* | 0 | 4 | 0 | 0 | *4* | 0 | 0 | 2 | 0 | *2* |
| **5:00 PM** | **3** | **12** | **14** | **0** | ***29*** | **0** | **2** | **0** | **0** | ***2*** | **0** | **0** | **0** | **0** | *0* |
| **5:15 PM** | **10** | **13** | **8** | **0** | ***31*** | **1** | **0** | **0** | **0** | ***1*** | **0** | **0** | **3** | **0** | *3* |
| **5:30 PM** | **11** | **11** | **10** | **0** | ***32*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **1** | **1** | *2* |
| **5:45 PM** | **5** | **12** | **12** | **0** | ***29*** | **3** | **0** | **0** | **0** | ***3*** | **0** | **0** | **2** | **0** | ***2*** |
| 6:00 PM | 8 | 6 | 13 | 0 | *27* | 6 | 0 | 0 | 0 | *6* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 12 | 9 | 8 | 0 | *29* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 2 | 0 | *2* |
| 6:30 PM | 7 | 5 | 9 | 0 | *21* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 1 | 0 | *1* |
| 6:45 PM | 8 | 8 | 12 | 0 | *28* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 85 | 122 | 131 | 0 | *338* | 11 | 16 | 0 | 0 | *27* | 0 | 0 | 17 | 1 | *18* |
| **Peak Hour** | **29** | **48** | **44** | **0** | ***121*** | **4** | **2** | **0** | **0** | ***6*** | **0** | **0** | **6** | **1** | ***7*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 NB Ramps | | | | US-101 NB On Ramp | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 4 | 0 | 0 | 0 | 8 | 5 | 0 | 1 | 0 | 12 | 0 | 0 | 0 | 0 | 30 | 0 |
| 4:15 PM | 0 | 0 | 8 | 1 | 0 | 0 | 7 | 6 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 33 | 0 |
| 4:30 PM | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 4 | 0 | 1 | 0 | 12 | 0 | 0 | 0 | 0 | 30 | 0 |
| 4:45 PM | 0 | 0 | 1 | 1 | 0 | 0 | 6 | 3 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 19 | 112 |
| **5:00 PM** | **0** | **0** | **2** | **1** | **0** | **0** | **8** | **4** | **0** | **0** | **0** | **14** | **0** | **0** | **0** | **0** | **29** | 111 |
| **5:15 PM** | **0** | **0** | **10** | **0** | **0** | **0** | **6** | **7** | **0** | **1** | **0** | **7** | **0** | **0** | **0** | **0** | **31** | 109 |
| **5:30 PM** | **0** | **0** | **11** | **0** | **0** | **0** | **6** | **5** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **32** | 111 |
| **5:45 PM** | **0** | **0** | **5** | **0** | **0** | **0** | **5** | **7** | **0** | **0** | **0** | **12** | **0** | **0** | **0** | **0** | **29** | **121** |
| 6:00 PM | 0 | 0 | 8 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 27 | 119 |
| 6:15 PM | 0 | 0 | 12 | 0 | 0 | 0 | 5 | 4 | 0 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 29 | 117 |
| 6:30 PM | 0 | 0 | 6 | 1 | 0 | 0 | 3 | 2 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 21 | 106 |
| 6:45 PM | 0 | 0 | 8 | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 28 | 105 |
| Count Total | 0 | 0 | 81 | 4 | 0 | 0 | 71 | 51 | 0 | 5 | 0 | 126 | 0 | 0 | 0 | 0 | 338 | 0 |
| **Peak Hour** | **0** | **0** | **28** | **1** | **0** | **0** | **25** | **23** | **0** | **1** | **0** | **43** | **0** | **0** | **0** | **0** | **121** | **0** |

## Three-Hour Count Summaries - Bikes

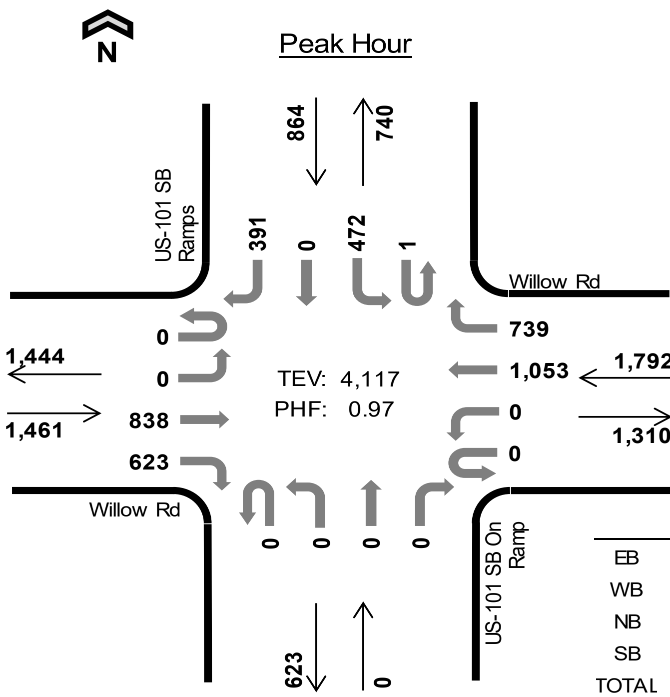
| Interval Start | Willow Rd | | | Willow Rd | | | US-101 NB Ramps | | | US-101 NB On Ramp | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 10 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 9 |
| **5:15 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 10 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 7 |
| **5:45 PM** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **6** |
| 6:00 PM | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 10 |
| 6:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 11 |
| 6:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 |
| 6:45 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 11 |
| Count Total | 0 | 11 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 |
| **Peak Hour** | **0** | **4** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

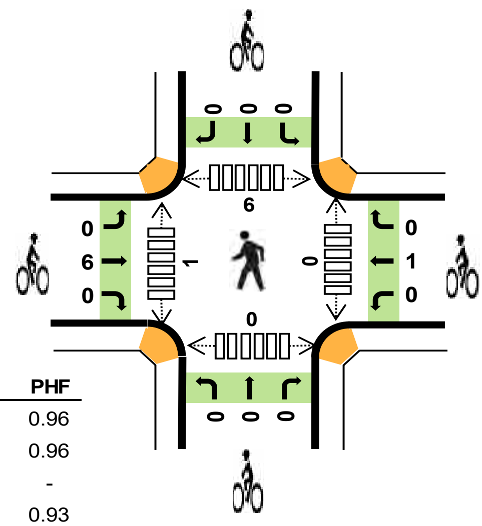
# US-101 SB On Ramp
# Willow Rd

**Date:** 03-13-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.4% | 0.96 |
| WB | 5.2% | 0.96 |
| NB | - | - |
| SB | 4.1% | 0.93 |
| TOTAL | 4.0% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Willow Rd Eastbound UT | LT | TH | RT | Willow Rd Westbound UT | LT | TH | RT | US-101 SB On Ramp Northbound UT | LT | TH | RT | US-101 SB Ramps Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | | 0 | 0 | 215 | 159 | 0 | 0 | 267 | 137 | 0 | 0 | 0 | 0 | 0 | 97 | 0 | 123 | 998 | 0 |
| 8:15 AM | | 0 | 0 | 207 | 174 | 0 | 0 | 278 | 189 | 0 | 0 | 0 | 0 | 0 | 118 | 0 | 91 | 1,057 | 0 |
| 8:30 AM | | 0 | 0 | 201 | 172 | 0 | 0 | 237 | 220 | 0 | 0 | 0 | 0 | 1 | 116 | 0 | 86 | 1,033 | 0 |
| 8:45 AM | | 0 | 0 | 215 | 118 | 0 | 0 | 271 | 193 | 0 | 0 | 0 | 0 | 0 | 141 | 0 | 91 | 1,029 | 4,117 |
| Peak Hour | All | 0 | 0 | 838 | 623 | 0 | 0 | 1,053 | 739 | 0 | 0 | 0 | 0 | 1 | 472 | 0 | 391 | 4,117 | 0 |
| | HV | 0 | 0 | 22 | 13 | 0 | 0 | 34 | 60 | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 9 | 164 | 0 |
| | HV% | - | - | 3% | 2% | - | - | 3% | 8% | - | - | - | - | 0% | 6% | - | 2% | 4% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | 6 | 32 | 0 | 9 | *47* | 2 | 1 | 0 | 0 | *3* | 0 | 1 | 1 | 0 | *2* |
| 8:15 AM | 10 | 21 | 0 | 11 | *42* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 9 | 24 | 0 | 10 | *43* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 2 | 0 | *2* |
| 8:45 AM | 10 | 17 | 0 | 5 | *32* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 3 | 0 | *3* |
| Peak Hour | 35 | 94 | 0 | 35 | *164* | 6 | 1 | 0 | 0 | *7* | 0 | 1 | 6 | 0 | *7* |

## Three-Hour Count Summaries

| Interval Start | | Willow Rd | | | | Willow Rd | | | | US-101 SB On Ramp | | | | US-101 SB Ramps | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | | 0 | 0 | 100 | 77 | 0 | 0 | 291 | 240 | 0 | 0 | 0 | 0 | 0 | 68 | 0 | 61 | 837 | 0 |
| 7:15 AM | | 0 | 0 | 140 | 84 | 0 | 0 | 319 | 198 | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 81 | 894 | 0 |
| 7:30 AM | | 0 | 0 | 156 | 113 | 0 | 0 | 317 | 172 | 0 | 0 | 0 | 0 | 0 | 99 | 0 | 79 | 936 | 0 |
| 7:45 AM | | 0 | 0 | 178 | 144 | 0 | 0 | 297 | 185 | 0 | 0 | 0 | 0 | 0 | 102 | 0 | 93 | 999 | 3,666 |
| **8:00 AM** | | **0** | **0** | **215** | **159** | **0** | **0** | **267** | **137** | **0** | **0** | **0** | **0** | **0** | **97** | **0** | **123** | **998** | 3,827 |
| **8:15 AM** | | **0** | **0** | **207** | **174** | **0** | **0** | **278** | **189** | **0** | **0** | **0** | **0** | **0** | **118** | **0** | **91** | **1,057** | 3,990 |
| **8:30 AM** | | **0** | **0** | **201** | **172** | **0** | **0** | **237** | **220** | **0** | **0** | **0** | **0** | **1** | **116** | **0** | **86** | **1,033** | 4,087 |
| **8:45 AM** | | **0** | **0** | **215** | **118** | **0** | **0** | **271** | **193** | **0** | **0** | **0** | **0** | **0** | **141** | **0** | **91** | **1,029** | **4,117** |
| 9:00 AM | | 0 | 0 | 182 | 139 | 0 | 0 | 275 | 222 | 0 | 0 | 0 | 0 | 0 | 105 | 0 | 67 | 990 | 4,109 |
| 9:15 AM | | 0 | 0 | 191 | 170 | 0 | 0 | 239 | 226 | 0 | 0 | 0 | 0 | 0 | 120 | 0 | 85 | 1,031 | 4,083 |
| 9:30 AM | | 0 | 0 | 162 | 158 | 1 | 0 | 205 | 204 | 0 | 0 | 0 | 0 | 0 | 106 | 0 | 66 | 902 | 3,952 |
| 9:45 AM | | 0 | 0 | 176 | 123 | 0 | 0 | 192 | 249 | 0 | 0 | 0 | 0 | 0 | 122 | 0 | 93 | 955 | 3,878 |
| Count Total | | 0 | 0 | 2,123 | 1,631 | 1 | 0 | 3,188 | 2,435 | 0 | 0 | 0 | 0 | 1 | 1,266 | 0 | 1,016 | 11,661 | 0 |
| **Peak Hour** | **All** | **0** | **0** | **838** | **623** | **0** | **0** | **1,053** | **739** | **0** | **0** | **0** | **0** | **1** | **472** | **0** | **391** | **4,117** | **0** |
| | **HV** | **0** | **0** | **22** | **13** | **0** | **0** | **34** | **60** | **0** | **0** | **0** | **0** | **0** | **26** | **0** | **9** | **164** | **0** |
| | **HV%** | **-** | **-** | **3%** | **2%** | **-** | **-** | **3%** | **8%** | **-** | **-** | **-** | **-** | **0%** | **6%** | **-** | **2%** | **4%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 10 | 27 | 0 | 2 | *39* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:15 AM | 5 | 27 | 0 | 6 | *38* | 2 | 0 | 0 | 0 | *2* | 0 | 1 | 1 | 0 | *2* |
| 7:30 AM | 9 | 16 | 0 | 6 | *31* | 3 | 1 | 0 | 0 | *4* | 0 | 0 | 3 | 0 | *3* |
| 7:45 AM | 6 | 16 | 0 | 12 | *34* | 2 | 0 | 0 | 0 | *2* | 1 | 0 | 1 | 0 | *2* |
| **8:00 AM** | **6** | **32** | **0** | **9** | ***47*** | **2** | **1** | **0** | **0** | ***3*** | **0** | **1** | **1** | **0** | *2* |
| **8:15 AM** | **10** | **21** | **0** | **11** | ***42*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **8:30 AM** | **9** | **24** | **0** | **10** | ***43*** | **2** | **0** | **0** | **0** | ***2*** | **0** | **0** | **2** | **0** | *2* |
| **8:45 AM** | **10** | **17** | **0** | **5** | ***32*** | **2** | **0** | **0** | **0** | ***2*** | **0** | **0** | **3** | **0** | ***3*** |
| 9:00 AM | 9 | 51 | 0 | 7 | *67* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:15 AM | 10 | 15 | 0 | 11 | *36* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 5 | 0 | *5* |
| 9:30 AM | 12 | 16 | 0 | 7 | *35* | 1 | 1 | 0 | 0 | *2* | 0 | 1 | 2 | 0 | *3* |
| 9:45 AM | 9 | 20 | 0 | 8 | *37* | 2 | 0 | 0 | 0 | *2* | 0 | 1 | 1 | 0 | *2* |
| Count Total | 105 | 282 | 0 | 94 | *481* | 17 | 3 | 0 | 0 | *20* | 1 | 4 | 19 | 0 | *24* |
| **Peak Hour** | **35** | **94** | **0** | **35** | ***164*** | **6** | **1** | **0** | **0** | ***7*** | **0** | **1** | **6** | **0** | ***7*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 SB On Ramp | | | | US-101 SB Ramps | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 6 | 4 | 0 | 0 | 13 | 14 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 39 | 0 |
| 7:15 AM | 0 | 0 | 4 | 1 | 0 | 0 | 10 | 17 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 38 | 0 |
| 7:30 AM | 0 | 0 | 6 | 3 | 0 | 0 | 9 | 7 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 31 | 0 |
| 7:45 AM | 0 | 0 | 4 | 2 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 3 | 34 | 142 |
| **8:00 AM** | **0** | **0** | **4** | **2** | **0** | **0** | **11** | **21** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **1** | **47** | 150 |
| **8:15 AM** | **0** | **0** | **6** | **4** | **0** | **0** | **8** | **13** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **3** | **42** | 154 |
| **8:30 AM** | **0** | **0** | **6** | **3** | **0** | **0** | **7** | **17** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **3** | **43** | 166 |
| **8:45 AM** | **0** | **0** | **6** | **4** | **0** | **0** | **8** | **9** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **32** | **164** |
| 9:00 AM | 0 | 0 | 7 | 2 | 0 | 0 | 21 | 30 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 67 | 184 |
| 9:15 AM | 0 | 0 | 8 | 2 | 0 | 0 | 6 | 9 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 4 | 36 | 178 |
| 9:30 AM | 0 | 0 | 6 | 6 | 1 | 0 | 4 | 11 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 35 | 170 |
| 9:45 AM | 0 | 0 | 8 | 1 | 0 | 0 | 4 | 16 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 3 | 37 | 175 |
| Count Total | 0 | 0 | 71 | 34 | 1 | 0 | 109 | 172 | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 28 | 481 | 0 |
| **Peak Hour** | **0** | **0** | **22** | **13** | **0** | **0** | **34** | **60** | **0** | **0** | **0** | **0** | **0** | **26** | **0** | **9** | **164** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Willow Rd | | | Willow Rd | | | US-101 SB On Ramp | | | US-101 SB Ramps | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:30 AM | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 7:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 |
| **8:00 AM** | **0** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | 11 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 9 |
| **8:30 AM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 7 |
| **8:45 AM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **7** |
| 9:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 9:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| 9:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| Count Total | 0 | 17 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| **Peak Hour** | **0** | **6** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** |

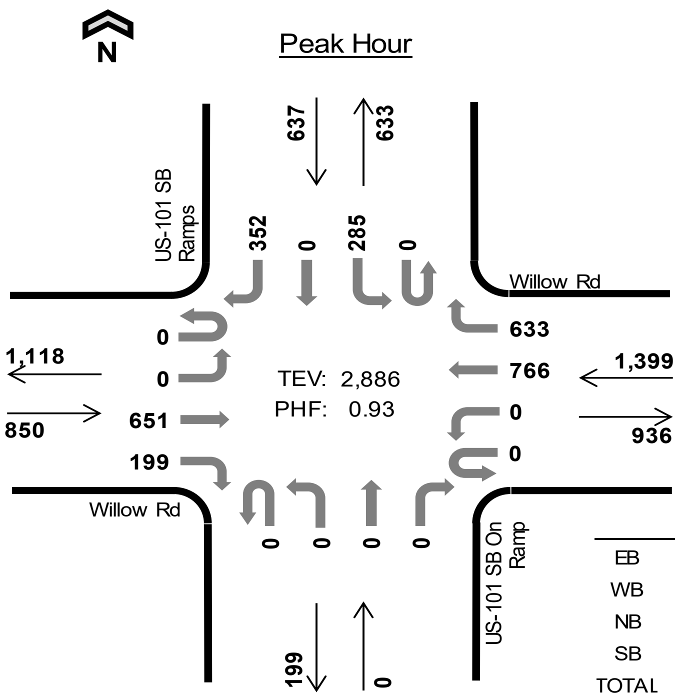
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# US-101 SB On Ramp
# Willow Rd

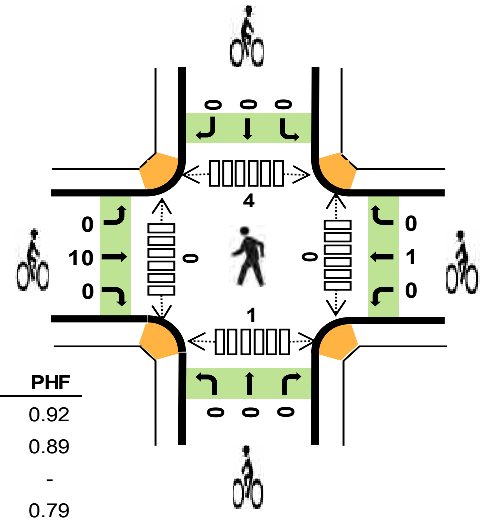
idax

Date: 03-13-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 5:30 PM to 6:30 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 3.1% | 0.92 |
| WB | 1.5% | 0.89 |
| NB | - | - |
| SB | 3.0% | 0.79 |
| TOTAL | 2.3% | 0.93 |




## Three-Hour Count Summaries

| Interval Start | | Willow Rd Eastbound UT | LT | TH | RT | Willow Rd Westbound UT | LT | TH | RT | US-101 SB On Ramp Northbound UT | LT | TH | RT | US-101 SB Ramps Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:30 PM | | 0 | 0 | 179 | 43 | 0 | 0 | 207 | 188 | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 73 | 776 | 0 |
| 5:45 PM | | 0 | 0 | 185 | 46 | 0 | 0 | 193 | 145 | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 87 | 723 | 0 |
| 6:00 PM | | 0 | 0 | 149 | 41 | 0 | 0 | 185 | 142 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 85 | 640 | 0 |
| 6:15 PM | | 0 | 0 | 138 | 69 | 0 | 0 | 181 | 158 | 0 | 0 | 0 | 0 | 0 | 94 | 0 | 107 | 747 | 2,886 |
| Peak Hour | All | 0 | 0 | 651 | 199 | 0 | 0 | 766 | 633 | 0 | 0 | 0 | 0 | 0 | 285 | 0 | 352 | 2,886 | 0 |
| | HV | 0 | 0 | 25 | 1 | 0 | 0 | 14 | 7 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 7 | 66 | 0 |
| | HV% | - | - | 4% | 1% | - | - | 2% | 1% | - | - | - | - | - | 4% | - | 2% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:30 PM | 7 | 6 | 0 | 5 | *18* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 1 | *1* |
| 5:45 PM | 4 | 5 | 0 | 5 | *14* | 3 | 0 | 0 | 0 | *3* | 0 | 0 | 2 | 0 | *2* |
| 6:00 PM | 7 | 5 | 0 | 3 | *15* | 7 | 0 | 0 | 0 | *7* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 8 | 5 | 0 | 6 | *19* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 2 | 0 | *2* |
| Peak Hour | 26 | 21 | 0 | 19 | *66* | 10 | 1 | 0 | 0 | *11* | 0 | 0 | 4 | 1 | *5* |

## Three-Hour Count Summaries

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 SB On Ramp | | | | US-101 SB Ramps | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 228 | 89 | 0 | 0 | 123 | 143 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 53 | 672 | 0 |
| 4:15 PM | 0 | 0 | 259 | 88 | 0 | 0 | 156 | 162 | 0 | 0 | 0 | 0 | 0 | 97 | 0 | 59 | 821 | 0 |
| 4:30 PM | 0 | 0 | 196 | 76 | 0 | 0 | 112 | 138 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 45 | 607 | 0 |
| 4:45 PM | 0 | 0 | 71 | 33 | 0 | 0 | 155 | 164 | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 44 | 500 | 2,600 |
| 5:00 PM | 0 | 0 | 171 | 46 | 0 | 0 | 149 | 172 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 55 | 630 | 2,558 |
| 5:15 PM | 0 | 0 | 164 | 49 | 0 | 0 | 150 | 189 | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 53 | 671 | 2,408 |
| **5:30 PM** | **0** | **0** | **179** | **43** | **0** | **0** | **207** | **188** | **0** | **0** | **0** | **0** | **0** | **86** | **0** | **73** | **776** | 2,577 |
| **5:45 PM** | **0** | **0** | **185** | **46** | **0** | **0** | **193** | **145** | **0** | **0** | **0** | **0** | **0** | **67** | **0** | **87** | **723** | 2,800 |
| **6:00 PM** | **0** | **0** | **149** | **41** | **0** | **0** | **185** | **142** | **0** | **0** | **0** | **0** | **0** | **38** | **0** | **85** | **640** | 2,810 |
| **6:15 PM** | **0** | **0** | **138** | **69** | **0** | **0** | **181** | **158** | **0** | **0** | **0** | **0** | **0** | **94** | **0** | **107** | **747** | **2,886** |
| 6:30 PM | 0 | 0 | 137 | 65 | 0 | 0 | 211 | 151 | 0 | 0 | 0 | 0 | 0 | 64 | 0 | 87 | 715 | 2,825 |
| 6:45 PM | 0 | 0 | 132 | 70 | 0 | 0 | 172 | 145 | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 65 | 666 | 2,768 |
| Count Total | 0 | 0 | 2,009 | 715 | 0 | 0 | 1,994 | 1,897 | 0 | 0 | 0 | 0 | 0 | 740 | 0 | 813 | 8,168 | 0 |
| **Peak Hour All** | **0** | **0** | **651** | **199** | **0** | **0** | **766** | **633** | **0** | **0** | **0** | **0** | **0** | **285** | **0** | **352** | **2,886** | **0** |
| **Peak Hour HV** | **0** | **0** | **25** | **1** | **0** | **0** | **14** | **7** | **0** | **0** | **0** | **0** | **0** | **12** | **0** | **7** | **66** | **0** |
| **Peak Hour HV%** | **-** | **-** | **4%** | **1%** | **-** | **-** | **2%** | **1%** | **-** | **-** | **-** | **-** | **-** | **4%** | **-** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 7 | 8 | 0 | 1 | *16* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 2 | 1 | *3* |
| 4:15 PM | 6 | 8 | 0 | 5 | *19* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* |
| 4:30 PM | 4 | 7 | 0 | 3 | *14* | 0 | 3 | 0 | 0 | *3* | 0 | 0 | 3 | 0 | *3* |
| 4:45 PM | 1 | 7 | 0 | 0 | *8* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 4 | 0 | *4* |
| 5:00 PM | 3 | 8 | 0 | 1 | *12* | 0 | 1 | 0 | 1 | *2* | 0 | 0 | 1 | 0 | *1* |
| 5:15 PM | 7 | 7 | 0 | 4 | *18* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 5 | 0 | *5* |
| **5:30 PM** | **7** | **6** | **0** | **5** | ***18*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **1** | *1* |
| **5:45 PM** | **4** | **5** | **0** | **5** | ***14*** | **3** | **0** | **0** | **0** | ***3*** | **0** | **0** | **2** | **0** | *2* |
| **6:00 PM** | **7** | **5** | **0** | **3** | ***15*** | **7** | **0** | **0** | **0** | ***7*** | **0** | **0** | **0** | **0** | *0* |
| **6:15 PM** | **8** | **5** | **0** | **6** | ***19*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **2** | **0** | ***2*** |
| 6:30 PM | 4 | 4 | 0 | 3 | *11* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 1 | 0 | *1* |
| 6:45 PM | 3 | 5 | 0 | 6 | *14* | 0 | 1 | 0 | 1 | *2* | 0 | 0 | 2 | 0 | *2* |
| Count Total | 61 | 75 | 0 | 42 | *178* | 12 | 9 | 0 | 2 | *23* | 0 | 0 | 23 | 2 | *25* |
| **Peak Hour** | **26** | **21** | **0** | **19** | ***66*** | **10** | **1** | **0** | **0** | ***11*** | **0** | **0** | **4** | **1** | ***5*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Willow Rd | | | | Willow Rd | | | | US-101 SB On Ramp | | | | US-101 SB Ramps | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 2 | 5 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 16 | 0 |
| 4:15 PM | 0 | 0 | 5 | 1 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 19 | 0 |
| 4:30 PM | 0 | 0 | 3 | 1 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 14 | 0 |
| 4:45 PM | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 57 |
| 5:00 PM | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 12 | 53 |
| 5:15 PM | 0 | 0 | 6 | 1 | 0 | 0 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 18 | 52 |
| **5:30 PM** | **0** | **0** | **7** | **0** | **0** | **0** | **5** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **18** | 56 |
| **5:45 PM** | **0** | **0** | **4** | **0** | **0** | **0** | **2** | **3** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **3** | **14** | 62 |
| **6:00 PM** | **0** | **0** | **7** | **0** | **0** | **0** | **4** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **15** | 65 |
| **6:15 PM** | **0** | **0** | **7** | **1** | **0** | **0** | **3** | **2** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **1** | **19** | **66** |
| 6:30 PM | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 11 | 59 |
| 6:45 PM | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 14 | 59 |
| Count Total | 0 | 0 | 51 | 10 | 0 | 0 | 41 | 34 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 7 | 178 | 0 |
| **Peak Hour** | **0** | **0** | **25** | **1** | **0** | **0** | **14** | **7** | **0** | **0** | **0** | **0** | **0** | **12** | **0** | **7** | **66** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Willow Rd | | | Willow Rd | | | US-101 SB On Ramp | | | US-101 SB Ramps | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 |
| 5:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 7 |
| 5:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 5 |
| **5:45 PM** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | 6 |
| **6:00 PM** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | 11 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **11** |
| 6:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 |
| 6:45 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 11 |
| Count Total | 0 | 12 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 23 | 0 |
| **Peak Hour** | **0** | **10** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **11** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32AM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 1

Groups Printed- Vehicles

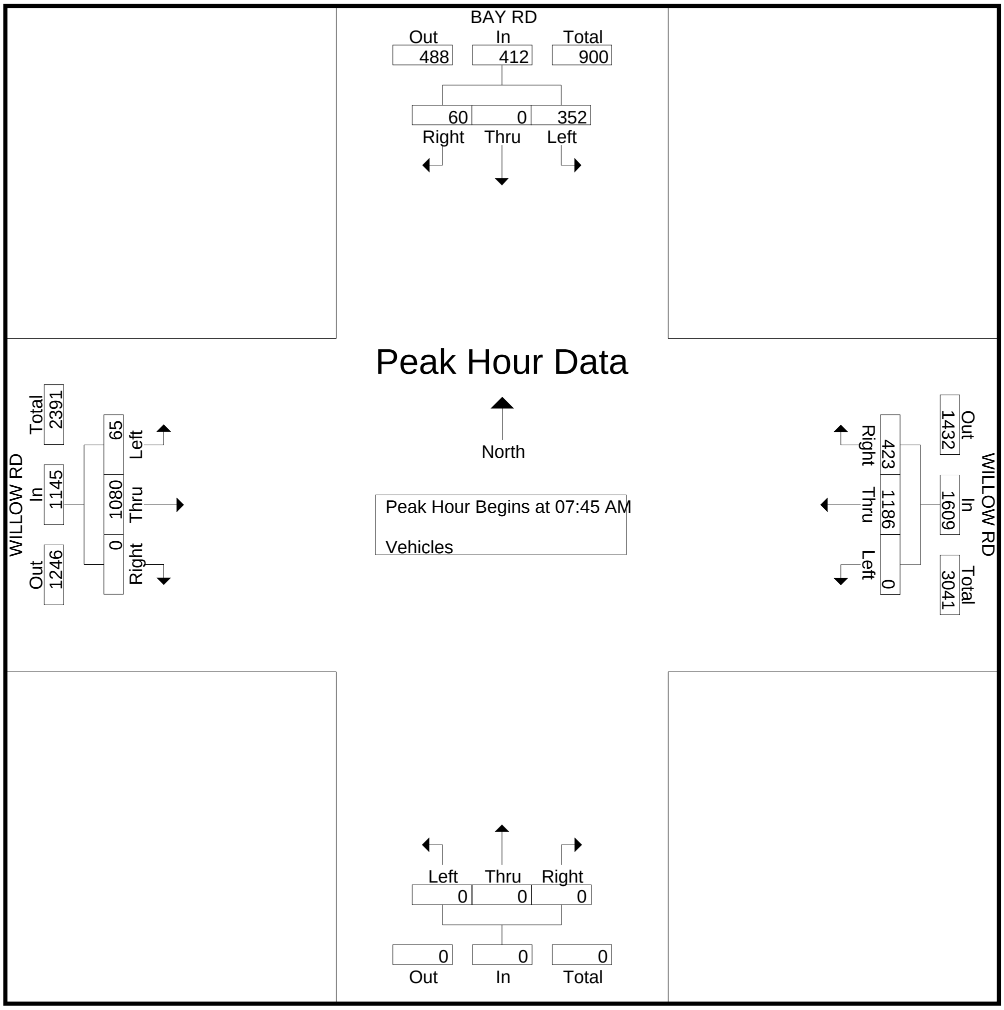
| | BAY RD Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 7 | 0 | 34 | 1 | 42 | 89 | 281 | 0 | 0 | 370 | 0 | 0 | 0 | 0 | 0 | 0 | 164 | 7 | 0 | 171 | 583 |
| 07:15 AM | 2 | 0 | 39 | 1 | 42 | 94 | 258 | 0 | 0 | 352 | 0 | 0 | 0 | 0 | 0 | 0 | 171 | 7 | 0 | 178 | 572 |
| 07:30 AM | 11 | 0 | 74 | 3 | 88 | 94 | 249 | 0 | 0 | 343 | 0 | 0 | 0 | 0 | 0 | 0 | 190 | 9 | 0 | 199 | 630 |
| 07:45 AM | 5 | 0 | 58 | 2 | 65 | 135 | 295 | 0 | 0 | 430 | 0 | 0 | 0 | 0 | 0 | 0 | 246 | 15 | 0 | 261 | 756 |
| Total | 25 | 0 | 205 | 7 | 237 | 412 | 1083 | 0 | 0 | 1495 | 0 | 0 | 0 | 0 | 0 | 0 | 771 | 38 | 0 | 809 | 2541 |
| 08:00 AM | 25 | 0 | 86 | 1 | 112 | 90 | 286 | 0 | 0 | 376 | 0 | 0 | 0 | 0 | 0 | 0 | 294 | 10 | 0 | 304 | 792 |
| 08:15 AM | 22 | 0 | 79 | 3 | 104 | 100 | 307 | 0 | 0 | 407 | 0 | 0 | 0 | 0 | 0 | 0 | 293 | 25 | 0 | 318 | 829 |
| 08:30 AM | 8 | 0 | 129 | 0 | 137 | 98 | 298 | 0 | 0 | 396 | 0 | 0 | 0 | 0 | 0 | 0 | 247 | 15 | 0 | 262 | 795 |
| 08:45 AM | 10 | 0 | 73 | 2 | 85 | 99 | 300 | 0 | 0 | 399 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 5 | 0 | 272 | 756 |
| Total | 65 | 0 | 367 | 6 | 438 | 387 | 1191 | 0 | 0 | 1578 | 0 | 0 | 0 | 0 | 0 | 0 | 1101 | 55 | 0 | 1156 | 3172 |
| 09:00 AM | 10 | 0 | 87 | 2 | 99 | 63 | 260 | 0 | 0 | 323 | 0 | 0 | 0 | 0 | 0 | 0 | 294 | 4 | 0 | 298 | 720 |
| 09:15 AM | 7 | 0 | 75 | 0 | 82 | 45 | 242 | 0 | 0 | 287 | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 7 | 0 | 232 | 601 |
| 09:30 AM | 4 | 0 | 50 | 0 | 54 | 40 | 275 | 0 | 0 | 315 | 0 | 0 | 0 | 0 | 0 | 0 | 219 | 8 | 0 | 227 | 596 |
| 09:45 AM | 6 | 0 | 47 | 0 | 53 | 40 | 245 | 0 | 0 | 285 | 0 | 0 | 0 | 0 | 0 | 0 | 191 | 4 | 0 | 195 | 533 |
| Total | 27 | 0 | 259 | 2 | 288 | 188 | 1022 | 0 | 0 | 1210 | 0 | 0 | 0 | 0 | 0 | 0 | 929 | 23 | 0 | 952 | 2450 |
| Grand Total | 117 | 0 | 831 | 15 | 963 | 987 | 3296 | 0 | 0 | 4283 | 0 | 0 | 0 | 0 | 0 | 0 | 2801 | 116 | 0 | 2917 | 8163 |
| Apprch % | 12.1 | 0 | 86.3 | 1.6 | | 23 | 77 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 96 | 4 | 0 | | |
| Total % | 1.4 | 0 | 10.2 | 0.2 | 11.8 | 12.1 | 40.4 | 0 | 0 | 52.5 | 0 | 0 | 0 | 0 | 0 | 0 | 34.3 | 1.4 | 0 | 35.7 | |

| | BAY RD Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 5 | 0 | 58 | 63 | **135** | 295 | 0 | **430** | 0 | 0 | 0 | 0 | 0 | 246 | 15 | 261 | 754 |
| 08:00 AM | **25** | 0 | 86 | 111 | 90 | 286 | 0 | 376 | 0 | 0 | 0 | 0 | 0 | **294** | 10 | 304 | 791 |
| 08:15 AM | 22 | 0 | 79 | 101 | 100 | **307** | 0 | 407 | 0 | 0 | 0 | 0 | 0 | 293 | **25** | **318** | **826** |
| 08:30 AM | 8 | 0 | **129** | **137** | 98 | 298 | 0 | 396 | 0 | 0 | 0 | 0 | 0 | 247 | 15 | 262 | 795 |
| Total Volume | 60 | 0 | 352 | 412 | 423 | 1186 | 0 | 1609 | 0 | 0 | 0 | 0 | 0 | 1080 | 65 | 1145 | 3166 |
| % App. Total | 14.6 | 0 | 85.4 | | 26.3 | 73.7 | 0 | | 0 | 0 | 0 | | 0 | 94.3 | 5.7 | | |
| PHF | .600 | .000 | .682 | .752 | .783 | .966 | .000 | .935 | .000 | .000 | .000 | .000 | .000 | .918 | .650 | .900 | .958 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32AM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32AM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

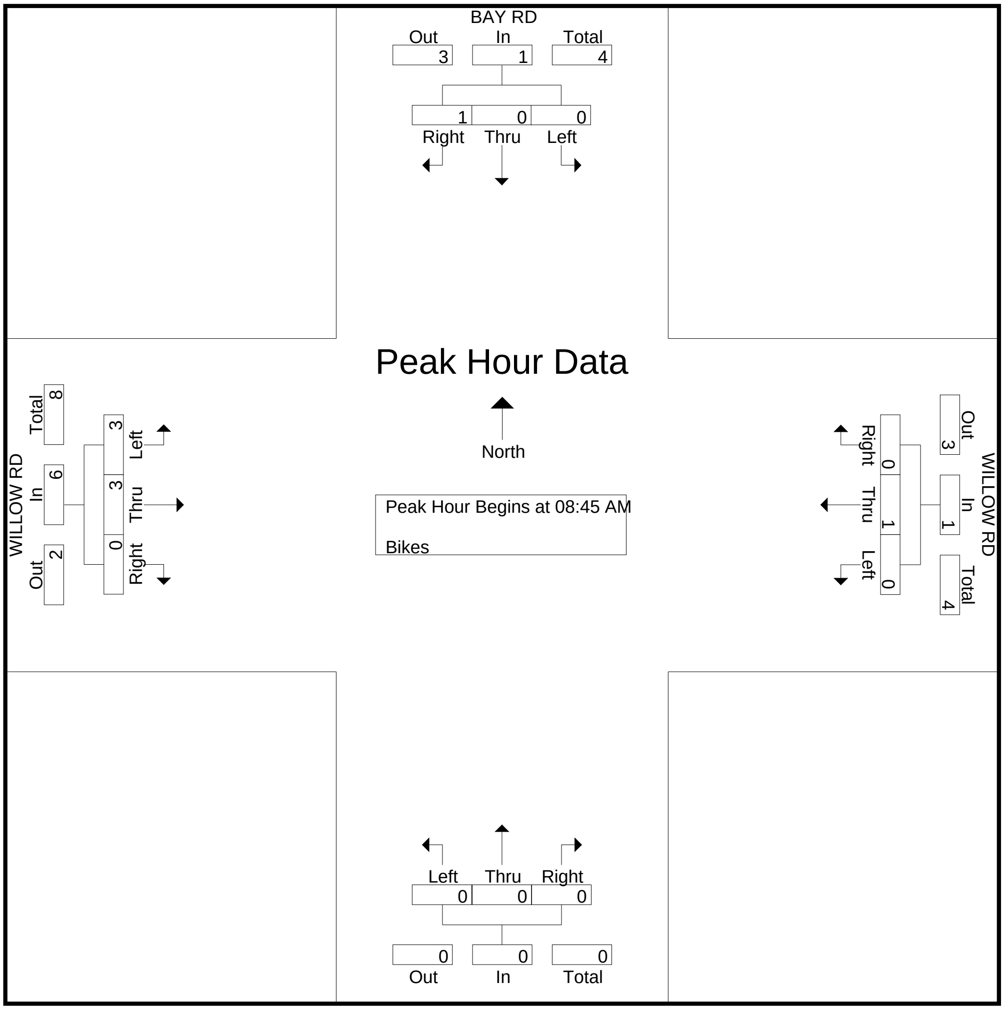
| | BAY RD Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| Total | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 3 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 6 | 7 |
| Grand Total | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 8 | 12 |
| Apprch % | 100 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 50 | 50 | 0 | | |
| Total % | 8.3 | 0 | 0 | 0 | 8.3 | 0 | 25 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 33.3 | 33.3 | 0 | 66.7 | |

| | BAY RD Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:45 AM | | | | | | | | | | | | | | | | | |
| 08:45 AM | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 2 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **1** | 1 | **2** | **3** |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Total Volume | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 6 | 8 |
| % App. Total | 100 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 50 | 50 | | |
| PHF | .250 | .000 | .000 | .250 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | .000 | .750 | .750 | .750 | .667 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32AM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 32PM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 1

Groups Printed- Vehicles

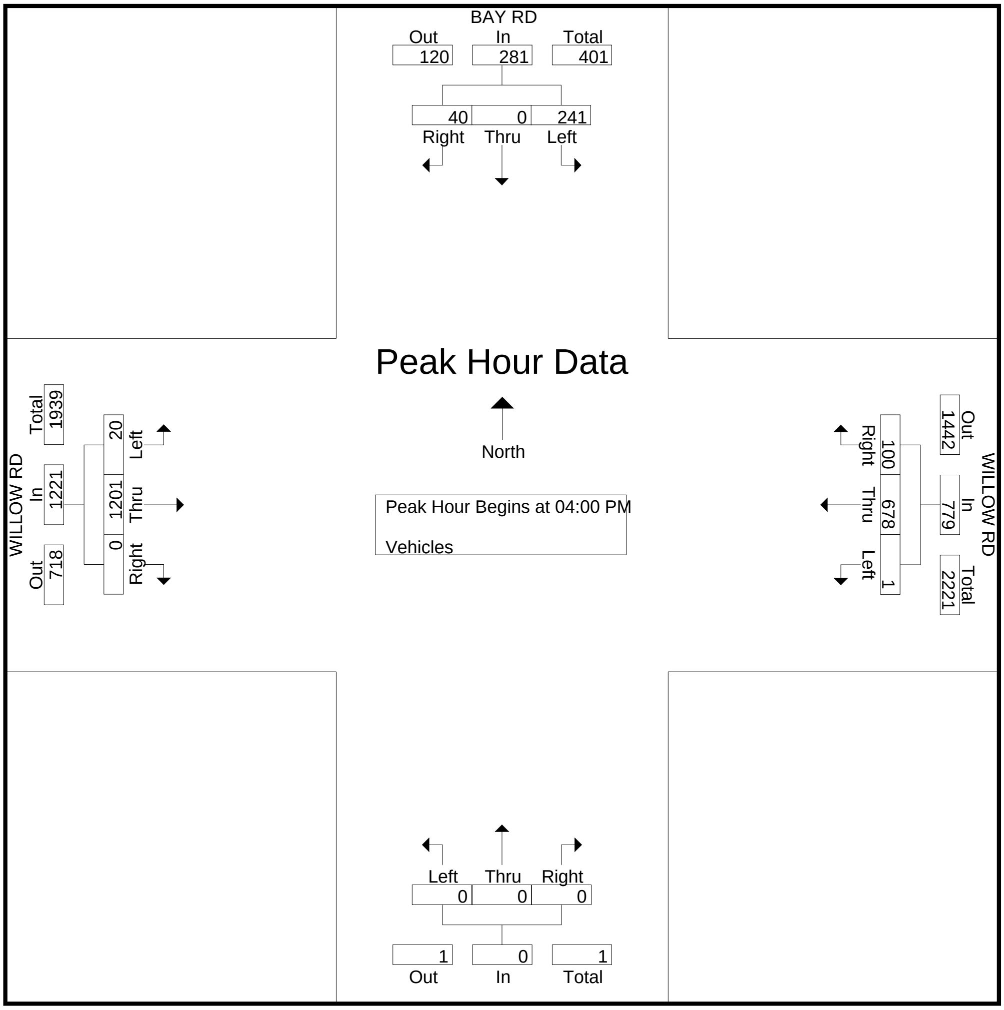
| | BAY RD Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 7 | 0 | 48 | 0 | 55 | 25 | 162 | 0 | 0 | 187 | 0 | 0 | 0 | 0 | 0 | 0 | 331 | 3 | 0 | 334 | 576 |
| 04:15 PM | 13 | 0 | 74 | 3 | 90 | 27 | 178 | 0 | 0 | 205 | 0 | 0 | 0 | 0 | 0 | 0 | 286 | 8 | 0 | 294 | 589 |
| 04:30 PM | 10 | 0 | 55 | 0 | 65 | 29 | 164 | 1 | 0 | 194 | 0 | 0 | 0 | 0 | 0 | 0 | 299 | 4 | 0 | 303 | 562 |
| 04:45 PM | 10 | 0 | 64 | 0 | 74 | 19 | 174 | 0 | 0 | 193 | 0 | 0 | 0 | 0 | 0 | 0 | 285 | 5 | 0 | 290 | 557 |
| Total | 40 | 0 | 241 | 3 | 284 | 100 | 678 | 1 | 0 | 779 | 0 | 0 | 0 | 0 | 0 | 0 | 1201 | 20 | 0 | 1221 | 2284 |
| 05:00 PM | 9 | 0 | 75 | 2 | 86 | 29 | 176 | 0 | 0 | 205 | 0 | 0 | 0 | 0 | 0 | 0 | 217 | 4 | 0 | 221 | 512 |
| 05:15 PM | 4 | 0 | 37 | 7 | 48 | 35 | 210 | 0 | 0 | 245 | 0 | 0 | 0 | 0 | 0 | 0 | 245 | 7 | 0 | 252 | 545 |
| 05:30 PM | 8 | 0 | 46 | 1 | 55 | 29 | 226 | 1 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 0 | 227 | 2 | 0 | 229 | 540 |
| 05:45 PM | 10 | 0 | 47 | 1 | 58 | 54 | 211 | 1 | 0 | 266 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 7 | 0 | 237 | 561 |
| Total | 31 | 0 | 205 | 11 | 247 | 147 | 823 | 2 | 0 | 972 | 0 | 0 | 0 | 0 | 0 | 0 | 919 | 20 | 0 | 939 | 2158 |
| 06:00 PM | 11 | 0 | 35 | 2 | 48 | 38 | 254 | 0 | 0 | 292 | 0 | 0 | 0 | 0 | 0 | 0 | 237 | 6 | 0 | 243 | 583 |
| 06:15 PM | 13 | 0 | 40 | 0 | 53 | 37 | 197 | 0 | 0 | 234 | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 2 | 0 | 227 | 514 |
| 06:30 PM | 2 | 0 | 37 | 1 | 40 | 33 | 229 | 0 | 0 | 262 | 0 | 0 | 0 | 0 | 0 | 0 | 223 | 5 | 0 | 228 | 530 |
| 06:45 PM | 8 | 0 | 36 | 0 | 44 | 42 | 186 | 0 | 0 | 228 | 0 | 0 | 0 | 0 | 0 | 0 | 208 | 2 | 0 | 210 | 482 |
| Total | 34 | 0 | 148 | 3 | 185 | 150 | 866 | 0 | 0 | 1016 | 0 | 0 | 0 | 0 | 0 | 0 | 893 | 15 | 0 | 908 | 2109 |
| Grand Total | 105 | 0 | 594 | 17 | 716 | 397 | 2367 | 3 | 0 | 2767 | 0 | 0 | 0 | 0 | 0 | 0 | 3013 | 55 | 0 | 3068 | 6551 |
| Apprch % | 14.7 | 0 | 83 | 2.4 | | 14.3 | 85.5 | 0.1 | 0 | | 0 | 0 | 0 | 0 | | 0 | 98.2 | 1.8 | 0 | | |
| Total % | 1.6 | 0 | 9.1 | 0.3 | 10.9 | 6.1 | 36.1 | 0 | 0 | 42.2 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 0.8 | 0 | 46.8 | |

| | BAY RD Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 7 | 0 | 48 | 55 | 25 | 162 | 0 | 187 | 0 | 0 | 0 | 0 | 0 | **331** | 3 | **334** | 576 |
| 04:15 PM | **13** | 0 | **74** | **87** | 27 | **178** | 0 | **205** | 0 | 0 | 0 | 0 | 0 | 286 | **8** | 294 | **586** |
| 04:30 PM | 10 | 0 | 55 | 65 | **29** | 164 | **1** | 194 | 0 | 0 | 0 | 0 | 0 | 299 | 4 | 303 | 562 |
| 04:45 PM | 10 | 0 | 64 | 74 | 19 | 174 | 0 | 193 | 0 | 0 | 0 | 0 | 0 | 285 | 5 | 290 | 557 |
| Total Volume | 40 | 0 | 241 | 281 | 100 | 678 | 1 | 779 | 0 | 0 | 0 | 0 | 0 | 1201 | 20 | 1221 | 2281 |
| % App. Total | 14.2 | 0 | 85.8 | | 12.8 | 87 | 0.1 | | 0 | 0 | 0 | | 0 | 98.4 | 1.6 | | |
| PHF | .769 | .000 | .814 | .807 | .862 | .952 | .250 | .950 | .000 | .000 | .000 | .000 | .000 | .907 | .625 | .914 | .973 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32PM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 32PM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 1

Groups Printed- Bikes

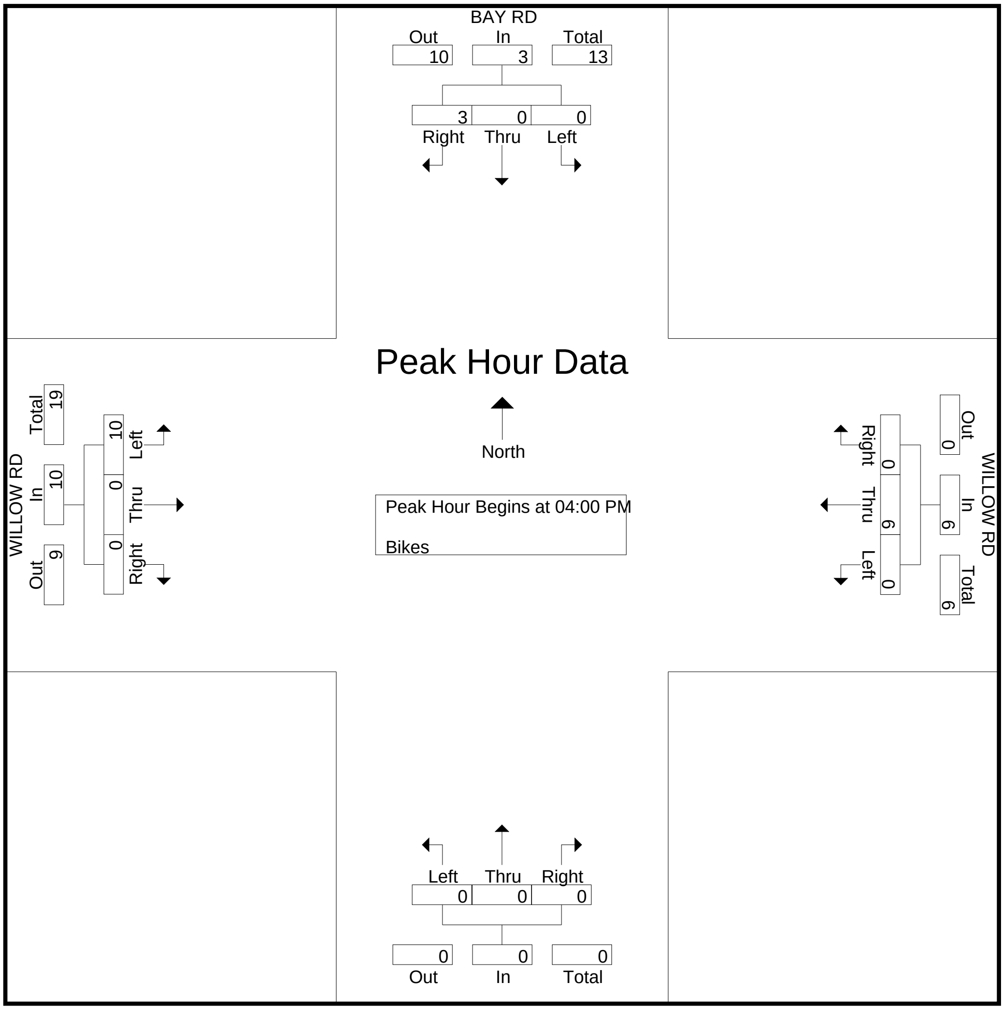
| | BAY RD Southbound | | | | | WILLOW RD Westbound | | | | | Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 9 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 |
| 04:45 PM | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| Total | 3 | 0 | 0 | 0 | 3 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10 | 19 |
| 05:00 PM | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 5 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2 | 0 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 9 |
| 06:00 PM | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 06:15 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 06:45 PM | 3 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |
| Total | 6 | 0 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 14 |
| Grand Total | 11 | 0 | 0 | 0 | 11 | 1 | 15 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 14 | 0 | 15 | 42 |
| Apprch % | 100 | 0 | 0 | 0 | | 6.2 | 93.8 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 6.7 | 93.3 | 0 | | |
| Total % | 26.2 | 0 | 0 | 0 | 26.2 | 2.4 | 35.7 | 0 | 0 | 38.1 | 0 | 0 | 0 | 0 | 0 | 0 | 2.4 | 33.3 | 0 | 35.7 | |

| | BAY RD Southbound | | | | WILLOW RD Westbound | | | | Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 1 | 0 | 0 | 1 | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | **6** | **6** | **9** |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| 04:45 PM | **2** | 0 | 0 | **2** | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 |
| Total Volume | 3 | 0 | 0 | 3 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 19 |
| % App. Total | 100 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 0 | 100 | | |
| PHF | .375 | .000 | .000 | .375 | .000 | .750 | .000 | .750 | .000 | .000 | .000 | .000 | .000 | .000 | .417 | .417 | .528 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 32PM FINAL
Site Code : 00000032
Start Date : 4/23/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19AM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

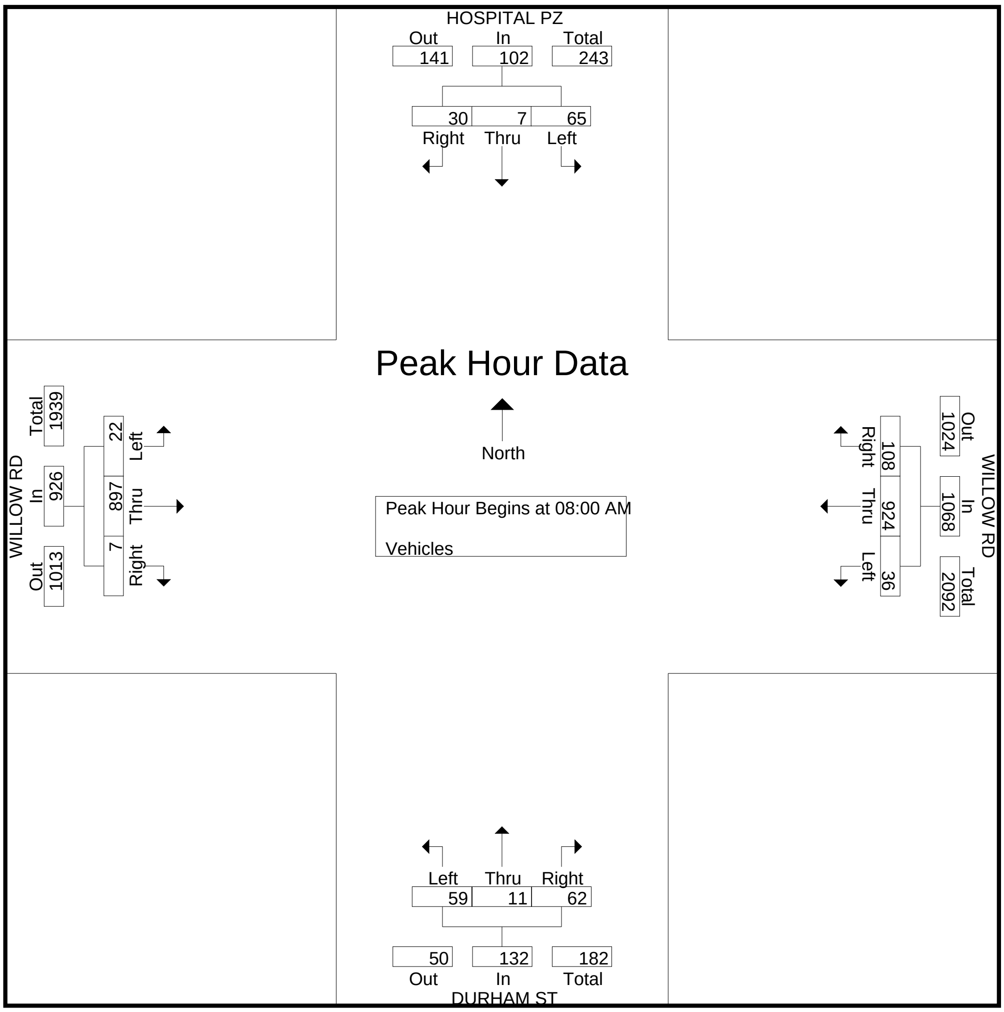
| | HOSPITAL PZ Southbound | | | | | WILLOW RD Westbound | | | | | DURHAM ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 4 | 3 | 13 | 0 | 20 | 46 | 217 | 5 | 2 | 270 | 8 | 1 | 5 | 2 | 16 | 2 | 111 | 2 | 5 | 120 | 426 |
| 07:15 AM | 4 | 0 | 9 | 2 | 15 | 38 | 241 | 6 | 0 | 285 | 13 | 4 | 5 | 1 | 23 | 0 | 127 | 6 | 2 | 135 | 458 |
| 07:30 AM | 2 | 2 | 12 | 1 | 17 | 27 | 239 | 10 | 2 | 278 | 16 | 3 | 9 | 2 | 30 | 1 | 142 | 3 | 0 | 146 | 471 |
| 07:45 AM | 4 | 0 | 8 | 0 | 12 | 26 | 243 | 6 | 3 | 278 | 9 | 7 | 12 | 4 | 32 | 2 | 178 | 4 | 3 | 187 | 509 |
| Total | 14 | 5 | 42 | 3 | 64 | 137 | 940 | 27 | 7 | 1111 | 46 | 15 | 31 | 9 | 101 | 5 | 558 | 15 | 10 | 588 | 1864 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 7 | 1 | 18 | 2 | 28 | 31 | 225 | 7 | 0 | 263 | 11 | 5 | 26 | 0 | 42 | 1 | 206 | 4 | 4 | 215 | 548 |
| 08:15 AM | 8 | 2 | 19 | 1 | 30 | 32 | 230 | 10 | 3 | 275 | 19 | 2 | 10 | 6 | 37 | 4 | 223 | 5 | 6 | 238 | 580 |
| 08:30 AM | 8 | 2 | 17 | 0 | 27 | 19 | 225 | 12 | 4 | 260 | 20 | 2 | 13 | 2 | 37 | 0 | 235 | 6 | 9 | 250 | 574 |
| 08:45 AM | 7 | 2 | 11 | 3 | 23 | 26 | 244 | 7 | 1 | 278 | 12 | 2 | 10 | 9 | 33 | 2 | 233 | 7 | 3 | 245 | 579 |
| Total | 30 | 7 | 65 | 6 | 108 | 108 | 924 | 36 | 8 | 1076 | 62 | 11 | 59 | 17 | 149 | 7 | 897 | 22 | 22 | 948 | 2281 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 8 | 0 | 13 | 0 | 21 | 18 | 249 | 9 | 2 | 278 | 6 | 1 | 4 | 6 | 17 | 1 | 199 | 7 | 3 | 210 | 526 |
| 09:15 AM | 2 | 1 | 12 | 0 | 15 | 13 | 226 | 10 | 1 | 250 | 14 | 3 | 10 | 7 | 34 | 2 | 171 | 3 | 3 | 179 | 478 |
| 09:30 AM | 6 | 3 | 9 | 0 | 18 | 26 | 215 | 10 | 1 | 252 | 4 | 2 | 7 | 0 | 13 | 3 | 188 | 4 | 1 | 196 | 479 |
| 09:45 AM | 7 | 1 | 11 | 0 | 19 | 22 | 205 | 6 | 1 | 234 | 13 | 5 | 9 | 2 | 29 | 2 | 171 | 7 | 7 | 187 | 469 |
| Total | 23 | 5 | 45 | 0 | 73 | 79 | 895 | 35 | 5 | 1014 | 37 | 11 | 30 | 15 | 93 | 8 | 729 | 21 | 14 | 772 | 1952 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 67 | 17 | 152 | 9 | 245 | 324 | 2759 | 98 | 20 | 3201 | 145 | 37 | 120 | 41 | 343 | 20 | 2184 | 58 | 46 | 2308 | 6097 |
| Apprch % | 27.3 | 6.9 | 62 | 3.7 | | 10.1 | 86.2 | 3.1 | 0.6 | | 42.3 | 10.8 | 35 | 12 | | 0.9 | 94.6 | 2.5 | 2 | | |
| Total % | 1.1 | 0.3 | 2.5 | 0.1 | 4 | 5.3 | 45.3 | 1.6 | 0.3 | 52.5 | 2.4 | 0.6 | 2 | 0.7 | 5.6 | 0.3 | 35.8 | 1 | 0.8 | 37.9 | |

| | HOSPITAL PZ Southbound | | | | WILLOW RD Westbound | | | | DURHAM ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 7 | 1 | 18 | 26 | 31 | 225 | 7 | 263 | 11 | **5** | **26** | **42** | 1 | 206 | 4 | 211 | 542 |
| 08:15 AM | **8** | **2** | **19** | **29** | **32** | 230 | 10 | 272 | 19 | 2 | 10 | 31 | **4** | 223 | 5 | 232 | **564** |
| 08:30 AM | 8 | 2 | 17 | 27 | 19 | 225 | **12** | 256 | **20** | 2 | 13 | 35 | 0 | **235** | 6 | 241 | 559 |
| 08:45 AM | 7 | 2 | 11 | 20 | 26 | **244** | 7 | **277** | 12 | 2 | 10 | 24 | 2 | 233 | **7** | **242** | 563 |
| Total Volume | 30 | 7 | 65 | 102 | 108 | 924 | 36 | 1068 | 62 | 11 | 59 | 132 | 7 | 897 | 22 | 926 | 2228 |
| % App. Total | 29.4 | 6.9 | 63.7 | | 10.1 | 86.5 | 3.4 | | 47 | 8.3 | 44.7 | | 0.8 | 96.9 | 2.4 | | |
| PHF | .938 | .875 | .855 | .879 | .844 | .947 | .750 | .964 | .775 | .550 | .567 | .786 | .438 | .954 | .786 | .957 | .988 |

# Traffic Data Service


San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 19AM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19AM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

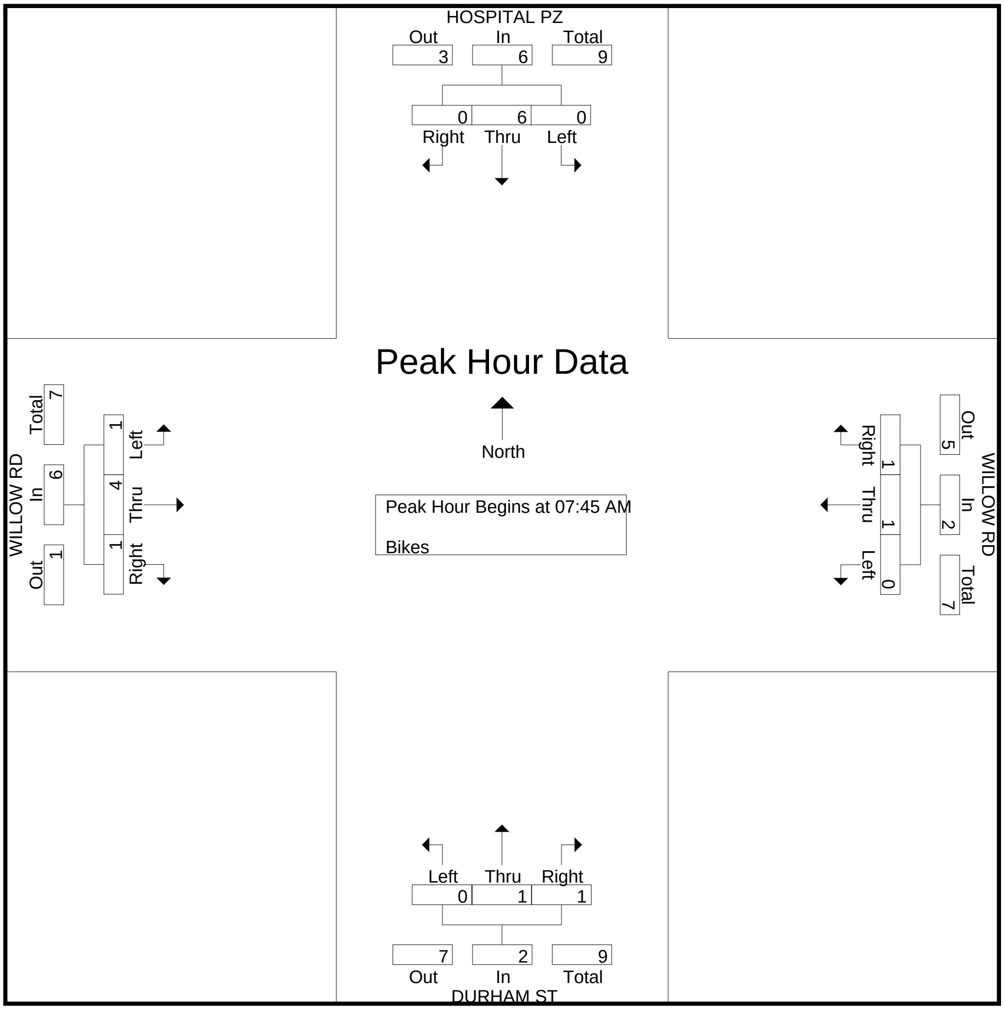
| | HOSPITAL PZ Southbound | | | | | WILLOW RD Westbound | | | | | DURHAM ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 4 | 5 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 6 | 7 |
| 08:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:15 AM | 0 | 3 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 7 |
| 08:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 6 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 11 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 4 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 0 | 6 | 11 |
| Grand Total | 0 | 6 | 0 | 0 | 6 | 1 | 5 | 0 | 0 | 6 | 2 | 1 | 0 | 0 | 3 | 1 | 12 | 1 | 0 | 14 | 29 |
| Apprch % | 0 | 100 | 0 | 0 | | 16.7 | 83.3 | 0 | 0 | | 66.7 | 33.3 | 0 | 0 | | 7.1 | 85.7 | 7.1 | 0 | | |
| Total % | 0 | 20.7 | 0 | 0 | 20.7 | 3.4 | 17.2 | 0 | 0 | 20.7 | 6.9 | 3.4 | 0 | 0 | 10.3 | 3.4 | 41.4 | 3.4 | 0 | 48.3 | |

| | HOSPITAL PZ Southbound | | | | WILLOW RD Westbound | | | | DURHAM ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **1** | **2** | **1** | **4** | 5 |
| 08:00 AM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:15 AM | 0 | **3** | 0 | **3** | **1** | 0 | 0 | 1 | **1** | **1** | 0 | **2** | 0 | 1 | 0 | 1 | **7** |
| 08:30 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| Total Volume | 0 | 6 | 0 | 6 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 2 | 1 | 4 | 1 | 6 | 16 |
| % App. Total | 0 | 100 | 0 | | 50 | 50 | 0 | | 50 | 50 | 0 | | 16.7 | 66.7 | 16.7 | | |
| PHF | .000 | .500 | .000 | .500 | .250 | .250 | .000 | .500 | .250 | .250 | .000 | .250 | .250 | .500 | .250 | .375 | .571 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19AM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19PM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 1

Groups Printed- Vehicles

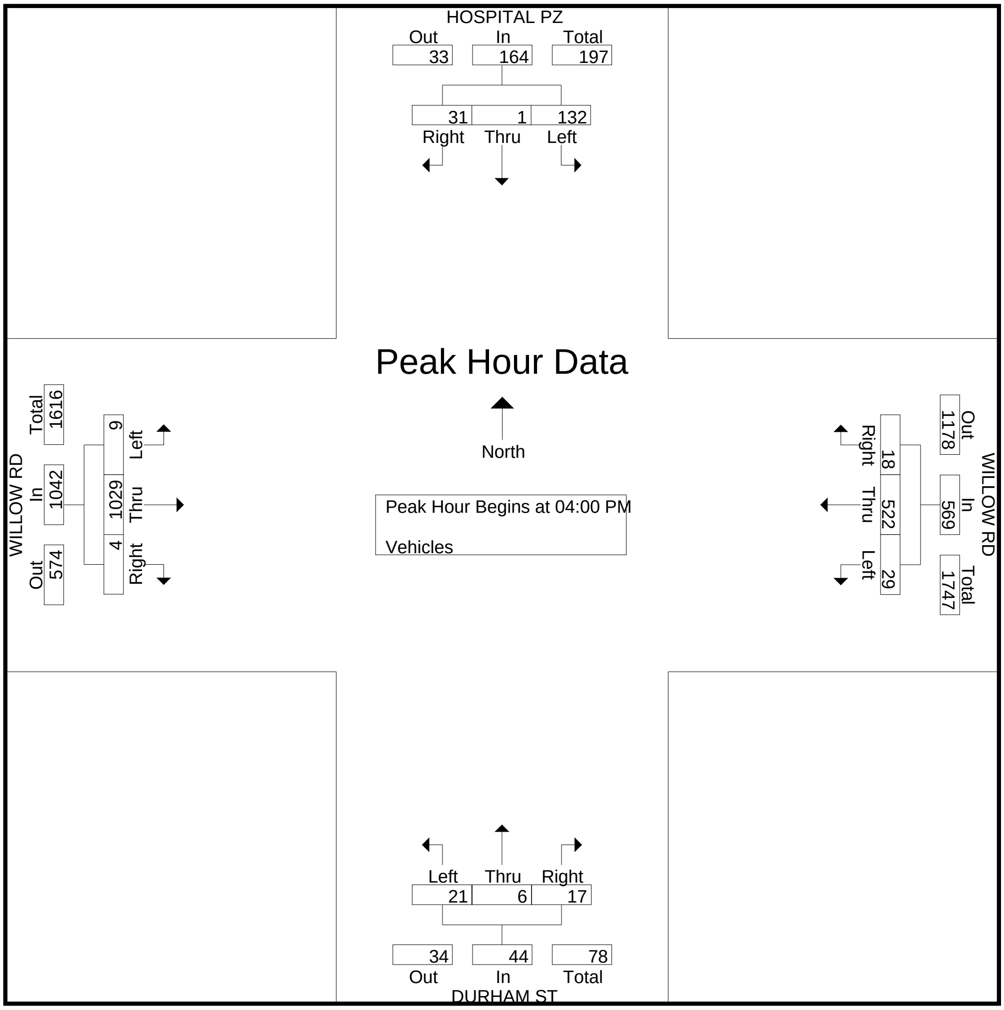
| | HOSPITAL PZ Southbound | | | | | WILLOW RD Westbound | | | | | DURHAM ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 10 | 1 | 55 | 1 | 67 | 6 | 121 | 5 | 3 | 135 | 6 | 2 | 4 | 6 | 18 | 2 | 246 | 2 | 4 | 254 | 474 |
| 04:15 PM | 1 | 0 | 20 | 2 | 23 | 5 | 152 | 5 | 3 | 165 | 6 | 2 | 4 | 2 | 14 | 1 | 299 | 2 | 1 | 303 | 505 |
| 04:30 PM | 12 | 0 | 40 | 0 | 52 | 4 | 132 | 9 | 3 | 148 | 2 | 1 | 7 | 1 | 11 | 0 | 251 | 2 | 1 | 254 | 465 |
| 04:45 PM | 8 | 0 | 17 | 0 | 25 | 3 | 117 | 10 | 1 | 131 | 3 | 1 | 6 | 10 | 20 | 1 | 233 | 3 | 3 | 240 | 416 |
| Total | 31 | 1 | 132 | 3 | 167 | 18 | 522 | 29 | 10 | 579 | 17 | 6 | 21 | 19 | 63 | 4 | 1029 | 9 | 9 | 1051 | 1860 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 3 | 2 | 11 | 0 | 16 | 5 | 149 | 6 | 0 | 160 | 10 | 0 | 10 | 0 | 20 | 2 | 234 | 2 | 0 | 238 | 434 |
| 05:15 PM | 5 | 1 | 13 | 1 | 20 | 3 | 143 | 12 | 5 | 163 | 4 | 4 | 13 | 3 | 24 | 1 | 194 | 0 | 3 | 198 | 405 |
| 05:30 PM | 6 | 0 | 10 | 1 | 17 | 5 | 170 | 10 | 7 | 192 | 5 | 3 | 7 | 2 | 17 | 2 | 219 | 1 | 1 | 223 | 449 |
| 05:45 PM | 7 | 0 | 14 | 1 | 22 | 5 | 192 | 6 | 2 | 205 | 1 | 2 | 11 | 1 | 15 | 6 | 161 | 3 | 0 | 170 | 412 |
| Total | 21 | 3 | 48 | 3 | 75 | 18 | 654 | 34 | 14 | 720 | 20 | 9 | 41 | 6 | 76 | 11 | 808 | 6 | 4 | 829 | 1700 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 7 | 0 | 8 | 4 | 19 | 3 | 172 | 4 | 0 | 179 | 3 | 2 | 6 | 3 | 14 | 2 | 169 | 1 | 3 | 175 | 387 |
| 06:15 PM | 2 | 0 | 7 | 3 | 12 | 8 | 176 | 4 | 3 | 191 | 2 | 3 | 3 | 2 | 10 | 3 | 185 | 3 | 0 | 191 | 404 |
| 06:30 PM | 4 | 2 | 7 | 3 | 16 | 3 | 181 | 3 | 1 | 188 | 9 | 0 | 3 | 0 | 12 | 1 | 227 | 4 | 0 | 232 | 448 |
| 06:45 PM | 0 | 2 | 8 | 1 | 11 | 5 | 185 | 3 | 2 | 195 | 3 | 1 | 6 | 2 | 12 | 2 | 208 | 2 | 1 | 213 | 431 |
| Total | 13 | 4 | 30 | 11 | 58 | 19 | 714 | 14 | 6 | 753 | 17 | 6 | 18 | 7 | 48 | 8 | 789 | 10 | 4 | 811 | 1670 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 65 | 8 | 210 | 17 | 300 | 55 | 1890 | 77 | 30 | 2052 | 54 | 21 | 80 | 32 | 187 | 23 | 2626 | 25 | 17 | 2691 | 5230 |
| Apprch % | 21.7 | 2.7 | 70 | 5.7 | | 2.7 | 92.1 | 3.8 | 1.5 | | 28.9 | 11.2 | 42.8 | 17.1 | | 0.9 | 97.6 | 0.9 | 0.6 | | |
| Total % | 1.2 | 0.2 | 4 | 0.3 | 5.7 | 1.1 | 36.1 | 1.5 | 0.6 | 39.2 | 1 | 0.4 | 1.5 | 0.6 | 3.6 | 0.4 | 50.2 | 0.5 | 0.3 | 51.5 | |

| | HOSPITAL PZ Southbound | | | | WILLOW RD Westbound | | | | DURHAM ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 10 | **1** | **55** | **66** | **6** | 121 | 5 | 132 | **6** | **2** | 4 | **12** | **2** | 246 | 2 | 250 | 460 |
| 04:15 PM | 1 | 0 | 20 | 21 | 5 | **152** | 5 | **162** | 6 | 2 | 4 | 12 | 1 | **299** | 2 | **302** | **497** |
| 04:30 PM | **12** | 0 | 40 | 52 | 4 | 132 | 9 | 145 | 2 | 1 | **7** | 10 | 0 | 251 | 2 | 253 | 460 |
| 04:45 PM | 8 | 0 | 17 | 25 | 3 | 117 | **10** | 130 | 3 | 1 | 6 | 10 | 1 | 233 | **3** | 237 | 402 |
| Total Volume | 31 | 1 | 132 | 164 | 18 | 522 | 29 | 569 | 17 | 6 | 21 | 44 | 4 | 1029 | 9 | 1042 | 1819 |
| % App. Total | 18.9 | 0.6 | 80.5 | | 3.2 | 91.7 | 5.1 | | 38.6 | 13.6 | 47.7 | | 0.4 | 98.8 | 0.9 | | |
| PHF | .646 | .250 | .600 | .621 | .750 | .859 | .725 | .878 | .708 | .750 | .750 | .917 | .500 | .860 | .750 | .863 | .915 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19PM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19PM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 1

Groups Printed- Bikes

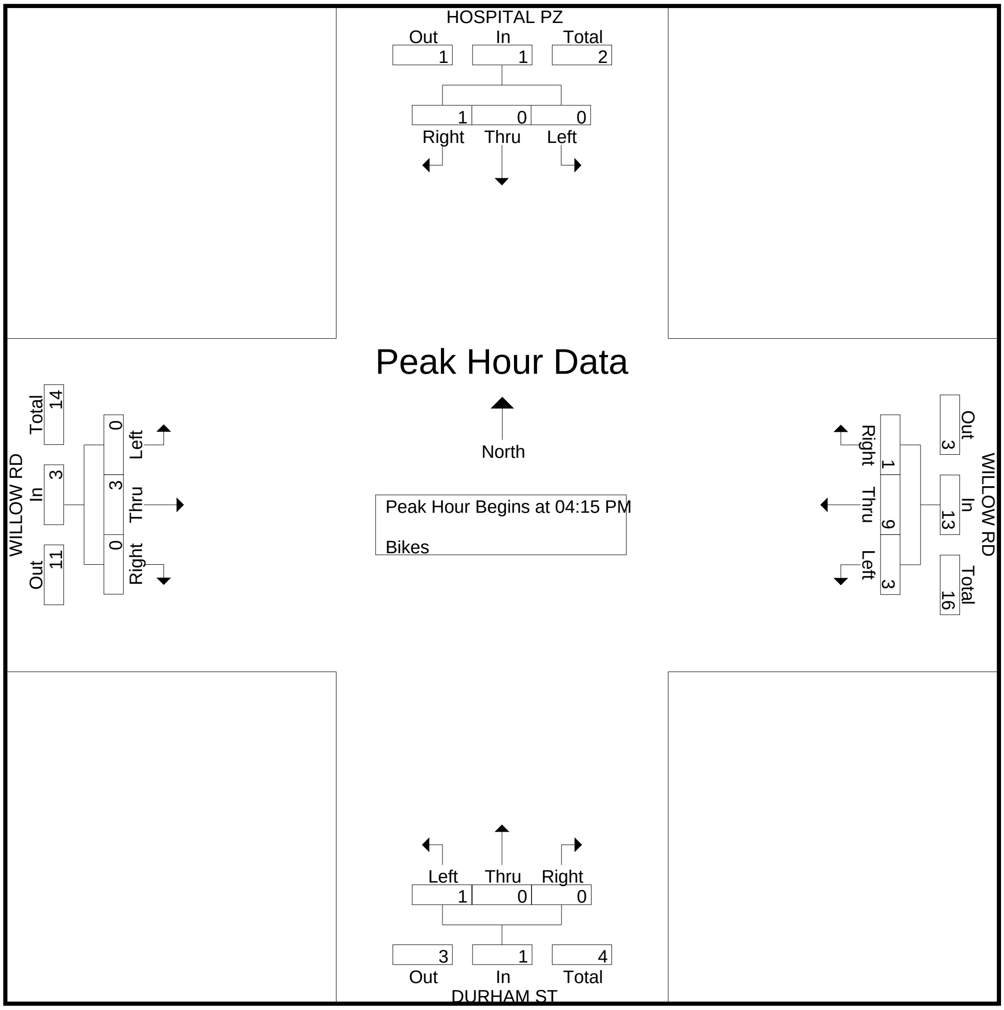
| | HOSPITAL PZ Southbound | | | | | WILLOW RD Westbound | | | | | DURHAM ST Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 7 |
| Total | 1 | 0 | 0 | 0 | 1 | 2 | 4 | 3 | 0 | 9 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 14 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 |
| 05:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 05:45 PM | 0 | 2 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 6 |
| Total | 1 | 2 | 0 | 0 | 3 | 1 | 8 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 4 | 16 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 4 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 3 | 12 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 2 | 2 | 0 | 0 | 4 | 3 | 20 | 3 | 0 | 26 | 1 | 0 | 1 | 0 | 2 | 2 | 7 | 1 | 0 | 10 | 42 |
| Apprch % | 50 | 50 | 0 | 0 | | 11.5 | 76.9 | 11.5 | 0 | | 50 | 0 | 50 | 0 | | 20 | 70 | 10 | 0 | | |
| Total % | 4.8 | 4.8 | 0 | 0 | 9.5 | 7.1 | 47.6 | 7.1 | 0 | 61.9 | 2.4 | 0 | 2.4 | 0 | 4.8 | 4.8 | 16.7 | 2.4 | 0 | 23.8 | |

| | HOSPITAL PZ Southbound | | | | WILLOW RD Westbound | | | | DURHAM ST Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | **2** | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | **1** | 0 | 0 | **1** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | **1** | **1** | 0 | **2** | 0 | **2** | **7** |
| 05:00 PM | 0 | 0 | 0 | 0 | **1** | **5** | 0 | **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Total Volume | 1 | 0 | 0 | 1 | 1 | 9 | 3 | 13 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 3 | 18 |
| % App. Total | 100 | 0 | 0 | | 7.7 | 69.2 | 23.1 | | 0 | 0 | 100 | | 0 | 100 | 0 | | |
| PHF | .250 | .000 | .000 | .250 | .250 | .450 | .375 | .542 | .000 | .000 | .250 | .250 | .000 | .375 | .000 | .375 | .643 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 19PM FINAL
Site Code : 00000019
Start Date : 4/16/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18AM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

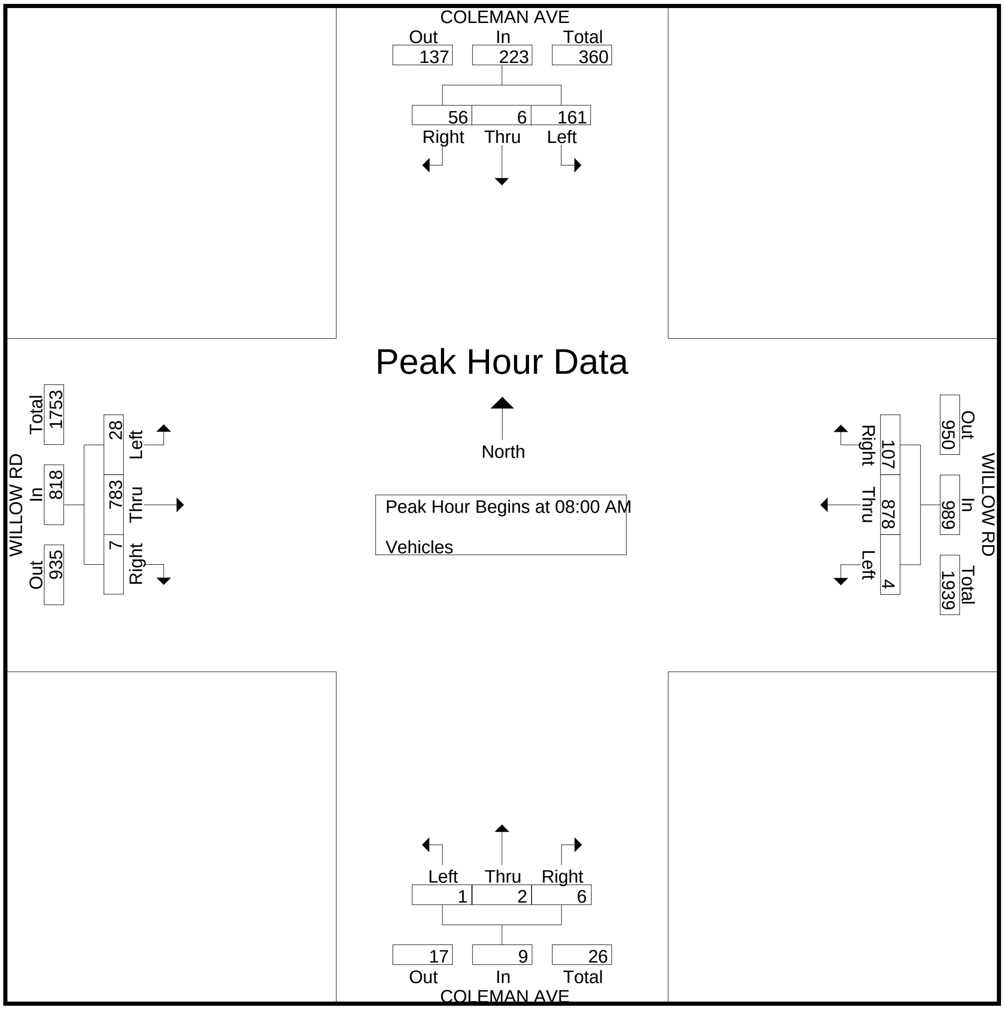
| | COLEMAN AVE Southbound | | | | | WILLOW RD Westbound | | | | | COLEMAN AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 4 | 1 | 14 | 1 | 20 | 9 | 215 | 0 | 0 | 224 | 0 | 0 | 0 | 1 | 1 | 0 | 94 | 0 | 1 | 95 | 340 |
| 07:15 AM | 4 | 0 | 17 | 0 | 21 | 18 | 224 | 1 | 1 | 244 | 0 | 0 | 1 | 0 | 1 | 2 | 91 | 1 | 1 | 95 | 361 |
| 07:30 AM | 6 | 0 | 34 | 2 | 42 | 17 | 218 | 1 | 2 | 238 | 2 | 0 | 0 | 3 | 5 | 2 | 132 | 1 | 0 | 135 | 420 |
| 07:45 AM | 10 | 1 | 23 | 2 | 36 | 16 | 247 | 1 | 11 | 275 | 3 | 1 | 0 | 3 | 7 | 3 | 156 | 2 | 2 | 163 | 481 |
| Total | 24 | 2 | 88 | 5 | 119 | 60 | 904 | 3 | 14 | 981 | 5 | 1 | 1 | 7 | 14 | 7 | 473 | 4 | 4 | 488 | 1602 |
| 08:00 AM | 10 | 0 | 32 | 3 | 45 | 35 | 222 | 3 | 12 | 272 | 1 | 0 | 0 | 4 | 5 | 1 | 200 | 5 | 9 | 215 | 537 |
| 08:15 AM | 15 | 1 | 36 | 0 | 52 | 21 | 228 | 1 | 9 | 259 | 2 | 0 | 0 | 1 | 3 | 1 | 214 | 6 | 2 | 223 | 537 |
| 08:30 AM | 21 | 1 | 55 | 0 | 77 | 27 | 213 | 0 | 16 | 256 | 2 | 1 | 0 | 1 | 4 | 1 | 188 | 10 | 1 | 200 | 537 |
| 08:45 AM | 10 | 4 | 38 | 1 | 53 | 24 | 215 | 0 | 3 | 242 | 1 | 1 | 1 | 3 | 6 | 4 | 181 | 7 | 4 | 196 | 497 |
| Total | 56 | 6 | 161 | 4 | 227 | 107 | 878 | 4 | 40 | 1029 | 6 | 2 | 1 | 9 | 18 | 7 | 783 | 28 | 16 | 834 | 2108 |
| 09:00 AM | 11 | 2 | 29 | 1 | 43 | 17 | 196 | 2 | 7 | 222 | 3 | 1 | 2 | 3 | 9 | 2 | 181 | 4 | 3 | 190 | 464 |
| 09:15 AM | 11 | 2 | 39 | 1 | 53 | 17 | 197 | 1 | 6 | 221 | 3 | 2 | 0 | 1 | 6 | 0 | 177 | 1 | 0 | 178 | 458 |
| 09:30 AM | 9 | 0 | 31 | 2 | 42 | 12 | 202 | 2 | 4 | 220 | 1 | 0 | 1 | 0 | 2 | 4 | 145 | 0 | 0 | 149 | 413 |
| 09:45 AM | 5 | 1 | 25 | 1 | 32 | 11 | 214 | 0 | 6 | 231 | 2 | 0 | 0 | 1 | 3 | 1 | 147 | 4 | 2 | 154 | 420 |
| Total | 36 | 5 | 124 | 5 | 170 | 57 | 809 | 5 | 23 | 894 | 9 | 3 | 3 | 5 | 20 | 7 | 650 | 9 | 5 | 671 | 1755 |
| Grand Total | 116 | 13 | 373 | 14 | 516 | 224 | 2591 | 12 | 77 | 2904 | 20 | 6 | 5 | 21 | 52 | 21 | 1906 | 41 | 25 | 1993 | 5465 |
| Apprch % | 22.5 | 2.5 | 72.3 | 2.7 | | 7.7 | 89.2 | 0.4 | 2.7 | | 38.5 | 11.5 | 9.6 | 40.4 | | 1.1 | 95.6 | 2.1 | 1.3 | | |
| Total % | 2.1 | 0.2 | 6.8 | 0.3 | 9.4 | 4.1 | 47.4 | 0.2 | 1.4 | 53.1 | 0.4 | 0.1 | 0.1 | 0.4 | 1 | 0.4 | 34.9 | 0.8 | 0.5 | 36.5 | |

| | COLEMAN AVE Southbound | | | | WILLOW RD Westbound | | | | COLEMAN AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 10 | 0 | 32 | 42 | **35** | 222 | **3** | **260** | 1 | 0 | 0 | 1 | 1 | 200 | 5 | 206 | 509 |
| 08:15 AM | 15 | 1 | 36 | 52 | 21 | **228** | 1 | 250 | **2** | 0 | 0 | 2 | 1 | **214** | 6 | **221** | **525** |
| 08:30 AM | **21** | 1 | **55** | **77** | 27 | 213 | 0 | 240 | 2 | **1** | 0 | **3** | 1 | 188 | **10** | 199 | 519 |
| 08:45 AM | 10 | **4** | 38 | 52 | 24 | 215 | 0 | 239 | 1 | 1 | **1** | 3 | **4** | 181 | 7 | 192 | 486 |
| Total Volume | 56 | 6 | 161 | 223 | 107 | 878 | 4 | 989 | 6 | 2 | 1 | 9 | 7 | 783 | 28 | 818 | 2039 |
| % App. Total | 25.1 | 2.7 | 72.2 | | 10.8 | 88.8 | 0.4 | | 66.7 | 22.2 | 11.1 | | 0.9 | 95.7 | 3.4 | | |
| PHF | .667 | .375 | .732 | .724 | .764 | .963 | .333 | .951 | .750 | .500 | .250 | .750 | .438 | .915 | .700 | .925 | .971 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18AM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18AM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

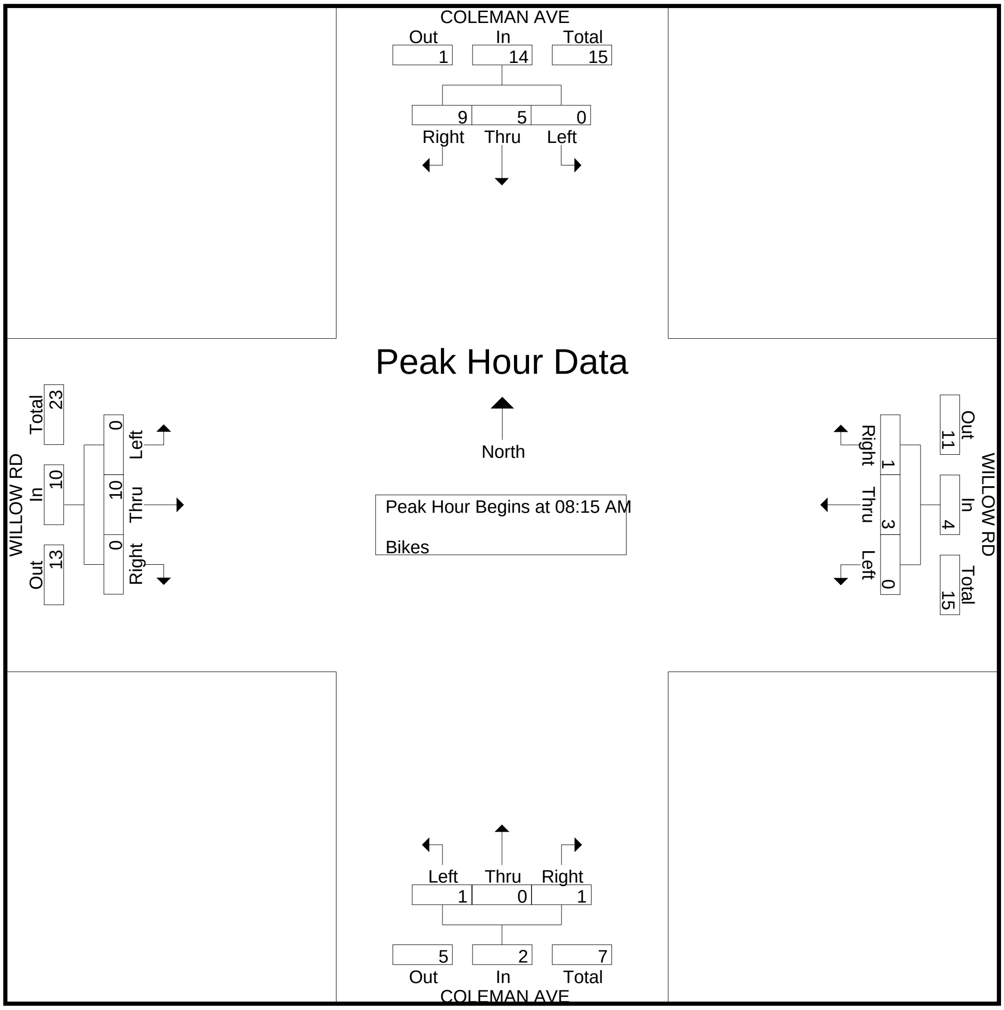
| | COLEMAN AVE Southbound | | | | | WILLOW RD Westbound | | | | | COLEMAN AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 3 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 6 |
| 07:15 AM | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 11 |
| 07:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:45 AM | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 5 |
| Total | 7 | 1 | 0 | 0 | 8 | 0 | 6 | 0 | 0 | 6 | 0 | 2 | 0 | 0 | 2 | 3 | 5 | 0 | 0 | 8 | 24 |
| 08:00 AM | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 08:15 AM | 3 | 3 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 9 |
| 08:30 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 4 |
| 08:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 5 |
| Total | 5 | 8 | 0 | 0 | 13 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 6 | 0 | 0 | 6 | 22 |
| 09:00 AM | 5 | 0 | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 12 |
| 09:15 AM | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 5 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 7 |
| 09:45 AM | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total | 8 | 2 | 1 | 0 | 11 | 1 | 6 | 0 | 0 | 7 | 1 | 0 | 1 | 0 | 2 | 0 | 8 | 0 | 0 | 8 | 28 |
| Grand Total | 20 | 11 | 1 | 0 | 32 | 1 | 14 | 0 | 0 | 15 | 1 | 2 | 2 | 0 | 5 | 3 | 19 | 0 | 0 | 22 | 74 |
| Apprch % | 62.5 | 34.4 | 3.1 | 0 | | 6.7 | 93.3 | 0 | 0 | | 20 | 40 | 40 | 0 | | 13.6 | 86.4 | 0 | 0 | | |
| Total % | 27 | 14.9 | 1.4 | 0 | 43.2 | 1.4 | 18.9 | 0 | 0 | 20.3 | 1.4 | 2.7 | 2.7 | 0 | 6.8 | 4.1 | 25.7 | 0 | 0 | 29.7 | |

| | COLEMAN AVE Southbound | | | | WILLOW RD Westbound | | | | COLEMAN AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:15 AM | | | | | | | | | | | | | | | | | |
| 08:15 AM | 3 | **3** | 0 | **6** | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 9 |
| 08:30 AM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 1 | 0 | 1 | 4 |
| 08:45 AM | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 5 |
| 09:00 AM | **5** | 0 | 0 | 5 | **1** | 1 | 0 | **2** | **1** | 0 | 0 | 1 | 0 | **4** | 0 | **4** | **12** |
| Total Volume | 9 | 5 | 0 | 14 | 1 | 3 | 0 | 4 | 1 | 0 | 1 | 2 | 0 | 10 | 0 | 10 | 30 |
| % App. Total | 64.3 | 35.7 | 0 | | 25 | 75 | 0 | | 50 | 0 | 50 | | 0 | 100 | 0 | | |
| PHF | .450 | .417 | .000 | .583 | .250 | .750 | .000 | .500 | .250 | .000 | .250 | .500 | .000 | .625 | .000 | .625 | .625 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18AM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18PM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

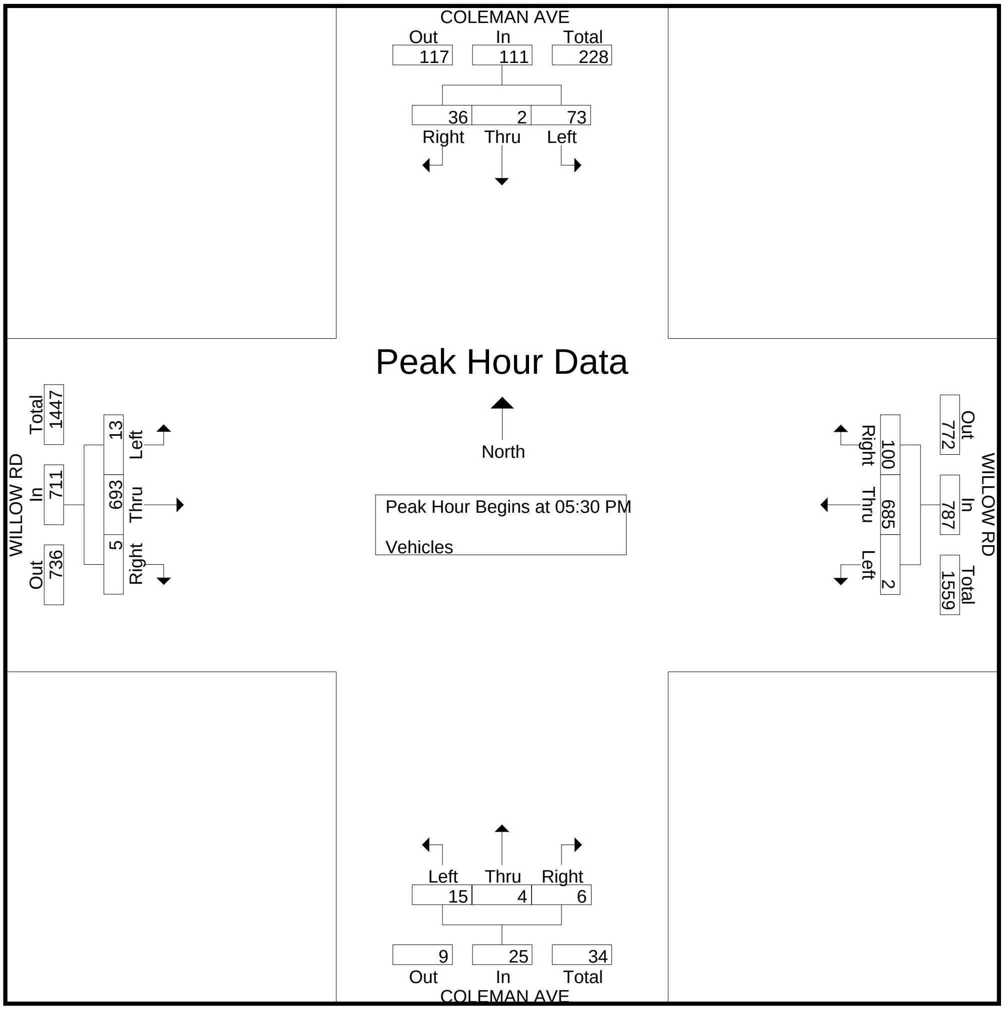
| | COLEMAN AVE Southbound | | | | | WILLOW RD Westbound | | | | | COLEMAN AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 4 | 0 | 22 | 2 | 28 | 13 | 107 | 0 | 1 | 121 | 1 | 0 | 0 | 1 | 2 | 0 | 222 | 6 | 1 | 229 | 380 |
| 04:15 PM | 8 | 0 | 19 | 0 | 27 | 19 | 113 | 0 | 8 | 140 | 0 | 1 | 1 | 4 | 6 | 1 | 219 | 2 | 8 | 230 | 403 |
| 04:30 PM | 8 | 3 | 12 | 2 | 25 | 17 | 128 | 4 | 11 | 160 | 0 | 3 | 3 | 6 | 12 | 7 | 223 | 4 | 1 | 235 | 432 |
| 04:45 PM | 10 | 1 | 14 | 1 | 26 | 17 | 143 | 2 | 7 | 169 | 0 | 4 | 4 | 5 | 13 | 1 | 121 | 3 | 7 | 132 | 340 |
| Total | 30 | 4 | 67 | 5 | 106 | 66 | 491 | 6 | 27 | 590 | 1 | 8 | 8 | 16 | 33 | 9 | 785 | 15 | 17 | 826 | 1555 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 8 | 2 | 5 | 1 | 16 | 22 | 156 | 1 | 4 | 183 | 0 | 3 | 1 | 1 | 5 | 3 | 94 | 8 | 3 | 108 | 312 |
| 05:15 PM | 7 | 1 | 13 | 1 | 22 | 18 | 155 | 5 | 5 | 183 | 0 | 1 | 4 | 4 | 9 | 4 | 121 | 8 | 4 | 137 | 351 |
| 05:30 PM | 14 | 2 | 17 | 2 | 35 | 22 | 162 | 1 | 6 | 191 | 2 | 1 | 8 | 2 | 13 | 0 | 170 | 2 | 4 | 176 | 415 |
| 05:45 PM | 10 | 0 | 16 | 5 | 31 | 22 | 168 | 0 | 3 | 193 | 3 | 1 | 2 | 3 | 9 | 2 | 197 | 5 | 13 | 217 | 450 |
| Total | 39 | 5 | 51 | 9 | 104 | 84 | 641 | 7 | 18 | 750 | 5 | 6 | 15 | 10 | 36 | 9 | 582 | 23 | 24 | 638 | 1528 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 8 | 0 | 23 | 4 | 35 | 18 | 174 | 1 | 8 | 201 | 1 | 1 | 5 | 7 | 14 | 3 | 155 | 2 | 10 | 170 | 420 |
| 06:15 PM | 4 | 0 | 17 | 4 | 25 | 38 | 181 | 0 | 9 | 228 | 0 | 1 | 0 | 6 | 7 | 0 | 171 | 4 | 9 | 184 | 444 |
| 06:30 PM | 4 | 0 | 18 | 3 | 25 | 21 | 168 | 0 | 10 | 199 | 1 | 0 | 0 | 5 | 6 | 0 | 182 | 3 | 6 | 191 | 421 |
| 06:45 PM | 7 | 0 | 15 | 1 | 23 | 21 | 148 | 0 | 7 | 176 | 0 | 0 | 2 | 3 | 5 | 0 | 220 | 6 | 4 | 230 | 434 |
| Total | 23 | 0 | 73 | 12 | 108 | 98 | 671 | 1 | 34 | 804 | 2 | 2 | 7 | 21 | 32 | 3 | 728 | 15 | 29 | 775 | 1719 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 92 | 9 | 191 | 26 | 318 | 248 | 1803 | 14 | 79 | 2144 | 8 | 16 | 30 | 47 | 101 | 21 | 2095 | 53 | 70 | 2239 | 4802 |
| Apprch % | 28.9 | 2.8 | 60.1 | 8.2 | | 11.6 | 84.1 | 0.7 | 3.7 | | 7.9 | 15.8 | 29.7 | 46.5 | | 0.9 | 93.6 | 2.4 | 3.1 | | |
| Total % | 1.9 | 0.2 | 4 | 0.5 | 6.6 | 5.2 | 37.5 | 0.3 | 1.6 | 44.6 | 0.2 | 0.3 | 0.6 | 1 | 2.1 | 0.4 | 43.6 | 1.1 | 1.5 | 46.6 | |

| | COLEMAN AVE Southbound | | | | WILLOW RD Westbound | | | | COLEMAN AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:30 PM | | | | | | | | | | | | | | | | | |
| 05:30 PM | **14** | **2** | 17 | **33** | 22 | 162 | **1** | 185 | 2 | **1** | **8** | **11** | 0 | 170 | 2 | 172 | 401 |
| 05:45 PM | 10 | 0 | 16 | 26 | 22 | 168 | 0 | 190 | **3** | 1 | 2 | 6 | 2 | **197** | **5** | **204** | **426** |
| 06:00 PM | 8 | 0 | **23** | 31 | 18 | 174 | 1 | 193 | 1 | 1 | 5 | 7 | **3** | 155 | 2 | 160 | 391 |
| 06:15 PM | 4 | 0 | 17 | 21 | **38** | **181** | 0 | **219** | 0 | 1 | 0 | 1 | 0 | 171 | 4 | 175 | 416 |
| Total Volume | 36 | 2 | 73 | 111 | 100 | 685 | 2 | 787 | 6 | 4 | 15 | 25 | 5 | 693 | 13 | 711 | 1634 |
| % App. Total | 32.4 | 1.8 | 65.8 | | 12.7 | 87 | 0.3 | | 24 | 16 | 60 | | 0.7 | 97.5 | 1.8 | | |
| PHF | .643 | .250 | .793 | .841 | .658 | .946 | .500 | .898 | .500 | 1.00 | .469 | .568 | .417 | .879 | .650 | .871 | .959 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18PM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18PM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

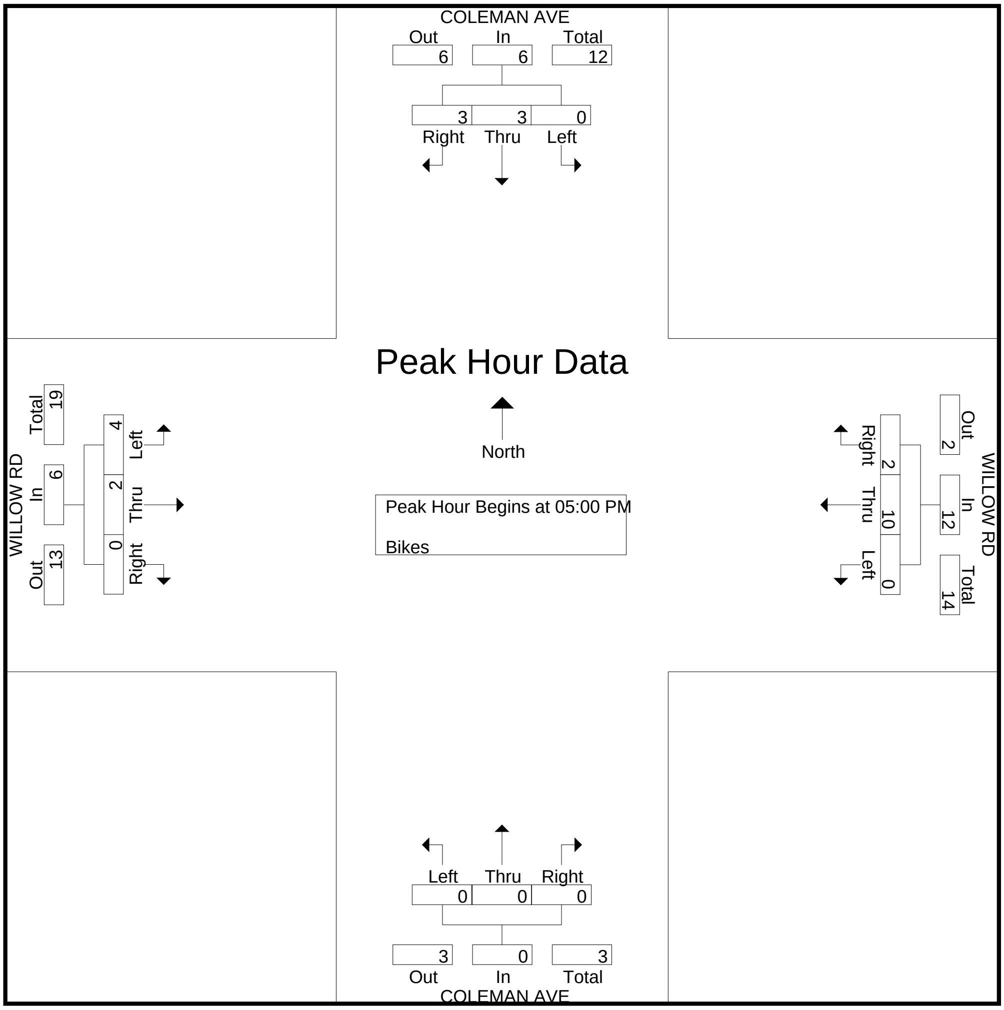
| | COLEMAN AVE Southbound | | | | | WILLOW RD Westbound | | | | | COLEMAN AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 5 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 13 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |
| 05:30 PM | 1 | 3 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 8 |
| 05:45 PM | 2 | 0 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 8 |
| Total | 3 | 3 | 0 | 0 | 6 | 2 | 10 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 6 | 24 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 |
| 06:15 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 3 | 5 |
| 06:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 2 | 5 |
| 06:45 PM | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 5 |
| Total | 3 | 1 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 4 | 4 | 0 | 8 | 17 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 6 | 5 | 1 | 0 | 12 | 2 | 20 | 0 | 0 | 22 | 4 | 0 | 0 | 0 | 4 | 0 | 7 | 9 | 0 | 16 | 54 |
| Apprch % | 50 | 41.7 | 8.3 | 0 | | 9.1 | 90.9 | 0 | 0 | | 100 | 0 | 0 | 0 | | 0 | 43.8 | 56.2 | 0 | | |
| Total % | 11.1 | 9.3 | 1.9 | 0 | 22.2 | 3.7 | 37 | 0 | 0 | 40.7 | 7.4 | 0 | 0 | 0 | 7.4 | 0 | 13 | 16.7 | 0 | 29.6 | |

| | COLEMAN AVE Southbound | | | | WILLOW RD Westbound | | | | COLEMAN AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:00 PM | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | **4** | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 |
| 05:30 PM | 1 | **3** | 0 | **4** | **1** | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | **2** | **2** | **8** |
| 05:45 PM | **2** | 0 | 0 | 2 | 1 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | **2** | 0 | 2 | 8 |
| Total Volume | 3 | 3 | 0 | 6 | 2 | 10 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 6 | 24 |
| % App. Total | 50 | 50 | 0 | | 16.7 | 83.3 | 0 | | 0 | 0 | 0 | | 0 | 33.3 | 66.7 | | |
| PHF | .375 | .250 | .000 | .375 | .500 | .625 | .000 | .750 | .000 | .000 | .000 | .000 | .000 | .250 | .500 | .750 | .750 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 18PM FINAL
Site Code : 00000018
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17AM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

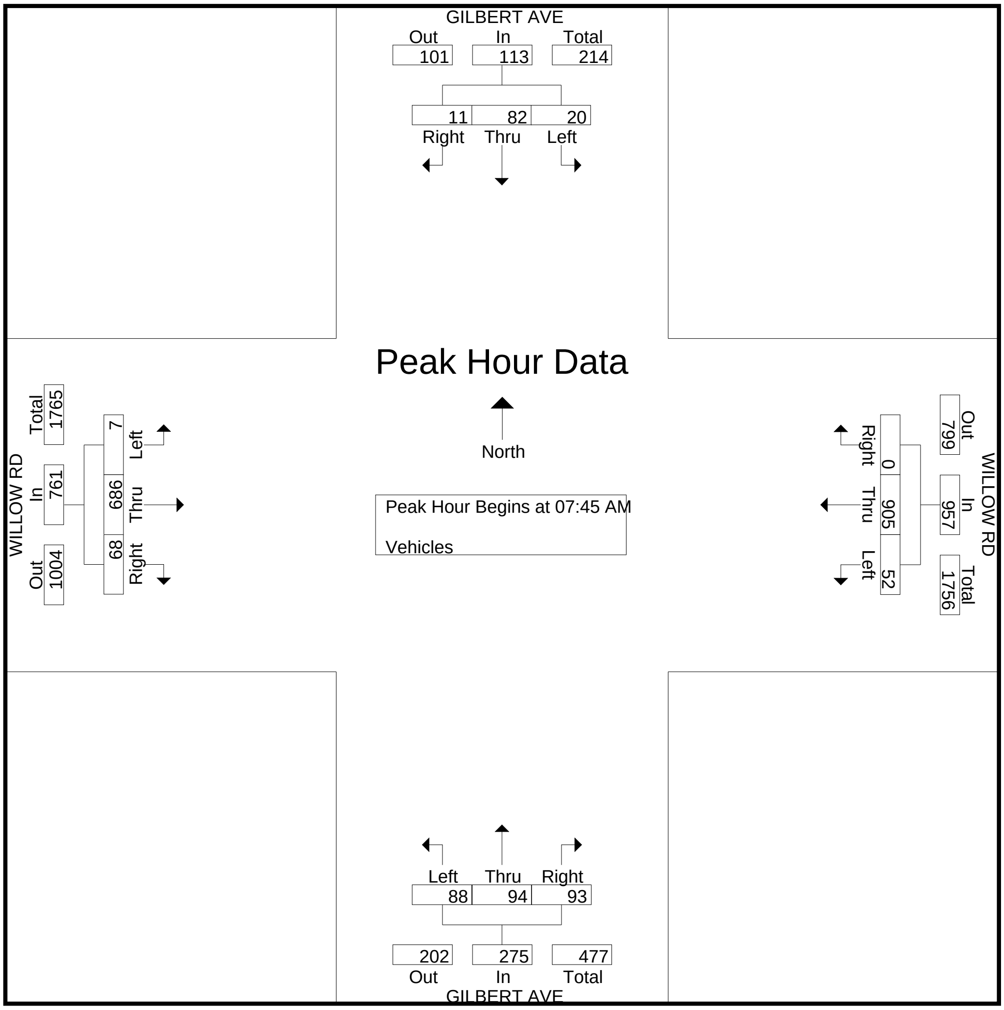
| | GILBERT AVE Southbound | | | | | WILLOW RD Westbound | | | | | GILBERT AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 1 | 0 | 3 | 1 | 5 | 1 | 214 | 1 | 2 | 218 | 8 | 1 | 5 | 0 | 14 | 1 | 87 | 1 | 0 | 89 | 326 |
| 07:15 AM | 2 | 1 | 4 | 0 | 7 | 0 | 225 | 5 | 0 | 230 | 12 | 3 | 14 | 0 | 29 | 5 | 90 | 1 | 0 | 96 | 362 |
| 07:30 AM | 1 | 4 | 3 | 2 | 10 | 1 | 216 | 7 | 2 | 226 | 17 | 18 | 22 | 1 | 58 | 5 | 121 | 1 | 4 | 131 | 425 |
| 07:45 AM | 4 | 8 | 6 | 1 | 19 | 0 | 246 | 11 | 1 | 258 | 11 | 10 | 23 | 1 | 45 | 11 | 159 | 1 | 7 | 178 | 500 |
| Total | 8 | 13 | 16 | 4 | 41 | 2 | 901 | 24 | 5 | 932 | 48 | 32 | 64 | 2 | 146 | 22 | 457 | 4 | 11 | 494 | 1613 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 1 | 19 | 5 | 3 | 28 | 0 | 219 | 7 | 2 | 228 | 27 | 26 | 21 | 0 | 74 | 16 | 179 | 1 | 4 | 200 | 530 |
| 08:15 AM | 2 | 30 | 4 | 1 | 37 | 0 | 231 | 18 | 1 | 250 | 22 | 26 | 21 | 0 | 69 | 27 | 188 | 3 | 1 | 219 | 575 |
| 08:30 AM | 4 | 25 | 5 | 0 | 34 | 0 | 209 | 16 | 3 | 228 | 33 | 32 | 23 | 0 | 88 | 14 | 160 | 2 | 0 | 176 | 526 |
| 08:45 AM | 2 | 14 | 5 | 0 | 21 | 0 | 217 | 15 | 0 | 232 | 13 | 12 | 16 | 0 | 41 | 13 | 171 | 0 | 0 | 184 | 478 |
| Total | 9 | 88 | 19 | 4 | 120 | 0 | 876 | 56 | 6 | 938 | 95 | 96 | 81 | 0 | 272 | 70 | 698 | 6 | 5 | 779 | 2109 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 3 | 12 | 5 | 0 | 20 | 1 | 190 | 12 | 2 | 205 | 21 | 14 | 16 | 2 | 53 | 8 | 167 | 0 | 1 | 176 | 454 |
| 09:15 AM | 1 | 7 | 5 | 2 | 15 | 0 | 197 | 14 | 1 | 212 | 16 | 9 | 11 | 1 | 37 | 8 | 154 | 2 | 3 | 167 | 431 |
| 09:30 AM | 2 | 3 | 6 | 1 | 12 | 1 | 207 | 3 | 0 | 211 | 7 | 4 | 15 | 10 | 36 | 7 | 131 | 0 | 0 | 138 | 397 |
| 09:45 AM | 2 | 1 | 7 | 0 | 10 | 0 | 209 | 10 | 0 | 219 | 15 | 4 | 11 | 1 | 31 | 4 | 127 | 3 | 2 | 136 | 396 |
| Total | 8 | 23 | 23 | 3 | 57 | 2 | 803 | 39 | 3 | 847 | 59 | 31 | 53 | 14 | 157 | 27 | 579 | 5 | 6 | 617 | 1678 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 25 | 124 | 58 | 11 | 218 | 4 | 2580 | 119 | 14 | 2717 | 202 | 159 | 198 | 16 | 575 | 119 | 1734 | 15 | 22 | 1890 | 5400 |
| Apprch % | 11.5 | 56.9 | 26.6 | 5 | | 0.1 | 95 | 4.4 | 0.5 | | 35.1 | 27.7 | 34.4 | 2.8 | | 6.3 | 91.7 | 0.8 | 1.2 | | |
| Total % | 0.5 | 2.3 | 1.1 | 0.2 | 4 | 0.1 | 47.8 | 2.2 | 0.3 | 50.3 | 3.7 | 2.9 | 3.7 | 0.3 | 10.6 | 2.2 | 32.1 | 0.3 | 0.4 | 35 | |

| | GILBERT AVE Southbound | | | | WILLOW RD Westbound | | | | GILBERT AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | **4** | 8 | **6** | 18 | 0 | **246** | 11 | **257** | 11 | 10 | **23** | 44 | 11 | 159 | 1 | 171 | 490 |
| 08:00 AM | 1 | 19 | 5 | 25 | 0 | 219 | 7 | 226 | 27 | 26 | 21 | 74 | 16 | 179 | 1 | 196 | 521 |
| 08:15 AM | 2 | **30** | 4 | **36** | 0 | 231 | **18** | 249 | 22 | 26 | 21 | 69 | **27** | **188** | **3** | **218** | **572** |
| 08:30 AM | 4 | 25 | 5 | 34 | 0 | 209 | 16 | 225 | **33** | **32** | 23 | **88** | 14 | 160 | 2 | 176 | 523 |
| Total Volume | 11 | 82 | 20 | 113 | 0 | 905 | 52 | 957 | 93 | 94 | 88 | 275 | 68 | 686 | 7 | 761 | 2106 |
| % App. Total | 9.7 | 72.6 | 17.7 | | 0 | 94.6 | 5.4 | | 33.8 | 34.2 | 32 | | 8.9 | 90.1 | 0.9 | | |
| PHF | .688 | .683 | .833 | .785 | .000 | .920 | .722 | .931 | .705 | .734 | .957 | .781 | .630 | .912 | .583 | .873 | .920 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17AM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 17AM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

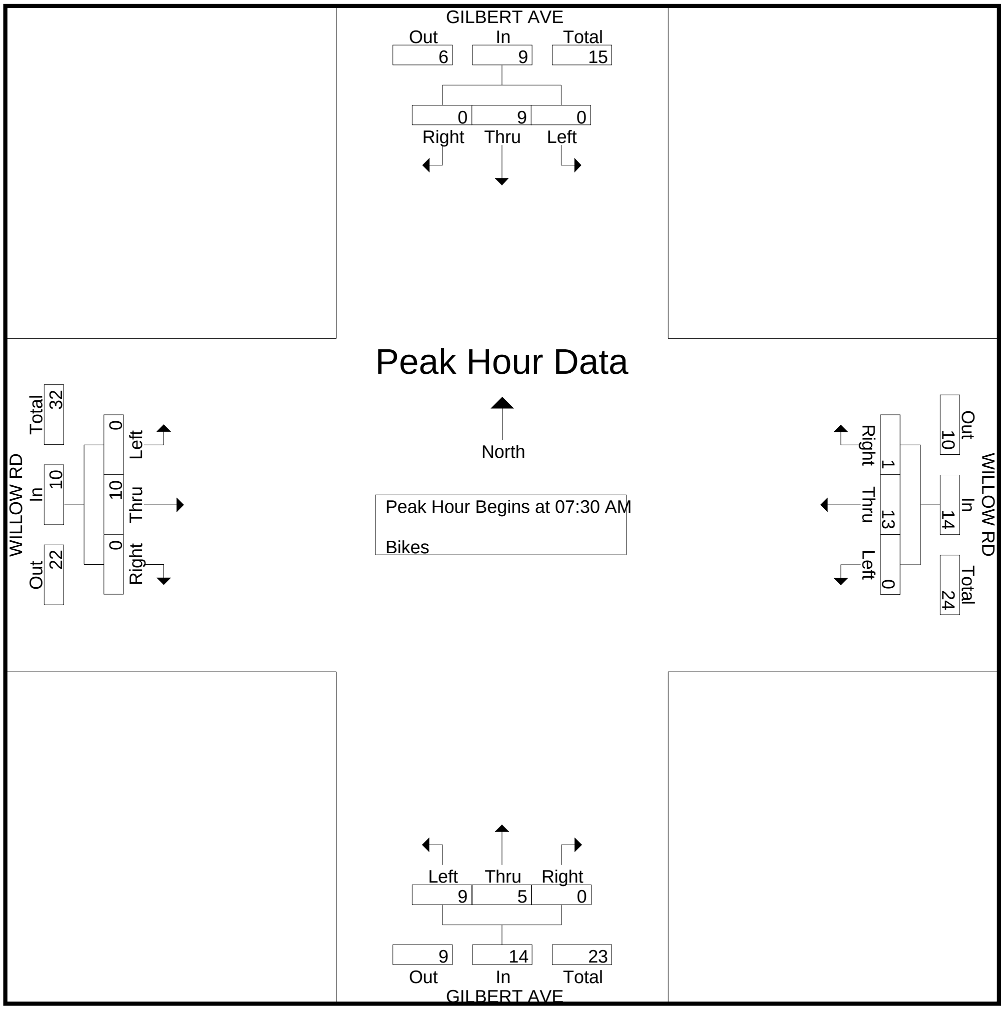
| | GILBERT AVE Southbound | | | | | WILLOW RD Westbound | | | | | GILBERT AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 5 |
| 07:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 10 |
| 07:30 AM | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 10 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 3 | 0 | 4 | 0 | 0 | 4 | 10 |
| Total | 0 | 2 | 0 | 0 | 2 | 1 | 13 | 1 | 0 | 15 | 0 | 1 | 7 | 0 | 8 | 0 | 10 | 0 | 0 | 10 | 35 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 3 | 2 | 0 | 5 | 0 | 2 | 0 | 0 | 2 | 10 |
| 08:15 AM | 0 | 8 | 0 | 0 | 8 | 0 | 5 | 0 | 0 | 5 | 0 | 1 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 17 |
| 08:30 AM | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 6 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 6 | 10 |
| Total | 0 | 11 | 0 | 0 | 11 | 0 | 12 | 0 | 0 | 12 | 0 | 6 | 3 | 0 | 9 | 1 | 10 | 0 | 0 | 11 | 43 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 10 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 6 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 17 | 0 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 5 | 23 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 13 | 0 | 0 | 13 | 1 | 42 | 1 | 0 | 44 | 0 | 8 | 10 | 0 | 18 | 1 | 25 | 0 | 0 | 26 | 101 |
| Apprch % | 0 | 100 | 0 | 0 | | 2.3 | 95.5 | 2.3 | 0 | | 0 | 44.4 | 55.6 | 0 | | 3.8 | 96.2 | 0 | 0 | | |
| Total % | 0 | 12.9 | 0 | 0 | 12.9 | 1 | 41.6 | 1 | 0 | 43.6 | 0 | 7.9 | 9.9 | 0 | 17.8 | 1 | 24.8 | 0 | 0 | 25.7 | |

| | GILBERT AVE Southbound | | | | WILLOW RD Westbound | | | | GILBERT AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 1 | 0 | 1 | **1** | 2 | 0 | 3 | 0 | 0 | **4** | 4 | 0 | 2 | 0 | 2 | 10 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 1 | 2 | 3 | 0 | **4** | 0 | **4** | 10 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | **3** | 2 | **5** | 0 | 2 | 0 | 2 | 10 |
| 08:15 AM | 0 | **8** | 0 | **8** | 0 | **5** | 0 | **5** | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 2 | **17** |
| Total Volume | 0 | 9 | 0 | 9 | 1 | 13 | 0 | 14 | 0 | 5 | 9 | 14 | 0 | 10 | 0 | 10 | 47 |
| % App. Total | 0 | 100 | 0 | | 7.1 | 92.9 | 0 | | 0 | 35.7 | 64.3 | | 0 | 100 | 0 | | |
| PHF | .000 | .281 | .000 | .281 | .250 | .650 | .000 | .700 | .000 | .417 | .563 | .700 | .000 | .625 | .000 | .625 | .691 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17AM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 17PM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

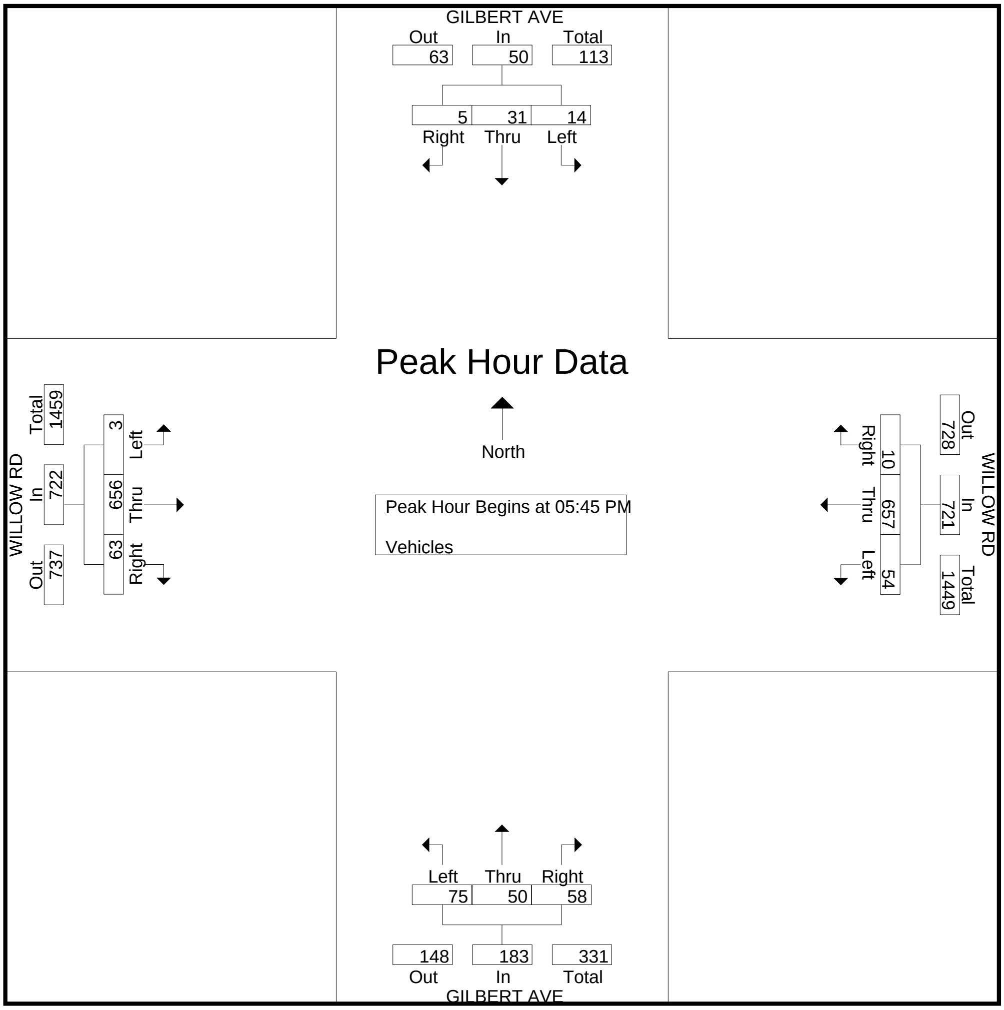
| | GILBERT AVE Southbound | | | | | WILLOW RD Westbound | | | | | GILBERT AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 1 | 13 | 5 | 1 | 20 | 2 | 107 | 11 | 2 | 122 | 20 | 11 | 30 | 0 | 61 | 14 | 194 | 1 | 0 | 209 | 412 |
| 04:15 PM | 0 | 16 | 5 | 0 | 21 | 3 | 108 | 12 | 1 | 124 | 18 | 26 | 18 | 3 | 65 | 9 | 205 | 0 | 0 | 214 | 424 |
| 04:30 PM | 0 | 15 | 3 | 2 | 20 | 2 | 134 | 12 | 1 | 149 | 15 | 10 | 13 | 0 | 38 | 8 | 208 | 0 | 0 | 216 | 423 |
| 04:45 PM | 0 | 14 | 2 | 0 | 16 | 2 | 146 | 13 | 0 | 161 | 11 | 14 | 24 | 1 | 50 | 14 | 106 | 0 | 1 | 121 | 348 |
| Total | 1 | 58 | 15 | 3 | 77 | 9 | 495 | 48 | 4 | 556 | 64 | 61 | 85 | 4 | 214 | 45 | 713 | 1 | 1 | 760 | 1607 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 3 | 13 | 4 | 1 | 21 | 1 | 155 | 14 | 1 | 171 | 8 | 13 | 17 | 0 | 38 | 13 | 92 | 0 | 1 | 106 | 336 |
| 05:15 PM | 0 | 12 | 1 | 1 | 14 | 0 | 150 | 16 | 2 | 168 | 12 | 17 | 26 | 1 | 56 | 9 | 122 | 0 | 1 | 132 | 370 |
| 05:30 PM | 1 | 10 | 3 | 1 | 15 | 1 | 169 | 12 | 0 | 182 | 6 | 16 | 13 | 1 | 36 | 14 | 168 | 1 | 1 | 184 | 417 |
| 05:45 PM | 0 | 10 | 2 | 1 | 13 | 0 | 167 | 12 | 1 | 180 | 13 | 17 | 11 | 0 | 41 | 17 | 186 | 0 | 1 | 204 | 438 |
| Total | 4 | 45 | 10 | 4 | 63 | 2 | 641 | 54 | 4 | 701 | 39 | 63 | 67 | 2 | 171 | 53 | 568 | 1 | 4 | 626 | 1561 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 1 | 9 | 5 | 1 | 16 | 3 | 169 | 12 | 0 | 184 | 10 | 14 | 25 | 2 | 51 | 17 | 150 | 0 | 0 | 167 | 418 |
| 06:15 PM | 0 | 8 | 3 | 3 | 14 | 6 | 162 | 16 | 4 | 188 | 16 | 11 | 16 | 3 | 46 | 16 | 155 | 1 | 1 | 173 | 421 |
| 06:30 PM | 4 | 4 | 4 | 2 | 14 | 1 | 159 | 14 | 0 | 174 | 19 | 8 | 23 | 0 | 50 | 13 | 165 | 2 | 1 | 181 | 419 |
| 06:45 PM | 3 | 6 | 6 | 0 | 15 | 4 | 132 | 16 | 2 | 154 | 12 | 9 | 5 | 0 | 26 | 11 | 207 | 1 | 1 | 220 | 415 |
| Total | 8 | 27 | 18 | 6 | 59 | 14 | 622 | 58 | 6 | 700 | 57 | 42 | 69 | 5 | 173 | 57 | 677 | 4 | 3 | 741 | 1673 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 13 | 130 | 43 | 13 | 199 | 25 | 1758 | 160 | 14 | 1957 | 160 | 166 | 221 | 11 | 558 | 155 | 1958 | 6 | 8 | 2127 | 4841 |
| Apprch % | 6.5 | 65.3 | 21.6 | 6.5 | | 1.3 | 89.8 | 8.2 | 0.7 | | 28.7 | 29.7 | 39.6 | 2 | | 7.3 | 92.1 | 0.3 | 0.4 | | |
| Total % | 0.3 | 2.7 | 0.9 | 0.3 | 4.1 | 0.5 | 36.3 | 3.3 | 0.3 | 40.4 | 3.3 | 3.4 | 4.6 | 0.2 | 11.5 | 3.2 | 40.4 | 0.1 | 0.2 | 43.9 | |

| | GILBERT AVE Southbound | | | | WILLOW RD Westbound | | | | GILBERT AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:45 PM | | | | | | | | | | | | | | | | | |
| 05:45 PM | 0 | **10** | 2 | 12 | 0 | 167 | 12 | 179 | 13 | **17** | 11 | 41 | **17** | **186** | 0 | **203** | **435** |
| 06:00 PM | 1 | 9 | **5** | **15** | 3 | **169** | 12 | **184** | 10 | 14 | **25** | 49 | 17 | 150 | 0 | 167 | 415 |
| 06:15 PM | 0 | 8 | 3 | 11 | **6** | 162 | **16** | 184 | 16 | 11 | 16 | 43 | 16 | 155 | 1 | 172 | 410 |
| 06:30 PM | **4** | 4 | 4 | 12 | 1 | 159 | 14 | 174 | **19** | 8 | 23 | **50** | 13 | 165 | **2** | 180 | 416 |
| Total Volume | 5 | 31 | 14 | 50 | 10 | 657 | 54 | 721 | 58 | 50 | 75 | 183 | 63 | 656 | 3 | 722 | 1676 |
| % App. Total | 10 | 62 | 28 | | 1.4 | 91.1 | 7.5 | | 31.7 | 27.3 | 41 | | 8.7 | 90.9 | 0.4 | | |
| PHF | .313 | .775 | .700 | .833 | .417 | .972 | .844 | .980 | .763 | .735 | .750 | .915 | .926 | .882 | .375 | .889 | .963 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17PM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17PM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

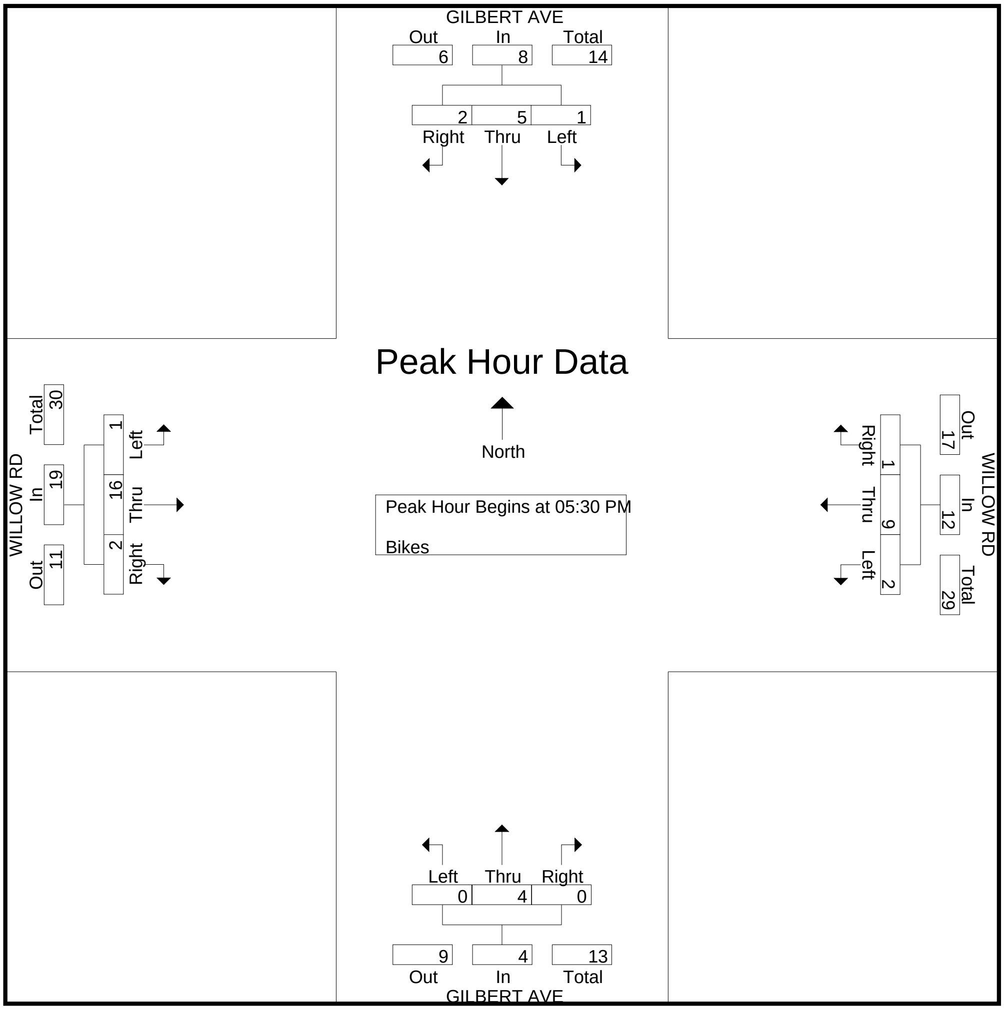
| | GILBERT AVE Southbound | | | | | WILLOW RD Westbound | | | | | GILBERT AVE Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 7 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 7 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 0 | 11 | 0 | 2 | 0 | 0 | 2 | 3 | 5 | 0 | 0 | 8 | 21 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| 05:15 PM | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 8 |
| 05:30 PM | 1 | 3 | 0 | 0 | 4 | 1 | 1 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 6 | 14 |
| 05:45 PM | 1 | 1 | 0 | 0 | 2 | 0 | 4 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 1 | 0 | 7 | 14 |
| Total | 3 | 5 | 0 | 0 | 8 | 2 | 9 | 2 | 0 | 13 | 0 | 1 | 0 | 0 | 1 | 2 | 14 | 1 | 0 | 17 | 39 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 6 |
| 06:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 5 | 9 |
| 06:30 PM | 0 | 3 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 9 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 4 |
| Total | 0 | 4 | 1 | 0 | 5 | 0 | 7 | 0 | 0 | 7 | 0 | 4 | 0 | 0 | 4 | 1 | 11 | 0 | 0 | 12 | 28 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 3 | 9 | 1 | 0 | 13 | 2 | 26 | 3 | 0 | 31 | 0 | 7 | 0 | 0 | 7 | 6 | 30 | 1 | 0 | 37 | 88 |
| Apprch % | 23.1 | 69.2 | 7.7 | 0 | | 6.5 | 83.9 | 9.7 | 0 | | 0 | 100 | 0 | 0 | | 16.2 | 81.1 | 2.7 | 0 | | |
| Total % | 3.4 | 10.2 | 1.1 | 0 | 14.8 | 2.3 | 29.5 | 3.4 | 0 | 35.2 | 0 | 8 | 0 | 0 | 8 | 6.8 | 34.1 | 1.1 | 0 | 42 | |

| | GILBERT AVE Southbound | | | | WILLOW RD Westbound | | | | GILBERT AVE Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:30 PM | | | | | | | | | | | | | | | | | |
| 05:30 PM | **1** | **3** | 0 | **4** | **1** | 1 | **1** | 3 | 0 | 1 | 0 | 1 | **1** | **5** | 0 | 6 | **14** |
| 05:45 PM | 1 | 1 | 0 | 2 | 0 | **4** | 1 | **5** | 0 | 0 | 0 | 0 | 1 | 5 | **1** | **7** | 14 |
| 06:00 PM | 0 | 0 | **1** | 1 | 0 | 2 | 0 | 2 | 0 | **2** | 0 | **2** | 0 | 1 | 0 | 1 | 6 |
| 06:15 PM | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 5 | 0 | 5 | 9 |
| Total Volume | 2 | 5 | 1 | 8 | 1 | 9 | 2 | 12 | 0 | 4 | 0 | 4 | 2 | 16 | 1 | 19 | 43 |
| % App. Total | 25 | 62.5 | 12.5 | | 8.3 | 75 | 16.7 | | 0 | 100 | 0 | | 10.5 | 84.2 | 5.3 | | |
| PHF | .500 | .417 | .250 | .500 | .250 | .563 | .500 | .600 | .000 | .500 | .000 | .500 | .500 | .800 | .250 | .679 | .768 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 17PM FINAL
Site Code : 00000017
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 16AM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

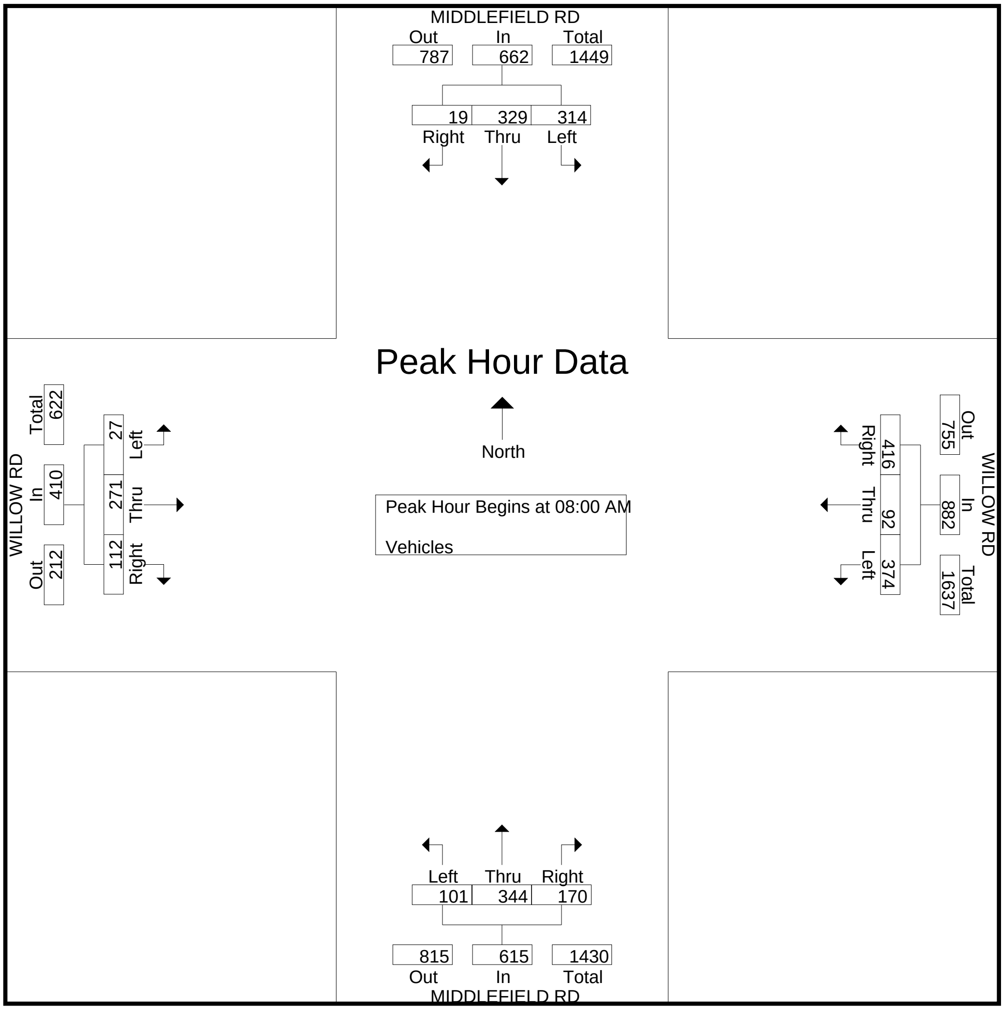
| | MIDDLEFIELD RD Southbound | | | | | WILLOW RD Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 1 | 35 | 35 | 1 | 72 | 99 | 16 | 89 | 0 | 204 | 27 | 34 | 7 | 2 | 70 | 9 | 25 | 0 | 0 | 34 | 380 |
| 07:15 AM | 1 | 36 | 32 | 2 | 71 | 122 | 13 | 109 | 1 | 245 | 23 | 67 | 2 | 2 | 94 | 15 | 27 | 1 | 0 | 43 | 453 |
| 07:30 AM | 1 | 65 | 49 | 2 | 117 | 130 | 18 | 74 | 0 | 222 | 33 | 73 | 11 | 10 | 127 | 11 | 42 | 7 | 1 | 61 | 527 |
| 07:45 AM | 1 | 64 | 57 | 1 | 123 | 129 | 36 | 110 | 11 | 286 | 43 | 85 | 16 | 14 | 158 | 20 | 59 | 8 | 0 | 87 | 654 |
| Total | 4 | 200 | 173 | 6 | 383 | 480 | 83 | 382 | 12 | 957 | 126 | 259 | 36 | 28 | 449 | 55 | 153 | 16 | 1 | 225 | 2014 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 6 | 74 | 92 | 1 | 173 | 118 | 20 | 91 | 2 | 231 | 30 | 78 | 18 | 8 | 134 | 23 | 70 | 10 | 0 | 103 | 641 |
| 08:15 AM | 11 | 74 | 79 | 2 | 166 | 113 | 25 | 77 | 0 | 215 | 54 | 101 | 24 | 2 | 181 | 28 | 69 | 5 | 2 | 104 | 666 |
| 08:30 AM | 1 | 74 | 57 | 0 | 132 | 98 | 25 | 111 | 1 | 235 | 41 | 77 | 25 | 7 | 150 | 36 | 74 | 10 | 7 | 127 | 644 |
| 08:45 AM | 1 | 107 | 86 | 1 | 195 | 87 | 22 | 95 | 2 | 206 | 45 | 88 | 34 | 3 | 170 | 25 | 58 | 2 | 1 | 86 | 657 |
| Total | 19 | 329 | 314 | 4 | 666 | 416 | 92 | 374 | 5 | 887 | 170 | 344 | 101 | 20 | 635 | 112 | 271 | 27 | 10 | 420 | 2608 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 1 | 81 | 60 | 2 | 144 | 63 | 14 | 82 | 2 | 161 | 27 | 77 | 19 | 2 | 125 | 25 | 60 | 4 | 6 | 95 | 525 |
| 09:15 AM | 3 | 51 | 59 | 2 | 115 | 69 | 22 | 86 | 1 | 178 | 37 | 59 | 23 | 4 | 123 | 30 | 46 | 4 | 1 | 81 | 497 |
| 09:30 AM | 3 | 73 | 51 | 1 | 128 | 71 | 30 | 94 | 1 | 196 | 29 | 50 | 19 | 4 | 102 | 18 | 37 | 4 | 1 | 60 | 486 |
| 09:45 AM | 3 | 53 | 48 | 1 | 105 | 68 | 29 | 67 | 17 | 181 | 29 | 63 | 17 | 5 | 114 | 23 | 37 | 4 | 1 | 65 | 465 |
| Total | 10 | 258 | 218 | 6 | 492 | 271 | 95 | 329 | 21 | 716 | 122 | 249 | 78 | 15 | 464 | 96 | 180 | 16 | 9 | 301 | 1973 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 33 | 787 | 705 | 16 | 1541 | 1167 | 270 | 1085 | 38 | 2560 | 418 | 852 | 215 | 63 | 1548 | 263 | 604 | 59 | 20 | 946 | 6595 |
| Apprch % | 2.1 | 51.1 | 45.7 | 1 | | 45.6 | 10.5 | 42.4 | 1.5 | | 27 | 55 | 13.9 | 4.1 | | 27.8 | 63.8 | 6.2 | 2.1 | | |
| Total % | 0.5 | 11.9 | 10.7 | 0.2 | 23.4 | 17.7 | 4.1 | 16.5 | 0.6 | 38.8 | 6.3 | 12.9 | 3.3 | 1 | 23.5 | 4 | 9.2 | 0.9 | 0.3 | 14.3 | |

| | MIDDLEFIELD RD Southbound | | | | WILLOW RD Westbound | | | | MIDDLEFIELD RD Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | | | | | |
| 08:00 AM | 6 | 74 | **92** | 172 | **118** | 20 | 91 | 229 | 30 | 78 | 18 | 126 | 23 | 70 | **10** | 103 | 630 |
| 08:15 AM | **11** | 74 | 79 | 164 | 113 | **25** | 77 | 215 | **54** | **101** | 24 | **179** | 28 | 69 | 5 | 102 | **660** |
| 08:30 AM | 1 | 74 | 57 | 132 | 98 | 25 | **111** | **234** | 41 | 77 | 25 | 143 | **36** | **74** | 10 | **120** | 629 |
| 08:45 AM | 1 | **107** | 86 | **194** | 87 | 22 | 95 | 204 | 45 | 88 | **34** | 167 | 25 | 58 | 2 | 85 | 650 |
| Total Volume | 19 | 329 | 314 | 662 | 416 | 92 | 374 | 882 | 170 | 344 | 101 | 615 | 112 | 271 | 27 | 410 | 2569 |
| % App. Total | 2.9 | 49.7 | 47.4 | | 47.2 | 10.4 | 42.4 | | 27.6 | 55.9 | 16.4 | | 27.3 | 66.1 | 6.6 | | |
| PHF | .432 | .769 | .853 | .853 | .881 | .920 | .842 | .942 | .787 | .851 | .743 | .859 | .778 | .916 | .675 | .854 | .973 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 16AM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 16AM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 1

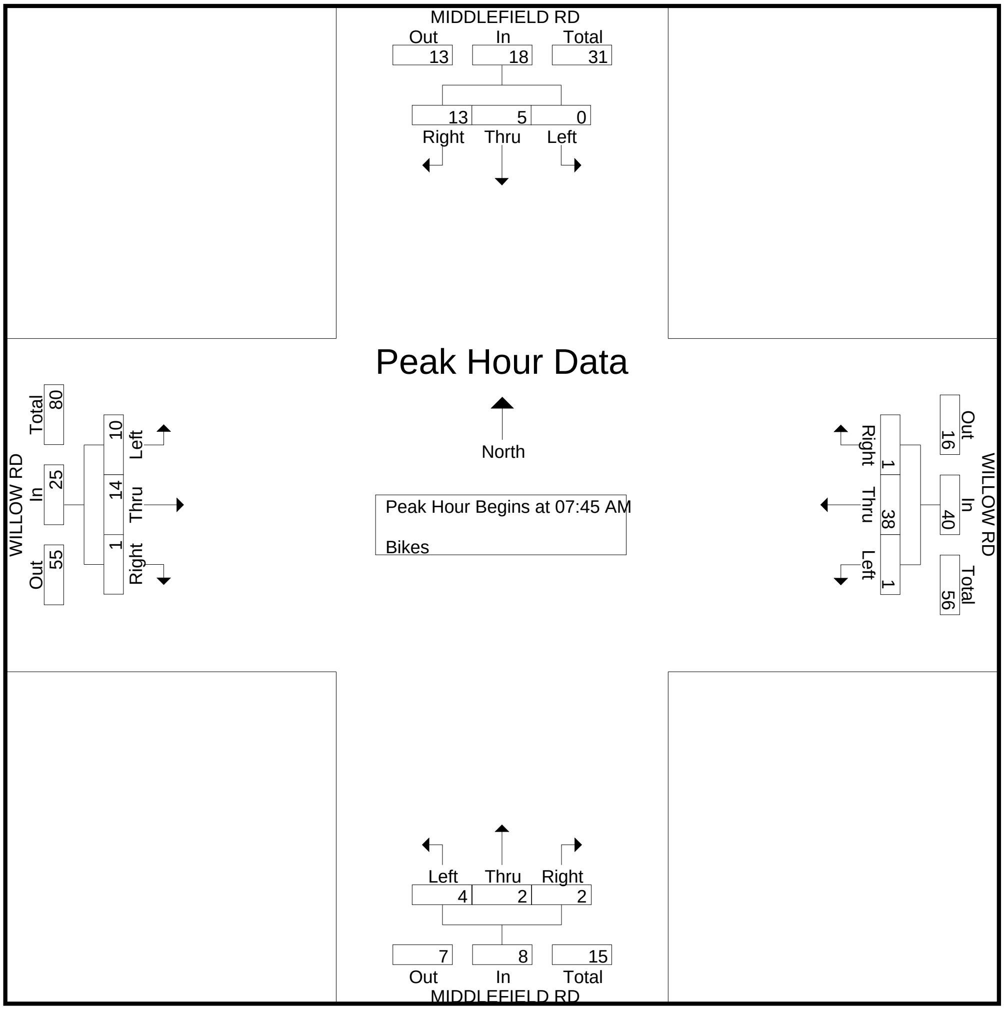
Groups Printed- Bikes

| | MIDDLEFIELD RD Southbound | | | | | WILLOW RD Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 3 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 3 | 10 |
| 07:15 AM | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 3 | 9 |
| 07:30 AM | 2 | 0 | 0 | 0 | 2 | 1 | 7 | 1 | 0 | 9 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 14 |
| 07:45 AM | 0 | 3 | 0 | 0 | 3 | 0 | 21 | 0 | 0 | 21 | 1 | 1 | 1 | 0 | 3 | 0 | 2 | 1 | 0 | 3 | 30 |
| Total | 6 | 3 | 0 | 0 | 9 | 1 | 35 | 1 | 0 | 37 | 2 | 1 | 3 | 0 | 6 | 2 | 6 | 3 | 0 | 11 | 63 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 4 | 0 | 0 | 0 | 4 | 1 | 8 | 1 | 0 | 10 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 3 | 19 |
| 08:15 AM | 2 | 1 | 0 | 0 | 3 | 0 | 6 | 0 | 0 | 6 | 1 | 0 | 1 | 0 | 2 | 0 | 5 | 1 | 0 | 6 | 17 |
| 08:30 AM | 7 | 1 | 0 | 0 | 8 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 1 | 7 | 5 | 0 | 13 | 25 |
| 08:45 AM | 5 | 0 | 0 | 0 | 5 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 6 | 1 | 0 | 7 | 16 |
| Total | 18 | 2 | 0 | 0 | 20 | 1 | 19 | 2 | 0 | 22 | 1 | 2 | 3 | 0 | 6 | 1 | 18 | 10 | 0 | 29 | 77 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 4 | 3 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 4 | 0 | 9 | 24 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 6 | 0 | 8 | 15 |
| 09:30 AM | 6 | 1 | 0 | 0 | 7 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 11 |
| 09:45 AM | 4 | 2 | 0 | 0 | 6 | 0 | 5 | 0 | 0 | 5 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 14 |
| Total | 14 | 6 | 0 | 0 | 20 | 0 | 21 | 0 | 0 | 21 | 0 | 3 | 2 | 0 | 5 | 0 | 8 | 10 | 0 | 18 | 64 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 38 | 11 | 0 | 0 | 49 | 2 | 75 | 3 | 0 | 80 | 3 | 6 | 8 | 0 | 17 | 3 | 32 | 23 | 0 | 58 | 204 |
| Apprch % | 77.6 | 22.4 | 0 | 0 | | 2.5 | 93.8 | 3.8 | 0 | | 17.6 | 35.3 | 47.1 | 0 | | 5.2 | 55.2 | 39.7 | 0 | | |
| Total % | 18.6 | 5.4 | 0 | 0 | 24 | 1 | 36.8 | 1.5 | 0 | 39.2 | 1.5 | 2.9 | 3.9 | 0 | 8.3 | 1.5 | 15.7 | 11.3 | 0 | 28.4 | |

| | MIDDLEFIELD RD Southbound | | | | WILLOW RD Westbound | | | | MIDDLEFIELD RD Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | **3** | 0 | 3 | 0 | **21** | 0 | **21** | **1** | **1** | **1** | **3** | 0 | 2 | 1 | 3 | **30** |
| 08:00 AM | 4 | 0 | 0 | 4 | **1** | 8 | **1** | 10 | 0 | 1 | 1 | 2 | 0 | 0 | 3 | 3 | 19 |
| 08:15 AM | 2 | 1 | 0 | 3 | 0 | 6 | 0 | 6 | 1 | 0 | 1 | 2 | 0 | 5 | 1 | 6 | 17 |
| 08:30 AM | **7** | 1 | 0 | **8** | 0 | 3 | 0 | 3 | 0 | 0 | 1 | 1 | **1** | **7** | **5** | **13** | 25 |
| Total Volume | 13 | 5 | 0 | 18 | 1 | 38 | 1 | 40 | 2 | 2 | 4 | 8 | 1 | 14 | 10 | 25 | 91 |
| % App. Total | 72.2 | 27.8 | 0 | | 2.5 | 95 | 2.5 | | 25 | 25 | 50 | | 4 | 56 | 40 | | |
| PHF | .464 | .417 | .000 | .563 | .250 | .452 | .250 | .476 | .500 | .500 | 1.00 | .667 | .250 | .500 | .500 | .481 | .758 |

# Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 16AM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 16PM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 1

Groups Printed- Vehicles

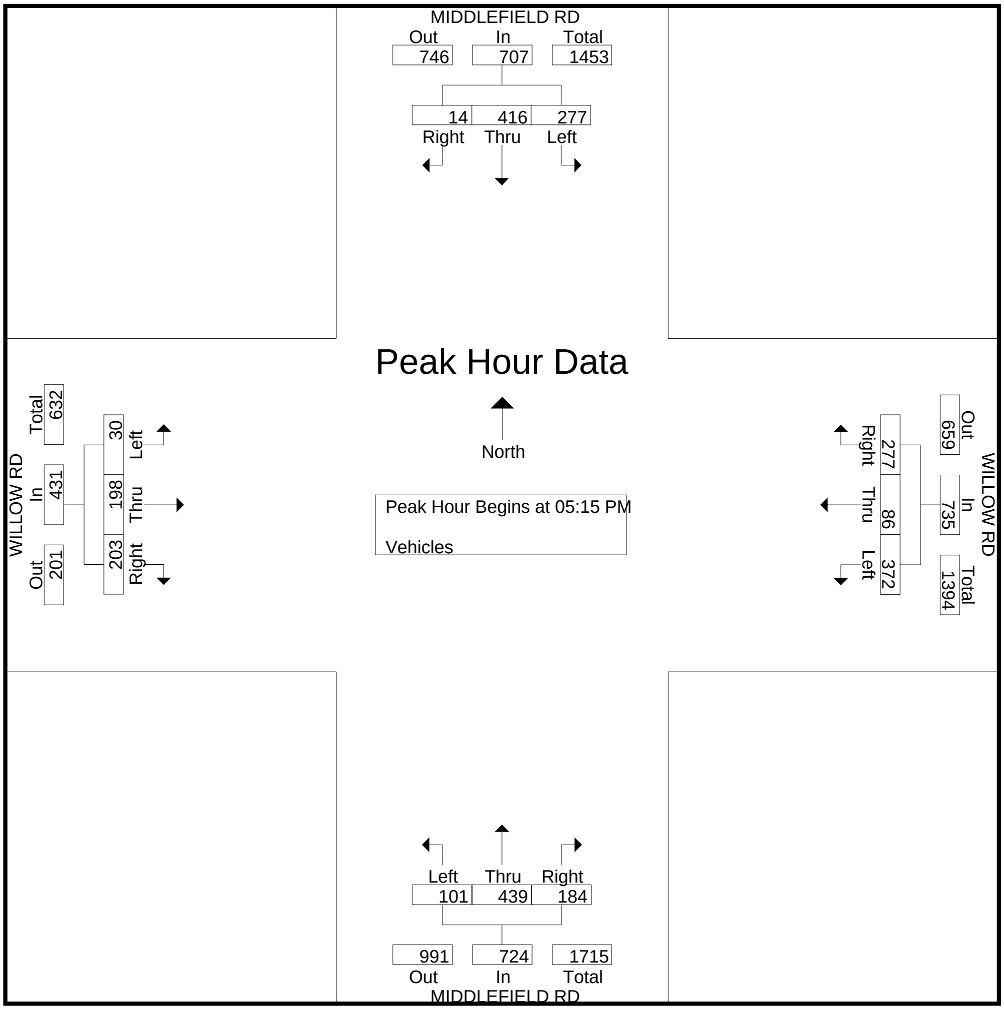
| | MIDDLEFIELD RD Southbound | | | | | WILLOW RD Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 7 | 91 | 105 | 4 | 207 | 84 | 16 | 51 | 10 | 161 | 64 | 105 | 13 | 2 | 184 | 42 | 48 | 6 | 3 | 99 | 651 |
| 04:15 PM | 4 | 79 | 92 | 0 | 175 | 55 | 19 | 48 | 0 | 122 | 68 | 90 | 22 | 4 | 184 | 36 | 58 | 6 | 2 | 102 | 583 |
| 04:30 PM | 3 | 94 | 64 | 3 | 164 | 60 | 16 | 79 | 3 | 158 | 64 | 90 | 21 | 8 | 183 | 45 | 74 | 4 | 7 | 130 | 635 |
| 04:45 PM | 5 | 129 | 64 | 2 | 200 | 79 | 24 | 74 | 3 | 180 | 32 | 123 | 26 | 6 | 187 | 36 | 39 | 2 | 5 | 82 | 649 |
| Total | 19 | 393 | 325 | 9 | 746 | 278 | 75 | 252 | 16 | 621 | 228 | 408 | 82 | 20 | 738 | 159 | 219 | 18 | 17 | 413 | 2518 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 4 | 117 | 42 | 0 | 163 | 71 | 12 | 72 | 2 | 157 | 26 | 110 | 47 | 7 | 190 | 65 | 42 | 11 | 2 | 120 | 630 |
| 05:15 PM | 3 | 122 | 53 | 3 | 181 | 73 | 25 | 83 | 4 | 185 | 38 | 97 | 27 | 3 | 165 | 52 | 35 | 12 | 1 | 100 | 631 |
| 05:30 PM | 6 | 100 | 71 | 1 | 178 | 68 | 21 | 80 | 3 | 172 | 46 | 129 | 20 | 6 | 201 | 53 | 54 | 7 | 4 | 118 | 669 |
| 05:45 PM | 3 | 98 | 73 | 4 | 178 | 61 | 14 | 110 | 1 | 186 | 61 | 101 | 29 | 7 | 198 | 55 | 58 | 7 | 3 | 123 | 685 |
| Total | 16 | 437 | 239 | 8 | 700 | 273 | 72 | 345 | 10 | 700 | 171 | 437 | 123 | 23 | 754 | 225 | 189 | 37 | 10 | 461 | 2615 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 2 | 96 | 80 | 4 | 182 | 75 | 26 | 99 | 1 | 201 | 39 | 112 | 25 | 8 | 184 | 43 | 51 | 4 | 2 | 100 | 667 |
| 06:15 PM | 3 | 73 | 55 | 2 | 133 | 76 | 17 | 90 | 5 | 188 | 52 | 87 | 21 | 6 | 166 | 49 | 65 | 4 | 1 | 119 | 606 |
| 06:30 PM | 2 | 79 | 73 | 3 | 157 | 77 | 20 | 80 | 3 | 180 | 57 | 74 | 15 | 0 | 146 | 34 | 50 | 6 | 1 | 91 | 574 |
| 06:45 PM | 0 | 69 | 69 | 0 | 138 | 58 | 17 | 57 | 4 | 136 | 81 | 70 | 22 | 3 | 176 | 32 | 57 | 7 | 1 | 97 | 547 |
| Total | 7 | 317 | 277 | 9 | 610 | 286 | 80 | 326 | 13 | 705 | 229 | 343 | 83 | 17 | 672 | 158 | 223 | 21 | 5 | 407 | 2394 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 42 | 1147 | 841 | 26 | 2056 | 837 | 227 | 923 | 39 | 2026 | 628 | 1188 | 288 | 60 | 2164 | 542 | 631 | 76 | 32 | 1281 | 7527 |
| Apprch % | 2 | 55.8 | 40.9 | 1.3 | | 41.3 | 11.2 | 45.6 | 1.9 | | 29 | 54.9 | 13.3 | 2.8 | | 42.3 | 49.3 | 5.9 | 2.5 | | |
| Total % | 0.6 | 15.2 | 11.2 | 0.3 | 27.3 | 11.1 | 3 | 12.3 | 0.5 | 26.9 | 8.3 | 15.8 | 3.8 | 0.8 | 28.7 | 7.2 | 8.4 | 1 | 0.4 | 17 | |

| | MIDDLEFIELD RD Southbound | | | | WILLOW RD Westbound | | | | MIDDLEFIELD RD Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:15 PM | | | | | | | | | | | | | | | | | |
| 05:15 PM | 3 | **122** | 53 | **178** | 73 | 25 | 83 | 181 | 38 | 97 | 27 | 162 | 52 | 35 | **12** | 99 | 620 |
| 05:30 PM | **6** | 100 | 71 | 177 | 68 | 21 | 80 | 169 | 46 | **129** | 20 | **195** | 53 | 54 | 7 | 114 | 655 |
| 05:45 PM | 3 | 98 | 73 | 174 | 61 | 14 | **110** | 185 | **61** | 101 | **29** | 191 | **55** | **58** | 7 | **120** | **670** |
| 06:00 PM | 2 | 96 | **80** | 178 | **75** | **26** | 99 | **200** | 39 | 112 | 25 | 176 | 43 | 51 | 4 | 98 | 652 |
| Total Volume | 14 | 416 | 277 | 707 | 277 | 86 | 372 | 735 | 184 | 439 | 101 | 724 | 203 | 198 | 30 | 431 | 2597 |
| % App. Total | 2 | 58.8 | 39.2 | | 37.7 | 11.7 | 50.6 | | 25.4 | 60.6 | 14 | | 47.1 | 45.9 | 7 | | |
| PHF | .583 | .852 | .866 | .993 | .923 | .827 | .845 | .919 | .754 | .851 | .871 | .928 | .923 | .853 | .625 | .898 | .969 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 16PM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 16PM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 1

Groups Printed- Bikes

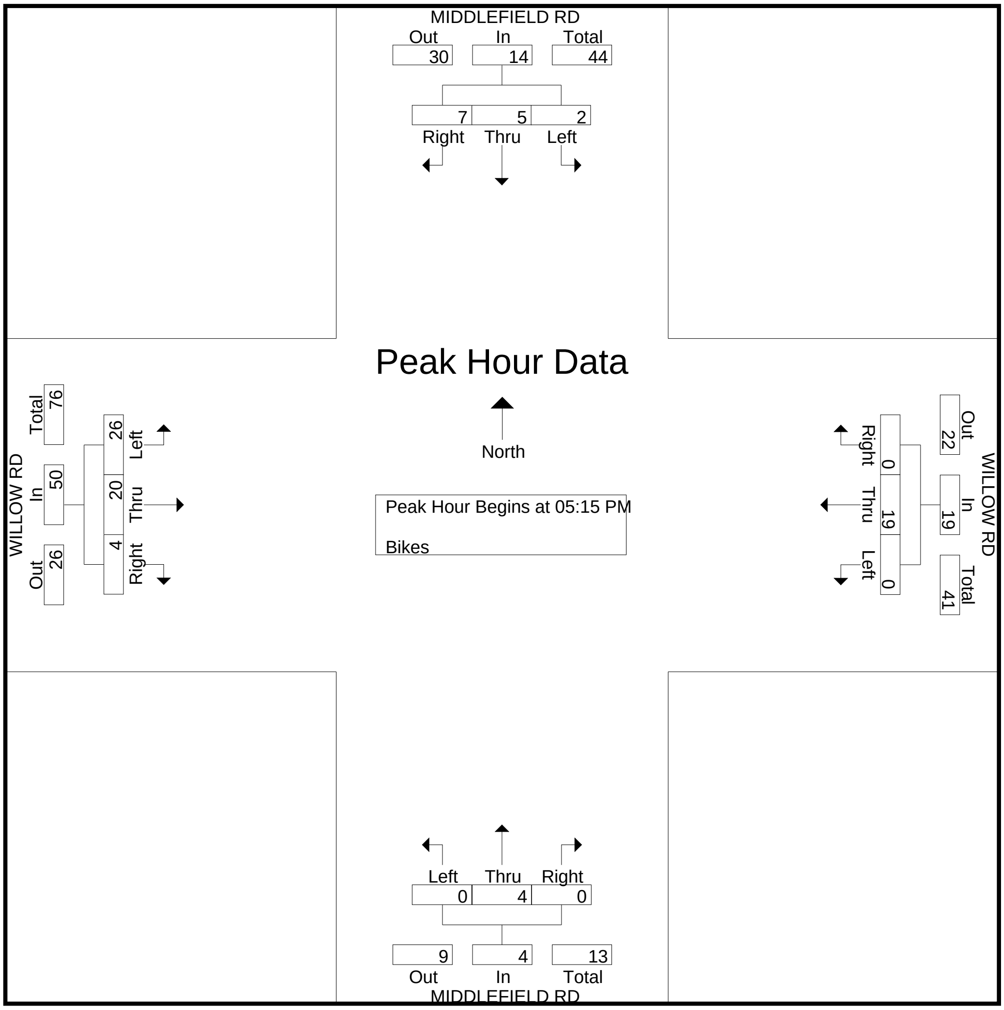
| | MIDDLEFIELD RD Southbound | | | | | WILLOW RD Westbound | | | | | MIDDLEFIELD RD Northbound | | | | | WILLOW RD Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 4 | 0 | 9 | 12 |
| 04:15 PM | 2 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 5 | 1 | 0 | 6 | 12 |
| 04:30 PM | 2 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 2 | 2 | 0 | 4 | 11 |
| 04:45 PM | 1 | 2 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 4 | 11 |
| Total | 7 | 3 | 0 | 0 | 10 | 0 | 7 | 1 | 0 | 8 | 0 | 5 | 0 | 0 | 5 | 2 | 12 | 9 | 0 | 23 | 46 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 3 | 0 | 0 | 0 | 3 | 1 | 4 | 0 | 0 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 3 | 0 | 5 | 14 |
| 05:15 PM | 1 | 0 | 1 | 0 | 2 | 0 | 6 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 11 | 0 | 14 | 23 |
| 05:30 PM | 3 | 4 | 0 | 0 | 7 | 0 | 4 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 0 | 11 | 4 | 0 | 15 | 28 |
| 05:45 PM | 1 | 0 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 4 | 0 | 10 | 18 |
| Total | 8 | 4 | 1 | 0 | 13 | 1 | 21 | 0 | 0 | 22 | 0 | 3 | 1 | 0 | 4 | 0 | 22 | 22 | 0 | 44 | 83 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 2 | 1 | 1 | 0 | 4 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 7 | 0 | 11 | 18 |
| 06:15 PM | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 2 | 0 | 6 | 6 | 0 | 12 | 19 |
| 06:30 PM | 2 | 3 | 1 | 0 | 6 | 0 | 3 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 1 | 4 | 5 | 0 | 10 | 21 |
| 06:45 PM | 3 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 5 | 1 | 0 | 7 | 13 |
| Total | 8 | 5 | 2 | 0 | 15 | 0 | 9 | 0 | 0 | 9 | 2 | 5 | 0 | 0 | 7 | 6 | 15 | 19 | 0 | 40 | 71 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 23 | 12 | 3 | 0 | 38 | 1 | 37 | 1 | 0 | 39 | 2 | 13 | 1 | 0 | 16 | 8 | 49 | 50 | 0 | 107 | 200 |
| Apprch % | 60.5 | 31.6 | 7.9 | 0 | | 2.6 | 94.9 | 2.6 | 0 | | 12.5 | 81.2 | 6.2 | 0 | | 7.5 | 45.8 | 46.7 | 0 | | |
| Total % | 11.5 | 6 | 1.5 | 0 | 19 | 0.5 | 18.5 | 0.5 | 0 | 19.5 | 1 | 6.5 | 0.5 | 0 | 8 | 4 | 24.5 | 25 | 0 | 53.5 | |

| | MIDDLEFIELD RD Southbound | | | | WILLOW RD Westbound | | | | MIDDLEFIELD RD Northbound | | | | WILLOW RD Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 05:15 PM | | | | | | | | | | | | | | | | | |
| 05:15 PM | 1 | 0 | **1** | 2 | 0 | 6 | 0 | 6 | 0 | 1 | 0 | 1 | 0 | 3 | **11** | 14 | 23 |
| 05:30 PM | **3** | **4** | 0 | **7** | 0 | 4 | 0 | 4 | 0 | **2** | 0 | **2** | 0 | **11** | 4 | **15** | **28** |
| 05:45 PM | 1 | 0 | 0 | 1 | 0 | **7** | 0 | **7** | 0 | 0 | 0 | 0 | 0 | 6 | 4 | 10 | 18 |
| 06:00 PM | 2 | 1 | 1 | 4 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | **4** | 0 | 7 | 11 | 18 |
| Total Volume | 7 | 5 | 2 | 14 | 0 | 19 | 0 | 19 | 0 | 4 | 0 | 4 | 4 | 20 | 26 | 50 | 87 |
| % App. Total | 50 | 35.7 | 14.3 | | 0 | 100 | 0 | | 0 | 100 | 0 | | 8 | 40 | 52 | | |
| PHF | .583 | .313 | .500 | .500 | .000 | .679 | .000 | .679 | .000 | .500 | .000 | .500 | .250 | .455 | .591 | .833 | .777 |

# Traffic Data Service

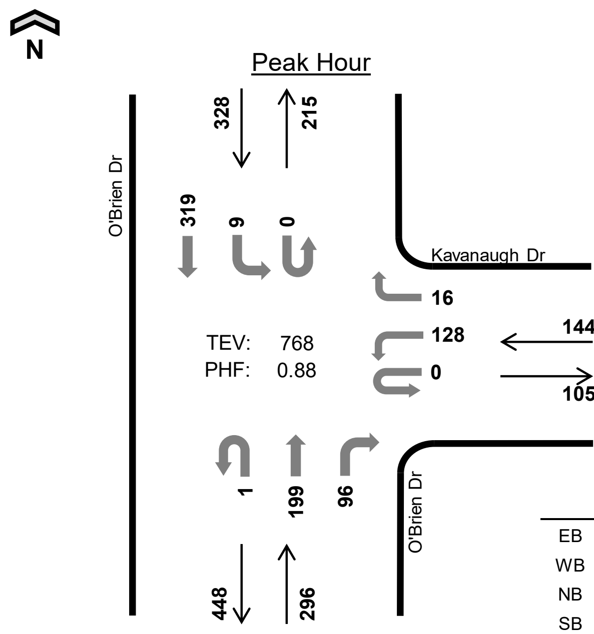
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 16PM FINAL
Site Code : 00000016
Start Date : 3/19/2019
Page No : 2

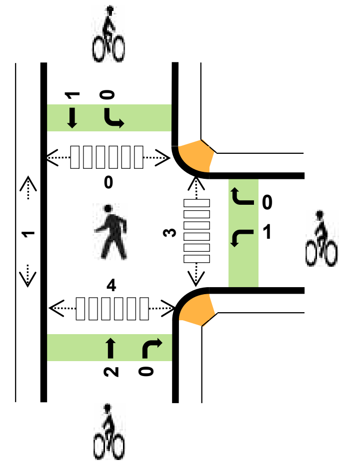


# O'Brien Dr
# Kavanaugh Dr

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 7:30 AM to 8:30 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 0.0% | 0.88 |
| NB | 3.4% | 0.82 |
| SB | 4.0% | 0.65 |
| TOTAL | 3.0% | 0.88 |




**Three-Hour Count Summaries**

| Interval Start | | n/a Eastbound UT | LT | TH | RT | Kavanaugh Dr Westbound UT | LT | TH | RT | O'Brien Dr Northbound UT | LT | TH | RT | O'Brien Dr Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:30 AM | | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 3 | 0 | 0 | 38 | 27 | 0 | 0 | 58 | 0 | 164 | 0 |
| 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 5 | 0 | 0 | 44 | 16 | 0 | 0 | 126 | 0 | 218 | 0 |
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 3 | 0 | 0 | 61 | 29 | 0 | 5 | 79 | 0 | 213 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 5 | 1 | 0 | 56 | 24 | 0 | 4 | 56 | 0 | 173 | 768 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 16 | 1 | 0 | 199 | 96 | 0 | 9 | 319 | 0 | 768 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 13 | 0 | 23 | 0 |
| | HV% | - | - | - | - | - | 0% | - | 0% | 0% | - | 5% | 0% | - | 0% | 4% | - | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:30 AM | 0 | 0 | 2 | 1 | *3* | 0 | 0 | 1 | 0 | *1* | 1 | 0 | 0 | 3 | *4* |
| 7:45 AM | 0 | 0 | 3 | 4 | *7* | 0 | 0 | 1 | 0 | *1* | 0 | 1 | 0 | 1 | *2* |
| 8:00 AM | 0 | 0 | 3 | 4 | *7* | 0 | 1 | 0 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| 8:15 AM | 0 | 0 | 2 | 4 | *6* | 0 | 0 | 0 | 1 | *1* | 1 | 0 | 0 | 0 | *1* |
| Peak Hour | 0 | 0 | 10 | 13 | *23* | 0 | 1 | 2 | 1 | *4* | 3 | 1 | 0 | 4 | *8* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | Kavanaugh Dr Westbound UT | LT | TH | RT | O'Brien Dr Northbound UT | LT | TH | RT | O'Brien Dr Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 3 | 0 | 0 | 36 | 15 | 0 | 1 | 26 | 0 | 102 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 2 | 0 | 0 | 33 | 9 | 0 | 0 | 25 | 0 | 104 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **38** | **0** | **3** | **0** | **0** | **38** | **27** | **0** | **0** | **58** | **0** | **164** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **27** | **0** | **5** | **0** | **0** | **44** | **16** | **0** | **0** | **126** | **0** | **218** | 588 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **36** | **0** | **3** | **0** | **0** | **61** | **29** | **0** | **5** | **79** | **0** | **213** | 699 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **27** | **0** | **5** | **1** | **0** | **56** | **24** | **0** | **4** | **56** | **0** | **173** | 768 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 1 | 0 | 0 | 60 | 20 | 0 | 7 | 29 | 0 | 138 | 742 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 3 | 0 | 0 | 71 | 14 | 0 | 5 | 42 | 0 | 155 | 679 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 1 | 0 | 0 | 88 | 15 | 0 | 0 | 36 | 0 | 162 | 628 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 47 | 11 | 0 | 3 | 41 | 0 | 112 | 567 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 2 | 0 | 0 | 50 | 7 | 0 | 5 | 36 | 0 | 110 | 539 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 3 | 0 | 0 | 31 | 12 | 0 | 3 | 31 | 0 | 86 | 470 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 273 | 0 | 31 | 1 | 0 | 615 | 199 | 0 | 33 | 585 | 0 | 1,737 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **128** | **0** | **16** | **1** | **0** | **199** | **96** | **0** | **9** | **319** | **0** | **768** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **13** | **0** | **23** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **0%** | **-** | **0%** | **0%** | **-** | **5%** | **0%** | **-** | **0%** | **4%** | **-** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 3 | 6 | *9* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 7:15 AM | 0 | 1 | 1 | 1 | *3* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 1 | *1* |
| **7:30 AM** | **0** | **0** | **2** | **1** | ***3*** | **0** | **0** | **1** | **0** | ***1*** | **1** | **0** | **0** | **3** | *4* |
| **7:45 AM** | **0** | **0** | **3** | **4** | ***7*** | **0** | **0** | **1** | **0** | ***1*** | **0** | **1** | **0** | **1** | *2* |
| **8:00 AM** | **0** | **0** | **3** | **4** | ***7*** | **0** | **1** | **0** | **0** | ***1*** | **1** | **0** | **0** | **0** | *1* |
| **8:15 AM** | **0** | **0** | **2** | **4** | ***6*** | **0** | **0** | **0** | **1** | ***1*** | **1** | **0** | **0** | **0** | ***1*** |
| 8:30 AM | 0 | 0 | 5 | 1 | *6* | 0 | 1 | 2 | 0 | *3* | 1 | 0 | 0 | 1 | *2* |
| 8:45 AM | 0 | 0 | 1 | 3 | *4* | 0 | 2 | 1 | 0 | *3* | 0 | 0 | 0 | 1 | *1* |
| 9:00 AM | 0 | 0 | 4 | 7 | *11* | 0 | 1 | 0 | 1 | *2* | 1 | 0 | 0 | 1 | *2* |
| 9:15 AM | 0 | 0 | 3 | 15 | *18* | 0 | 0 | 4 | 1 | *5* | 1 | 0 | 0 | 0 | *1* |
| 9:30 AM | 0 | 0 | 0 | 6 | *6* | 0 | 0 | 2 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 0 | 0 | 5 | 4 | *9* | 0 | 1 | 2 | 0 | *3* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 0 | 1 | 32 | 56 | *89* | 0 | 7 | 14 | 3 | *24* | 6 | 1 | 0 | 8 | *15* |
| **Peak Hr** | **0** | **0** | **10** | **13** | ***23*** | **0** | **1** | **2** | **1** | ***4*** | **3** | **1** | **0** | **4** | ***8*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Kavanaugh Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 6 | 0 | 9 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **3** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **4** | **0** | **7** | 22 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **4** | **0** | **7** | 20 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **4** | **0** | **6** | **23** |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 6 | 26 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 4 | 23 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 7 | 0 | 11 | 27 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 13 | 0 | 18 | 39 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 6 | 39 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 4 | 0 | 9 | 44 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 30 | 2 | 0 | 4 | 52 | 0 | 89 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **13** | **0** | **23** | **0** |

## Three-Hour Count Summaries - Bikes

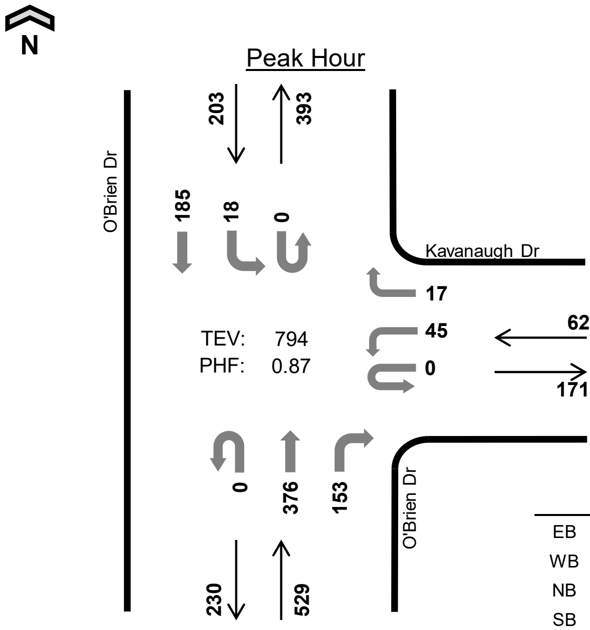
| Interval Start | n/a | | | Kavanaugh Dr | | | O'Brien Dr | | | O'Brien Dr | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | 4 |
| **8:00 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 4 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **4** |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 6 |
| 8:45 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 8 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 9 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 5 | 13 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 12 |
| 9:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 12 |
| Count Total | 0 | 0 | 0 | 5 | 0 | 2 | 0 | 9 | 5 | 1 | 2 | 0 | 24 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **0** | **4** | **0** |

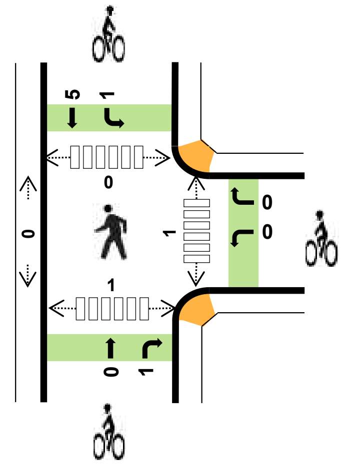
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# O'Brien Dr
# Kavanaugh Dr

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:30 PM to 5:30 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 4.8% | 0.91 |
| NB | 5.5% | 0.80 |
| SB | 3.0% | 0.94 |
| TOTAL | 4.8% | 0.87 |

### Three-Hour Count Summaries

| Interval Start | n/a | | | | Kavanaugh Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 94 | 25 | 0 | 6 | 47 | 0 | 189 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 3 | 0 | 0 | 64 | 48 | 0 | 3 | 47 | 0 | 174 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 3 | 0 | 0 | 98 | 34 | 0 | 4 | 50 | 0 | 203 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 11 | 0 | 0 | 120 | 46 | 0 | 5 | 41 | 0 | 228 | 794 |
| Peak Hour All | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 17 | 0 | 0 | 376 | 153 | 0 | 18 | 185 | 0 | 794 | 0 |
| Peak Hour HV | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 28 | 1 | 0 | 0 | 6 | 0 | 38 | 0 |
| Peak Hour HV% | - | - | - | - | - | 4% | - | 6% | - | - | 7% | 1% | - | 0% | 3% | - | 5% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:30 PM | 0 | 2 | 8 | 1 | *11* | 0 | 0 | 0 | 2 | *2* | 1 | 0 | 0 | 1 | *2* |
| 4:45 PM | 0 | 0 | 6 | 3 | *9* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 5:00 PM | 0 | 1 | 11 | 2 | *14* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 0 | 0 | 4 | 0 | *4* | 0 | 0 | 0 | 3 | *3* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 0 | 3 | 29 | 6 | *38* | 0 | 0 | 1 | 6 | *7* | 1 | 0 | 0 | 1 | *2* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | Kavanaugh Dr Westbound UT | LT | TH | RT | O'Brien Dr Northbound UT | LT | TH | RT | O'Brien Dr Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 42 | 37 | 0 | 3 | 58 | 0 | 153 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 1 | 0 | 0 | 79 | 35 | 0 | 0 | 38 | 0 | 167 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **94** | **25** | **0** | **6** | **47** | **0** | **189** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **3** | **0** | **0** | **64** | **48** | **0** | **3** | **47** | **0** | **174** | 683 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **14** | **0** | **3** | **0** | **0** | **98** | **34** | **0** | **4** | **50** | **0** | **203** | 733 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **11** | **0** | **0** | **120** | **46** | **0** | **5** | **41** | **0** | **228** | **794** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 7 | 0 | 0 | 62 | 26 | 0 | 5 | 41 | 0 | 159 | 764 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 6 | 0 | 0 | 70 | 29 | 0 | 4 | 31 | 0 | 161 | 751 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 6 | 0 | 0 | 85 | 41 | 0 | 4 | 20 | 0 | 179 | 727 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 6 | 0 | 0 | 46 | 30 | 0 | 1 | 19 | 0 | 114 | 613 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 2 | 0 | 0 | 35 | 24 | 0 | 2 | 23 | 0 | 105 | 559 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 2 | 0 | 0 | 20 | 22 | 0 | 0 | 13 | 0 | 71 | 469 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 179 | 0 | 47 | 0 | 0 | 815 | 397 | 0 | 37 | 428 | 0 | 1,903 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **45** | **0** | **17** | **0** | **0** | **376** | **153** | **0** | **18** | **185** | **0** | **794** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **28** | **1** | **0** | **0** | **6** | **0** | **38** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **4%** | **-** | **6%** | **-** | **-** | **7%** | **1%** | **-** | **0%** | **3%** | **-** | **5%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 5 | 1 | *6* | 0 | 1 | 1 | 0 | *2* | 2 | 0 | 0 | 0 | *2* |
| 4:15 PM | 0 | 0 | 2 | 1 | *3* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| **4:30 PM** | **0** | **2** | **8** | **1** | ***11*** | **0** | **0** | **0** | **2** | ***2*** | **1** | **0** | **0** | **1** | *2* |
| **4:45 PM** | **0** | **0** | **6** | **3** | ***9*** | **0** | **0** | **1** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **5:00 PM** | **0** | **1** | **11** | **2** | ***14*** | **0** | **0** | **0** | **1** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **5:15 PM** | **0** | **0** | **4** | **0** | ***4*** | **0** | **0** | **0** | **3** | ***3*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:30 PM | 0 | 2 | 2 | 2 | *6* | 0 | 0 | 1 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| 5:45 PM | 0 | 0 | 7 | 1 | *8* | 0 | 0 | 3 | 0 | *3* | 1 | 0 | 0 | 0 | *1* |
| 6:00 PM | 0 | 4 | 5 | 2 | *11* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 0 | 1 | 7 | 0 | *8* | 0 | 0 | 0 | 3 | *3* | 0 | 0 | 0 | 2 | *2* |
| 6:30 PM | 0 | 1 | 4 | 0 | *5* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* |
| 6:45 PM | 0 | 0 | 5 | 1 | *6* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 0 | 11 | 66 | 14 | *91* | 0 | 1 | 8 | 9 | *18* | 5 | 0 | 1 | 3 | *9* |
| **Peak Hr** | **0** | **3** | **29** | **6** | ***38*** | **0** | **0** | **1** | **6** | ***7*** | **1** | **0** | **0** | **1** | ***2*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Kavanaugh Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 6 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **1** | **0** | **11** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **1** | **0** | **0** | **3** | **0** | **9** | 29 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **11** | **0** | **0** | **0** | **2** | **0** | **14** | 37 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **4** | **38** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 6 | 33 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 1 | 0 | 8 | 32 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 4 | 1 | 0 | 0 | 2 | 0 | 11 | 29 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 8 | 33 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 32 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 6 | 30 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 8 | 0 | 0 | 63 | 3 | 0 | 2 | 12 | 0 | 91 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **28** | **1** | **0** | **0** | **6** | **0** | **38** | **0** |

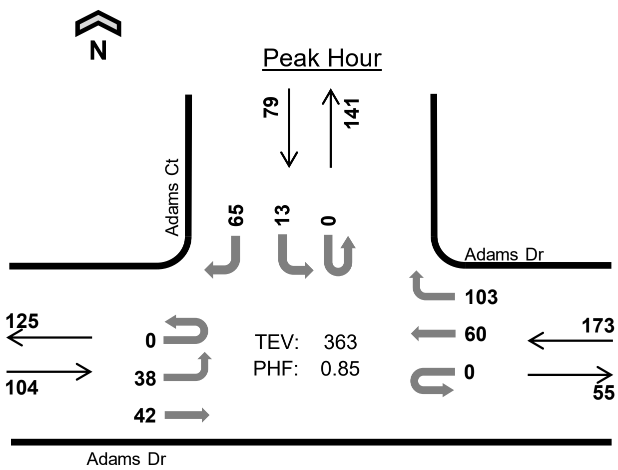
## Three-Hour Count Summaries - Bikes

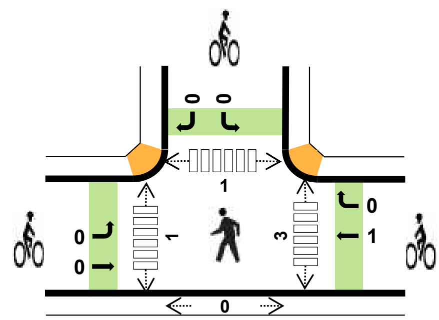
| Interval Start | n/a | | | Kavanaugh Dr | | | O'Brien Dr | | | O'Brien Dr | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **2** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | 6 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | 5 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **3** | **7** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 6 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | 8 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 8 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 8 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Count Total | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 7 | 1 | 8 | 0 | 18 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **5** | **0** | **7** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Adams Ct
# Adams Dr

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:15 AM to 9:15 AM




| | HV %: | PHF |
|---|---|---|
| EB | 12.5% | 0.84 |
| WB | 15.6% | 0.82 |
| NB | - | 0.88 |
| SB | 46.8% | 0.56 |
| TOTAL | 21.6% | 0.85 |

**Three-Hour Count Summaries**

| Interval Start | Adams Dr Eastbound UT | LT | TH | RT | Adams Dr Westbound UT | LT | TH | RT | n/a Northbound UT | LT | TH | RT | Adams Ct Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | 0 | 15 | 9 | 3 | 0 | 3 | 15 | 35 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8 | 89 | 0 |
| 8:30 AM | 0 | 7 | 14 | 10 | 0 | 4 | 19 | 28 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 8 | 94 | 0 |
| 8:45 AM | 0 | 10 | 3 | 5 | 0 | 1 | 12 | 14 | 0 | 0 | 1 | 1 | 0 | 6 | 0 | 20 | 73 | 0 |
| 9:00 AM | 0 | 6 | 16 | 6 | 0 | 2 | 14 | 26 | 1 | 1 | 0 | 0 | 0 | 5 | 1 | 29 | 107 | 363 |
| Peak Hour All | 0 | 38 | 42 | 24 | 0 | 10 | 60 | 103 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 65 | 356 | 0 |
| Peak Hour HV | 0 | 5 | 3 | 5 | 0 | 0 | 3 | 24 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 34 | 77 | 0 |
| Peak Hour HV% | - | 13% | 7% | 21% | - | 0% | 5% | 23% | - | - | - | - | - | 23% | 0% | 52% | 22% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | 1 | 3 | 0 | 3 | *7* | 0 | 1 | 0 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 6 | 9 | 0 | 1 | *16* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:45 AM | 0 | 3 | 0 | 5 | *8* | 1 | 0 | 0 | 2 | *3* | 0 | 0 | 0 | 0 | *0* |
| 9:00 AM | 6 | 12 | 0 | 28 | *46* | 0 | 1 | 0 | 0 | *1* | 3 | 1 | 1 | 0 | *5* |
| Peak Hour | 13 | 27 | 0 | 37 | *77* | 1 | 2 | 0 | 3 | *6* | 3 | 1 | 1 | 0 | *5* |

## Three-Hour Count Summaries

| Interval Start | | Adams Dr Eastbound UT | Adams Dr Eastbound LT | Adams Dr Eastbound TH | Adams Dr Eastbound RT | Adams Dr Westbound UT | Adams Dr Westbound LT | Adams Dr Westbound TH | Adams Dr Westbound RT | n/a Northbound UT | n/a Northbound LT | n/a Northbound TH | n/a Northbound RT | Adams Ct Southbound UT | Adams Ct Southbound LT | Adams Ct Southbound TH | Adams Ct Southbound RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | 0 | 9 | 1 | 2 | 0 | 0 | 5 | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 38 | 0 |
| 7:15 AM | | 0 | 3 | 4 | 0 | 0 | 0 | 7 | 8 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 5 | 30 | 0 |
| 7:30 AM | | 0 | 8 | 3 | 0 | 0 | 2 | 8 | 20 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 6 | 51 | 0 |
| 7:45 AM | | 0 | 9 | 6 | 0 | 0 | 2 | 14 | 22 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 59 | 178 |
| 8:00 AM | | 0 | 12 | 7 | 2 | 0 | 2 | 21 | 33 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 13 | 94 | 234 |
| **8:15 AM** | | **0** | **15** | **9** | **3** | **0** | **3** | **15** | **35** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **8** | **89** | 293 |
| **8:30 AM** | | **0** | **7** | **14** | **10** | **0** | **4** | **19** | **28** | **0** | **1** | **0** | **1** | **0** | **2** | **0** | **8** | **94** | 336 |
| **8:45 AM** | | **0** | **10** | **3** | **5** | **0** | **1** | **12** | **14** | **0** | **0** | **1** | **1** | **0** | **6** | **0** | **20** | **73** | 350 |
| **9:00 AM** | | **0** | **6** | **16** | **6** | **0** | **2** | **14** | **26** | **1** | **1** | **0** | **0** | **0** | **5** | **1** | **29** | **107** | **363** |
| 9:15 AM | | 0 | 4 | 5 | 4 | 0 | 7 | 9 | 20 | 1 | 2 | 0 | 2 | 0 | 2 | 0 | 32 | 88 | 362 |
| 9:30 AM | | 0 | 3 | 6 | 5 | 0 | 5 | 8 | 14 | 1 | 1 | 0 | 2 | 0 | 3 | 0 | 11 | 59 | 327 |
| 9:45 AM | | 0 | 2 | 9 | 2 | 1 | 2 | 6 | 20 | 1 | 1 | 0 | 1 | 0 | 5 | 0 | 6 | 56 | 310 |
| Count Total | | 0 | 88 | 83 | 39 | 1 | 30 | 138 | 255 | 0 | 0 | 0 | 0 | 0 | 32 | 1 | 148 | 815 | 0 |
| **Peak Hour** | **All** | **0** | **38** | **42** | **24** | **0** | **10** | **60** | **103** | **0** | **0** | **0** | **0** | **0** | **13** | **1** | **65** | **356** | **0** |
| | **HV** | **0** | **5** | **3** | **5** | **0** | **0** | **3** | **24** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **34** | **77** | **0** |
| | **HV%** | **-** | **13%** | **7%** | **21%** | **-** | **0%** | **5%** | **23%** | **-** | **-** | **-** | **-** | **-** | **23%** | **0%** | **52%** | **22%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 1 | 0 | 0 | 4 | *5* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* |
| 7:15 AM | 1 | 0 | 0 | 2 | *3* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 2 | 2 | 0 | 1 | *5* | 0 | 0 | 0 | 0 | *0* | 1 | 1 | 0 | 0 | *2* |
| 7:45 AM | 3 | 4 | 0 | 1 | *8* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 8:00 AM | 0 | 2 | 0 | 1 | *3* | 1 | 1 | 0 | 0 | *2* | 2 | 0 | 2 | 0 | *4* |
| **8:15 AM** | **1** | **3** | **0** | **3** | ***7*** | **0** | **1** | **0** | **1** | ***2*** | **0** | **0** | **0** | **0** | *0* |
| **8:30 AM** | **6** | **9** | **0** | **1** | ***16*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **8:45 AM** | **0** | **3** | **0** | **5** | ***8*** | **1** | **0** | **0** | **2** | ***3*** | **0** | **0** | **0** | **0** | *0* |
| **9:00 AM** | **6** | **12** | **0** | **28** | ***46*** | **0** | **1** | **0** | **0** | ***1*** | **3** | **1** | **1** | **0** | ***5*** |
| 9:15 AM | 1 | 6 | 0 | 26 | *33* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 0 | 0 | 0 | 8 | *8* | 1 | 0 | 0 | 3 | *4* | 0 | 1 | 0 | 0 | *1* |
| 9:45 AM | 2 | 1 | 0 | 3 | *6* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 1 | 0 | *1* |
| Count Total | 23 | 42 | 0 | 83 | *148* | 5 | 3 | 0 | 8 | *16* | 6 | 3 | 5 | 0 | *14* |
| **Peak Hr** | **13** | **27** | **0** | **37** | ***77*** | **1** | **2** | **0** | **3** | ***6*** | **3** | **1** | **1** | **0** | ***5*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Adams Dr | | | | Adams Dr | | | | n/a | | | | Adams Ct | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 |
| 7:30 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 |
| 7:45 AM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 22 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 19 |
| **8:15 AM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **8** | 24 |
| **8:30 AM** | **0** | **1** | **1** | **4** | **0** | **0** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **16** | 35 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **8** | 35 |
| **9:00 AM** | **0** | **4** | **1** | **1** | **0** | **0** | **2** | **10** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **25** | **46** | **78** |
| 9:15 AM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 25 | 35 | 105 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 7 | 8 | 97 |
| 9:45 AM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 7 | 96 |
| Count Total | 0 | 12 | 6 | 5 | 0 | 1 | 4 | 37 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 76 | 148 | 0 |
| **Peak Hour** | **0** | **5** | **3** | **5** | **0** | **0** | **3** | **24** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **34** | **77** | **0** |

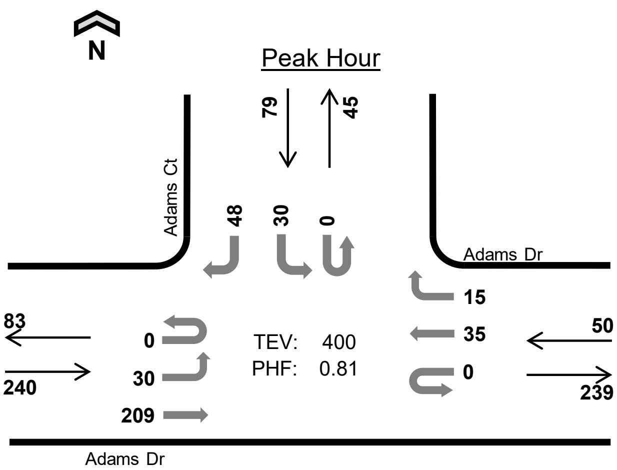
## Three-Hour Count Summaries - Bikes

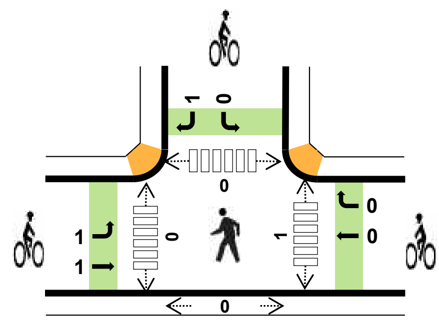
| Interval Start | Adams Dr | | | Adams Dr | | | n/a | | | Adams Ct | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| **8:15 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **2** | 5 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 5 |
| **8:45 AM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **3** | 7 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **6** |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 |
| 9:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 4 | 9 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 |
| Count Total | 1 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 16 | 0 |
| **Peak Hour** | **0** | **0** | **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **6** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Adams Ct
# Adams Dr

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:30 PM to 5:30 PM




| | HV %: | PHF |
|---|---|---|
| EB | 7.9% | 0.74 |
| WB | 14.0% | 0.78 |
| NB | - | 0.86 |
| SB | 12.7% | 0.79 |
| TOTAL | 9.8% | 0.81 |

## Three-Hour Count Summaries

| Interval Start | | Adams Dr Eastbound UT | LT | TH | RT | Adams Dr Westbound UT | LT | TH | RT | n/a Northbound UT | LT | TH | RT | Adams Ct Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM | | 0 | 6 | 51 | 1 | 0 | 0 | 6 | 5 | 0 | 4 | 0 | 4 | 0 | 8 | 0 | 9 | 94 | 0 |
| 4:45 PM | | 0 | 8 | 26 | 0 | 0 | 0 | 9 | 0 | 0 | 6 | 0 | 0 | 0 | 4 | 1 | 14 | 68 | 0 |
| 5:00 PM | | 0 | 12 | 55 | 0 | 0 | 0 | 8 | 6 | 0 | 4 | 0 | 5 | 0 | 12 | 0 | 13 | 115 | 0 |
| 5:15 PM | | 0 | 4 | 77 | 0 | 0 | 0 | 12 | 4 | 0 | 6 | 0 | 2 | 0 | 6 | 0 | 12 | 123 | 400 |
| Peak Hour | All | 0 | 30 | 209 | 1 | 0 | 0 | 35 | 15 | 0 | 0 | 0 | 0 | 0 | 30 | 1 | 48 | 369 | 0 |
| | HV | 0 | 16 | 3 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 36 | 0 |
| | HV% | - | 53% | 1% | 0% | - | - | 3% | 40% | - | - | - | - | - | 17% | 0% | 10% | 10% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM | 4 | 0 | 0 | 1 | *5* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 4 | 1 | 0 | 2 | *7* | 1 | 0 | 0 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| 5:00 PM | 9 | 3 | 0 | 4 | *16* | 1 | 0 | 0 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 2 | 3 | 0 | 3 | *8* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 19 | 7 | 0 | 10 | *36* | 2 | 0 | 0 | 1 | *3* | 1 | 0 | 0 | 0 | *1* |

## Three-Hour Count Summaries

| Interval Start | | Adams Dr | | | | Adams Dr | | | | n/a | | | | Adams Ct | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 5 | 9 | 1 | 0 | 0 | 8 | 5 | 0 | 1 | 1 | 2 | 0 | 9 | 0 | 15 | 56 | 0 |
| 4:15 PM | | 0 | 5 | 30 | 1 | 0 | 1 | 9 | 4 | 0 | 3 | 0 | 2 | 0 | 9 | 0 | 12 | 76 | 0 |
| **4:30 PM** | | **0** | **6** | **51** | **1** | **0** | **0** | **6** | **5** | **0** | **4** | **0** | **4** | **0** | **8** | **0** | **9** | **94** | 0 |
| **4:45 PM** | | **0** | **8** | **26** | **0** | **0** | **0** | **9** | **0** | **0** | **6** | **0** | **0** | **0** | **4** | **1** | **14** | **68** | 294 |
| **5:00 PM** | | **0** | **12** | **55** | **0** | **0** | **0** | **8** | **6** | **0** | **4** | **0** | **5** | **0** | **12** | **0** | **13** | **115** | 353 |
| **5:15 PM** | | **0** | **4** | **77** | **0** | **0** | **0** | **12** | **4** | **0** | **6** | **0** | **2** | **0** | **6** | **0** | **12** | **123** | **400** |
| 5:30 PM | | 0 | 3 | 37 | 0 | 0 | 0 | 8 | 1 | 0 | 3 | 0 | 1 | 0 | 2 | 0 | 8 | 63 | 369 |
| 5:45 PM | | 0 | 6 | 39 | 3 | 0 | 0 | 7 | 3 | 1 | 2 | 1 | 2 | 0 | 2 | 0 | 9 | 75 | 376 |
| 6:00 PM | | 0 | 5 | 54 | 0 | 0 | 0 | 4 | 3 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 18 | 91 | 352 |
| 6:15 PM | | 0 | 8 | 19 | 0 | 0 | 0 | 2 | 3 | 0 | 5 | 0 | 2 | 0 | 3 | 0 | 9 | 51 | 280 |
| 6:30 PM | | 0 | 5 | 7 | 1 | 0 | 0 | 4 | 2 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 16 | 42 | 259 |
| 6:45 PM | | 0 | 7 | 2 | 1 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 7 | 25 | 209 |
| Count Total | | 0 | 74 | 406 | 8 | 0 | 1 | 77 | 39 | 0 | 0 | 0 | 0 | 0 | 62 | 1 | 142 | 810 | 0 |
| **Peak Hour** | **All** | **0** | **30** | **209** | **1** | **0** | **0** | **35** | **15** | **0** | **0** | **0** | **0** | **0** | **30** | **1** | **48** | **369** | **0** |
| | **HV** | **0** | **16** | **3** | **0** | **0** | **0** | **1** | **6** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **5** | **36** | **0** |
| | **HV%** | **-** | **53%** | **1%** | **0%** | **-** | **-** | **3%** | **40%** | **-** | **-** | **-** | **-** | **-** | **17%** | **0%** | **10%** | **10%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 4 | 2 | 0 | 2 | *8* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 1 | *1* |
| 4:15 PM | 2 | 1 | 0 | 4 | *7* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| **4:30 PM** | **4** | **0** | **0** | **1** | ***5*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **4:45 PM** | **4** | **1** | **0** | **2** | ***7*** | **1** | **0** | **0** | **0** | ***1*** | **1** | **0** | **0** | **0** | *1* |
| **5:00 PM** | **9** | **3** | **0** | **4** | ***16*** | **1** | **0** | **0** | **1** | ***2*** | **0** | **0** | **0** | **0** | *0* |
| **5:15 PM** | **2** | **3** | **0** | **3** | ***8*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:30 PM | 2 | 1 | 0 | 1 | *4* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 1 | *1* |
| 5:45 PM | 4 | 1 | 0 | 3 | *8* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:00 PM | 4 | 2 | 0 | 2 | *8* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 7 | 2 | 0 | 0 | *9* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 3 | 1 | 0 | 0 | *4* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 5 | 1 | 0 | 2 | *8* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 50 | 18 | 0 | 24 | *92* | 2 | 1 | 0 | 5 | *8* | 1 | 0 | 0 | 2 | *3* |
| **Peak Hr** | **19** | **7** | **0** | **10** | ***36*** | **2** | **0** | **0** | **1** | ***3*** | **1** | **0** | **0** | **0** | ***1*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Adams Dr | | | | Adams Dr | | | | n/a | | | | Adams Ct | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 8 | 0 |
| 4:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 7 | 0 |
| **4:30 PM** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **6** | 0 |
| **4:45 PM** | **0** | **3** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **1** | **8** | 29 |
| **5:00 PM** | **0** | **7** | **2** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **1** | **16** | 37 |
| **5:15 PM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **8** | **38** |
| 5:30 PM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 36 |
| 5:45 PM | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 9 | 37 |
| 6:00 PM | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 29 |
| 6:15 PM | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 30 |
| 6:30 PM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 30 |
| 6:45 PM | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 9 | 30 |
| Count Total | 0 | 41 | 9 | 0 | 0 | 0 | 2 | 16 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 15 | 92 | 0 |
| **Peak Hour** | **0** | **16** | **3** | **0** | **0** | **0** | **1** | **6** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **5** | **36** | **0** |

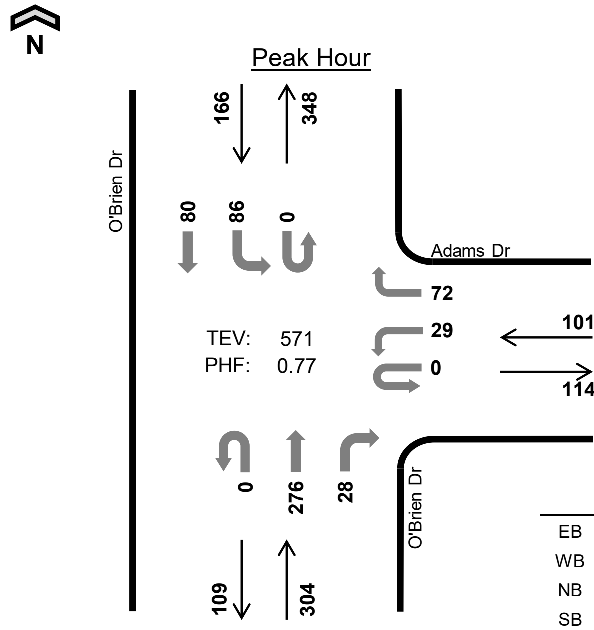
## Three-Hour Count Summaries - Bikes

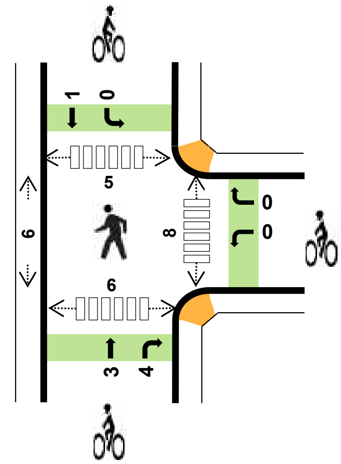
| Interval Start | Adams Dr | | | Adams Dr | | | n/a | | | Adams Ct | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:45 PM** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 2 |
| **5:00 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **2** | 3 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 5 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 |
| 6:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| Count Total | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 8 | 0 |
| **Peak Hour** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# O'Brien Dr
# Adams Dr

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 7:45 AM to 8:45 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 8.9% | 0.77 |
| NB | 3.0% | 0.59 |
| SB | 6.6% | 0.90 |
| TOTAL | 5.1% | 0.77 |

## Three-Hour Count Summaries

| Interval Start | | n/a Eastbound UT | LT | TH | RT | Adams Dr Westbound UT | LT | TH | RT | O'Brien Dr Northbound UT | LT | TH | RT | O'Brien Dr Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 13 | 0 | 0 | 124 | 5 | 0 | 14 | 25 | 0 | 185 | 0 |
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 24 | 0 | 0 | 67 | 9 | 0 | 19 | 27 | 0 | 155 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 17 | 0 | 0 | 54 | 8 | 0 | 27 | 14 | 0 | 127 | 0 |
| 8:30 AM | | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 18 | 0 | 0 | 31 | 6 | 0 | 26 | 14 | 0 | 104 | 571 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 72 | 0 | 0 | 276 | 28 | 0 | 86 | 80 | 0 | 571 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 0 | 0 | 6 | 3 | 0 | 8 | 3 | 0 | 29 | 0 |
| | HV% | - | - | - | - | - | 17% | - | 6% | - | - | 2% | 11% | - | 9% | 4% | - | 5% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:45 AM | 0 | 1 | 3 | 2 | *6* | 0 | 0 | 2 | 1 | *3* | 2 | 1 | 2 | 1 | *6* |
| 8:00 AM | 0 | 2 | 2 | 2 | *6* | 0 | 0 | 2 | 0 | *2* | 2 | 2 | 1 | 3 | *8* |
| 8:15 AM | 0 | 5 | 2 | 2 | *9* | 0 | 0 | 3 | 0 | *3* | 4 | 1 | 2 | 1 | *8* |
| 8:30 AM | 0 | 1 | 2 | 5 | *8* | 0 | 0 | 0 | 0 | *0* | 0 | 2 | 0 | 1 | *3* |
| Peak Hour | 0 | 9 | 9 | 11 | *29* | 0 | 0 | 7 | 1 | *8* | 8 | 6 | 5 | 6 | *25* |

## Three-Hour Count Summaries

| Interval Start | n/a | | | | Adams Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 7 | 0 | 0 | 17 | 4 | 1 | 6 | 11 | 0 | 51 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 9 | 0 | 0 | 30 | 3 | 0 | 5 | 13 | 0 | 63 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 9 | 0 | 0 | 56 | 4 | 0 | 7 | 17 | 0 | 95 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **13** | **0** | **0** | **124** | **5** | **0** | **14** | **25** | **0** | **185** | 394 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **24** | **0** | **0** | **67** | **9** | **0** | **19** | **27** | **0** | **155** | 498 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **17** | **0** | **0** | **54** | **8** | **0** | **27** | **14** | **0** | **127** | 562 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **18** | **0** | **0** | **31** | **6** | **0** | **26** | **14** | **0** | **104** | **571** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 13 | 0 | 0 | 38 | 6 | 0 | 15 | 28 | 0 | 113 | 499 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 16 | 0 | 0 | 32 | 15 | 0 | 30 | 27 | 0 | 140 | 484 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 20 | 0 | 0 | 23 | 12 | 0 | 15 | 17 | 0 | 111 | 468 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 14 | 0 | 0 | 36 | 3 | 0 | 19 | 24 | 0 | 102 | 466 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 9 | 0 | 0 | 17 | 5 | 0 | 15 | 12 | 0 | 60 | 413 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 104 | 0 | 169 | 0 | 0 | 525 | 80 | 1 | 198 | 229 | 0 | 1,306 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **29** | **0** | **72** | **0** | **0** | **276** | **28** | **0** | **86** | **80** | **0** | **571** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **4** | **0** | **0** | **6** | **3** | **0** | **8** | **3** | **0** | **29** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **17%** | **-** | **6%** | **-** | **-** | **2%** | **11%** | **-** | **9%** | **4%** | **-** | **5%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 5 | 1 | 3 | *9* | 0 | 0 | 0 | 0 | *0* | 0 | 2 | 1 | 2 | *5* |
| 7:15 AM | 0 | 2 | 0 | 2 | *4* | 0 | 0 | 1 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| 7:30 AM | 0 | 1 | 1 | 2 | *4* | 0 | 1 | 0 | 1 | *2* | 1 | 0 | 1 | 0 | *2* |
| **7:45 AM** | **0** | **1** | **3** | **2** | ***6*** | **0** | **0** | **2** | **1** | ***3*** | **2** | **1** | **2** | **1** | *6* |
| **8:00 AM** | **0** | **2** | **2** | **2** | ***6*** | **0** | **0** | **2** | **0** | ***2*** | **2** | **2** | **1** | **3** | *8* |
| **8:15 AM** | **0** | **5** | **2** | **2** | ***9*** | **0** | **0** | **3** | **0** | ***3*** | **4** | **1** | **2** | **1** | *8* |
| **8:30 AM** | **0** | **1** | **2** | **5** | ***8*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **2** | **0** | **1** | *3* |
| 8:45 AM | 0 | 5 | 0 | 1 | *6* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:00 AM | 0 | 23 | 4 | 3 | *30* | 0 | 1 | 0 | 1 | *2* | 11 | 0 | 1 | 2 | *14* |
| 9:15 AM | 0 | 29 | 0 | 2 | *31* | 0 | 1 | 0 | 1 | *2* | 1 | 1 | 1 | 1 | *4* |
| 9:30 AM | 0 | 7 | 0 | 0 | *7* | 0 | 1 | 0 | 1 | *2* | 1 | 3 | 0 | 4 | *8* |
| 9:45 AM | 0 | 2 | 2 | 3 | *7* | 0 | 0 | 0 | 2 | *2* | 3 | 0 | 2 | 0 | *5* |
| Count Total | 0 | 83 | 17 | 27 | *127* | 0 | 4 | 8 | 7 | *19* | 26 | 12 | 11 | 15 | *64* |
| **Peak Hr** | **0** | **9** | **9** | **11** | ***29*** | **0** | **0** | **7** | **1** | ***8*** | **8** | **6** | **5** | **6** | ***25*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Adams Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 9 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **1** | **0** | **2** | **0** | **0** | **6** | 23 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **1** | **1** | **0** | **6** | 20 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **0** | **0** | **1** | **1** | **0** | **1** | **1** | **0** | **9** | 25 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **4** | **1** | **0** | **8** | **29** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 29 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 7 | 0 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 30 | 53 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 31 | 75 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 74 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 7 | 75 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 36 | 0 | 0 | 11 | 6 | 1 | 14 | 12 | 0 | 127 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **4** | **0** | **0** | **6** | **3** | **0** | **8** | **3** | **0** | **29** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | n/a | | | Adams Dr | | | O'Brien Dr | | | O'Brien Dr | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **3** | 6 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **2** | 8 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **0** | **3** | 10 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 5 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 4 |
| 9:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 6 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 8 |
| Count Total | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 3 | 5 | 2 | 5 | 0 | 19 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **4** | **0** | **1** | **0** | **8** | **0** |

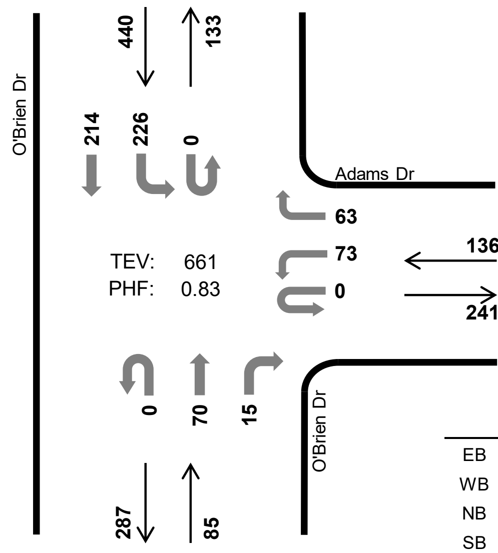
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

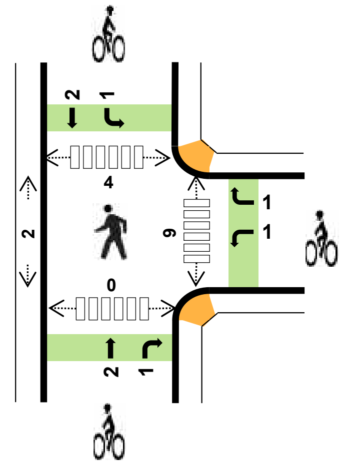
# O'Brien Dr
# Adams Dr

N

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:30 PM to 5:30 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 5.1% | 0.87 |
| NB | 3.5% | 0.89 |
| SB | 6.1% | 0.80 |
| TOTAL | 5.6% | 0.83 |

**Three-Hour Count Summaries**

| Interval Start | | n/a | | | | Adams Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:30 PM | | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 12 | 0 | 0 | 15 | 1 | 0 | 61 | 51 | 0 | 151 | 0 |
| 4:45 PM | | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 18 | 0 | 0 | 22 | 2 | 0 | 27 | 50 | 0 | 136 | 0 |
| 5:00 PM | | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 14 | 0 | 0 | 16 | 6 | 0 | 64 | 49 | 0 | 174 | 0 |
| 5:15 PM | | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 19 | 0 | 0 | 17 | 6 | 0 | 74 | 64 | 0 | 200 | 661 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 63 | 0 | 0 | 70 | 15 | 0 | 226 | 214 | 0 | 661 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 20 | 7 | 0 | 37 | 0 |
| | HV% | - | - | - | - | - | 4% | - | 6% | - | - | 4% | 0% | - | 9% | 3% | - | 6% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:30 PM | 0 | 1 | 1 | 7 | *9* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 0 | 1 | 1 | 4 | *6* | 0 | 0 | 1 | 0 | *1* | 8 | 2 | 3 | 0 | *13* |
| 5:00 PM | 0 | 1 | 1 | 12 | *14* | 0 | 1 | 0 | 1 | *2* | 1 | 0 | 1 | 0 | *2* |
| 5:15 PM | 0 | 4 | 0 | 4 | *8* | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 0 | 7 | 3 | 27 | *37* | 0 | 2 | 3 | 3 | *8* | 9 | 2 | 4 | 0 | *15* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | Adams Dr Westbound UT | LT | TH | RT | O'Brien Dr Northbound UT | LT | TH | RT | O'Brien Dr Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 12 | 0 | 0 | 20 | 3 | 0 | 15 | 46 | 0 | 114 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 14 | 0 | 0 | 17 | 0 | 0 | 31 | 55 | 0 | 134 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **11** | **0** | **12** | **0** | **0** | **15** | **1** | **0** | **61** | **51** | **0** | **151** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **17** | **0** | **18** | **0** | **0** | **22** | **2** | **0** | **27** | **50** | **0** | **136** | 535 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **25** | **0** | **14** | **0** | **0** | **16** | **6** | **0** | **64** | **49** | **0** | **174** | 595 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **20** | **0** | **19** | **0** | **0** | **17** | **6** | **0** | **74** | **64** | **0** | **200** | **661** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 15 | 0 | 0 | 18 | 2 | 0 | 37 | 34 | 0 | 117 | 627 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 12 | 0 | 0 | 10 | 4 | 0 | 44 | 43 | 0 | 128 | 619 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 9 | 0 | 0 | 12 | 2 | 1 | 52 | 39 | 0 | 127 | 572 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 9 | 0 | 0 | 6 | 2 | 0 | 25 | 29 | 0 | 82 | 454 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 16 | 0 | 0 | 4 | 4 | 0 | 14 | 27 | 0 | 78 | 415 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 2 | 0 | 0 | 5 | 3 | 0 | 9 | 23 | 0 | 51 | 338 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 179 | 0 | 152 | 0 | 0 | 162 | 35 | 1 | 453 | 510 | 0 | 1,492 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **73** | **0** | **63** | **0** | **0** | **70** | **15** | **0** | **226** | **214** | **0** | **661** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **4** | **0** | **0** | **3** | **0** | **0** | **20** | **7** | **0** | **37** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **4%** | **-** | **6%** | **-** | **-** | **4%** | **0%** | **-** | **9%** | **3%** | **-** | **6%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 1 | 2 | 4 | *7* | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 1 | 1 | *3* |
| 4:15 PM | 0 | 3 | 0 | 2 | *5* | 0 | 0 | 0 | 0 | *0* | 3 | 0 | 2 | 0 | *5* |
| **4:30 PM** | **0** | **1** | **1** | **7** | ***9*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **4:45 PM** | **0** | **1** | **1** | **4** | ***6*** | **0** | **0** | **1** | **0** | ***1*** | **8** | **2** | **3** | **0** | *13* |
| **5:00 PM** | **0** | **1** | **1** | **12** | ***14*** | **0** | **1** | **0** | **1** | ***2*** | **1** | **0** | **1** | **0** | *2* |
| **5:15 PM** | **0** | **4** | **0** | **4** | ***8*** | **0** | **0** | **2** | **2** | ***4*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:30 PM | 0 | 1 | 0 | 4 | *5* | 0 | 3 | 0 | 0 | *3* | 1 | 1 | 1 | 1 | *4* |
| 5:45 PM | 0 | 2 | 1 | 6 | *9* | 0 | 2 | 0 | 2 | *4* | 0 | 1 | 0 | 1 | *2* |
| 6:00 PM | 0 | 1 | 1 | 6 | *8* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:15 PM | 0 | 1 | 0 | 8 | *9* | 0 | 0 | 2 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 0 | 0 | 0 | 5 | *5* | 0 | 1 | 0 | 1 | *2* | 2 | 0 | 2 | 0 | *4* |
| 6:45 PM | 0 | 2 | 0 | 6 | *8* | 0 | 1 | 0 | 1 | *2* | 2 | 3 | 2 | 1 | *8* |
| Count Total | 0 | 18 | 7 | 68 | *93* | 0 | 10 | 5 | 7 | *22* | 17 | 8 | 12 | 4 | *41* |
| **Peak Hr** | **0** | **7** | **3** | **27** | ***37*** | **0** | **2** | **3** | **3** | ***8*** | **9** | **2** | **4** | **0** | ***15*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Adams Dr | | | | O'Brien Dr | | | | O'Brien Dr | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 0 | 7 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 5 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **6** | **1** | **0** | **9** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **3** | **1** | **0** | **6** | 27 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **9** | **3** | **0** | **14** | 34 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** | **2** | **0** | **8** | **37** |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 5 | 33 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 2 | 0 | 9 | 36 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 4 | 2 | 0 | 8 | 30 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 9 | 31 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 31 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 8 | 30 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 8 | 0 | 0 | 6 | 1 | 0 | 55 | 13 | 0 | 93 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **4** | **0** | **0** | **3** | **0** | **0** | **20** | **7** | **0** | **37** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | n/a | | | Adams Dr | | | O'Brien Dr | | | O'Brien Dr | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | 2 |
| **5:00 PM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | 4 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **4** | **8** |
| 5:30 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 10 |
| 5:45 PM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 13 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 10 |
| 6:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 9 |
| 6:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 7 |
| Count Total | 0 | 0 | 0 | 7 | 0 | 3 | 0 | 4 | 1 | 1 | 6 | 0 | 22 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **2** | **1** | **1** | **2** | **0** | **8** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 38AM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 1

Groups Printed- Vehicles

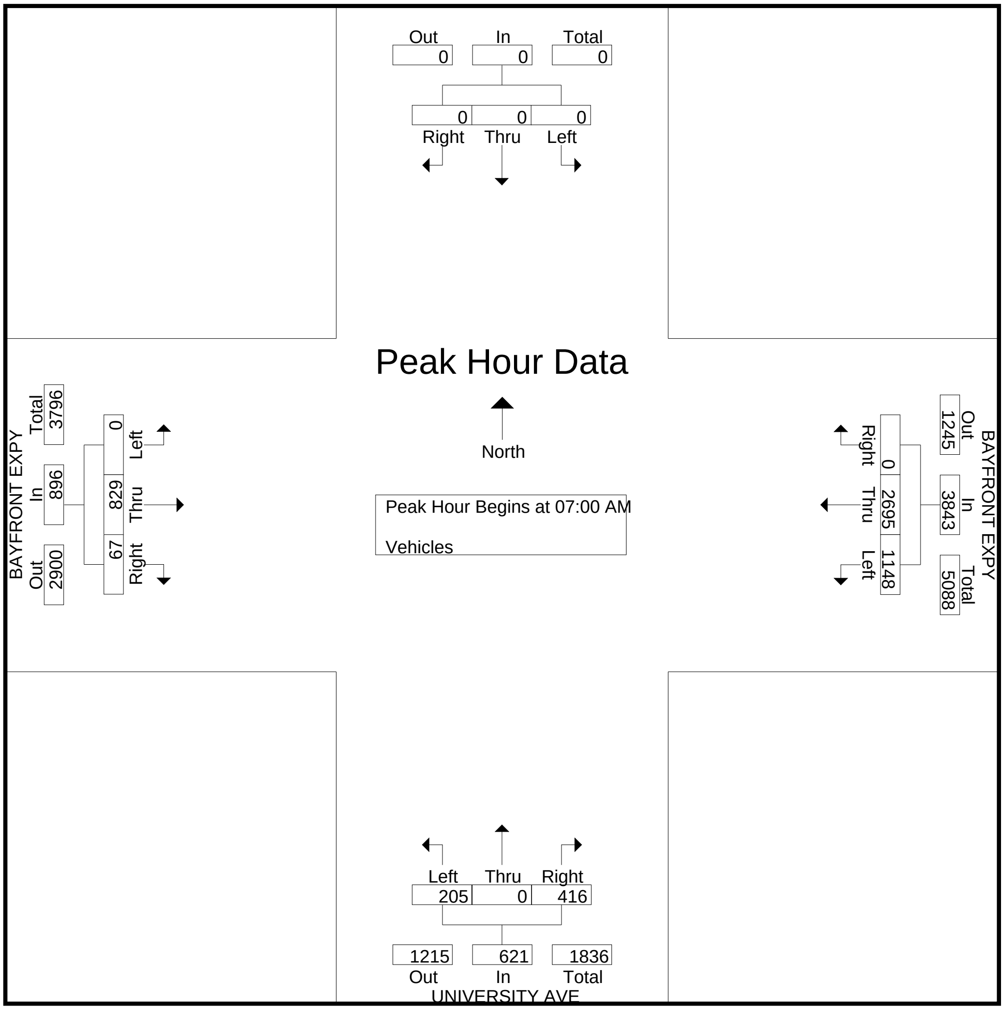
| | Southbound | | | | | BAYFRONT EXPY Westbound | | | | | UNIVERSITY AVE Northbound | | | | | BAYFRONT EXPY Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 724 | 243 | 0 | 967 | 88 | 0 | 39 | 2 | 129 | 19 | 216 | 0 | 0 | 235 | 1331 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 699 | 269 | 1 | 969 | 108 | 0 | 55 | 6 | 169 | 17 | 209 | 0 | 0 | 226 | 1364 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 636 | 332 | 0 | 968 | 112 | 0 | 58 | 4 | 174 | 17 | 196 | 0 | 0 | 213 | 1355 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 636 | 304 | 1 | 941 | 108 | 0 | 53 | 1 | 162 | 14 | 208 | 0 | 0 | 222 | 1325 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2695 | 1148 | 2 | 3845 | 416 | 0 | 205 | 13 | 634 | 67 | 829 | 0 | 0 | 896 | 5375 |
| | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 494 | 426 | 2 | 922 | 93 | 0 | 48 | 4 | 145 | 29 | 161 | 0 | 0 | 190 | 1257 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 462 | 394 | 0 | 856 | 107 | 0 | 57 | 5 | 169 | 35 | 137 | 0 | 0 | 172 | 1197 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 536 | 376 | 2 | 914 | 127 | 0 | 70 | 7 | 204 | 32 | 145 | 0 | 0 | 177 | 1295 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 520 | 388 | 5 | 913 | 106 | 0 | 83 | 3 | 192 | 29 | 130 | 0 | 0 | 159 | 1264 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2012 | 1584 | 9 | 3605 | 433 | 0 | 258 | 19 | 710 | 125 | 573 | 0 | 0 | 698 | 5013 |
| | | | | | | | | | | | | | | | | | | | | | |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 576 | 362 | 4 | 942 | 118 | 0 | 96 | 5 | 219 | 31 | 161 | 0 | 0 | 192 | 1353 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 581 | 358 | 4 | 943 | 107 | 0 | 81 | 2 | 190 | 24 | 153 | 0 | 0 | 177 | 1310 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 635 | 368 | 3 | 1006 | 113 | 0 | 81 | 3 | 197 | 11 | 168 | 0 | 0 | 179 | 1382 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 589 | 335 | 0 | 924 | 86 | 0 | 73 | 2 | 161 | 21 | 174 | 0 | 0 | 195 | 1280 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2381 | 1423 | 11 | 3815 | 424 | 0 | 331 | 12 | 767 | 87 | 656 | 0 | 0 | 743 | 5325 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 7088 | 4155 | 22 | 11265 | 1273 | 0 | 794 | 44 | 2111 | 279 | 2058 | 0 | 0 | 2337 | 15713 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 62.9 | 36.9 | 0.2 | | 60.3 | 0 | 37.6 | 2.1 | | 11.9 | 88.1 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 45.1 | 26.4 | 0.1 | 71.7 | 8.1 | 0 | 5.1 | 0.3 | 13.4 | 1.8 | 13.1 | 0 | 0 | 14.9 | |

| | Southbound | | | | BAYFRONT EXPY Westbound | | | | UNIVERSITY AVE Northbound | | | | BAYFRONT EXPY Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | | | | | |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | **724** | 243 | 967 | 88 | 0 | 39 | 127 | **19** | **216** | 0 | **235** | 1329 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 699 | 269 | **968** | 108 | 0 | 55 | 163 | 17 | 209 | 0 | 226 | **1357** |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 636 | **332** | 968 | **112** | 0 | **58** | **170** | 17 | 196 | 0 | 213 | 1351 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 636 | 304 | 940 | 108 | 0 | 53 | 161 | 14 | 208 | 0 | 222 | 1323 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 2695 | 1148 | 3843 | 416 | 0 | 205 | 621 | 67 | 829 | 0 | 896 | 5360 |
| % App. Total | 0 | 0 | 0 | | 0 | 70.1 | 29.9 | | 67 | 0 | 33 | | 7.5 | 92.5 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .931 | .864 | .993 | .929 | .000 | .884 | .913 | .882 | .959 | .000 | .953 | .987 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 38AM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 2



# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 38AM FINAL
Site Code : 00000038
Start Date : 4/25/2019

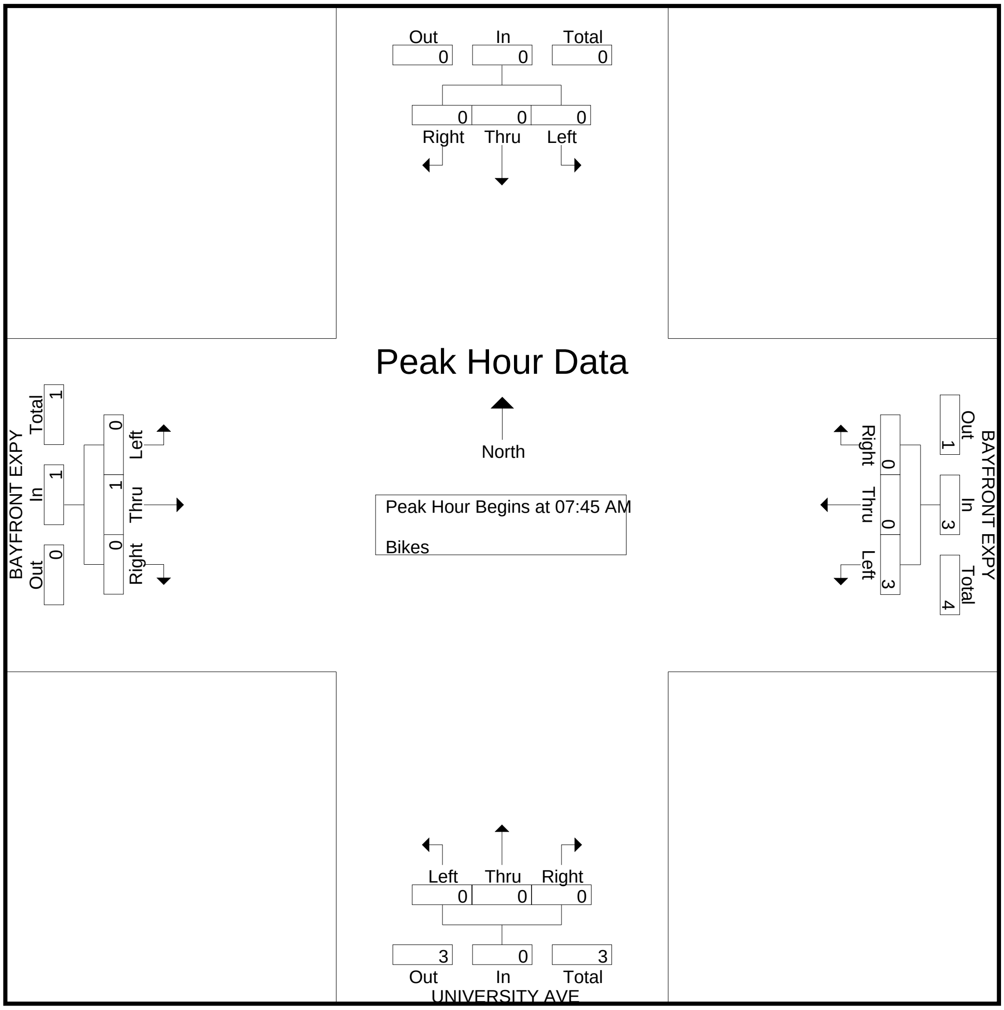

Groups Printed- Bikes

| | Southbound | | | | | BAYFRONT EXPY Westbound | | | | | UNIVERSITY AVE Northbound | | | | | BAYFRONT EXPY Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 4 |
| 09:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 5 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 100 | 0 | | 0 | 0 | 0 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 20 | |

| | Southbound | | | | BAYFRONT EXPY Westbound | | | | UNIVERSITY AVE Northbound | | | | BAYFRONT EXPY Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | **2** |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .750 | .750 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .500 |

# Traffic Data Service
San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***


File Name : 38AM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 38PM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 1

Groups Printed- Vehicles

| | Southbound | | | | | BAYFRONT EXPY Westbound | | | | | UNIVERSITY AVE Northbound | | | | | BAYFRONT EXPY Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 268 | 102 | 0 | 370 | 467 | 0 | 16 | 1 | 484 | 2 | 810 | 0 | 0 | 812 | 1666 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 262 | 74 | 0 | 336 | 410 | 0 | 15 | 4 | 429 | 9 | 877 | 0 | 0 | 886 | 1651 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 95 | 0 | 325 | 525 | 0 | 19 | 5 | 549 | 6 | 791 | 0 | 0 | 797 | 1671 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 210 | 88 | 0 | 298 | 401 | 0 | 18 | 5 | 424 | 3 | 829 | 0 | 0 | 832 | 1554 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 970 | 359 | 0 | 1329 | 1803 | 0 | 68 | 15 | 1886 | 20 | 3307 | 0 | 0 | 3327 | 6542 |
| | | | | | | | | | | | | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 246 | 109 | 2 | 357 | 478 | 0 | 17 | 3 | 498 | 12 | 698 | 0 | 0 | 710 | 1565 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 82 | 1 | 308 | 358 | 0 | 4 | 4 | 366 | 4 | 791 | 0 | 0 | 795 | 1469 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 272 | 129 | 0 | 401 | 471 | 0 | 19 | 3 | 493 | 4 | 671 | 0 | 0 | 675 | 1569 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 233 | 104 | 0 | 337 | 380 | 0 | 11 | 3 | 394 | 8 | 797 | 0 | 0 | 805 | 1536 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 976 | 424 | 3 | 1403 | 1687 | 0 | 51 | 13 | 1751 | 28 | 2957 | 0 | 0 | 2985 | 6139 |
| | | | | | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 183 | 104 | 2 | 289 | 368 | 0 | 12 | 7 | 387 | 8 | 477 | 0 | 0 | 485 | 1161 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 164 | 71 | 2 | 237 | 355 | 0 | 9 | 9 | 373 | 5 | 498 | 0 | 0 | 503 | 1113 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 156 | 99 | 1 | 256 | 426 | 0 | 18 | 3 | 447 | 5 | 478 | 0 | 0 | 483 | 1186 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 124 | 63 | 1 | 188 | 277 | 0 | 9 | 2 | 288 | 5 | 465 | 0 | 0 | 470 | 946 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 627 | 337 | 6 | 970 | 1426 | 0 | 48 | 21 | 1495 | 23 | 1918 | 0 | 0 | 1941 | 4406 |
| | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 2573 | 1120 | 9 | 3702 | 4916 | 0 | 167 | 49 | 5132 | 71 | 8182 | 0 | 0 | 8253 | 17087 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 69.5 | 30.3 | 0.2 | | 95.8 | 0 | 3.3 | 1 | | 0.9 | 99.1 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 15.1 | 6.6 | 0.1 | 21.7 | 28.8 | 0 | 1 | 0.3 | 30 | 0.4 | 47.9 | 0 | 0 | 48.3 | |

| | Southbound | | | | BAYFRONT EXPY Westbound | | | | UNIVERSITY AVE Northbound | | | | BAYFRONT EXPY Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | **268** | **102** | **370** | 467 | 0 | 16 | 483 | 2 | 810 | 0 | 812 | 1665 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 262 | 74 | 336 | 410 | 0 | 15 | 425 | **9** | **877** | 0 | **886** | 1647 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 230 | 95 | 325 | **525** | 0 | **19** | **544** | 6 | 791 | 0 | 797 | **1666** |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 210 | 88 | 298 | 401 | 0 | 18 | 419 | 3 | 829 | 0 | 832 | 1549 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 970 | 359 | 1329 | 1803 | 0 | 68 | 1871 | 20 | 3307 | 0 | 3327 | 6527 |
| % App. Total | 0 | 0 | 0 | | 0 | 73 | 27 | | 96.4 | 0 | 3.6 | | 0.6 | 99.4 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .905 | .880 | .898 | .859 | .000 | .895 | .860 | .556 | .943 | .000 | .939 | .979 |

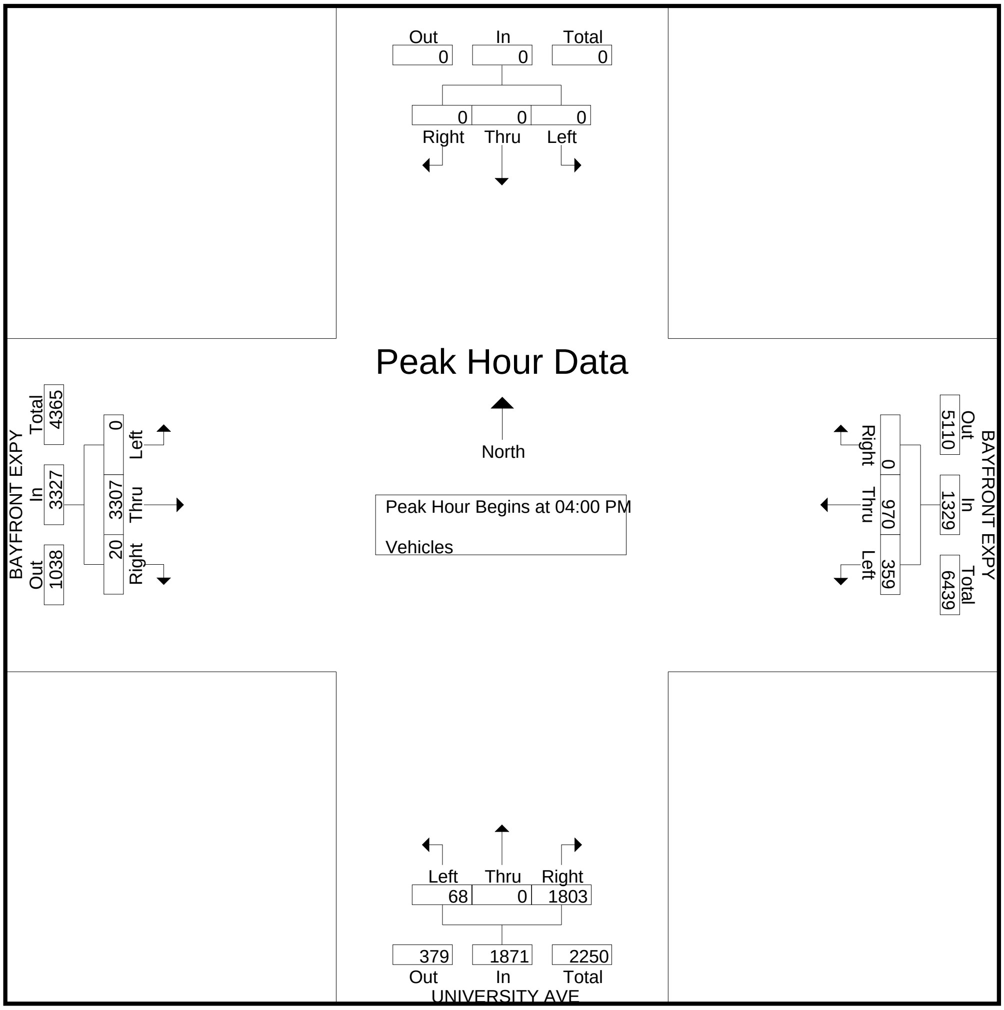
# Traffic Data Service

San Jose, CA

**(408) 622-4787**

***tdsbay@cs.com***


File Name : 38PM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 2



# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 38PM FINAL
Site Code : 00000038
Start Date : 4/25/2019


Groups Printed- Bikes

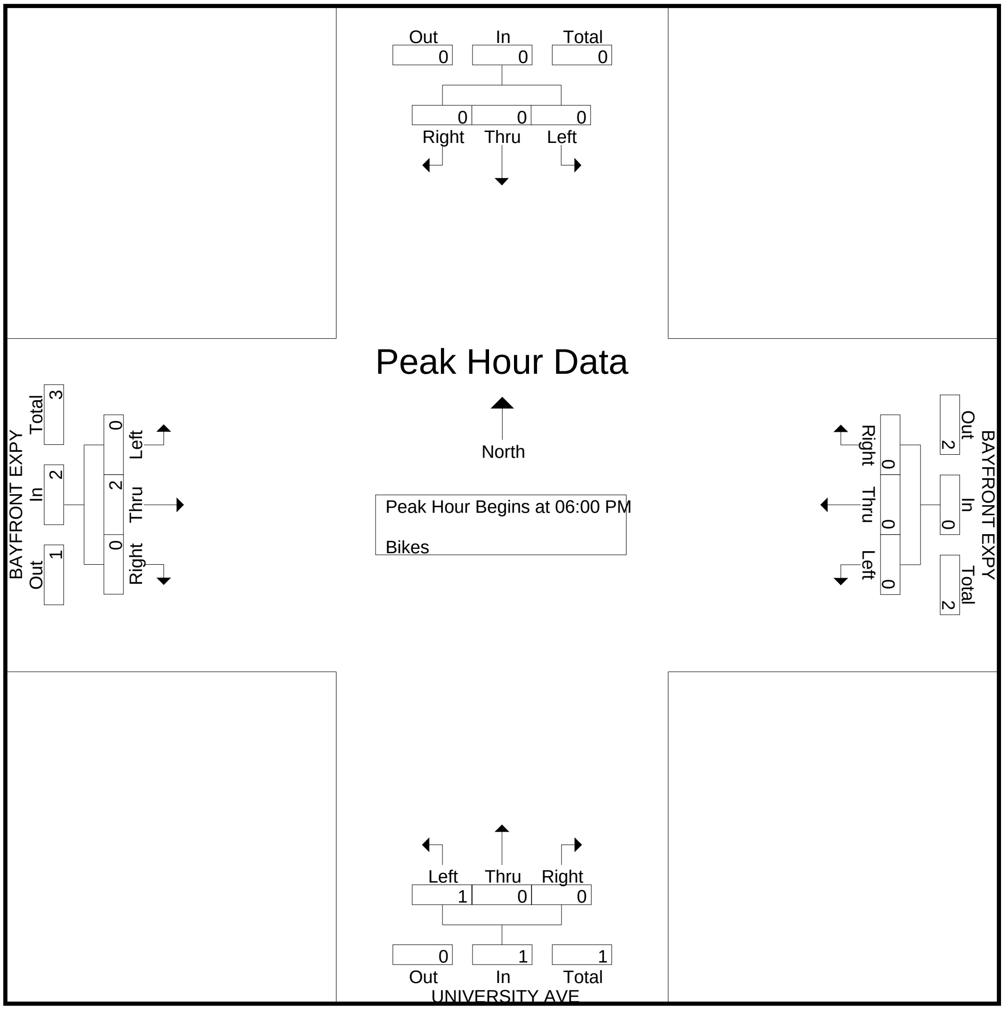
| | Southbound | | | | | BAYFRONT EXPY Westbound | | | | | UNIVERSITY AVE Northbound | | | | | BAYFRONT EXPY Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 3 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 4 |
| Apprch % | 0 | 0 | 0 | 0 | | 0 | 0 | 100 | 0 | | 0 | 0 | 100 | 0 | | 0 | 100 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 25 | 0 | 0 | 25 | 0 | 25 | 0 | 50 | 0 | 0 | 50 | |

| | Southbound | | | | BAYFRONT EXPY Westbound | | | | UNIVERSITY AVE Northbound | | | | BAYFRONT EXPY Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Right | Thru | Left | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 06:00 PM | | | | | | | | | | | | | | | | | |
| 06:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | **1** |
| 06:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 1 |
| 06:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 2 | 3 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 100 | | 0 | 100 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .000 | .500 | .000 | .500 | .750 |

# Traffic Data Service

San Jose, CA
**(408) 622-4787**
***tdsbay@cs.com***

File Name : 38PM FINAL
Site Code : 00000038
Start Date : 4/25/2019
Page No : 2

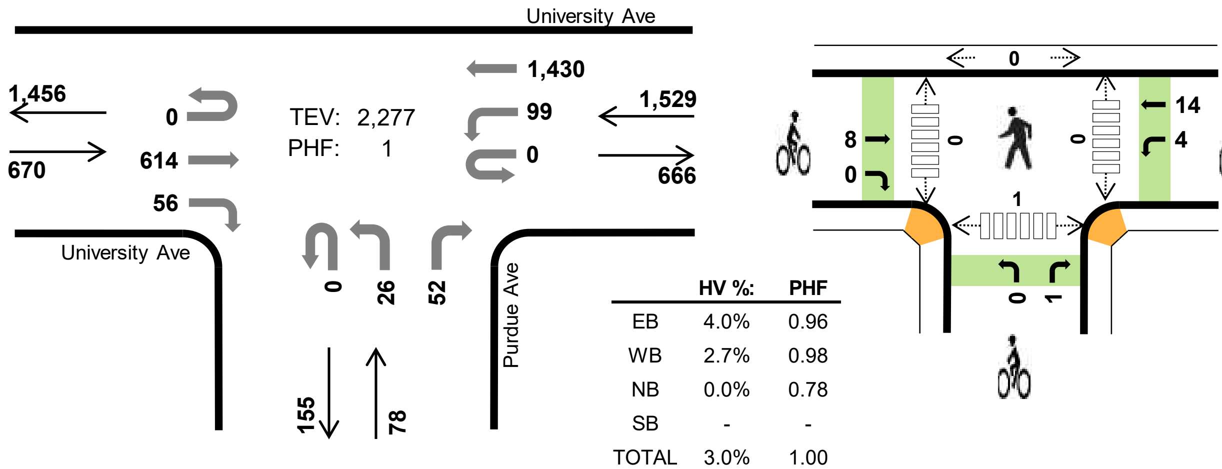


# Purdue Ave
# University Ave

N

Peak Hour

**Date:** 06-05-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:15 AM to 9:15 AM




| | HV %: | PHF |
|---|---|---|
| EB | 4.0% | 0.96 |
| WB | 2.7% | 0.98 |
| NB | 0.0% | 0.78 |
| SB | - | - |
| TOTAL | 3.0% | 1.00 |

## Three-Hour Count Summaries

| Interval Start | | University Ave Eastbound | | | | University Ave Westbound | | | | Purdue Ave Northbound | | | | n/a Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 8:15 AM | | 0 | 0 | 144 | 23 | 0 | 33 | 351 | 0 | 0 | 8 | 0 | 12 | 0 | 0 | 0 | 0 | 571 | 0 |
| 8:30 AM | | 0 | 0 | 159 | 12 | 0 | 19 | 356 | 0 | 0 | 7 | 0 | 18 | 0 | 0 | 0 | 0 | 571 | 0 |
| 8:45 AM | | 0 | 0 | 145 | 13 | 0 | 20 | 372 | 0 | 0 | 6 | 0 | 16 | 0 | 0 | 0 | 0 | 572 | 0 |
| 9:00 AM | | 0 | 0 | 166 | 8 | 0 | 27 | 351 | 0 | 0 | 5 | 0 | 6 | 0 | 0 | 0 | 0 | 563 | 2,277 |
| Peak Hour | All | 0 | 0 | 614 | 56 | 0 | 99 | 1,430 | 0 | 0 | 26 | 0 | 52 | 0 | 0 | 0 | 0 | 2,277 | 0 |
| | HV | 0 | 0 | 27 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 0 |
| | HV% | - | - | 4% | 0% | - | 0% | 3% | - | - | 0% | - | 0% | - | - | - | - | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 8:15 AM | 5 | 16 | 0 | 0 | *21* | 1 | 1 | 0 | 0 | *2* | 0 | 0 | 0 | 1 | *1* |
| 8:30 AM | 7 | 6 | 0 | 0 | *13* | 2 | 5 | 0 | 0 | *7* | 0 | 0 | 0 | 0 | *0* |
| 8:45 AM | 7 | 10 | 0 | 0 | *17* | 2 | 3 | 0 | 0 | *5* | 0 | 0 | 0 | 0 | *0* |
| 9:00 AM | 8 | 10 | 0 | 0 | *18* | 3 | 9 | 1 | 0 | *13* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 27 | 42 | 0 | 0 | *69* | 8 | 18 | 1 | 0 | *27* | 0 | 0 | 0 | 1 | *1* |

## Three-Hour Count Summaries

| Interval Start | University Ave Eastbound UT | LT | TH | RT | University Ave Westbound UT | LT | TH | RT | Purdue Ave Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 95 | 11 | 0 | 3 | 295 | 0 | 0 | 12 | 0 | 20 | 0 | 0 | 0 | 0 | 436 | 0 |
| 7:15 AM | 0 | 0 | 123 | 4 | 0 | 22 | 317 | 0 | 0 | 14 | 0 | 20 | 0 | 0 | 0 | 0 | 500 | 0 |
| 7:30 AM | 0 | 0 | 136 | 6 | 0 | 22 | 356 | 0 | 0 | 9 | 0 | 15 | 0 | 0 | 0 | 0 | 544 | 0 |
| 7:45 AM | 0 | 0 | 161 | 7 | 0 | 24 | 332 | 0 | 0 | 7 | 0 | 13 | 0 | 0 | 0 | 0 | 544 | 2,024 |
| 8:00 AM | 0 | 0 | 126 | 6 | 0 | 34 | 335 | 0 | 0 | 7 | 0 | 11 | 0 | 0 | 0 | 0 | 519 | 2,107 |
| **8:15 AM** | **0** | **0** | **144** | **23** | **0** | **33** | **351** | **0** | **0** | **8** | **0** | **12** | **0** | **0** | **0** | **0** | **571** | 2,178 |
| **8:30 AM** | **0** | **0** | **159** | **12** | **0** | **19** | **356** | **0** | **0** | **7** | **0** | **18** | **0** | **0** | **0** | **0** | **571** | 2,205 |
| **8:45 AM** | **0** | **0** | **145** | **13** | **0** | **20** | **372** | **0** | **0** | **6** | **0** | **16** | **0** | **0** | **0** | **0** | **572** | 2,233 |
| **9:00 AM** | **0** | **0** | **166** | **8** | **0** | **27** | **351** | **0** | **0** | **5** | **0** | **6** | **0** | **0** | **0** | **0** | **563** | **2,277** |
| 9:15 AM | 0 | 0 | 128 | 6 | 0 | 30 | 332 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 506 | 2,212 |
| 9:30 AM | 0 | 0 | 161 | 3 | 1 | 20 | 365 | 0 | 0 | 6 | 0 | 10 | 0 | 0 | 0 | 0 | 566 | 2,207 |
| 9:45 AM | 0 | 0 | 140 | 9 | 0 | 25 | 348 | 0 | 0 | 5 | 0 | 6 | 0 | 0 | 0 | 0 | 533 | 2,168 |
| Count Total | 0 | 0 | 1,684 | 108 | 1 | 279 | 4,110 | 0 | 0 | 87 | 0 | 156 | 0 | 0 | 0 | 0 | 6,425 | 0 |
| **Peak Hour All** | **0** | **0** | **614** | **56** | **0** | **99** | **1,430** | **0** | **0** | **26** | **0** | **52** | **0** | **0** | **0** | **0** | **2,277** | **0** |
| **Peak Hour HV** | **0** | **0** | **27** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **69** | **0** |
| **Peak Hour HV%** | **-** | **-** | **4%** | **0%** | **-** | **0%** | **3%** | **-** | **-** | **0%** | **-** | **0%** | **-** | **-** | **-** | **-** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 11 | 7 | 1 | 0 | *19* | 1 | 4 | 1 | 0 | *6* | 0 | 0 | 0 | 2 | *2* |
| 7:15 AM | 2 | 7 | 1 | 0 | *10* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 2 | 0 | *2* |
| 7:30 AM | 5 | 8 | 0 | 0 | *13* | 0 | 6 | 0 | 0 | *6* | 0 | 0 | 0 | 0 | *0* |
| 7:45 AM | 4 | 5 | 0 | 0 | *9* | 1 | 2 | 0 | 0 | *3* | 0 | 0 | 0 | 0 | *0* |
| 8:00 AM | 2 | 9 | 1 | 0 | *12* | 2 | 2 | 1 | 0 | *5* | 0 | 0 | 0 | 0 | *0* |
| **8:15 AM** | **5** | **16** | **0** | **0** | ***21*** | **1** | **1** | **0** | **0** | ***2*** | **0** | **0** | **0** | **1** | *1* |
| **8:30 AM** | **7** | **6** | **0** | **0** | ***13*** | **2** | **5** | **0** | **0** | ***7*** | **0** | **0** | **0** | **0** | *0* |
| **8:45 AM** | **7** | **10** | **0** | **0** | ***17*** | **2** | **3** | **0** | **0** | ***5*** | **0** | **0** | **0** | **0** | *0* |
| **9:00 AM** | **8** | **10** | **0** | **0** | ***18*** | **3** | **9** | **1** | **0** | ***13*** | **0** | **0** | **0** | **0** | ***0*** |
| 9:15 AM | 6 | 15 | 0 | 0 | *21* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 1 | 0 | *1* |
| 9:30 AM | 14 | 12 | 0 | 0 | *26* | 3 | 3 | 1 | 0 | *7* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 14 | 19 | 0 | 0 | *33* | 1 | 3 | 2 | 0 | *6* | 0 | 0 | 4 | 0 | *4* |
| Count Total | 85 | 124 | 3 | 0 | *212* | 17 | 38 | 6 | 0 | *61* | 0 | 0 | 7 | 3 | *10* |
| **Peak Hr** | **27** | **42** | **0** | **0** | ***69*** | **8** | **18** | **1** | **0** | ***27*** | **0** | **0** | **0** | **1** | ***1*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | University Ave Eastbound UT | LT | TH | RT | University Ave Westbound UT | LT | TH | RT | Purdue Ave Northbound UT | LT | TH | RT | n/a Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 10 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 19 | 0 |
| 7:15 AM | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| 7:30 AM | 0 | 0 | 5 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 |
| 7:45 AM | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 51 |
| 8:00 AM | 0 | 0 | 1 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 12 | 44 |
| **8:15 AM** | **0** | **0** | **5** | **0** | **0** | **0** | **16** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **21** | 55 |
| **8:30 AM** | **0** | **0** | **7** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **13** | 55 |
| **8:45 AM** | **0** | **0** | **7** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **17** | 63 |
| **9:00 AM** | **0** | **0** | **8** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **18** | **69** |
| 9:15 AM | 0 | 0 | 5 | 1 | 0 | 1 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 69 |
| 9:30 AM | 0 | 0 | 14 | 0 | 0 | 1 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 82 |
| 9:45 AM | 0 | 0 | 14 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 98 |
| Count Total | 0 | 0 | 82 | 3 | 0 | 2 | 122 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 212 | 0 |
| **Peak Hour** | **0** | **0** | **27** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **69** | **0** |

## Three-Hour Count Summaries - Bikes

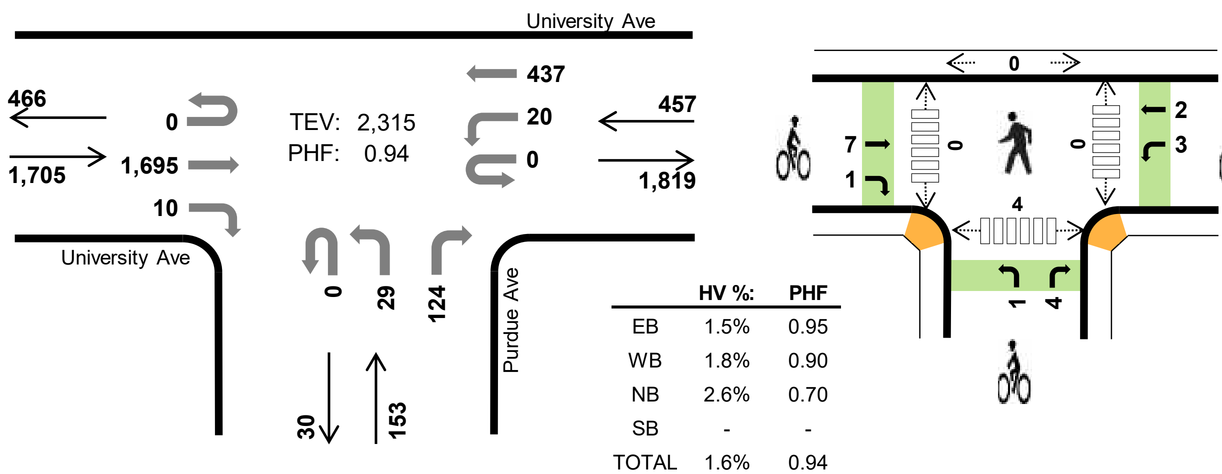
| Interval Start | University Ave Eastbound LT | TH | RT | University Ave Westbound LT | TH | RT | Purdue Ave Northbound LT | TH | RT | n/a Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 |
| 7:45 AM | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 15 |
| 8:00 AM | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 14 |
| **8:15 AM** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 16 |
| **8:30 AM** | **0** | **2** | **0** | **1** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | 17 |
| **8:45 AM** | **0** | **2** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | 19 |
| **9:00 AM** | **0** | **3** | **0** | **2** | **7** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **13** | **27** |
| 9:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 26 |
| 9:30 AM | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 26 |
| 9:45 AM | 0 | 1 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 27 |
| Count Total | 0 | 16 | 1 | 11 | 27 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 61 | 0 |
| **Peak Hour** | **0** | **8** | **0** | **4** | **14** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **27** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Purdue Ave
# University Ave

Peak Hour

**Date:** 06-05-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 5:15 PM to 6:15 PM




| | HV %: | PHF |
|---|---|---|
| EB | 1.5% | 0.95 |
| WB | 1.8% | 0.90 |
| NB | 2.6% | 0.70 |
| SB | - | - |
| TOTAL | 1.6% | 0.94 |

## Three-Hour Count Summaries

| Interval Start | | University Ave | | | | University Ave | | | | Purdue Ave | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 5:15 PM | | 0 | 0 | 450 | 1 | 0 | 9 | 99 | 0 | 0 | 10 | 0 | 45 | 0 | 0 | 0 | 0 | 614 | 0 |
| 5:30 PM | | 0 | 0 | 409 | 2 | 0 | 7 | 118 | 0 | 0 | 6 | 0 | 29 | 0 | 0 | 0 | 0 | 571 | 0 |
| 5:45 PM | | 0 | 0 | 447 | 4 | 0 | 0 | 97 | 0 | 0 | 5 | 0 | 34 | 0 | 0 | 0 | 0 | 587 | 0 |
| 6:00 PM | | 0 | 0 | 389 | 3 | 0 | 4 | 123 | 0 | 0 | 8 | 0 | 16 | 0 | 0 | 0 | 0 | 543 | 2,315 |
| Peak Hour | All | 0 | 0 | 1,695 | 10 | 0 | 20 | 437 | 0 | 0 | 29 | 0 | 124 | 0 | 0 | 0 | 0 | 2,315 | 0 |
| | HV | 0 | 0 | 25 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 37 | 0 |
| | HV% | - | - | 1% | 0% | - | 0% | 2% | - | - | 0% | - | 3% | - | - | - | - | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 5:15 PM | 7 | 2 | 0 | 0 | *9* | 3 | 0 | 1 | 0 | *4* | 0 | 0 | 0 | 0 | *0* |
| 5:30 PM | 9 | 2 | 2 | 0 | *13* | 1 | 1 | 2 | 0 | *4* | 0 | 0 | 0 | 3 | *3* |
| 5:45 PM | 6 | 1 | 1 | 0 | *8* | 3 | 1 | 1 | 0 | *5* | 0 | 0 | 0 | 1 | *1* |
| 6:00 PM | 3 | 3 | 1 | 0 | *7* | 1 | 3 | 1 | 0 | *5* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 25 | 8 | 4 | 0 | *37* | 8 | 5 | 5 | 0 | *18* | 0 | 0 | 0 | 4 | *4* |

## Three-Hour Count Summaries

| Interval Start | University Ave | | | | University Ave | | | | Purdue Ave | | | | n/a | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 465 | 4 | 0 | 9 | 103 | 0 | 0 | 6 | 0 | 15 | 0 | 0 | 0 | 0 | 602 | 0 |
| 4:15 PM | 0 | 0 | 476 | 0 | 0 | 7 | 75 | 0 | 0 | 3 | 0 | 22 | 0 | 0 | 0 | 0 | 583 | 0 |
| 4:30 PM | 0 | 0 | 407 | 3 | 0 | 6 | 108 | 0 | 0 | 3 | 0 | 34 | 0 | 0 | 0 | 0 | 561 | 0 |
| 4:45 PM | 0 | 0 | 379 | 1 | 0 | 9 | 98 | 0 | 0 | 4 | 0 | 33 | 0 | 0 | 0 | 0 | 524 | 2,270 |
| 5:00 PM | 0 | 0 | 370 | 2 | 0 | 4 | 92 | 0 | 0 | 3 | 0 | 39 | 0 | 0 | 0 | 0 | 510 | 2,178 |
| **5:15 PM** | **0** | **0** | **450** | **1** | **0** | **9** | **99** | **0** | **0** | **10** | **0** | **45** | **0** | **0** | **0** | **0** | **614** | 2,209 |
| **5:30 PM** | **0** | **0** | **409** | **2** | **0** | **7** | **118** | **0** | **0** | **6** | **0** | **29** | **0** | **0** | **0** | **0** | **571** | 2,219 |
| **5:45 PM** | **0** | **0** | **447** | **4** | **0** | **0** | **97** | **0** | **0** | **5** | **0** | **34** | **0** | **0** | **0** | **0** | **587** | 2,282 |
| **6:00 PM** | **0** | **0** | **389** | **3** | **0** | **4** | **123** | **0** | **0** | **8** | **0** | **16** | **0** | **0** | **0** | **0** | **543** | **2,315** |
| 6:15 PM | 0 | 0 | 433 | 4 | 0 | 5 | 83 | 0 | 0 | 3 | 0 | 34 | 0 | 0 | 0 | 0 | 562 | 2,263 |
| 6:30 PM | 0 | 0 | 426 | 6 | 0 | 10 | 102 | 0 | 0 | 7 | 0 | 17 | 0 | 0 | 0 | 0 | 568 | 2,260 |
| 6:45 PM | 0 | 0 | 434 | 7 | 0 | 10 | 61 | 0 | 0 | 3 | 0 | 16 | 0 | 0 | 0 | 0 | 531 | 2,204 |
| Count Total | 0 | 0 | 5,085 | 37 | 0 | 80 | 1,159 | 0 | 0 | 61 | 0 | 334 | 0 | 0 | 0 | 0 | 6,756 | 0 |
| **Peak Hour All** | **0** | **0** | **1,695** | **10** | **0** | **20** | **437** | **0** | **0** | **29** | **0** | **124** | **0** | **0** | **0** | **0** | **2,315** | **0** |
| **Peak Hour HV** | **0** | **0** | **25** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **37** | **0** |
| **Peak Hour HV%** | **-** | **-** | **1%** | **0%** | **-** | **0%** | **2%** | **-** | **-** | **0%** | **-** | **3%** | **-** | **-** | **-** | **-** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 13 | 2 | 0 | 0 | *15* | 2 | 1 | 0 | 0 | *3* | 0 | 0 | 0 | 1 | *1* |
| 4:15 PM | 11 | 1 | 0 | 0 | *12* | 1 | 1 | 0 | 0 | *2* | 0 | 0 | 0 | 2 | *2* |
| 4:30 PM | 13 | 4 | 0 | 0 | *17* | 3 | 0 | 0 | 0 | *3* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 10 | 4 | 0 | 0 | *14* | 2 | 1 | 2 | 0 | *5* | 0 | 0 | 0 | 0 | *0* |
| 5:00 PM | 5 | 4 | 0 | 0 | *9* | 5 | 2 | 1 | 0 | *8* | 0 | 1 | 0 | 0 | *1* |
| **5:15 PM** | **7** | **2** | **0** | **0** | ***9*** | **3** | **0** | **1** | **0** | ***4*** | **0** | **0** | **0** | **0** | *0* |
| **5:30 PM** | **9** | **2** | **2** | **0** | ***13*** | **1** | **1** | **2** | **0** | ***4*** | **0** | **0** | **0** | **3** | *3* |
| **5:45 PM** | **6** | **1** | **1** | **0** | ***8*** | **3** | **1** | **1** | **0** | ***5*** | **0** | **0** | **0** | **1** | *1* |
| **6:00 PM** | **3** | **3** | **1** | **0** | ***7*** | **1** | **3** | **1** | **0** | ***5*** | **0** | **0** | **0** | **0** | ***0*** |
| 6:15 PM | 12 | 0 | 1 | 0 | *13* | 1 | 2 | 0 | 0 | *3* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 4 | 3 | 2 | 0 | *9* | 1 | 5 | 1 | 0 | *7* | 0 | 0 | 0 | 3 | *3* |
| 6:45 PM | 11 | 3 | 1 | 0 | *15* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 1 | 0 | *1* |
| Count Total | 104 | 29 | 8 | 0 | *141* | 23 | 18 | 9 | 0 | *50* | 0 | 1 | 1 | 10 | *12* |
| **Peak Hr** | **25** | **8** | **4** | **0** | ***37*** | **8** | **5** | **5** | **0** | ***18*** | **0** | **0** | **0** | **4** | ***4*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | University Ave Eastbound | | | | University Ave Westbound | | | | Purdue Ave Northbound | | | | n/a Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 13 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 |
| 4:15 PM | 0 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| 4:30 PM | 0 | 0 | 13 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 |
| 4:45 PM | 0 | 0 | 10 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 58 |
| 5:00 PM | 0 | 0 | 5 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 52 |
| **5:15 PM** | **0** | **0** | **7** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **9** | 49 |
| **5:30 PM** | **0** | **0** | **9** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **13** | 45 |
| **5:45 PM** | **0** | **0** | **6** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **8** | 39 |
| **6:00 PM** | **0** | **0** | **3** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **7** | **37** |
| 6:15 PM | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 13 | 41 |
| 6:30 PM | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 37 |
| 6:45 PM | 0 | 0 | 11 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 15 | 44 |
| Count Total | 0 | 0 | 104 | 0 | 0 | 0 | 29 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 141 | 0 |
| **Peak Hour** | **0** | **0** | **25** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **37** | **0** |

## Three-Hour Count Summaries - Bikes

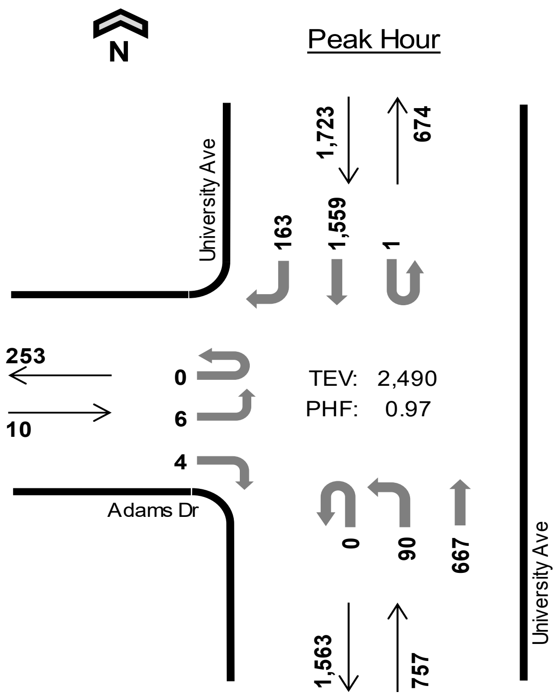
| Interval Start | University Ave Eastbound | | | University Ave Westbound | | | Purdue Ave Northbound | | | n/a Southbound | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 4:30 PM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:45 PM | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 13 |
| 5:00 PM | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 18 |
| **5:15 PM** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **4** | 20 |
| **5:30 PM** | **0** | **1** | **0** | **1** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **4** | 21 |
| **5:45 PM** | **0** | **2** | **1** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **5** | 21 |
| **6:00 PM** | **0** | **1** | **0** | **1** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **5** | **18** |
| 6:15 PM | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 17 |
| 6:30 PM | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 20 |
| 6:45 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16 |
| Count Total | 0 | 22 | 1 | 5 | 13 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 50 | 0 |
| **Peak Hour** | **0** | **7** | **1** | **3** | **2** | **0** | **1** | **0** | **4** | **0** | **0** | **0** | **18** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

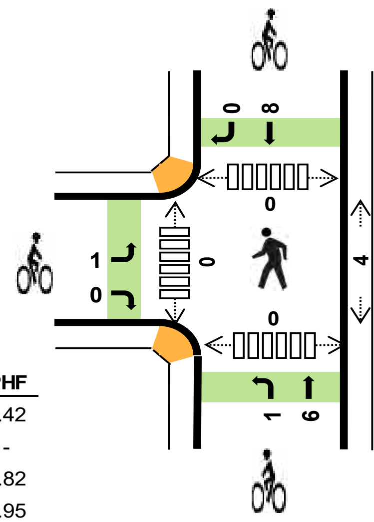
# University Ave
# Adams Dr

Date: 04-25-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 7:45 AM to 8:45 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 10.0% | 0.42 |
| WB | - | - |
| NB | 3.7% | 0.82 |
| SB | 3.4% | 0.95 |
| TOTAL | 3.5% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Adams Dr Eastbound UT | LT | TH | RT | n/a Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:45 AM | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 149 | 0 | 0 | 0 | 425 | 30 | 620 | 0 |
| 8:00 AM | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 29 | 144 | 0 | 0 | 0 | 393 | 41 | 609 | 0 |
| 8:15 AM | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 168 | 0 | 0 | 0 | 381 | 51 | 621 | 0 |
| 8:30 AM | | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 26 | 206 | 0 | 1 | 0 | 360 | 41 | 640 | 2,490 |
| Peak Hour | All | 0 | 6 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 90 | 667 | 0 | 1 | 0 | 1,559 | 163 | 2,490 | 0 |
| | HV | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 27 | 0 | 0 | 0 | 41 | 17 | 87 | 0 |
| | HV% | - | 17% | - | 0% | - | - | - | - | - | 1% | 4% | - | 0% | - | 3% | 10% | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:45 AM | 0 | 0 | 3 | 12 | *15* | 0 | 0 | 0 | 2 | *2* | 0 | 0 | 0 | 0 | *0* |
| 8:00 AM | 0 | 0 | 8 | 7 | *15* | 1 | 0 | 2 | 1 | *4* | 2 | 0 | 0 | 0 | *2* |
| 8:15 AM | 1 | 0 | 8 | 18 | *27* | 0 | 0 | 4 | 3 | *7* | 2 | 0 | 0 | 0 | *2* |
| 8:30 AM | 0 | 0 | 9 | 21 | *30* | 0 | 0 | 1 | 2 | *3* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 1 | 0 | 28 | 58 | *87* | 1 | 0 | 7 | 8 | *16* | 4 | 0 | 0 | 0 | *4* |

## Three-Hour Count Summaries

| Interval Start | Adams Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 97 | 0 | 0 | 0 | 295 | 15 | 417 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 152 | 0 | 0 | 0 | 316 | 14 | 488 | 0 |
| 7:30 AM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 | 144 | 0 | 0 | 0 | 393 | 22 | 575 | 0 |
| **7:45 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **15** | **149** | **0** | **0** | **0** | **425** | **30** | **620** | 2,100 |
| **8:00 AM** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **29** | **144** | **0** | **0** | **0** | **393** | **41** | **609** | 2,292 |
| **8:15 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **20** | **168** | **0** | **0** | **0** | **381** | **51** | **621** | 2,425 |
| **8:30 AM** | **0** | **3** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **26** | **206** | **0** | **1** | **0** | **360** | **41** | **640** | **2,490** |
| 8:45 AM | 0 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 13 | 187 | 0 | 0 | 0 | 370 | 31 | 608 | 2,478 |
| 9:00 AM | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 202 | 0 | 0 | 0 | 312 | 46 | 582 | 2,451 |
| 9:15 AM | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 23 | 180 | 0 | 0 | 0 | 339 | 33 | 581 | 2,411 |
| 9:30 AM | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 185 | 0 | 0 | 0 | 341 | 25 | 567 | 2,338 |
| 9:45 AM | 0 | 3 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 15 | 167 | 0 | 0 | 0 | 323 | 21 | 534 | 2,264 |
| Count Total | 0 | 28 | 0 | 16 | 0 | 0 | 0 | 0 | 2 | 196 | 1,981 | 0 | 1 | 0 | 4,248 | 370 | 6,842 | 0 |
| **Peak Hour All** | **0** | **6** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **90** | **667** | **0** | **1** | **0** | **1,559** | **163** | **2,490** | **0** |
| **Peak Hour HV** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **27** | **0** | **0** | **0** | **41** | **17** | **87** | **0** |
| **Peak Hour HV%** | **-** | **17%** | **-** | **0%** | **-** | **-** | **-** | **-** | **-** | **1%** | **4%** | **-** | **0%** | **-** | **3%** | **10%** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 1 | 0 | 4 | 5 | *10* | 0 | 0 | 1 | 2 | *3* | 2 | 1 | 0 | 0 | *3* |
| 7:15 AM | 0 | 0 | 6 | 8 | *14* | 0 | 0 | 1 | 2 | *3* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 0 | 0 | 3 | 16 | *19* | 0 | 0 | 0 | 4 | *4* | 0 | 0 | 0 | 0 | *0* |
| **7:45 AM** | **0** | **0** | **3** | **12** | ***15*** | **0** | **0** | **0** | **2** | ***2*** | **0** | **0** | **0** | **0** | *0* |
| **8:00 AM** | **0** | **0** | **8** | **7** | ***15*** | **1** | **0** | **2** | **1** | ***4*** | **2** | **0** | **0** | **0** | *2* |
| **8:15 AM** | **1** | **0** | **8** | **18** | ***27*** | **0** | **0** | **4** | **3** | ***7*** | **2** | **0** | **0** | **0** | *2* |
| **8:30 AM** | **0** | **0** | **9** | **21** | ***30*** | **0** | **0** | **1** | **2** | ***3*** | **0** | **0** | **0** | **0** | ***0*** |
| 8:45 AM | 0 | 0 | 2 | 15 | *17* | 0 | 0 | 3 | 1 | *4* | 0 | 0 | 0 | 0 | *0* |
| 9:00 AM | 2 | 0 | 17 | 29 | *48* | 0 | 0 | 2 | 4 | *6* | 0 | 0 | 0 | 0 | *0* |
| 9:15 AM | 3 | 0 | 14 | 28 | *45* | 0 | 0 | 4 | 1 | *5* | 1 | 0 | 0 | 1 | *2* |
| 9:30 AM | 1 | 0 | 10 | 12 | *23* | 0 | 0 | 2 | 3 | *5* | 2 | 0 | 1 | 0 | *3* |
| 9:45 AM | 2 | 0 | 6 | 17 | *25* | 0 | 0 | 0 | 0 | *0* | 2 | 0 | 0 | 0 | *2* |
| Count Total | 10 | 0 | 90 | 188 | *288* | 1 | 0 | 20 | 25 | *46* | 11 | 1 | 1 | 1 | *14* |
| **Peak Hr** | **1** | **0** | **28** | **58** | ***87*** | **1** | **0** | **7** | **8** | ***16*** | **4** | **0** | **0** | **0** | ***4*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Adams Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 10 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 8 | 0 | 14 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 15 | 1 | 19 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **8** | **4** | **15** | 58 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **5** | **2** | **15** | 63 |
| **8:15 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **15** | **3** | **27** | 76 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **8** | **0** | **0** | **0** | **13** | **8** | **30** | **87** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 12 | 3 | 17 | 89 |
| 9:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 0 | 0 | 0 | 18 | 11 | 48 | 122 |
| 9:15 AM | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 0 | 0 | 0 | 24 | 4 | 45 | 140 |
| 9:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 12 | 0 | 23 | 133 |
| 9:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 16 | 1 | 25 | 141 |
| Count Total | 0 | 8 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 87 | 0 | 0 | 0 | 151 | 37 | 288 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **27** | **0** | **0** | **0** | **41** | **17** | **87** | **0** |

## Three-Hour Count Summaries - Bikes

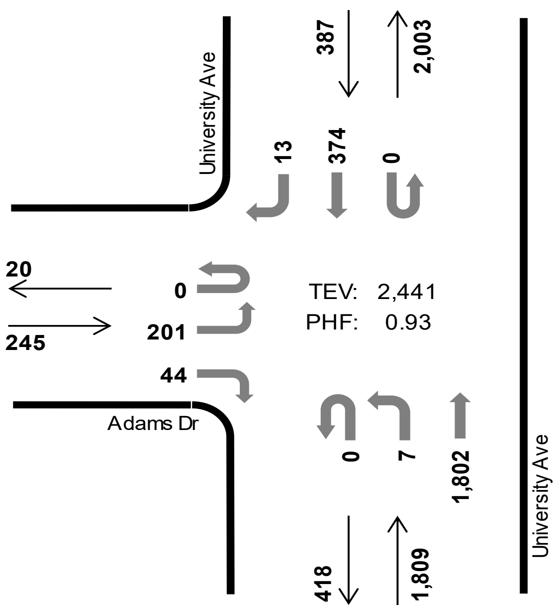
| Interval Start | Adams Dr | | | n/a | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **2** | 12 |
| **8:00 AM** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **0** | **4** | 13 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **3** | **0** | **7** | 17 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **0** | **3** | **16** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 4 | 18 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 6 | 20 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 5 | 18 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 20 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| Count Total | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 0 | 0 | 23 | 2 | 46 | 0 |
| **Peak Hour** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **6** | **0** | **0** | **8** | **0** | **16** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

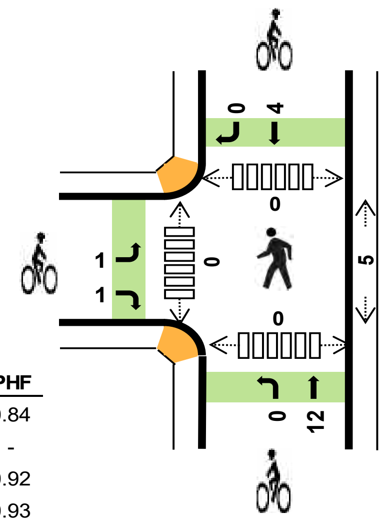
# University Ave
# Adams Dr

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:15 PM to 5:15 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.4% | 0.84 |
| WB | - | - |
| NB | 1.8% | 0.92 |
| SB | 4.1% | 0.93 |
| TOTAL | 2.2% | 0.93 |




## Three-Hour Count Summaries

| Interval Start | | Adams Dr Eastbound UT | LT | TH | RT | n/a Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:15 PM | | 0 | 41 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 2 | 449 | 0 | 0 | 0 | 93 | 2 | 595 | 0 |
| 4:30 PM | | 0 | 58 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 2 | 490 | 0 | 0 | 0 | 90 | 4 | 658 | 0 |
| 4:45 PM | | 0 | 40 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 1 | 443 | 0 | 0 | 0 | 102 | 2 | 599 | 0 |
| 5:00 PM | | 0 | 62 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 2 | 420 | 0 | 0 | 0 | 89 | 5 | 589 | 2,441 |
| Peak Hour | All | 0 | 201 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 7 | 1,802 | 0 | 0 | 0 | 374 | 13 | 2,441 | 0 |
| | HV | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 29 | 0 | 0 | 0 | 13 | 3 | 54 | 0 |
| | HV% | - | 3% | - | 0% | - | - | - | - | - | 43% | 2% | - | - | - | 3% | 23% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:15 PM | 1 | 0 | 9 | 3 | *13* | 0 | 0 | 3 | 1 | *4* | 1 | 0 | 0 | 0 | *1* |
| 4:30 PM | 1 | 0 | 8 | 4 | *13* | 0 | 0 | 4 | 1 | *5* | 3 | 0 | 0 | 0 | *3* |
| 4:45 PM | 2 | 0 | 7 | 2 | *11* | 0 | 0 | 3 | 0 | *3* | 0 | 0 | 0 | 0 | *0* |
| 5:00 PM | 2 | 0 | 8 | 7 | *17* | 2 | 0 | 2 | 2 | *6* | 1 | 0 | 0 | 0 | *1* |
| Peak Hour | 6 | 0 | 32 | 16 | *54* | 2 | 0 | 12 | 4 | *18* | 5 | 0 | 0 | 0 | *5* |

## Three-Hour Count Summaries

| Interval Start | Adams Dr Eastbound UT | LT | TH | RT | n/a Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 25 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 437 | 0 | 0 | 0 | 89 | 3 | 570 | 0 |
| **4:15 PM** | **0** | **41** | **0** | **8** | **0** | **0** | **0** | **0** | **0** | **2** | **449** | **0** | **0** | **0** | **93** | **2** | **595** | 0 |
| **4:30 PM** | **0** | **58** | **0** | **14** | **0** | **0** | **0** | **0** | **0** | **2** | **490** | **0** | **0** | **0** | **90** | **4** | **658** | 0 |
| **4:45 PM** | **0** | **40** | **0** | **11** | **0** | **0** | **0** | **0** | **0** | **1** | **443** | **0** | **0** | **0** | **102** | **2** | **599** | 2,422 |
| **5:00 PM** | **0** | **62** | **0** | **11** | **0** | **0** | **0** | **0** | **0** | **2** | **420** | **0** | **0** | **0** | **89** | **5** | **589** | **2,441** |
| 5:15 PM | 0 | 78 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 1 | 310 | 0 | 0 | 0 | 106 | 3 | 515 | 2,361 |
| 5:30 PM | 0 | 43 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 1 | 401 | 0 | 0 | 0 | 108 | 0 | 569 | 2,272 |
| 5:45 PM | 0 | 44 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 378 | 0 | 0 | 0 | 137 | 3 | 570 | 2,243 |
| 6:00 PM | 0 | 50 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 3 | 387 | 0 | 0 | 0 | 98 | 2 | 549 | 2,203 |
| 6:15 PM | 0 | 22 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 403 | 0 | 0 | 0 | 111 | 5 | 546 | 2,234 |
| 6:30 PM | 0 | 8 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 470 | 0 | 0 | 0 | 85 | 2 | 572 | 2,237 |
| 6:45 PM | 0 | 5 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 2 | 285 | 0 | 0 | 0 | 87 | 2 | 388 | 2,055 |
| Count Total | 0 | 476 | 0 | 123 | 0 | 0 | 0 | 0 | 0 | 20 | 4,873 | 0 | 0 | 0 | 1,195 | 33 | 6,720 | 0 |
| **Peak Hour All** | **0** | **201** | **0** | **44** | **0** | **0** | **0** | **0** | **0** | **7** | **1,802** | **0** | **0** | **0** | **374** | **13** | **2,441** | **0** |
| **Peak Hour HV** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **29** | **0** | **0** | **0** | **13** | **3** | **54** | **0** |
| **Peak Hour HV%** | **-** | **3%** | **-** | **0%** | **-** | **-** | **-** | **-** | **-** | **43%** | **2%** | **-** | **-** | **-** | **3%** | **23%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 1 | 0 | 9 | 3 | *13* | 2 | 0 | 0 | 1 | *3* | 0 | 0 | 0 | 0 | *0* |
| **4:15 PM** | **1** | **0** | **9** | **3** | ***13*** | **0** | **0** | **3** | **1** | ***4*** | **1** | **0** | **0** | **0** | *1* |
| **4:30 PM** | **1** | **0** | **8** | **4** | ***13*** | **0** | **0** | **4** | **1** | ***5*** | **3** | **0** | **0** | **0** | *3* |
| **4:45 PM** | **2** | **0** | **7** | **2** | ***11*** | **0** | **0** | **3** | **0** | ***3*** | **0** | **0** | **0** | **0** | *0* |
| **5:00 PM** | **2** | **0** | **8** | **7** | ***17*** | **2** | **0** | **2** | **2** | ***6*** | **1** | **0** | **0** | **0** | ***1*** |
| 5:15 PM | 2 | 0 | 12 | 3 | *17* | 0 | 0 | 4 | 2 | *6* | 3 | 1 | 0 | 0 | *4* |
| 5:30 PM | 1 | 0 | 4 | 1 | *6* | 0 | 0 | 3 | 3 | *6* | 0 | 2 | 0 | 0 | *2* |
| 5:45 PM | 1 | 0 | 2 | 2 | *5* | 0 | 0 | 11 | 1 | *12* | 4 | 1 | 0 | 0 | *5* |
| 6:00 PM | 0 | 0 | 13 | 2 | *15* | 1 | 0 | 3 | 1 | *5* | 1 | 2 | 0 | 0 | *3* |
| 6:15 PM | 1 | 0 | 7 | 7 | *15* | 0 | 0 | 1 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 0 | 0 | 6 | 2 | *8* | 0 | 0 | 9 | 0 | *9* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 1 | 0 | 6 | 0 | *7* | 0 | 0 | 2 | 4 | *6* | 2 | 0 | 0 | 0 | *2* |
| Count Total | 13 | 0 | 91 | 36 | *140* | 5 | 0 | 45 | 17 | *67* | 15 | 6 | 0 | 0 | *21* |
| **Peak Hr** | **6** | **0** | **32** | **16** | ***54*** | **2** | **0** | **12** | **4** | ***18*** | **5** | **0** | **0** | **0** | ***5*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Adams Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 2 | 1 | 13 | 0 |
| **4:15 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **8** | **0** | **0** | **0** | **3** | **0** | **13** | 0 |
| **4:30 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **4** | **0** | **13** | 0 |
| **4:45 PM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **6** | **0** | **0** | **0** | **1** | **1** | **11** | 50 |
| **5:00 PM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **7** | **0** | **0** | **0** | **5** | **2** | **17** | **54** |
| 5:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 1 | 2 | 17 | 58 |
| 5:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 6 | 51 |
| 5:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 5 | 45 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 2 | 15 | 43 |
| 6:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 4 | 3 | 15 | 41 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 1 | 8 | 43 |
| 6:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 7 | 45 |
| Count Total | 0 | 11 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 87 | 0 | 0 | 0 | 23 | 13 | 140 | 0 |
| **Peak Hour** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **29** | **0** | **0** | **0** | **13** | **3** | **54** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Adams Dr | | | n/a | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **0** | **4** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **1** | **0** | **5** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **3** | 15 |
| **5:00 PM** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **6** | **18** |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 0 | 6 | 20 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 6 | 21 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 1 | 0 | 12 | 30 |
| 6:00 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 5 | 29 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 25 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 9 | 28 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 6 | 22 |
| Count Total | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 16 | 1 | 67 | 0 |
| **Peak Hour** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **12** | **0** | **0** | **4** | **0** | **18** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

File Name: G:\Data 2019\Menlo Park 3-19\39AM FINAL.ppd
Start Date: 4/23/2019
Start Time: 7:00:00 AM
Site Code: 00000039
Comment 1: 0
Comment 2: 0
Comment 3: 0
Comment 4: 0

| | UNIVERSITY AVE Southbound | | | | Westbound | | | | UNIVERSITY AVE Northbound | | | | OBRIEN DR Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds |
| 07:00 AM | 19 | 305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92 | 13 | 0 | 5 | 0 | 5 | 2 |
| 07:15 AM | 31 | 278 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 7 | 0 | 7 | 0 | 0 | 0 |
| 07:30 AM | 52 | 303 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 154 | 18 | 0 | 4 | 0 | 3 | 0 |
| 07:45 AM | 82 | 284 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 191 | 24 | 0 | 3 | 0 | 6 | 0 |
| 08:00 AM | 60 | 324 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 158 | 23 | 0 | 8 | 0 | 2 | 3 |
| 08:15 AM | 76 | 308 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 195 | 33 | 0 | 3 | 0 | 13 | 0 |
| 08:30 AM | 57 | 268 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189 | 30 | 0 | 6 | 0 | 11 | 2 |
| 08:45 AM | 31 | 285 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 197 | 29 | 0 | 12 | 0 | 11 | 0 |
| 09:00 AM | 26 | 245 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 244 | 37 | 0 | 10 | 0 | 5 | 0 |
| 09:15 AM | 21 | 282 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 181 | 37 | 0 | 17 | 0 | 11 | 0 |
| 09:30 AM | 13 | 284 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 167 | 26 | 0 | 16 | 0 | 12 | 1 |
| 09:45 AM | 15 | 279 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168 | 17 | 0 | 11 | 0 | 9 | 0 |

| | UNIVERSITY AVE | | | | | | | | UNIVERSITY AVE | | | | OBRIEN DR | | | | Vehicle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Total |
| 7:00-8:00 | 184 | 1170 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 581 | 62 | 0 | 19 | 0 | 14 | 2 | 2,030 |
| 7:15-8:15 | 225 | 1189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 647 | 72 | 0 | 22 | 0 | 11 | 3 | 2,166 |
| 7:30-8:30 | 270 | 1219 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 698 | 98 | 0 | 18 | 0 | 24 | 3 | 2,327 |
| 7:45-8:45 | 275 | 1184 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 733 | 110 | 0 | 20 | 0 | 32 | 5 | **2,354** |
| 8:00-9:00 | 224 | 1185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 739 | 115 | 0 | 29 | 0 | 37 | 5 | 2,329 |
| 8:00-9:00 | 190 | 1106 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 825 | 129 | 0 | 31 | 0 | 40 | 2 | 2,321 |
| 8:15-9:15 | 135 | 1080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 811 | 133 | 0 | 45 | 0 | 38 | 2 | 2,242 |
| 8:30-9:30 | 91 | 1096 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 789 | 129 | 0 | 55 | 0 | 39 | 1 | 2,199 |
| 8:45-9:45 | 75 | 1090 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 760 | 117 | 0 | 54 | 0 | 37 | 1 | 2,133 |
| 9:00-10:00 | 49 | 845 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 516 | 80 | 0 | 44 | 0 | 32 | 1 | 1,566 |

File Name: G:\Data 2019\Menlo Park 3-19\39AM FINAL.ppd
Start Date: 4/23/2019
Start Time: 7:00:00 AM
Site Code: 00000039
Comment 1: 0
Comment 2: 0
Comment 3: 0
Comment 4: 0

| | UNIVERSITY AVE Southbound | | | | Westbound | | | | UNIVERSITY AVE Northbound | | | | OBRIEN DR Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 08:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 09:30 AM | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 09:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

File Name: G:\Data 2019\Menlo Park 3-19\39PM FINAL.ppd
Start Date: 4/23/2019
Start Time: 4:00:00 PM
Site Code: 00000039
Comment 1: 0
Comment 2: 0
Comment 3: 0
Comment 4: 0

| | UNIVERSITY AVE Southbound | | | | Westbound | | | | UNIVERSITY AVE Northbound | | | | OBRIEN DR Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds |
| 04:00 PM | 0 | 73 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 442 | 2 | 0 | 41 | 0 | 38 | 0 |
| 04:15 PM | 3 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 431 | 4 | 0 | 25 | 0 | 51 | 1 |
| 04:30 PM | 2 | 81 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 414 | 2 | 0 | 26 | 0 | 46 | 0 |
| 04:45 PM | 1 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 359 | 4 | 0 | 26 | 0 | 40 | 0 |
| 05:00 PM | 2 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 397 | 3 | 0 | 36 | 0 | 49 | 1 |
| 05:15 PM | 2 | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360 | 0 | 0 | 36 | 0 | 44 | 2 |
| 05:30 PM | 3 | 111 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 375 | 2 | 0 | 37 | 0 | 44 | 0 |
| 05:45 PM | 2 | 129 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 390 | 1 | 0 | 32 | 0 | 48 | 0 |
| 06:00 PM | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 430 | 1 | 0 | 28 | 0 | 33 | 2 |
| 06:15 PM | 4 | 119 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 364 | 5 | 0 | 22 | 0 | 24 | 2 |
| 06:30 PM | 3 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 259 | 0 | 0 | 17 | 0 | 17 | 2 |
| 06:45 PM | 2 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 386 | 2 | 0 | 11 | 0 | 17 | 1 |

| | UNIVERSITY AVE | | | | | | | | UNIVERSITY AVE | | | | OBRIEN DR | | | | Vehicle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Total |
| 4:00-5:00 | 6 | 356 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1646 | 12 | 0 | 118 | 0 | 175 | 1 | 2,314 |
| 4:15-5:15 | 8 | 387 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1601 | 13 | 0 | 113 | 0 | 186 | 2 | 2,309 |
| 4:30-5:30 | 7 | 422 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1530 | 9 | 0 | 124 | 0 | 179 | 3 | 2,272 |
| 4:45-5:45 | 8 | 452 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1491 | 9 | 0 | 135 | 0 | 177 | 3 | 2,273 |
| 5:00-6:00 | 9 | 464 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1522 | 6 | 0 | 141 | 0 | 185 | 3 | **2,328** |
| 5:00-6:00 | 7 | 446 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1555 | 4 | 0 | 133 | 0 | 169 | 4 | 2,315 |
| 5:15-6:15 | 9 | 445 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1559 | 9 | 0 | 119 | 0 | 149 | 4 | 2,291 |
| 5:30-6:30 | 9 | 438 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1443 | 7 | 0 | 99 | 0 | 122 | 6 | 2,118 |
| 5:45-6:45 | 9 | 420 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1439 | 8 | 0 | 78 | 0 | 91 | 7 | 2,045 |
| 6:00-7:00 | 9 | 334 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1009 | 7 | 0 | 50 | 0 | 58 | 5 | 1,467 |

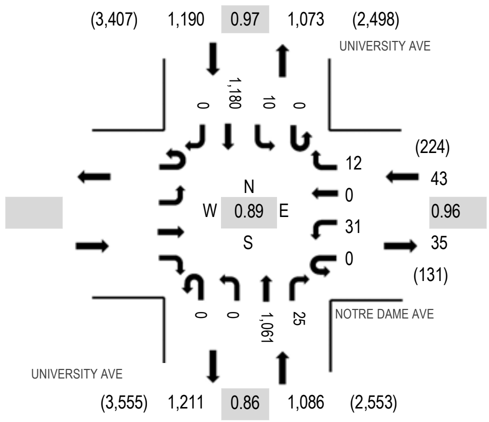
File Name: G:\Data 2019\Menlo Park 3-19\39PM FINAL.ppd
Start Date: 4/23/2019
Start Time: 4:00:00 PM
Site Code: 00000039
Comment 1: 0
Comment 2: 0
Comment 3: 0
Comment 4: 0

| | UNIVERSITY AVE Southbound | | | | Westbound | | | | UNIVERSITY AVE Northbound | | | | OBRIEN DR Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds | Right | Thru | Left | Peds |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 |
| 04:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| 04:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 2 | 0 | 0 | 0 |
| 06:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 06:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

Location: 1 UNIVERSITY AVE & NOTRE DAME AVE AM
Date: Wednesday, March 4, 2020
Peak Hour: 08:45 AM - 09:45 AM
Peak 15-Minutes: 09:00 AM - 09:15 AM

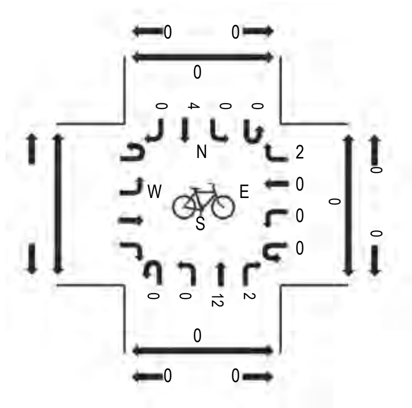
(303) 216-2439
www.alltrafficdata.net

## Peak Hour - Motorized Vehicles

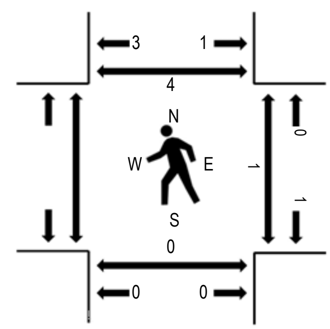



Note: Total study counts contained in parentheses.

## Peak Hour - Bicycles




## Peak Hour - Pedestrians




## Traffic Counts - Motorized Vehicles

| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | NOTRE DAME AVE Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | UNIVERSITY AVE Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | UNIVERSITY AVE Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | | | | 0 | 19 | 0 | 2 | 0 | 0 | 120 | 8 | 0 | 0 | 270 | 0 | 419 | 1,776 | | 1 | 0 | 1 |
| 7:15 AM | | | | | 0 | 18 | 0 | 7 | 0 | 0 | 131 | 11 | 0 | 1 | 285 | 0 | 453 | 1,824 | | 0 | 0 | 1 |
| 7:30 AM | | | | | 0 | 22 | 0 | 5 | 0 | 0 | 144 | 8 | 0 | 1 | 259 | 0 | 439 | 1,913 | | 0 | 0 | 0 |
| 7:45 AM | | | | | 0 | 18 | 0 | 5 | 0 | 0 | 161 | 11 | 0 | 2 | 268 | 0 | 465 | 2,010 | | 0 | 0 | 1 |
| 8:00 AM | | | | | 0 | 22 | 0 | 5 | 0 | 0 | 183 | 14 | 0 | 2 | 241 | 0 | 467 | 2,094 | | 0 | 0 | 1 |
| 8:15 AM | | | | | 0 | 19 | 0 | 8 | 0 | 0 | 202 | 15 | 0 | 1 | 297 | 0 | 542 | 2,281 | | 0 | 0 | 0 |
| 8:30 AM | | | | | 0 | 13 | 0 | 5 | 0 | 0 | 245 | 9 | 0 | 4 | 260 | 0 | 536 | 2,307 | | 0 | 0 | 1 |
| 8:45 AM | | | | | 0 | 12 | 0 | 5 | 0 | 0 | 276 | 8 | 0 | 1 | 247 | 0 | 549 | 2,319 | | 1 | 0 | 1 |
| 9:00 AM | | | | | 0 | 7 | 0 | 2 | 0 | 0 | 316 | 6 | 0 | 1 | 322 | 0 | 654 | 2,314 | | 0 | 0 | 0 |
| 9:15 AM | | | | | 0 | 5 | 0 | 4 | 0 | 0 | 246 | 5 | 0 | 4 | 304 | 0 | 568 | | | 0 | 0 | 2 |
| 9:30 AM | | | | | 0 | 7 | 0 | 1 | 0 | 0 | 223 | 6 | 0 | 4 | 307 | 0 | 548 | | | 0 | 0 | 1 |
| 9:45 AM | | | | | 0 | 9 | 0 | 4 | 0 | 0 | 198 | 7 | 0 | 2 | 324 | 0 | 544 | | | 0 | 0 | 0 |

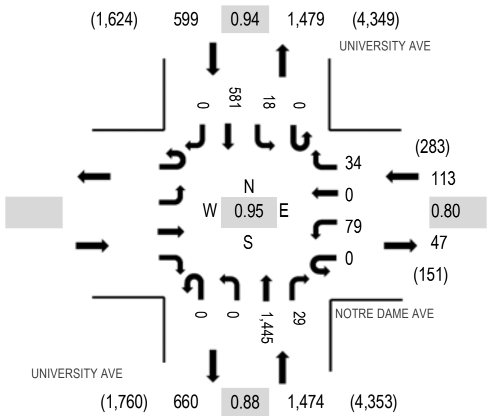
## Peak Rolling Hour Flow Rates

| Vehicle Type | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 0 | 7 |
| Lights | | | | | 0 | 31 | 0 | 12 | 0 | 0 | 1,011 | 25 | 0 | 7 | 1,104 | 0 | 2,190 |
| Mediums | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 3 | 71 | 0 | 122 |
| Total | | | | | 0 | 31 | 0 | 12 | 0 | 0 | 1,061 | 25 | 0 | 10 | 1,180 | 0 | 2,319 |

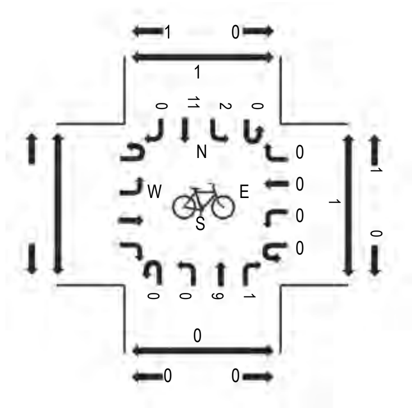
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: 1 UNIVERSITY AVE & NOTRE DAME AVE PM
Date: Wednesday, March 4, 2020
Peak Hour: 05:30 PM - 06:30 PM
Peak 15-Minutes: 05:45 PM - 06:00 PM

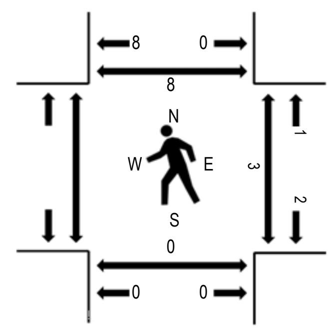
## Peak Hour - Motorized Vehicles




## Peak Hour - Bicycles




## Peak Hour - Pedestrians




Note: Total study counts contained in parentheses.

## Traffic Counts - Motorized Vehicles

| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | NOTRE DAME AVE Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | UNIVERSITY AVE Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | UNIVERSITY AVE Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | | | | 0 | 8 | 0 | 6 | 0 | 0 | 420 | 11 | 0 | 7 | 94 | 0 | 546 | 2,098 | | 0 | 0 | 2 |
| 4:15 PM | | | | | 0 | 14 | 0 | 5 | 0 | 0 | 370 | 5 | 0 | 7 | 117 | 0 | 518 | 2,058 | | 1 | 0 | 0 |
| 4:30 PM | | | | | 0 | 14 | 0 | 7 | 0 | 0 | 360 | 10 | 0 | 6 | 129 | 0 | 526 | 2,054 | | 1 | 0 | 1 |
| 4:45 PM | | | | | 0 | 17 | 0 | 10 | 0 | 0 | 342 | 4 | 0 | 3 | 132 | 0 | 508 | 2,081 | | 2 | 0 | 1 |
| 5:00 PM | | | | | 0 | 14 | 0 | 5 | 0 | 0 | 351 | 1 | 0 | 5 | 130 | 0 | 506 | 2,151 | | 2 | 0 | 0 |
| 5:15 PM | | | | | 0 | 18 | 0 | 10 | 0 | 0 | 328 | 3 | 0 | 6 | 149 | 0 | 514 | 2,163 | | 4 | 0 | 0 |
| 5:30 PM | | | | | 0 | 17 | 0 | 6 | 0 | 0 | 358 | 11 | 0 | 3 | 158 | 0 | 553 | 2,186 | | 0 | 0 | 0 |
| 5:45 PM | | | | | 0 | 29 | 0 | 8 | 0 | 0 | 368 | 10 | 0 | 5 | 158 | 0 | 578 | 2,155 | | 3 | 0 | 0 |
| 6:00 PM | | | | | 0 | 16 | 0 | 14 | 0 | 0 | 356 | 6 | 0 | 4 | 122 | 0 | 518 | 2,011 | | 0 | 0 | 5 |
| 6:15 PM | | | | | 0 | 17 | 0 | 6 | 0 | 0 | 363 | 2 | 0 | 6 | 143 | 0 | 537 | | | 0 | 0 | 3 |
| 6:30 PM | | | | | 0 | 19 | 0 | 5 | 0 | 0 | 355 | 17 | 0 | 6 | 120 | 0 | 522 | | | 0 | 0 | 0 |
| 6:45 PM | | | | | 0 | 13 | 0 | 5 | 0 | 0 | 291 | 11 | 0 | 2 | 112 | 0 | 434 | | | 0 | 0 | 0 |

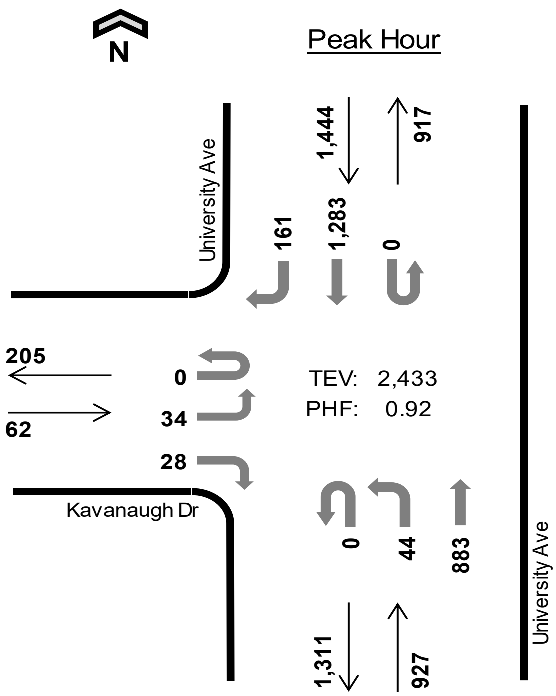
## Peak Rolling Hour Flow Rates

| Vehicle Type | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 |
| Lights | | | | | 0 | 79 | 0 | 33 | 0 | 0 | 1,413 | 29 | 0 | 18 | 573 | 0 | 2,145 |
| Mediums | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 31 | 0 | 0 | 0 | 7 | 0 | 39 |
| Total | | | | | 0 | 79 | 0 | 34 | 0 | 0 | 1,445 | 29 | 0 | 18 | 581 | 0 | 2,186 |

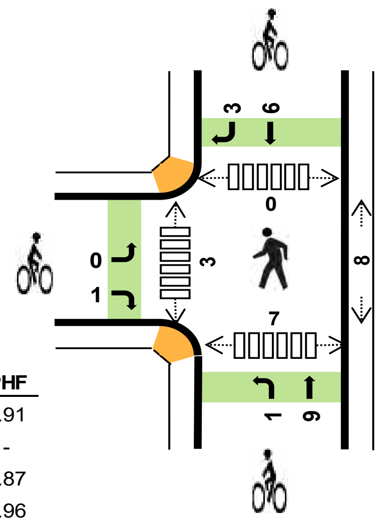
# University Ave
# Kavanaugh Dr

Date: 04-25-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 8:00 AM to 9:00 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.91 |
| WB | - | - |
| NB | 2.6% | 0.87 |
| SB | 3.3% | 0.96 |
| TOTAL | 2.9% | 0.92 |




## Three-Hour Count Summaries

| Interval Start | Kavanaugh Dr Eastbound UT | LT | TH | RT | n/a Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | 0 | 6 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 19 | 193 | 0 | 0 | 0 | 329 | 34 | 592 | 0 |
| 8:15 AM | 0 | 11 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 13 | 208 | 0 | 0 | 0 | 309 | 37 | 582 | 0 |
| 8:30 AM | 0 | 11 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 8 | 257 | 0 | 0 | 0 | 307 | 70 | 658 | 0 |
| 8:45 AM | 0 | 6 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 4 | 225 | 0 | 0 | 0 | 338 | 20 | 601 | 2,433 |
| Peak Hour All | 0 | 34 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 44 | 883 | 0 | 0 | 0 | 1,283 | 161 | 2,433 | 0 |
| Peak Hour HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 23 | 0 | 0 | 0 | 42 | 5 | 71 | 0 |
| Peak Hour HV% | - | 0% | - | 0% | - | - | - | - | - | 2% | 3% | - | - | - | 3% | 3% | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | 0 | 0 | 6 | 6 | *12* | 0 | 0 | 4 | 5 | *9* | 2 | 0 | 0 | 2 | *4* |
| 8:15 AM | 0 | 0 | 6 | 14 | *20* | 0 | 0 | 3 | 1 | *4* | 4 | 2 | 0 | 3 | *9* |
| 8:30 AM | 0 | 0 | 10 | 14 | *24* | 0 | 0 | 0 | 1 | *1* | 1 | 1 | 0 | 1 | *3* |
| 8:45 AM | 0 | 0 | 2 | 13 | *15* | 1 | 0 | 3 | 2 | *6* | 1 | 0 | 0 | 1 | *2* |
| Peak Hour | 0 | 0 | 24 | 47 | *71* | 1 | 0 | 10 | 9 | *20* | 8 | 3 | 0 | 7 | *18* |

## Three-Hour Count Summaries

| Interval Start | Kavanaugh Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 4 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 5 | 119 | 0 | 0 | 0 | 285 | 16 | 441 | 0 |
| 7:15 AM | 0 | 3 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 9 | 160 | 0 | 0 | 0 | 287 | 17 | 488 | 0 |
| 7:30 AM | 0 | 7 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 4 | 157 | 0 | 0 | 0 | 326 | 26 | 534 | 0 |
| 7:45 AM | 0 | 8 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 13 | 182 | 0 | 0 | 0 | 305 | 30 | 551 | 2,014 |
| **8:00 AM** | **0** | **6** | **0** | **11** | **0** | **0** | **0** | **0** | **0** | **19** | **193** | **0** | **0** | **0** | **329** | **34** | **592** | 2,165 |
| **8:15 AM** | **0** | **11** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **13** | **208** | **0** | **0** | **0** | **309** | **37** | **582** | 2,259 |
| **8:30 AM** | **0** | **11** | **0** | **5** | **0** | **0** | **0** | **0** | **0** | **8** | **257** | **0** | **0** | **0** | **307** | **70** | **658** | 2,383 |
| **8:45 AM** | **0** | **6** | **0** | **8** | **0** | **0** | **0** | **0** | **0** | **4** | **225** | **0** | **0** | **0** | **338** | **20** | **601** | **2,433** |
| 9:00 AM | 0 | 11 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 5 | 248 | 0 | 1 | 0 | 276 | 17 | 564 | 2,405 |
| 9:15 AM | 0 | 6 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 6 | 205 | 0 | 0 | 0 | 328 | 14 | 569 | 2,392 |
| 9:30 AM | 0 | 8 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 5 | 208 | 0 | 0 | 0 | 353 | 13 | 593 | 2,327 |
| 9:45 AM | 1 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 200 | 0 | 0 | 0 | 314 | 5 | 530 | 2,256 |
| Count Total | 1 | 84 | 0 | 105 | 0 | 0 | 0 | 0 | 0 | 94 | 2,362 | 0 | 1 | 0 | 3,757 | 299 | 6,703 | 0 |
| **Peak Hour All** | **0** | **34** | **0** | **28** | **0** | **0** | **0** | **0** | **0** | **44** | **883** | **0** | **0** | **0** | **1,283** | **161** | **2,433** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **23** | **0** | **0** | **0** | **42** | **5** | **71** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **-** | **0%** | **-** | **-** | **-** | **-** | **-** | **2%** | **3%** | **-** | **-** | **-** | **3%** | **3%** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 1 | 0 | 8 | 9 | *18* | 0 | 0 | 0 | 2 | *2* | 2 | 0 | 0 | 1 | *3* |
| 7:15 AM | 0 | 0 | 7 | 10 | *17* | 0 | 0 | 1 | 3 | *4* | 4 | 1 | 0 | 4 | *9* |
| 7:30 AM | 0 | 0 | 3 | 12 | *15* | 1 | 0 | 0 | 3 | *4* | 3 | 0 | 0 | 3 | *6* |
| 7:45 AM | 1 | 0 | 6 | 9 | *16* | 0 | 0 | 0 | 2 | *2* | 6 | 2 | 0 | 6 | *14* |
| **8:00 AM** | **0** | **0** | **6** | **6** | ***12*** | **0** | **0** | **4** | **5** | ***9*** | **2** | **0** | **0** | **2** | *4* |
| **8:15 AM** | **0** | **0** | **6** | **14** | ***20*** | **0** | **0** | **3** | **1** | ***4*** | **4** | **2** | **0** | **3** | *9* |
| **8:30 AM** | **0** | **0** | **10** | **14** | ***24*** | **0** | **0** | **0** | **1** | ***1*** | **1** | **1** | **0** | **1** | *3* |
| **8:45 AM** | **0** | **0** | **2** | **13** | ***15*** | **1** | **0** | **3** | **2** | ***6*** | **1** | **0** | **0** | **1** | ***2*** |
| 9:00 AM | 0 | 0 | 9 | 23 | *32* | 0 | 0 | 0 | 3 | *3* | 0 | 2 | 0 | 1 | *3* |
| 9:15 AM | 0 | 0 | 4 | 38 | *42* | 0 | 0 | 2 | 0 | *2* | 2 | 1 | 2 | 2 | *7* |
| 9:30 AM | 0 | 0 | 9 | 15 | *24* | 0 | 0 | 1 | 4 | *5* | 0 | 2 | 0 | 0 | *2* |
| 9:45 AM | 0 | 0 | 7 | 14 | *21* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 2 | 0 | 77 | 177 | *256* | 2 | 0 | 14 | 26 | *42* | 25 | 11 | 2 | 24 | *62* |
| **Peak Hr** | **0** | **0** | **24** | **47** | ***71*** | **1** | **0** | **10** | **9** | ***20*** | **8** | **3** | **0** | **7** | ***18*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Kavanaugh Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 9 | 0 | 18 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 10 | 0 | 17 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 12 | 0 | 15 | 0 |
| 7:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 2 | 16 | 66 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **5** | **1** | **12** | 60 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **12** | **2** | **20** | 63 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **9** | **0** | **0** | **0** | **13** | **1** | **24** | 72 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **12** | **1** | **15** | **71** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 21 | 2 | 32 | 91 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 38 | 0 | 42 | 113 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 13 | 2 | 24 | 113 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 14 | 0 | 21 | 119 |
| Count Total | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 75 | 0 | 0 | 0 | 166 | 11 | 256 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **23** | **0** | **0** | **0** | **42** | **5** | **71** | **0** |

## Three-Hour Count Summaries - Bikes

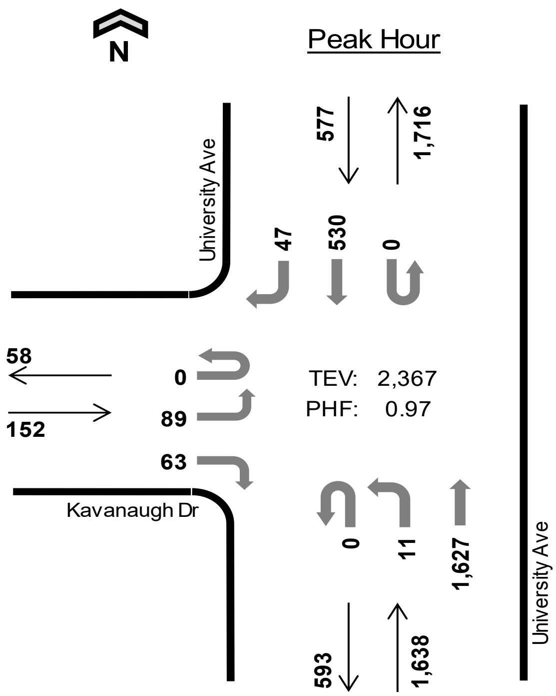
| Interval Start | Kavanaugh Dr | | | n/a | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 4 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 12 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **3** | **2** | **9** | 19 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **2** | **0** | **0** | **1** | **0** | **4** | 19 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | 16 |
| **8:45 AM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **1** | **6** | **20** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 | 14 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 12 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 5 | 16 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Count Total | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 13 | 0 | 0 | 21 | 5 | 42 | 0 |
| **Peak Hour** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **9** | **0** | **0** | **6** | **3** | **20** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

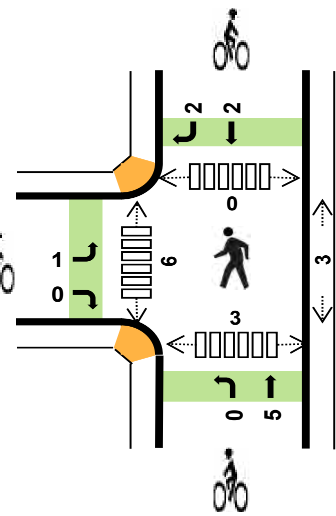
# University Ave
# Kavanaugh Dr

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.0% | 0.88 |
| WB | - | - |
| NB | 1.5% | 0.95 |
| SB | 2.3% | 0.89 |
| TOTAL | 1.7% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Kavanaugh Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 19 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 3 | 392 | 0 | 0 | 0 | 129 | 13 | 573 | 0 |
| 4:15 PM | | 0 | 25 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 3 | 402 | 0 | 0 | 0 | 137 | 7 | 586 | 0 |
| 4:30 PM | | 0 | 21 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 4 | 427 | 0 | 0 | 0 | 115 | 14 | 596 | 0 |
| 4:45 PM | | 0 | 24 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 1 | 406 | 0 | 0 | 0 | 149 | 13 | 612 | 2,367 |
| Peak Hour | All | 0 | 89 | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 11 | 1,627 | 0 | 0 | 0 | 530 | 47 | 2,367 | 0 |
| | HV | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 12 | 1 | 40 | 0 |
| | HV% | - | 2% | - | 2% | - | - | - | - | - | 0% | 1% | - | - | - | 2% | 2% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 1 | 0 | 8 | 3 | *12* | 1 | 0 | 0 | 2 | *3* | 1 | 1 | 0 | 1 | *3* |
| 4:15 PM | 1 | 0 | 7 | 4 | *12* | 0 | 0 | 0 | 0 | *0* | 1 | 2 | 0 | 1 | *4* |
| 4:30 PM | 1 | 0 | 4 | 4 | *9* | 0 | 0 | 2 | 1 | *3* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 0 | 0 | 5 | 2 | *7* | 0 | 0 | 3 | 1 | *4* | 1 | 3 | 0 | 1 | *5* |
| Peak Hour | 3 | 0 | 24 | 13 | *40* | 1 | 0 | 5 | 4 | *10* | 3 | 6 | 0 | 3 | *12* |

## Three-Hour Count Summaries

| Interval Start | | Kavanaugh Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | | **0** | **19** | **0** | **17** | **0** | **0** | **0** | **0** | **0** | **3** | **392** | **0** | **0** | **0** | **129** | **13** | **573** | 0 |
| **4:15 PM** | | **0** | **25** | **0** | **12** | **0** | **0** | **0** | **0** | **0** | **3** | **402** | **0** | **0** | **0** | **137** | **7** | **586** | 0 |
| **4:30 PM** | | **0** | **21** | **0** | **15** | **0** | **0** | **0** | **0** | **0** | **4** | **427** | **0** | **0** | **0** | **115** | **14** | **596** | 0 |
| **4:45 PM** | | **0** | **24** | **0** | **19** | **0** | **0** | **0** | **0** | **0** | **1** | **406** | **0** | **0** | **0** | **149** | **13** | **612** | **2,367** |
| 5:00 PM | | 0 | 37 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 3 | 350 | 0 | 0 | 0 | 135 | 9 | 545 | 2,339 |
| 5:15 PM | | 0 | 28 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 251 | 0 | 0 | 0 | 150 | 14 | 460 | 2,213 |
| 5:30 PM | | 0 | 25 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 1 | 327 | 0 | 0 | 0 | 154 | 14 | 537 | 2,154 |
| 5:45 PM | | 0 | 31 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 2 | 336 | 0 | 0 | 0 | 159 | 23 | 566 | 2,108 |
| 6:00 PM | | 0 | 28 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 3 | 312 | 0 | 1 | 0 | 127 | 22 | 507 | 2,070 |
| 6:15 PM | | 0 | 17 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 4 | 378 | 0 | 0 | 0 | 135 | 13 | 559 | 2,169 |
| 6:30 PM | | 0 | 12 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 4 | 402 | 0 | 0 | 0 | 112 | 11 | 554 | 2,186 |
| 6:45 PM | | 0 | 11 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 9 | 251 | 0 | 0 | 0 | 112 | 13 | 410 | 2,030 |
| Count Total | | 0 | 278 | 0 | 175 | 0 | 0 | 0 | 0 | 0 | 37 | 4,234 | 0 | 1 | 0 | 1,614 | 166 | 6,505 | 0 |
| **Peak Hour** | **All** | **0** | **89** | **0** | **63** | **0** | **0** | **0** | **0** | **0** | **11** | **1,627** | **0** | **0** | **0** | **530** | **47** | **2,367** | **0** |
| | **HV** | **0** | **2** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **24** | **0** | **0** | **0** | **12** | **1** | **40** | **0** |
| | **HV%** | **-** | **2%** | **-** | **2%** | **-** | **-** | **-** | **-** | **-** | **0%** | **1%** | **-** | **-** | **-** | **2%** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **4:00 PM** | **1** | **0** | **8** | **3** | ***12*** | **1** | **0** | **0** | **2** | ***3*** | **1** | **1** | **0** | **1** | *3* |
| **4:15 PM** | **1** | **0** | **7** | **4** | ***12*** | **0** | **0** | **0** | **0** | ***0*** | **1** | **2** | **0** | **1** | *4* |
| **4:30 PM** | **1** | **0** | **4** | **4** | ***9*** | **0** | **0** | **2** | **1** | ***3*** | **0** | **0** | **0** | **0** | *0* |
| **4:45 PM** | **0** | **0** | **5** | **2** | ***7*** | **0** | **0** | **3** | **1** | ***4*** | **1** | **3** | **0** | **1** | ***5*** |
| 5:00 PM | 0 | 0 | 5 | 5 | *10* | 0 | 0 | 0 | 4 | *4* | 1 | 0 | 0 | 1 | *2* |
| 5:15 PM | 0 | 0 | 6 | 3 | *9* | 0 | 0 | 5 | 5 | *10* | 3 | 2 | 0 | 6 | *11* |
| 5:30 PM | 0 | 0 | 3 | 3 | *6* | 0 | 0 | 2 | 4 | *6* | 0 | 1 | 0 | 1 | *2* |
| 5:45 PM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 9 | 3 | *12* | 1 | 4 | 0 | 1 | *6* |
| 6:00 PM | 1 | 0 | 9 | 1 | *11* | 0 | 0 | 3 | 0 | *3* | 0 | 2 | 0 | 0 | *2* |
| 6:15 PM | 0 | 0 | 6 | 4 | *10* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 0 | 0 | 8 | 1 | *9* | 0 | 0 | 9 | 2 | *11* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 0 | 0 | 3 | 0 | *3* | 0 | 0 | 2 | 4 | *6* | 1 | 1 | 0 | 1 | *3* |
| Count Total | 4 | 0 | 66 | 32 | *102* | 1 | 0 | 36 | 26 | *63* | 9 | 16 | 0 | 13 | *38* |
| **Peak Hr** | **3** | **0** | **24** | **13** | ***40*** | **1** | **0** | **5** | **4** | ***10*** | **3** | **6** | **0** | **3** | ***12*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Kavanaugh Dr | | | | n/a | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **3** | **0** | **12** | 0 |
| **4:15 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **4** | **0** | **12** | 0 |
| **4:30 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **3** | **1** | **9** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **0** | **2** | **0** | **7** | **40** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 | 38 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 1 | 9 | 35 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 1 | 6 | 32 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 4 | 29 |
| 6:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 1 | 0 | 11 | 30 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 4 | 0 | 10 | 31 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 9 | 34 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 33 |
| Count Total | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 0 | 0 | 28 | 4 | 102 | 0 |
| **Peak Hour** | **0** | **2** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **24** | **0** | **0** | **0** | **12** | **1** | **40** | **0** |

## Three-Hour Count Summaries - Bikes

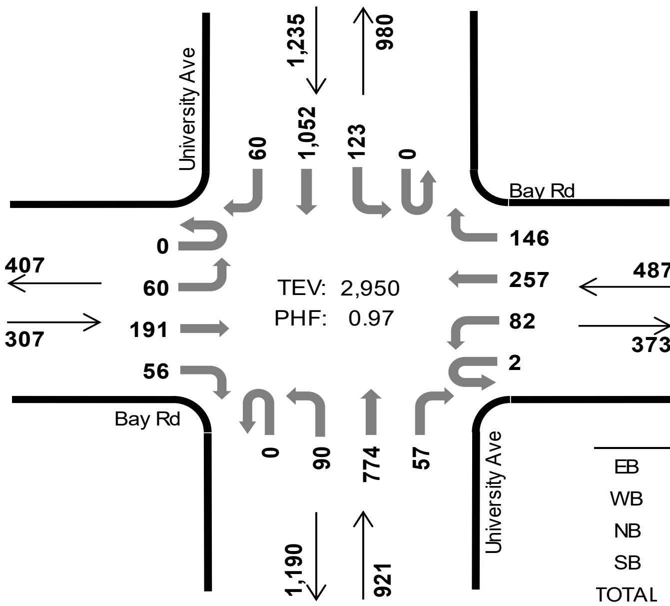
| Interval Start | Kavanaugh Dr | | | n/a | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **3** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **0** | **3** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **1** | **4** | **10** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 4 | 11 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 10 | 21 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 6 | 24 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 3 | 0 | 12 | 32 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 31 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 2 | 0 | 11 | 27 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 6 | 21 |
| Count Total | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 23 | 3 | 63 | 0 |
| **Peak Hour** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **2** | **2** | **10** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

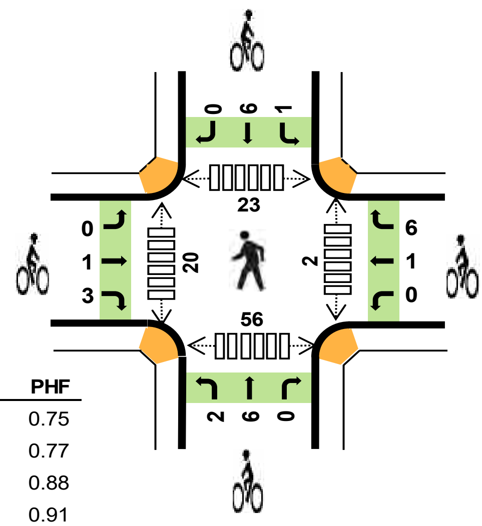
# University Ave
# Bay Rd

Date: 04-25-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 8:00 AM to 9:00 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.3% | 0.75 |
| WB | 3.1% | 0.77 |
| NB | 2.2% | 0.88 |
| SB | 3.0% | 0.91 |
| TOTAL | 2.7% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Bay Rd Eastbound UT | LT | TH | RT | Bay Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | | 0 | 16 | 56 | 11 | 0 | 24 | 86 | 49 | 0 | 27 | 166 | 23 | 0 | 28 | 228 | 25 | 739 | 0 |
| 8:15 AM | | 0 | 22 | 67 | 14 | 2 | 18 | 62 | 42 | 0 | 25 | 169 | 11 | 0 | 22 | 261 | 13 | 728 | 0 |
| 8:30 AM | | 0 | 12 | 37 | 16 | 0 | 21 | 62 | 31 | 0 | 20 | 231 | 10 | 0 | 32 | 274 | 14 | 760 | 0 |
| 8:45 AM | | 0 | 10 | 31 | 15 | 0 | 19 | 47 | 24 | 0 | 18 | 208 | 13 | 0 | 41 | 289 | 8 | 723 | 2,950 |
| Peak Hour | All | 0 | 60 | 191 | 56 | 2 | 82 | 257 | 146 | 0 | 90 | 774 | 57 | 0 | 123 | 1,052 | 60 | 2,950 | 0 |
| | HV | 0 | 0 | 5 | 2 | 0 | 3 | 5 | 7 | 0 | 4 | 16 | 0 | 0 | 4 | 32 | 1 | 79 | 0 |
| | HV% | - | 0% | 3% | 4% | 0% | 4% | 2% | 5% | - | 4% | 2% | 0% | - | 3% | 3% | 2% | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | 1 | 6 | 4 | 5 | *16* | 1 | 2 | 3 | 2 | *8* | 0 | 3 | 8 | 19 | *30* |
| 8:15 AM | 2 | 3 | 5 | 5 | *15* | 0 | 1 | 2 | 2 | *5* | 1 | 5 | 10 | 17 | *33* |
| 8:30 AM | 2 | 4 | 9 | 16 | *31* | 2 | 0 | 0 | 2 | *4* | 0 | 9 | 0 | 12 | *21* |
| 8:45 AM | 2 | 2 | 2 | 11 | *17* | 1 | 4 | 3 | 1 | *9* | 1 | 3 | 5 | 8 | *17* |
| Peak Hour | 7 | 15 | 20 | 37 | *79* | 4 | 7 | 8 | 7 | *26* | 2 | 20 | 23 | 56 | *101* |

## Three-Hour Count Summaries

| Interval Start | Bay Rd | | | | Bay Rd | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 17 | 39 | 6 | 1 | 36 | 40 | 26 | 1 | 13 | 96 | 26 | 0 | 40 | 246 | 11 | 598 | 0 |
| 7:15 AM | 0 | 13 | 35 | 9 | 0 | 32 | 39 | 44 | 0 | 16 | 116 | 26 | 0 | 23 | 242 | 12 | 607 | 0 |
| 7:30 AM | 0 | 8 | 41 | 13 | 1 | 39 | 53 | 34 | 0 | 17 | 128 | 21 | 0 | 34 | 271 | 16 | 676 | 0 |
| 7:45 AM | 0 | 10 | 65 | 5 | 0 | 12 | 69 | 50 | 1 | 23 | 147 | 18 | 1 | 27 | 208 | 51 | 687 | 2,568 |
| **8:00 AM** | **0** | **16** | **56** | **11** | **0** | **24** | **86** | **49** | **0** | **27** | **166** | **23** | **0** | **28** | **228** | **25** | **739** | 2,709 |
| **8:15 AM** | **0** | **22** | **67** | **14** | **2** | **18** | **62** | **42** | **0** | **25** | **169** | **11** | **0** | **22** | **261** | **13** | **728** | 2,830 |
| **8:30 AM** | **0** | **12** | **37** | **16** | **0** | **21** | **62** | **31** | **0** | **20** | **231** | **10** | **0** | **32** | **274** | **14** | **760** | 2,914 |
| **8:45 AM** | **0** | **10** | **31** | **15** | **0** | **19** | **47** | **24** | **0** | **18** | **208** | **13** | **0** | **41** | **289** | **8** | **723** | **2,950** |
| 9:00 AM | 0 | 9 | 30 | 19 | 0 | 17 | 26 | 28 | 0 | 12 | 221 | 19 | 0 | 25 | 247 | 13 | 666 | 2,877 |
| 9:15 AM | 0 | 12 | 31 | 16 | 0 | 20 | 23 | 14 | 0 | 18 | 203 | 20 | 2 | 10 | 298 | 7 | 674 | 2,823 |
| 9:30 AM | 0 | 6 | 38 | 17 | 0 | 21 | 26 | 22 | 0 | 16 | 191 | 15 | 0 | 31 | 266 | 7 | 656 | 2,719 |
| 9:45 AM | 0 | 3 | 32 | 16 | 0 | 20 | 20 | 20 | 1 | 13 | 174 | 22 | 0 | 23 | 299 | 6 | 649 | 2,645 |
| Count Total | 0 | 138 | 502 | 157 | 4 | 279 | 553 | 384 | 3 | 218 | 2,050 | 224 | 3 | 336 | 3,129 | 183 | 8,163 | 0 |
| **Peak Hour All** | **0** | **60** | **191** | **56** | **2** | **82** | **257** | **146** | **0** | **90** | **774** | **57** | **0** | **123** | **1,052** | **60** | **2,950** | **0** |
| **Peak Hour HV** | **0** | **0** | **5** | **2** | **0** | **3** | **5** | **7** | **0** | **4** | **16** | **0** | **0** | **4** | **32** | **1** | **79** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **3%** | **4%** | **0%** | **4%** | **2%** | **5%** | **-** | **4%** | **2%** | **0%** | **-** | **3%** | **3%** | **2%** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 6 | 9 | 5 | 10 | *30* | 0 | 1 | 0 | 1 | *2* | 2 | 2 | 2 | 10 | *16* |
| 7:15 AM | 6 | 4 | 3 | 10 | *23* | 2 | 1 | 1 | 0 | *4* | 2 | 5 | 1 | 4 | *12* |
| 7:30 AM | 2 | 5 | 5 | 14 | *26* | 1 | 0 | 1 | 3 | *5* | 3 | 3 | 13 | 3 | *22* |
| 7:45 AM | 2 | 3 | 6 | 7 | *18* | 1 | 0 | 2 | 1 | *4* | 0 | 8 | 8 | 12 | *28* |
| **8:00 AM** | **1** | **6** | **4** | **5** | ***16*** | **1** | **2** | **3** | **2** | ***8*** | **0** | **3** | **8** | **19** | *30* |
| **8:15 AM** | **2** | **3** | **5** | **5** | ***15*** | **0** | **1** | **2** | **2** | ***5*** | **1** | **5** | **10** | **17** | *33* |
| **8:30 AM** | **2** | **4** | **9** | **16** | ***31*** | **2** | **0** | **0** | **2** | ***4*** | **0** | **9** | **0** | **12** | *21* |
| **8:45 AM** | **2** | **2** | **2** | **11** | ***17*** | **1** | **4** | **3** | **1** | ***9*** | **1** | **3** | **5** | **8** | ***17*** |
| 9:00 AM | 2 | 4 | 9 | 21 | *36* | 2 | 1 | 3 | 2 | *8* | 4 | 2 | 3 | 5 | *14* |
| 9:15 AM | 4 | 3 | 9 | 36 | *52* | 0 | 4 | 2 | 0 | *6* | 1 | 8 | 2 | 7 | *18* |
| 9:30 AM | 6 | 3 | 14 | 12 | *35* | 2 | 0 | 1 | 2 | *5* | 1 | 17 | 4 | 6 | *28* |
| 9:45 AM | 2 | 3 | 5 | 16 | *26* | 0 | 0 | 2 | 1 | *3* | 0 | 3 | 3 | 7 | *13* |
| Count Total | 37 | 49 | 76 | 163 | *325* | 12 | 14 | 20 | 17 | *63* | 15 | 68 | 59 | 110 | *252* |
| **Peak Hour** | **7** | **15** | **20** | **37** | ***79*** | **4** | **7** | **8** | **7** | ***26*** | **2** | **20** | **23** | **56** | ***101*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bay Rd | | | | Bay Rd | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 4 | 2 | 0 | 0 | 2 | 6 | 1 | 0 | 0 | 2 | 3 | 0 | 2 | 8 | 0 | 30 | 0 |
| 7:15 AM | 0 | 3 | 2 | 1 | 0 | 0 | 3 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 8 | 0 | 23 | 0 |
| 7:30 AM | 0 | 0 | 0 | 2 | 0 | 4 | 1 | 0 | 0 | 1 | 3 | 1 | 0 | 1 | 13 | 0 | 26 | 0 |
| 7:45 AM | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 6 | 0 | 0 | 2 | 5 | 0 | 18 | 97 |
| **8:00 AM** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **3** | **0** | **1** | **3** | **0** | **0** | **1** | **4** | **0** | **16** | 83 |
| **8:15 AM** | **0** | **0** | **2** | **0** | **0** | **1** | **1** | **1** | **0** | **1** | **4** | **0** | **0** | **1** | **4** | **0** | **15** | 75 |
| **8:30 AM** | **0** | **0** | **1** | **1** | **0** | **2** | **0** | **2** | **0** | **1** | **8** | **0** | **0** | **1** | **14** | **1** | **31** | 80 |
| **8:45 AM** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **1** | **0** | **1** | **1** | **0** | **0** | **1** | **10** | **0** | **17** | **79** |
| 9:00 AM | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 2 | 6 | 1 | 0 | 0 | 21 | 0 | 36 | 99 |
| 9:15 AM | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 4 | 4 | 0 | 1 | 34 | 1 | 52 | 136 |
| 9:30 AM | 0 | 0 | 4 | 2 | 0 | 0 | 1 | 2 | 0 | 4 | 8 | 2 | 0 | 1 | 10 | 1 | 35 | 140 |
| 9:45 AM | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 5 | 0 | 0 | 3 | 12 | 1 | 26 | 149 |
| Count Total | 0 | 7 | 17 | 13 | 0 | 11 | 23 | 15 | 0 | 13 | 52 | 11 | 0 | 16 | 143 | 4 | 325 | 0 |
| **Peak Hour** | **0** | **0** | **5** | **2** | **0** | **3** | **5** | **7** | **0** | **4** | **16** | **0** | **0** | **4** | **32** | **1** | **79** | **0** |

## Three-Hour Count Summaries - Bikes

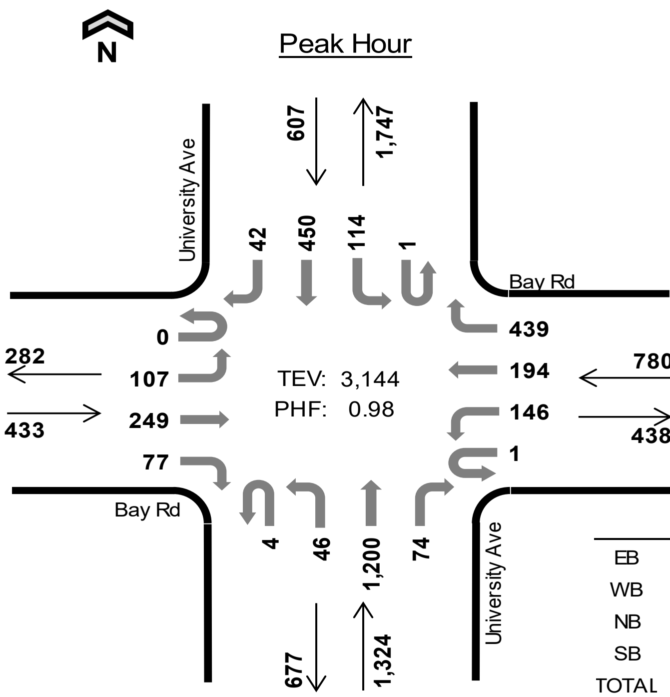
| Interval Start | Bay Rd | | | Bay Rd | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 7:15 AM | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 |
| 7:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 5 | 0 |
| 7:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 4 | 15 |
| **8:00 AM** | **0** | **1** | **0** | **0** | **0** | **2** | **1** | **2** | **0** | **1** | **1** | **0** | **8** | 21 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **2** | **0** | **0** | **2** | **0** | **5** | 22 |
| **8:30 AM** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **4** | 21 |
| **8:45 AM** | **0** | **0** | **1** | **0** | **1** | **3** | **1** | **2** | **0** | **0** | **1** | **0** | **9** | **26** |
| 9:00 AM | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 8 | 26 |
| 9:15 AM | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 6 | 27 |
| 9:30 AM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 5 | 28 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 3 | 22 |
| Count Total | 0 | 8 | 4 | 1 | 6 | 7 | 4 | 16 | 0 | 3 | 12 | 2 | 63 | 0 |
| **Peak Hour** | **0** | **1** | **3** | **0** | **1** | **6** | **2** | **6** | **0** | **1** | **6** | **0** | **26** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

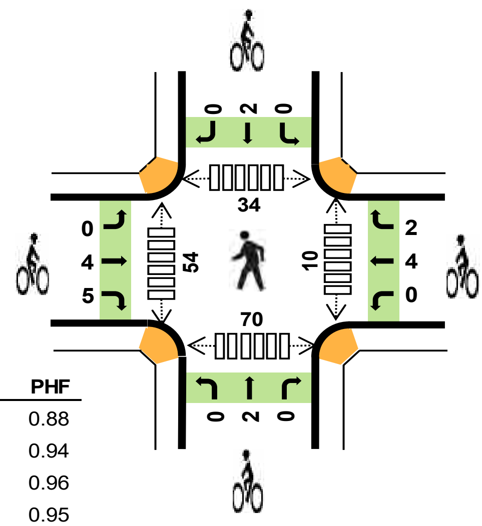
# University Ave
# Bay Rd

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.5% | 0.88 |
| WB | 1.8% | 0.94 |
| NB | 2.0% | 0.96 |
| SB | 2.3% | 0.95 |
| TOTAL | 2.1% | 0.98 |




## Three-Hour Count Summaries

| Interval Start | | Bay Rd Eastbound UT | LT | TH | RT | Bay Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | 0 | 37 | 60 | 26 | 0 | 42 | 50 | 115 | 2 | 14 | 273 | 19 | 0 | 35 | 111 | 12 | 796 | 0 |
| 4:15 PM | | 0 | 25 | 67 | 21 | 0 | 37 | 50 | 92 | 1 | 12 | 292 | 27 | 0 | 25 | 113 | 11 | 773 | 0 |
| 4:30 PM | | 0 | 22 | 55 | 10 | 0 | 35 | 47 | 114 | 1 | 8 | 325 | 12 | 1 | 25 | 109 | 5 | 769 | 0 |
| 4:45 PM | | 0 | 23 | 67 | 20 | 1 | 32 | 47 | 118 | 0 | 12 | 310 | 16 | 0 | 29 | 117 | 14 | 806 | 3,144 |
| Peak Hour | All | 0 | 107 | 249 | 77 | 1 | 146 | 194 | 439 | 4 | 46 | 1,200 | 74 | 1 | 114 | 450 | 42 | 3,144 | 0 |
| | HV | 0 | 1 | 6 | 4 | 0 | 0 | 7 | 7 | 0 | 3 | 17 | 7 | 0 | 4 | 7 | 3 | 66 | 0 |
| | HV% | - | 1% | 2% | 5% | 0% | 0% | 4% | 2% | 0% | 7% | 1% | 9% | 0% | 4% | 2% | 7% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 3 | 4 | 7 | 5 | *19* | 6 | 0 | 0 | 0 | *6* | 6 | 7 | 10 | 14 | *37* |
| 4:15 PM | 3 | 4 | 12 | 3 | *22* | 1 | 1 | 1 | 1 | *4* | 1 | 16 | 14 | 28 | *59* |
| 4:30 PM | 3 | 2 | 4 | 4 | *13* | 1 | 2 | 1 | 0 | *4* | 1 | 22 | 9 | 15 | *47* |
| 4:45 PM | 2 | 4 | 4 | 2 | *12* | 1 | 3 | 0 | 1 | *5* | 2 | 9 | 1 | 13 | *25* |
| Peak Hour | 11 | 14 | 27 | 14 | *66* | 9 | 6 | 2 | 2 | *19* | 10 | 54 | 34 | 70 | *168* |

## Three-Hour Count Summaries

| Interval Start | Bay Rd Eastbound UT | LT | TH | RT | Bay Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **37** | **60** | **26** | **0** | **42** | **50** | **115** | **2** | **14** | **273** | **19** | **0** | **35** | **111** | **12** | **796** | 0 |
| **4:15 PM** | **0** | **25** | **67** | **21** | **0** | **37** | **50** | **92** | **1** | **12** | **292** | **27** | **0** | **25** | **113** | **11** | **773** | 0 |
| **4:30 PM** | **0** | **22** | **55** | **10** | **0** | **35** | **47** | **114** | **1** | **8** | **325** | **12** | **1** | **25** | **109** | **5** | **769** | 0 |
| **4:45 PM** | **0** | **23** | **67** | **20** | **1** | **32** | **47** | **118** | **0** | **12** | **310** | **16** | **0** | **29** | **117** | **14** | **806** | **3,144** |
| 5:00 PM | 0 | 29 | 51 | 27 | 1 | 32 | 68 | 85 | 0 | 7 | 251 | 20 | 0 | 24 | 124 | 9 | 728 | 3,076 |
| 5:15 PM | 0 | 20 | 84 | 23 | 2 | 29 | 49 | 85 | 0 | 12 | 169 | 6 | 1 | 28 | 129 | 10 | 647 | 2,950 |
| 5:30 PM | 0 | 31 | 73 | 32 | 0 | 23 | 78 | 86 | 0 | 8 | 192 | 5 | 0 | 19 | 142 | 15 | 704 | 2,885 |
| 5:45 PM | 0 | 27 | 66 | 27 | 1 | 33 | 68 | 86 | 0 | 16 | 233 | 5 | 0 | 22 | 132 | 16 | 732 | 2,811 |
| 6:00 PM | 0 | 24 | 81 | 23 | 0 | 34 | 66 | 93 | 0 | 12 | 211 | 3 | 0 | 21 | 119 | 14 | 701 | 2,784 |
| 6:15 PM | 0 | 22 | 62 | 28 | 1 | 20 | 55 | 95 | 0 | 7 | 247 | 3 | 1 | 22 | 111 | 4 | 678 | 2,815 |
| 6:30 PM | 0 | 19 | 39 | 23 | 2 | 46 | 40 | 75 | 1 | 15 | 310 | 2 | 0 | 35 | 93 | 7 | 707 | 2,818 |
| 6:45 PM | 0 | 15 | 48 | 17 | 0 | 23 | 47 | 54 | 1 | 19 | 179 | 5 | 1 | 20 | 90 | 7 | 526 | 2,612 |
| Count Total | 0 | 294 | 753 | 277 | 8 | 386 | 665 | 1,098 | 6 | 142 | 2,992 | 123 | 4 | 305 | 1,390 | 124 | 8,567 | 0 |
| **Peak Hour All** | **0** | **107** | **249** | **77** | **1** | **146** | **194** | **439** | **4** | **46** | **1,200** | **74** | **1** | **114** | **450** | **42** | **3,144** | **0** |
| **Peak Hour HV** | **0** | **1** | **6** | **4** | **0** | **0** | **7** | **7** | **0** | **3** | **17** | **7** | **0** | **4** | **7** | **3** | **66** | **0** |
| **Peak Hour HV%** | **-** | **1%** | **2%** | **5%** | **0%** | **0%** | **4%** | **2%** | **0%** | **7%** | **1%** | **9%** | **0%** | **4%** | **2%** | **7%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **3** | **4** | **7** | **5** | ***19*** | **6** | **0** | **0** | **0** | ***6*** | **6** | **7** | **10** | **14** | *37* |
| **4:15 PM** | **3** | **4** | **12** | **3** | ***22*** | **1** | **1** | **1** | **1** | ***4*** | **1** | **16** | **14** | **28** | *59* |
| **4:30 PM** | **3** | **2** | **4** | **4** | ***13*** | **1** | **2** | **1** | **0** | ***4*** | **1** | **22** | **9** | **15** | *47* |
| **4:45 PM** | **2** | **4** | **4** | **2** | ***12*** | **1** | **3** | **0** | **1** | ***5*** | **2** | **9** | **1** | **13** | ***25*** |
| 5:00 PM | 4 | 1 | 4 | 5 | *14* | 1 | 1 | 0 | 1 | *3* | 1 | 15 | 3 | 16 | *35* |
| 5:15 PM | 1 | 3 | 7 | 1 | *12* | 1 | 1 | 2 | 4 | *8* | 1 | 4 | 9 | 8 | *22* |
| 5:30 PM | 5 | 6 | 3 | 2 | *16* | 0 | 1 | 3 | 4 | *8* | 4 | 14 | 5 | 34 | *57* |
| 5:45 PM | 3 | 1 | 4 | 1 | *9* | 2 | 5 | 4 | 1 | *12* | 0 | 7 | 6 | 14 | *27* |
| 6:00 PM | 4 | 2 | 6 | 1 | *13* | 0 | 1 | 1 | 1 | *3* | 0 | 11 | 8 | 15 | *34* |
| 6:15 PM | 1 | 4 | 4 | 4 | *13* | 1 | 1 | 0 | 0 | *2* | 3 | 7 | 5 | 13 | *28* |
| 6:30 PM | 2 | 2 | 8 | 1 | *13* | 3 | 1 | 9 | 0 | *13* | 1 | 5 | 0 | 14 | *20* |
| 6:45 PM | 2 | 2 | 4 | 0 | *8* | 2 | 2 | 1 | 3 | *8* | 3 | 4 | 4 | 9 | *20* |
| Count Total | 33 | 35 | 67 | 29 | *164* | 19 | 19 | 22 | 16 | *76* | 23 | 121 | 74 | 193 | *411* |
| **Peak Hour** | **11** | **14** | **27** | **14** | ***66*** | **9** | **6** | **2** | **2** | ***19*** | **10** | **54** | **34** | **70** | ***168*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bay Rd Eastbound UT | LT | TH | RT | Bay Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **1** | **1** | **1** | **0** | **0** | **2** | **2** | **0** | **1** | **5** | **1** | **0** | **3** | **1** | **1** | **19** | 0 |
| **4:15 PM** | **0** | **0** | **2** | **1** | **0** | **0** | **2** | **2** | **0** | **1** | **6** | **5** | **0** | **1** | **1** | **1** | **22** | 0 |
| **4:30 PM** | **0** | **0** | **2** | **1** | **0** | **0** | **2** | **0** | **0** | **1** | **3** | **0** | **0** | **0** | **4** | **0** | **13** | 0 |
| **4:45 PM** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **3** | **0** | **0** | **3** | **1** | **0** | **0** | **1** | **1** | **12** | **66** |
| 5:00 PM | 0 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 4 | 0 | 14 | 61 |
| 5:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 1 | 0 | 12 | 51 |
| 5:30 PM | 0 | 1 | 2 | 2 | 0 | 1 | 3 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 16 | 54 |
| 5:45 PM | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 9 | 51 |
| 6:00 PM | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 2 | 4 | 0 | 0 | 0 | 1 | 0 | 13 | 50 |
| 6:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 0 | 0 | 4 | 0 | 13 | 51 |
| 6:30 PM | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 7 | 0 | 0 | 0 | 1 | 0 | 13 | 48 |
| 6:45 PM | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 8 | 47 |
| Count Total | 0 | 5 | 15 | 13 | 0 | 2 | 19 | 14 | 0 | 12 | 48 | 7 | 0 | 6 | 20 | 3 | 164 | 0 |
| **Peak Hour** | **0** | **1** | **6** | **4** | **0** | **0** | **7** | **7** | **0** | **3** | **17** | **7** | **0** | **4** | **7** | **3** | **66** | **0** |

## Three-Hour Count Summaries - Bikes

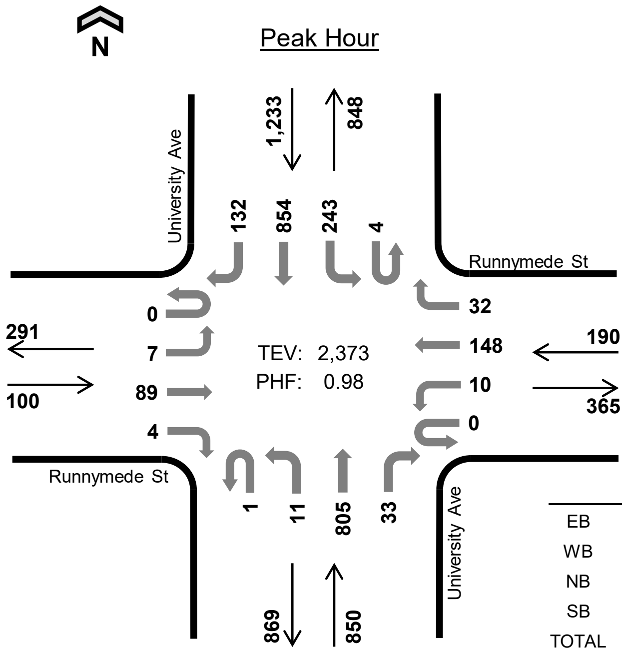
| Interval Start | Bay Rd Eastbound LT | TH | RT | Bay Rd Westbound LT | TH | RT | University Ave Northbound LT | TH | RT | University Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **3** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | 0 |
| **4:15 PM** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **4** | 0 |
| **4:30 PM** | **0** | **0** | **1** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **4** | 0 |
| **4:45 PM** | **0** | **1** | **0** | **0** | **2** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **5** | **19** |
| 5:00 PM | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 16 |
| 5:15 PM | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 2 | 0 | 8 | 20 |
| 5:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 2 | 2 | 0 | 8 | 24 |
| 5:45 PM | 0 | 2 | 0 | 0 | 0 | 5 | 0 | 4 | 0 | 1 | 0 | 0 | 12 | 31 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 31 |
| 6:15 PM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 25 |
| 6:30 PM | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 13 | 30 |
| 6:45 PM | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 8 | 26 |
| Count Total | 0 | 12 | 7 | 0 | 6 | 13 | 0 | 22 | 0 | 10 | 6 | 0 | 76 | 0 |
| **Peak Hour** | **0** | **4** | **5** | **0** | **4** | **2** | **0** | **2** | **0** | **0** | **2** | **0** | **19** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

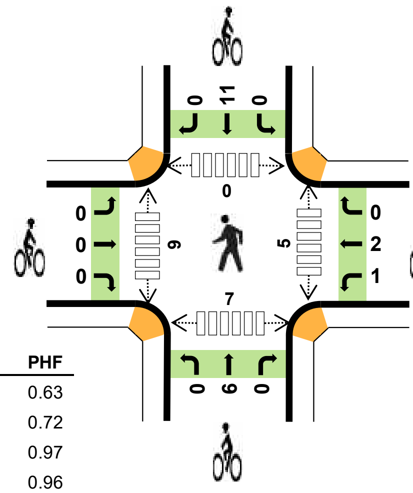
www.idaxdata.com

# University Ave
# Runnymede St

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:15 AM to 9:15 AM




| | HV %: | PHF |
|---|---|---|
| EB | 2.0% | 0.63 |
| WB | 1.6% | 0.72 |
| NB | 2.8% | 0.97 |
| SB | 4.5% | 0.96 |
| TOTAL | 3.6% | 0.98 |




## Three-Hour Count Summaries

| Interval Start | | Runnymede St Eastbound UT | LT | TH | RT | Runnymede St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | | 0 | 3 | 36 | 1 | 0 | 4 | 55 | 7 | 1 | 3 | 185 | 11 | 1 | 44 | 220 | 37 | 608 | 0 |
| 8:30 AM | | 0 | 1 | 17 | 1 | 0 | 3 | 41 | 8 | 0 | 4 | 208 | 8 | 0 | 71 | 205 | 27 | 594 | 0 |
| 8:45 AM | | 0 | 2 | 19 | 0 | 0 | 0 | 29 | 11 | 0 | 3 | 204 | 8 | 0 | 65 | 219 | 38 | 598 | 0 |
| 9:00 AM | | 0 | 1 | 17 | 2 | 0 | 3 | 23 | 6 | 0 | 1 | 208 | 6 | 3 | 63 | 210 | 30 | 573 | 2,373 |
| Peak Hour | All | 0 | 7 | 89 | 4 | 0 | 10 | 148 | 32 | 1 | 11 | 805 | 33 | 4 | 243 | 854 | 132 | 2,373 | 0 |
| | HV | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 24 | 0 | 1 | 0 | 43 | 12 | 85 | 0 |
| | HV% | - | 14% | 0% | 25% | - | 0% | 2% | 0% | 0% | 0% | 3% | 0% | 25% | 0% | 5% | 9% | 4% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | 0 | 1 | 10 | 4 | *15* | 0 | 1 | 1 | 1 | *3* | 1 | 1 | 0 | 5 | *7* |
| 8:30 AM | 0 | 1 | 4 | 19 | *24* | 0 | 0 | 0 | 5 | *5* | 1 | 4 | 0 | 0 | *5* |
| 8:45 AM | 1 | 1 | 1 | 8 | *11* | 0 | 1 | 3 | 1 | *5* | 0 | 3 | 0 | 1 | *4* |
| 9:00 AM | 1 | 0 | 9 | 25 | *35* | 0 | 1 | 2 | 4 | *7* | 3 | 1 | 0 | 1 | *5* |
| Peak Hour | 2 | 3 | 24 | 56 | *85* | 0 | 3 | 6 | 11 | *20* | 5 | 9 | 0 | 7 | *21* |

## Three-Hour Count Summaries

| Interval Start | | Runnymede St Eastbound UT | LT | TH | RT | Runnymede St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | 0 | 2 | 11 | 0 | 0 | 8 | 28 | 2 | 2 | 2 | 129 | 9 | 0 | 27 | 264 | 25 | 509 | 0 |
| 7:15 AM | | 0 | 2 | 17 | 4 | 0 | 6 | 39 | 5 | 0 | 7 | 144 | 14 | 0 | 22 | 255 | 25 | 540 | 0 |
| 7:30 AM | | 0 | 2 | 33 | 2 | 0 | 7 | 49 | 6 | 0 | 4 | 148 | 21 | 0 | 26 | 257 | 49 | 604 | 0 |
| 7:45 AM | | 0 | 4 | 47 | 0 | 0 | 5 | 52 | 5 | 1 | 2 | 164 | 31 | 0 | 24 | 171 | 41 | 547 | 2,200 |
| 8:00 AM | | 0 | 3 | 30 | 8 | 0 | 5 | 50 | 3 | 0 | 6 | 154 | 10 | 0 | 16 | 234 | 17 | 536 | 2,227 |
| **8:15 AM** | | **0** | **3** | **36** | **1** | **0** | **4** | **55** | **7** | **1** | **3** | **185** | **11** | **1** | **44** | **220** | **37** | **608** | 2,295 |
| **8:30 AM** | | **0** | **1** | **17** | **1** | **0** | **3** | **41** | **8** | **0** | **4** | **208** | **8** | **0** | **71** | **205** | **27** | **594** | 2,285 |
| **8:45 AM** | | **0** | **2** | **19** | **0** | **0** | **0** | **29** | **11** | **0** | **3** | **204** | **8** | **0** | **65** | **219** | **38** | **598** | 2,336 |
| **9:00 AM** | | **0** | **1** | **17** | **2** | **0** | **3** | **23** | **6** | **0** | **1** | **208** | **6** | **3** | **63** | **210** | **30** | **573** | **2,373** |
| 9:15 AM | | 0 | 3 | 2 | 2 | 0 | 8 | 16 | 6 | 0 | 4 | 206 | 11 | 1 | 35 | 267 | 36 | 597 | 2,362 |
| 9:30 AM | | 0 | 2 | 7 | 1 | 0 | 8 | 12 | 4 | 2 | 7 | 214 | 7 | 2 | 44 | 229 | 23 | 562 | 2,330 |
| 9:45 AM | | 0 | 2 | 7 | 3 | 0 | 9 | 8 | 7 | 2 | 0 | 204 | 7 | 0 | 31 | 285 | 29 | 594 | 2,326 |
| Count Total | | 0 | 27 | 243 | 24 | 0 | 66 | 402 | 70 | 8 | 43 | 2,168 | 143 | 7 | 468 | 2,816 | 377 | 6,862 | 0 |
| **Peak Hour** | **All** | **0** | **7** | **89** | **4** | **0** | **10** | **148** | **32** | **1** | **11** | **805** | **33** | **4** | **243** | **854** | **132** | **2,373** | **0** |
| | **HV** | **0** | **1** | **0** | **1** | **0** | **0** | **3** | **0** | **0** | **0** | **24** | **0** | **1** | **0** | **43** | **12** | **85** | **0** |
| | **HV%** | **-** | **14%** | **0%** | **25%** | **-** | **0%** | **2%** | **0%** | **0%** | **0%** | **3%** | **0%** | **25%** | **0%** | **5%** | **9%** | **4%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 1 | 0 | 5 | 10 | *16* | 1 | 1 | 0 | 1 | *3* | 2 | 1 | 2 | 1 | *6* |
| 7:15 AM | 0 | 0 | 2 | 9 | *11* | 0 | 0 | 1 | 3 | *4* | 0 | 4 | 4 | 1 | *9* |
| 7:30 AM | 1 | 1 | 6 | 18 | *26* | 1 | 1 | 0 | 3 | *5* | 3 | 3 | 1 | 1 | *8* |
| 7:45 AM | 0 | 1 | 6 | 7 | *14* | 0 | 1 | 1 | 0 | *2* | 2 | 3 | 0 | 1 | *6* |
| 8:00 AM | 0 | 0 | 2 | 3 | *5* | 1 | 0 | 1 | 2 | *4* | 0 | 2 | 0 | 1 | *3* |
| **8:15 AM** | **0** | **1** | **10** | **4** | ***15*** | **0** | **1** | **1** | **1** | ***3*** | **1** | **1** | **0** | **5** | *7* |
| **8:30 AM** | **0** | **1** | **4** | **19** | ***24*** | **0** | **0** | **0** | **5** | ***5*** | **1** | **4** | **0** | **0** | *5* |
| **8:45 AM** | **1** | **1** | **1** | **8** | ***11*** | **0** | **1** | **3** | **1** | ***5*** | **0** | **3** | **0** | **1** | *4* |
| **9:00 AM** | **1** | **0** | **9** | **25** | ***35*** | **0** | **1** | **2** | **4** | ***7*** | **3** | **1** | **0** | **1** | *5* |
| 9:15 AM | 0 | 0 | 10 | 37 | *47* | 0 | 0 | 0 | 0 | *0* | 2 | 3 | 5 | 2 | *12* |
| 9:30 AM | 0 | 0 | 14 | 16 | *30* | 2 | 0 | 0 | 3 | *5* | 0 | 9 | 2 | 0 | *11* |
| 9:45 AM | 1 | 0 | 6 | 14 | *21* | 1 | 1 | 0 | 1 | *3* | 1 | 1 | 1 | 0 | *3* |
| Count Total | 5 | 5 | 75 | 170 | *255* | 6 | 7 | 9 | 24 | *46* | 15 | 35 | 15 | 14 | *79* |
| **Peak Hour** | **2** | **3** | **24** | **56** | ***85*** | **0** | **3** | **6** | **11** | ***20*** | **5** | **9** | **0** | **7** | ***21*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Runnymede St | | | | Runnymede St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 9 | 0 | 16 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 9 | 0 | 11 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 1 | 15 | 2 | 26 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 0 | 14 | 67 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 5 | 56 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **3** | **1** | **15** | 60 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **15** | **4** | **24** | 58 |
| **8:45 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **7** | **1** | **11** | 55 |
| **9:00 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **1** | **0** | **18** | **6** | **35** | **85** |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 1 | 1 | 27 | 8 | 47 | 117 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 0 | 0 | 1 | 14 | 1 | 30 | 123 |
| 9:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 11 | 3 | 21 | 133 |
| Count Total | 0 | 1 | 3 | 1 | 0 | 0 | 4 | 1 | 0 | 1 | 71 | 3 | 2 | 4 | 138 | 26 | 255 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **1** | **0** | **0** | **3** | **0** | **0** | **0** | **24** | **0** | **1** | **0** | **43** | **12** | **85** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | Runnymede St | | | Runnymede St | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 4 | 0 |
| 7:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 14 |
| 8:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 4 | 15 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **3** | 14 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **5** | 14 |
| **8:45 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **0** | **5** | 17 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **4** | **0** | **7** | **20** |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 9:30 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 17 |
| 9:45 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 15 |
| Count Total | 0 | 5 | 1 | 2 | 5 | 0 | 0 | 9 | 0 | 0 | 24 | 0 | 46 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **1** | **2** | **0** | **0** | **6** | **0** | **0** | **11** | **0** | **20** | **0** |

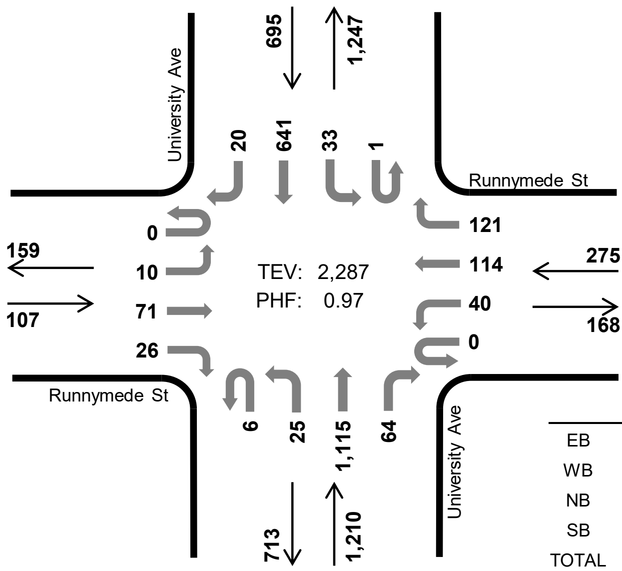
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# Runnymede St

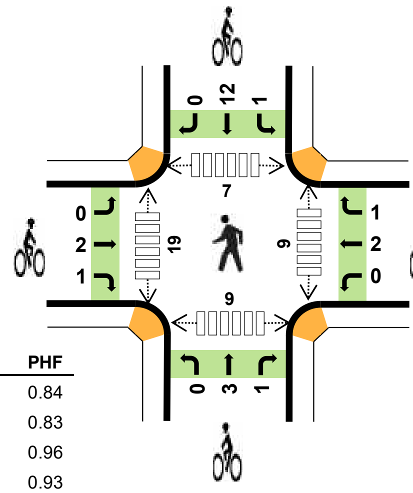
Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM

N

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.84 |
| WB | 0.4% | 0.83 |
| NB | 2.6% | 0.96 |
| SB | 1.6% | 0.93 |
| TOTAL | 1.9% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Runnymede St Eastbound UT | LT | TH | RT | Runnymede St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | 0 | 2 | 16 | 5 | 0 | 12 | 33 | 20 | 4 | 6 | 290 | 16 | 1 | 5 | 176 | 5 | 591 | 0 |
| 4:15 PM | | 0 | 5 | 11 | 6 | 0 | 12 | 23 | 24 | 2 | 3 | 263 | 19 | 0 | 11 | 155 | 6 | 540 | 0 |
| 4:30 PM | | 0 | 3 | 22 | 7 | 0 | 5 | 33 | 30 | 0 | 9 | 288 | 16 | 0 | 10 | 158 | 4 | 585 | 0 |
| 4:45 PM | | 0 | 0 | 22 | 8 | 0 | 11 | 25 | 47 | 0 | 7 | 274 | 13 | 0 | 7 | 152 | 5 | 571 | 2,287 |
| Peak Hour | All | 0 | 10 | 71 | 26 | 0 | 40 | 114 | 121 | 6 | 25 | 1,115 | 64 | 1 | 33 | 641 | 20 | 2,287 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 30 | 2 | 0 | 0 | 11 | 0 | 44 | 0 |
| | HV% | - | 0% | 0% | 0% | - | 0% | 1% | 0% | 0% | 0% | 3% | 3% | 0% | 0% | 2% | 0% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 1 | 8 | 2 | *11* | 1 | 0 | 1 | 5 | *7* | 1 | 7 | 1 | 4 | *13* |
| 4:15 PM | 0 | 0 | 10 | 1 | *11* | 1 | 1 | 2 | 3 | *7* | 1 | 2 | 3 | 1 | *7* |
| 4:30 PM | 0 | 0 | 5 | 6 | *11* | 0 | 0 | 1 | 2 | *3* | 6 | 7 | 1 | 0 | *14* |
| 4:45 PM | 0 | 0 | 9 | 2 | *11* | 1 | 2 | 0 | 3 | *6* | 1 | 3 | 2 | 4 | *10* |
| Peak Hour | 0 | 1 | 32 | 11 | *44* | 3 | 3 | 4 | 13 | *23* | 9 | 19 | 7 | 9 | *44* |

## Three-Hour Count Summaries

| Interval Start | Runnymede St Eastbound UT | LT | TH | RT | Runnymede St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **2** | **16** | **5** | **0** | **12** | **33** | **20** | **4** | **6** | **290** | **16** | **1** | **5** | **176** | **5** | **591** | 0 |
| **4:15 PM** | **0** | **5** | **11** | **6** | **0** | **12** | **23** | **24** | **2** | **3** | **263** | **19** | **0** | **11** | **155** | **6** | **540** | 0 |
| **4:30 PM** | **0** | **3** | **22** | **7** | **0** | **5** | **33** | **30** | **0** | **9** | **288** | **16** | **0** | **10** | **158** | **4** | **585** | 0 |
| **4:45 PM** | **0** | **0** | **22** | **8** | **0** | **11** | **25** | **47** | **0** | **7** | **274** | **13** | **0** | **7** | **152** | **5** | **571** | **2,287** |
| 5:00 PM | 0 | 1 | 22 | 8 | 0 | 11 | 32 | 45 | 2 | 8 | 203 | 16 | 0 | 5 | 166 | 7 | 526 | 2,222 |
| 5:15 PM | 0 | 3 | 19 | 3 | 0 | 13 | 34 | 27 | 0 | 9 | 137 | 19 | 1 | 16 | 160 | 9 | 450 | 2,132 |
| 5:30 PM | 0 | 2 | 23 | 5 | 0 | 14 | 39 | 30 | 1 | 8 | 153 | 8 | 0 | 14 | 186 | 11 | 494 | 2,041 |
| 5:45 PM | 0 | 8 | 33 | 8 | 0 | 18 | 46 | 24 | 1 | 10 | 198 | 5 | 0 | 6 | 178 | 5 | 540 | 2,010 |
| 6:00 PM | 0 | 0 | 28 | 6 | 0 | 21 | 39 | 30 | 1 | 11 | 192 | 19 | 1 | 9 | 174 | 7 | 538 | 2,022 |
| 6:15 PM | 0 | 3 | 17 | 6 | 0 | 13 | 31 | 29 | 6 | 12 | 224 | 19 | 0 | 7 | 148 | 8 | 523 | 2,095 |
| 6:30 PM | 0 | 2 | 15 | 8 | 0 | 22 | 31 | 16 | 2 | 6 | 229 | 18 | 1 | 12 | 162 | 9 | 533 | 2,134 |
| 6:45 PM | 0 | 5 | 20 | 7 | 0 | 12 | 10 | 15 | 3 | 15 | 197 | 13 | 0 | 6 | 132 | 5 | 440 | 2,034 |
| Count Total | 0 | 34 | 248 | 77 | 0 | 164 | 376 | 337 | 22 | 104 | 2,648 | 181 | 4 | 108 | 1,947 | 81 | 6,331 | 0 |
| **Peak Hour All** | **0** | **10** | **71** | **26** | **0** | **40** | **114** | **121** | **6** | **25** | **1,115** | **64** | **1** | **33** | **641** | **20** | **2,287** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **30** | **2** | **0** | **0** | **11** | **0** | **44** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **1%** | **0%** | **0%** | **0%** | **3%** | **3%** | **0%** | **0%** | **2%** | **0%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **1** | **8** | **2** | ***11*** | **1** | **0** | **1** | **5** | ***7*** | **1** | **7** | **1** | **4** | *13* |
| **4:15 PM** | **0** | **0** | **10** | **1** | ***11*** | **1** | **1** | **2** | **3** | ***7*** | **1** | **2** | **3** | **1** | *7* |
| **4:30 PM** | **0** | **0** | **5** | **6** | ***11*** | **0** | **0** | **1** | **2** | ***3*** | **6** | **7** | **1** | **0** | *14* |
| **4:45 PM** | **0** | **0** | **9** | **2** | ***11*** | **1** | **2** | **0** | **3** | ***6*** | **1** | **3** | **2** | **4** | ***10*** |
| 5:00 PM | 0 | 0 | 9 | 3 | *12* | 0 | 0 | 0 | 0 | *0* | 2 | 5 | 2 | 5 | *14* |
| 5:15 PM | 0 | 0 | 5 | 4 | *9* | 0 | 1 | 2 | 2 | *5* | 2 | 1 | 3 | 1 | *7* |
| 5:30 PM | 0 | 1 | 1 | 4 | *6* | 2 | 0 | 2 | 3 | *7* | 2 | 5 | 2 | 0 | *9* |
| 5:45 PM | 0 | 0 | 4 | 2 | *6* | 0 | 0 | 4 | 0 | *4* | 2 | 7 | 2 | 0 | *11* |
| 6:00 PM | 0 | 1 | 7 | 4 | *12* | 1 | 1 | 1 | 0 | *3* | 3 | 3 | 1 | 0 | *7* |
| 6:15 PM | 0 | 0 | 5 | 3 | *8* | 1 | 0 | 1 | 0 | *2* | 1 | 1 | 2 | 1 | *5* |
| 6:30 PM | 0 | 1 | 6 | 3 | *10* | 3 | 0 | 0 | 4 | *7* | 4 | 3 | 1 | 0 | *8* |
| 6:45 PM | 0 | 0 | 7 | 2 | *9* | 1 | 0 | 2 | 0 | *3* | 0 | 3 | 1 | 3 | *7* |
| Count Total | 0 | 4 | 76 | 36 | *116* | 11 | 5 | 16 | 22 | *54* | 25 | 47 | 21 | 19 | *112* |
| **Peak Hour** | **0** | **1** | **32** | **11** | ***44*** | **3** | **3** | **4** | **13** | ***23*** | **9** | **19** | **7** | **9** | ***44*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Runnymede St | | | | Runnymede St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **7** | **1** | **0** | **0** | **2** | **0** | **11** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **1** | **0** | **11** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **0** | **6** | **0** | **11** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **1** | **0** | **0** | **2** | **0** | **11** | **44** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 3 | 0 | 12 | 45 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 3 | 1 | 9 | 43 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 6 | 38 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 6 | 33 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 4 | 0 | 12 | 33 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 3 | 0 | 8 | 32 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 3 | 0 | 10 | 36 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 9 | 39 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 72 | 4 | 0 | 0 | 35 | 1 | 116 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **30** | **2** | **0** | **0** | **11** | **0** | **44** | **0** |

## Three-Hour Count Summaries - Bikes

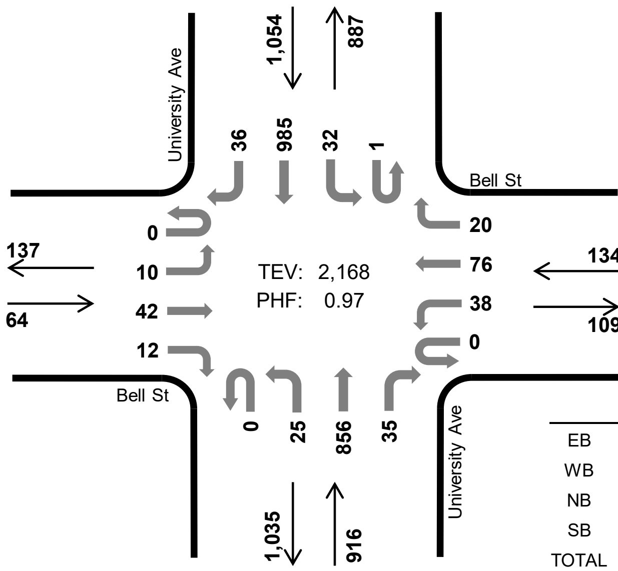
| Interval Start | Runnymede St | | | Runnymede St | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **5** | **0** | **7** | 0 |
| **4:15 PM** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **1** | **1** | **1** | **2** | **0** | **7** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **0** | **3** | 0 |
| **4:45 PM** | **0** | **1** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **6** | **23** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 5:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 5 | 14 |
| 5:30 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 7 | 18 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 4 | 16 |
| 6:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 19 |
| 6:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 16 |
| 6:30 PM | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 7 | 16 |
| 6:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 15 |
| Count Total | 1 | 8 | 2 | 0 | 4 | 1 | 0 | 14 | 2 | 1 | 21 | 0 | 54 | 0 |
| **Peak Hour** | **0** | **2** | **1** | **0** | **2** | **1** | **0** | **3** | **1** | **1** | **12** | **0** | **23** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

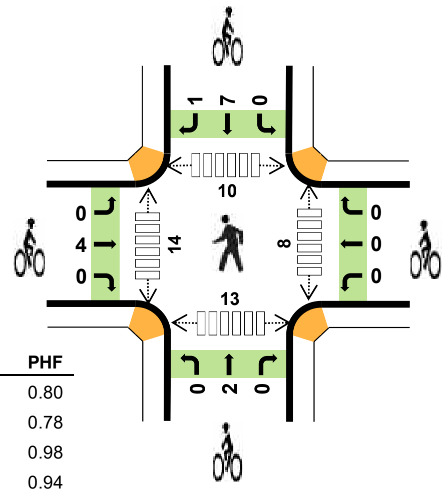
# University Ave
# Bell St

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 9:00 AM to 10:00 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.80 |
| WB | 3.7% | 0.78 |
| NB | 4.1% | 0.98 |
| SB | 6.9% | 0.94 |
| TOTAL | 5.4% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | Bell St | | | | Bell St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 9:00 AM | 0 | 0 | 14 | 6 | 0 | 11 | 30 | 2 | 0 | 9 | 214 | 9 | 0 | 8 | 232 | 4 | 539 | 0 |
| 9:15 AM | 0 | 2 | 5 | 4 | 0 | 5 | 20 | 5 | 0 | 6 | 216 | 8 | 0 | 7 | 234 | 12 | 524 | 0 |
| 9:30 AM | 0 | 3 | 11 | 1 | 0 | 6 | 11 | 4 | 0 | 4 | 224 | 5 | 1 | 9 | 261 | 9 | 549 | 0 |
| 9:45 AM | 0 | 5 | 12 | 1 | 0 | 16 | 15 | 9 | 0 | 6 | 202 | 13 | 0 | 8 | 258 | 11 | 556 | 2,168 |
| Peak Hour All | 0 | 10 | 42 | 12 | 0 | 38 | 76 | 20 | 0 | 25 | 856 | 35 | 1 | 32 | 985 | 36 | 2,168 | 0 |
| Peak Hour HV | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 36 | 2 | 0 | 0 | 71 | 2 | 116 | 0 |
| Peak Hour HV% | - | 0% | 0% | 0% | - | 0% | 3% | 15% | - | 0% | 4% | 6% | 0% | 0% | 7% | 6% | 5% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 9:00 AM | 0 | 1 | 9 | 13 | *23* | 1 | 0 | 2 | 2 | *5* | 1 | 1 | 3 | 6 | *11* |
| 9:15 AM | 0 | 2 | 9 | 30 | *41* | 1 | 0 | 0 | 1 | *2* | 1 | 1 | 1 | 1 | *4* |
| 9:30 AM | 0 | 2 | 13 | 19 | *34* | 1 | 0 | 0 | 3 | *4* | 0 | 7 | 2 | 3 | *12* |
| 9:45 AM | 0 | 0 | 7 | 11 | *18* | 1 | 0 | 0 | 2 | *3* | 6 | 5 | 4 | 3 | *18* |
| Peak Hour | 0 | 5 | 38 | 73 | *116* | 4 | 0 | 2 | 8 | *14* | 8 | 14 | 10 | 13 | *45* |

## Three-Hour Count Summaries

| Interval Start | Bell St | | | | Bell St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 7 | 28 | 0 | 0 | 18 | 27 | 2 | 0 | 7 | 130 | 6 | 0 | 6 | 263 | 12 | 506 | 0 |
| 7:15 AM | 0 | 2 | 23 | 11 | 0 | 21 | 28 | 4 | 1 | 6 | 157 | 9 | 0 | 10 | 239 | 15 | 526 | 0 |
| 7:30 AM | 0 | 5 | 22 | 10 | 0 | 30 | 28 | 0 | 0 | 12 | 164 | 7 | 0 | 9 | 206 | 8 | 501 | 0 |
| 7:45 AM | 0 | 3 | 27 | 22 | 0 | 18 | 35 | 1 | 0 | 12 | 187 | 13 | 0 | 6 | 207 | 9 | 540 | 2,073 |
| 8:00 AM | 0 | 2 | 19 | 19 | 0 | 30 | 34 | 1 | 0 | 10 | 165 | 4 | 0 | 4 | 199 | 4 | 491 | 2,058 |
| 8:15 AM | 0 | 3 | 20 | 30 | 0 | 20 | 29 | 0 | 0 | 10 | 194 | 5 | 0 | 3 | 197 | 3 | 514 | 2,046 |
| 8:30 AM | 0 | 2 | 36 | 17 | 0 | 33 | 21 | 3 | 0 | 8 | 208 | 9 | 0 | 2 | 198 | 2 | 539 | 2,084 |
| 8:45 AM | 0 | 1 | 13 | 8 | 0 | 25 | 36 | 3 | 1 | 9 | 209 | 3 | 0 | 2 | 222 | 1 | 533 | 2,077 |
| **9:00 AM** | **0** | **0** | **14** | **6** | **0** | **11** | **30** | **2** | **0** | **9** | **214** | **9** | **0** | **8** | **232** | **4** | **539** | 2,125 |
| **9:15 AM** | **0** | **2** | **5** | **4** | **0** | **5** | **20** | **5** | **0** | **6** | **216** | **8** | **0** | **7** | **234** | **12** | **524** | 2,135 |
| **9:30 AM** | **0** | **3** | **11** | **1** | **0** | **6** | **11** | **4** | **0** | **4** | **224** | **5** | **1** | **9** | **261** | **9** | **549** | 2,145 |
| **9:45 AM** | **0** | **5** | **12** | **1** | **0** | **16** | **15** | **9** | **0** | **6** | **202** | **13** | **0** | **8** | **258** | **11** | **556** | **2,168** |
| Count Total | 0 | 35 | 230 | 129 | 0 | 233 | 314 | 34 | 2 | 99 | 2,270 | 91 | 1 | 74 | 2,716 | 90 | 6,318 | 0 |
| **Peak Hour All** | **0** | **10** | **42** | **12** | **0** | **38** | **76** | **20** | **0** | **25** | **856** | **35** | **1** | **32** | **985** | **36** | **2,168** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **3** | **0** | **0** | **36** | **2** | **0** | **0** | **71** | **2** | **116** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **3%** | **15%** | **-** | **0%** | **4%** | **6%** | **0%** | **0%** | **7%** | **6%** | **5%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 3 | 4 | 9 | *16* | 0 | 1 | 0 | 1 | *2* | 2 | 1 | 5 | 2 | *10* |
| 7:15 AM | 0 | 2 | 3 | 8 | *13* | 1 | 0 | 1 | 2 | *4* | 2 | 4 | 1 | 2 | *9* |
| 7:30 AM | 0 | 0 | 7 | 8 | *15* | 1 | 2 | 0 | 3 | *6* | 4 | 6 | 2 | 5 | *17* |
| 7:45 AM | 0 | 1 | 7 | 10 | *18* | 2 | 0 | 1 | 0 | *3* | 2 | 2 | 2 | 5 | *11* |
| 8:00 AM | 1 | 2 | 1 | 5 | *9* | 1 | 0 | 1 | 1 | *3* | 4 | 5 | 4 | 8 | *21* |
| 8:15 AM | 2 | 1 | 9 | 3 | *15* | 3 | 3 | 1 | 1 | *8* | 5 | 0 | 5 | 9 | *19* |
| 8:30 AM | 0 | 1 | 5 | 13 | *19* | 0 | 0 | 0 | 1 | *1* | 0 | 2 | 1 | 3 | *6* |
| 8:45 AM | 1 | 1 | 0 | 7 | *9* | 0 | 0 | 3 | 3 | *6* | 0 | 4 | 4 | 6 | *14* |
| **9:00 AM** | **0** | **1** | **9** | **13** | ***23*** | **1** | **0** | **2** | **2** | ***5*** | **1** | **1** | **3** | **6** | *11* |
| **9:15 AM** | **0** | **2** | **9** | **30** | ***41*** | **1** | **0** | **0** | **1** | ***2*** | **1** | **1** | **1** | **1** | *4* |
| **9:30 AM** | **0** | **2** | **13** | **19** | ***34*** | **1** | **0** | **0** | **3** | ***4*** | **0** | **7** | **2** | **3** | *12* |
| **9:45 AM** | **0** | **0** | **7** | **11** | ***18*** | **1** | **0** | **0** | **2** | ***3*** | **6** | **5** | **4** | **3** | ***18*** |
| Count Total | 4 | 16 | 74 | 136 | *230* | 12 | 6 | 9 | 20 | *47* | 27 | 38 | 34 | 53 | *152* |
| **Peak Hour** | **0** | **5** | **38** | **73** | ***116*** | **4** | **0** | **2** | **8** | ***14*** | **8** | **14** | **10** | **13** | ***45*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bell St Eastbound UT | LT | TH | RT | Bell St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 9 | 0 | 16 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 8 | 0 | 13 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 1 | 15 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 10 | 0 | 18 | 62 |
| 8:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 9 | 55 |
| 8:15 AM | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 3 | 0 | 15 | 57 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 13 | 0 | 19 | 61 |
| 8:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 9 | 52 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **8** | **1** | **0** | **0** | **13** | **0** | **23** | 66 |
| **9:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **9** | **0** | **0** | **0** | **28** | **2** | **41** | 92 |
| **9:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **12** | **1** | **0** | **0** | **19** | **0** | **34** | 107 |
| **9:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **11** | **0** | **18** | **116** |
| Count Total | 0 | 1 | 3 | 0 | 0 | 3 | 7 | 6 | 0 | 1 | 69 | 4 | 0 | 0 | 132 | 4 | 230 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **3** | **0** | **0** | **36** | **2** | **0** | **0** | **71** | **2** | **116** | **0** |

## Three-Hour Count Summaries - Bikes

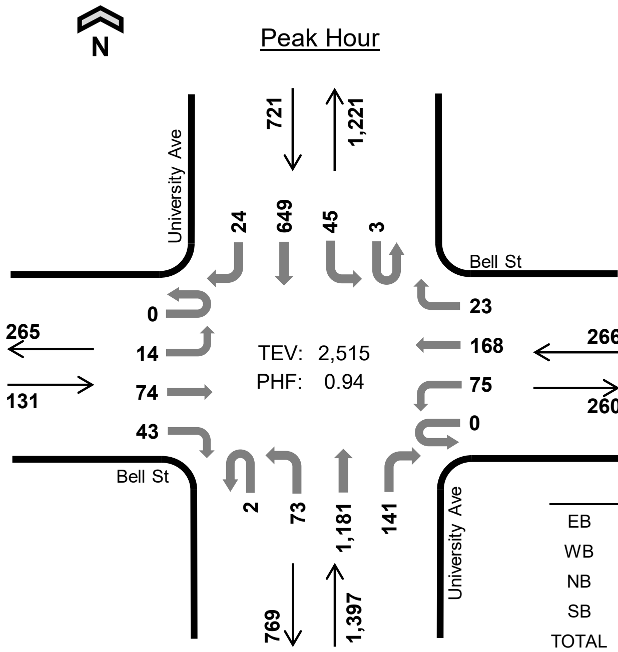
| Interval Start | Bell St Eastbound LT | TH | RT | Bell St Westbound LT | TH | RT | University Ave Northbound LT | TH | RT | University Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 4 | 0 |
| 7:30 AM | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 6 | 0 |
| 7:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 15 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 16 |
| 8:15 AM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 8 | 20 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 15 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 6 | 18 |
| **9:00 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **5** | 20 |
| **9:15 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **2** | 14 |
| **9:30 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **1** | **4** | 17 |
| **9:45 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **3** | **14** |
| Count Total | 0 | 12 | 0 | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 19 | 1 | 47 | 0 |
| **Peak Hour** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **7** | **1** | **14** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

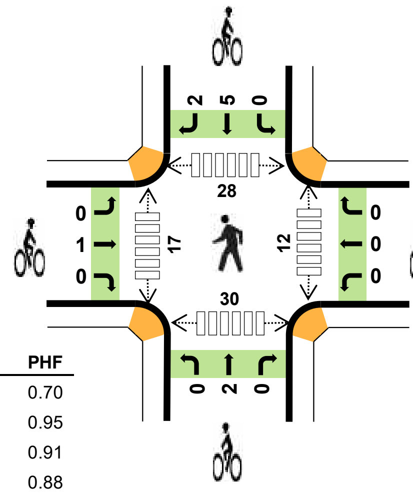
# University Ave
# Bell St

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 3.1% | 0.70 |
| WB | 1.5% | 0.95 |
| NB | 2.2% | 0.91 |
| SB | 1.8% | 0.88 |
| TOTAL | 2.1% | 0.94 |




## Three-Hour Count Summaries

| Interval Start | | Bell St Eastbound UT | LT | TH | RT | Bell St Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | 0 | 3 | 18 | 11 | 0 | 15 | 42 | 8 | 1 | 13 | 302 | 28 | 2 | 18 | 185 | 1 | 647 | 0 |
| 4:15 PM | | 0 | 3 | 12 | 6 | 0 | 27 | 39 | 4 | 1 | 16 | 280 | 34 | 0 | 9 | 158 | 8 | 597 | 0 |
| 4:30 PM | | 0 | 6 | 22 | 19 | 0 | 16 | 44 | 7 | 0 | 23 | 324 | 35 | 1 | 8 | 159 | 8 | 672 | 0 |
| 4:45 PM | | 0 | 2 | 22 | 7 | 0 | 17 | 43 | 4 | 0 | 21 | 275 | 44 | 0 | 10 | 147 | 7 | 599 | 2,515 |
| Peak Hour | All | 0 | 14 | 74 | 43 | 0 | 75 | 168 | 23 | 2 | 73 | 1,181 | 141 | 3 | 45 | 649 | 24 | 2,515 | 0 |
| | HV | 0 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 13 | 0 | 52 | 0 |
| | HV% | - | 0% | 1% | 7% | - | 1% | 2% | 0% | 0% | 0% | 3% | 0% | 0% | 0% | 2% | 0% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 3 | 1 | 8 | 3 | *15* | 1 | 0 | 0 | 2 | *3* | 3 | 6 | 9 | 7 | *25* |
| 4:15 PM | 1 | 0 | 10 | 1 | *12* | 0 | 0 | 2 | 3 | *5* | 1 | 3 | 7 | 12 | *23* |
| 4:30 PM | 0 | 1 | 5 | 7 | *13* | 0 | 0 | 0 | 1 | *1* | 5 | 6 | 8 | 5 | *24* |
| 4:45 PM | 0 | 2 | 8 | 2 | *12* | 0 | 0 | 0 | 1 | *1* | 3 | 2 | 4 | 6 | *15* |
| Peak Hour | 4 | 4 | 31 | 13 | *52* | 1 | 0 | 2 | 7 | *10* | 12 | 17 | 28 | 30 | *87* |

## Three-Hour Count Summaries

| Interval Start | Bell St | | | | Bell St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **3** | **18** | **11** | **0** | **15** | **42** | **8** | **1** | **13** | **302** | **28** | **2** | **18** | **185** | **1** | **647** | 0 |
| **4:15 PM** | **0** | **3** | **12** | **6** | **0** | **27** | **39** | **4** | **1** | **16** | **280** | **34** | **0** | **9** | **158** | **8** | **597** | 0 |
| **4:30 PM** | **0** | **6** | **22** | **19** | **0** | **16** | **44** | **7** | **0** | **23** | **324** | **35** | **1** | **8** | **159** | **8** | **672** | 0 |
| **4:45 PM** | **0** | **2** | **22** | **7** | **0** | **17** | **43** | **4** | **0** | **21** | **275** | **44** | **0** | **10** | **147** | **7** | **599** | **2,515** |
| 5:00 PM | 0 | 0 | 15 | 5 | 0 | 14 | 30 | 8 | 0 | 34 | 245 | 35 | 1 | 8 | 181 | 7 | 583 | 2,451 |
| 5:15 PM | 0 | 4 | 14 | 5 | 0 | 14 | 43 | 7 | 0 | 25 | 177 | 39 | 0 | 7 | 162 | 5 | 502 | 2,356 |
| 5:30 PM | 0 | 1 | 26 | 6 | 0 | 18 | 34 | 7 | 0 | 27 | 135 | 22 | 0 | 11 | 189 | 6 | 482 | 2,166 |
| 5:45 PM | 0 | 1 | 27 | 9 | 0 | 29 | 33 | 4 | 1 | 30 | 200 | 39 | 1 | 8 | 186 | 8 | 576 | 2,143 |
| 6:00 PM | 0 | 4 | 20 | 4 | 0 | 24 | 36 | 5 | 0 | 14 | 211 | 33 | 0 | 14 | 175 | 10 | 550 | 2,110 |
| 6:15 PM | 0 | 2 | 15 | 6 | 0 | 23 | 34 | 6 | 0 | 17 | 240 | 24 | 0 | 10 | 155 | 4 | 536 | 2,144 |
| 6:30 PM | 0 | 5 | 11 | 7 | 0 | 16 | 19 | 4 | 0 | 23 | 242 | 18 | 0 | 14 | 162 | 7 | 528 | 2,190 |
| 6:45 PM | 0 | 3 | 14 | 3 | 0 | 19 | 25 | 10 | 1 | 18 | 212 | 25 | 2 | 2 | 162 | 2 | 498 | 2,112 |
| Count Total | 0 | 34 | 216 | 88 | 0 | 232 | 422 | 74 | 4 | 261 | 2,843 | 376 | 7 | 119 | 2,021 | 73 | 6,770 | 0 |
| **Peak Hour All** | **0** | **14** | **74** | **43** | **0** | **75** | **168** | **23** | **2** | **73** | **1,181** | **141** | **3** | **45** | **649** | **24** | **2,515** | **0** |
| **Peak Hour HV** | **0** | **0** | **1** | **3** | **0** | **1** | **3** | **0** | **0** | **0** | **31** | **0** | **0** | **0** | **13** | **0** | **52** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **1%** | **7%** | **-** | **1%** | **2%** | **0%** | **0%** | **0%** | **3%** | **0%** | **0%** | **0%** | **2%** | **0%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **4:00 PM** | **3** | **1** | **8** | **3** | ***15*** | **1** | **0** | **0** | **2** | ***3*** | **3** | **6** | **9** | **7** | *25* |
| **4:15 PM** | **1** | **0** | **10** | **1** | ***12*** | **0** | **0** | **2** | **3** | ***5*** | **1** | **3** | **7** | **12** | *23* |
| **4:30 PM** | **0** | **1** | **5** | **7** | ***13*** | **0** | **0** | **0** | **1** | ***1*** | **5** | **6** | **8** | **5** | *24* |
| **4:45 PM** | **0** | **2** | **8** | **2** | ***12*** | **0** | **0** | **0** | **1** | ***1*** | **3** | **2** | **4** | **6** | ***15*** |
| 5:00 PM | 1 | 0 | 11 | 3 | *15* | 0 | 0 | 0 | 0 | *0* | 0 | 4 | 6 | 3 | *13* |
| 5:15 PM | 0 | 0 | 4 | 3 | *7* | 0 | 0 | 2 | 2 | *4* | 2 | 1 | 3 | 2 | *8* |
| 5:30 PM | 0 | 2 | 2 | 5 | *9* | 0 | 0 | 2 | 1 | *3* | 0 | 5 | 10 | 2 | *17* |
| 5:45 PM | 0 | 1 | 7 | 2 | *10* | 1 | 0 | 5 | 0 | *6* | 3 | 5 | 4 | 11 | *23* |
| 6:00 PM | 0 | 2 | 8 | 3 | *13* | 0 | 1 | 3 | 3 | *7* | 1 | 5 | 5 | 6 | *17* |
| 6:15 PM | 0 | 2 | 3 | 4 | *9* | 2 | 0 | 0 | 0 | *2* | 0 | 4 | 2 | 5 | *11* |
| 6:30 PM | 0 | 0 | 7 | 2 | *9* | 1 | 1 | 1 | 2 | *5* | 0 | 5 | 3 | 9 | *17* |
| 6:45 PM | 0 | 1 | 5 | 2 | *8* | 2 | 0 | 1 | 0 | *3* | 10 | 9 | 6 | 1 | *26* |
| Count Total | 5 | 12 | 78 | 37 | *132* | 7 | 2 | 16 | 15 | *40* | 28 | 55 | 67 | 69 | *219* |
| **Peak Hour** | **4** | **4** | **31** | **13** | ***52*** | **1** | **0** | **2** | **7** | ***10*** | **12** | **17** | **28** | **30** | ***87*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Bell St | | | | Bell St | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **1** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **3** | **0** | **15** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **1** | **0** | **12** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **5** | **0** | **0** | **0** | **7** | **0** | **13** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **2** | **0** | **12** | **52** |
| 5:00 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 1 | 0 | 0 | 3 | 0 | 15 | 52 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 3 | 0 | 7 | 47 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 5 | 0 | 9 | 43 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 2 | 0 | 10 | 41 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 7 | 0 | 0 | 0 | 3 | 0 | 13 | 39 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 9 | 41 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 9 | 41 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 8 | 39 |
| Count Total | 0 | 0 | 2 | 3 | 0 | 4 | 6 | 2 | 0 | 2 | 71 | 5 | 0 | 0 | 37 | 0 | 132 | 0 |
| **Peak Hour** | **0** | **0** | **1** | **3** | **0** | **1** | **3** | **0** | **0** | **0** | **31** | **0** | **0** | **0** | **13** | **0** | **52** | **0** |

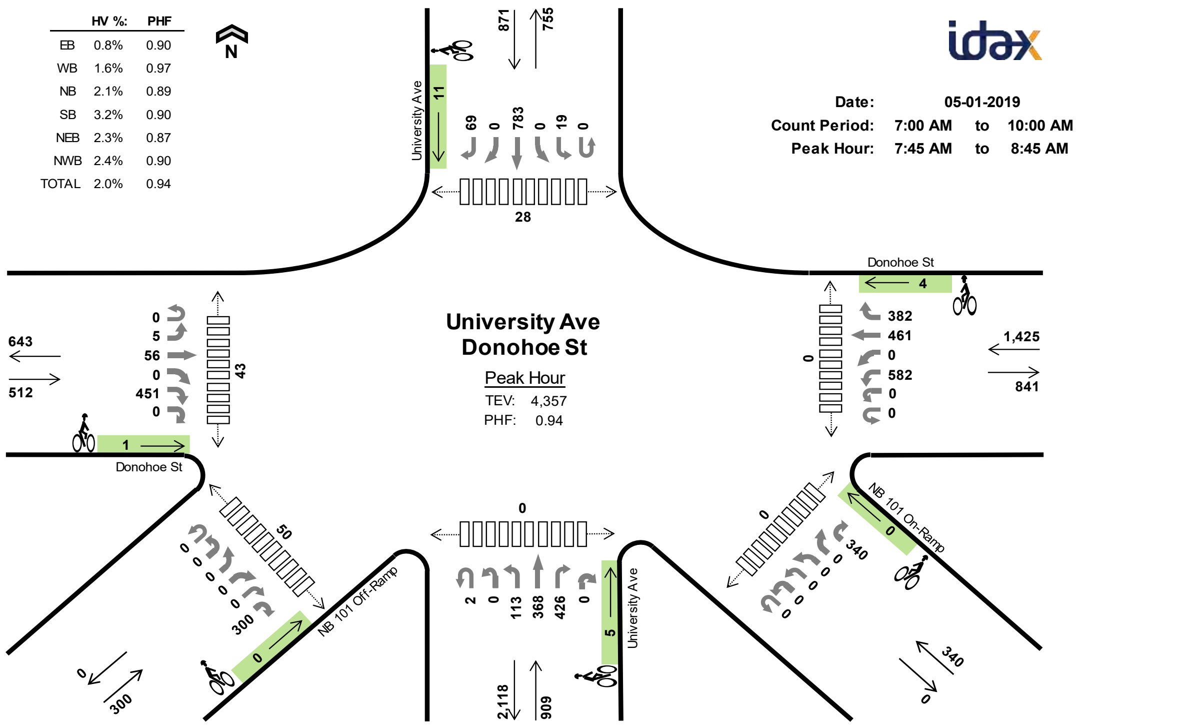
## Three-Hour Count Summaries - Bikes

| Interval Start | Bell St | | | Bell St | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **3** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **3** | **0** | **5** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **10** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 4 | 6 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 3 | 8 |
| 5:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 6 | 13 |
| 6:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 2 | 7 | 20 |
| 6:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 18 |
| 6:30 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 5 | 20 |
| 6:45 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 17 |
| Count Total | 0 | 6 | 1 | 0 | 2 | 0 | 0 | 16 | 0 | 0 | 10 | 5 | 40 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **5** | **2** | **10** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

| HV %: | | PHF |
|---|---|---|
| EB | 0.8% | 0.90 |
| WB | 1.6% | 0.97 |
| NB | 2.1% | 0.89 |
| SB | 3.2% | 0.90 |
| NEB | 2.3% | 0.87 |
| NWB | 2.4% | 0.90 |
| TOTAL | 2.0% | 0.94 |

**Date:** 05-01-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 7:45 AM to 8:45 AM




**Three-Hour Count Summaries**

| Interval Start | Donohoe St | | | | | | Donohoe St | | | | | | University Ave | | | | | | University Ave | | | | | | NB 101 Off-Ramp | | | | | | NB 101 On-Ramp | | | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | | Westbound | | | | | | Northbound | | | | | | Southbound | | | | | | Northeastbound | | | | | | Northwestbound | | | | | | | |
| | UT | LT | TH | BR | RT | HR | UT | HL | LT | BL | TH | RT | UT | HL | LT | TH | RT | HR | UT | LT | BL | TH | BR | RT | UT | HL | BL | BR | RT | HR | UT | HL | LT | BL | BR | HR | | |
| 7:00 AM | 0 | 2 | 30 | 0 | 94 | 0 | 0 | 0 | 84 | 0 | 116 | 71 | 0 | 0 | 17 | 58 | 79 | 0 | 0 | 11 | 0 | 251 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 86 | 974 | 0 |
| 7:15 AM | 0 | 1 | 19 | 0 | 103 | 0 | 0 | 0 | 120 | 0 | 125 | 74 | 0 | 0 | 19 | 71 | 117 | 0 | 0 | 11 | 0 | 155 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 90 | 993 | 0 |
| 7:30 AM | 0 | 0 | 12 | 0 | 135 | 0 | 0 | 0 | 153 | 0 | 121 | 63 | 0 | 0 | 11 | 92 | 115 | 0 | 0 | 6 | 0 | 148 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 93 | 1,039 | 0 |
| **7:45 AM** | **0** | **0** | **12** | **0** | **130** | **0** | **0** | **0** | **151** | **0** | **126** | **81** | **1** | **0** | **27** | **121** | **105** | **0** | **0** | **2** | **0** | **216** | **0** | **15** | **0** | **0** | **0** | **0** | **0** | **86** | **0** | **0** | **0** | **0** | **0** | **90** | **1,163** | 4,169 |
| **8:00 AM** | **0** | **1** | **14** | **0** | **126** | **0** | **0** | **0** | **145** | **0** | **127** | **94** | **0** | **0** | **34** | **83** | **102** | **0** | **0** | **6** | **0** | **178** | **0** | **28** | **0** | **0** | **0** | **0** | **0** | **74** | **0** | **0** | **0** | **0** | **0** | **84** | **1,096** | 4,291 |
| **8:15 AM** | **0** | **2** | **14** | **0** | **87** | **0** | **0** | **0** | **141** | **0** | **108** | **104** | **0** | **0** | **33** | **91** | **123** | **0** | **0** | **3** | **0** | **171** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **78** | **0** | **0** | **0** | **0** | **0** | **94** | **1,058** | 4,356 |
| **8:30 AM** | **0** | **2** | **16** | **0** | **108** | **0** | **0** | **0** | **145** | **0** | **100** | **103** | **1** | **0** | **19** | **73** | **96** | **0** | **0** | **8** | **0** | **218** | **0** | **17** | **0** | **0** | **0** | **0** | **0** | **62** | **0** | **0** | **0** | **0** | **0** | **72** | **1,040** | **4,357** |
| 8:45 AM | 0 | 2 | 14 | 0 | 103 | 0 | 0 | 0 | 145 | 0 | 95 | 144 | 0 | 0 | 20 | 87 | 87 | 0 | 0 | 10 | 0 | 229 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 71 | 1,101 | 4,295 |
| 9:00 AM | 0 | 2 | 19 | 0 | 75 | 0 | 0 | 0 | 96 | 0 | 100 | 137 | 0 | 0 | 18 | 66 | 75 | 0 | 0 | 10 | 0 | 248 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 64 | 976 | 4,175 |
| 9:15 AM | 0 | 1 | 12 | 0 | 82 | 0 | 0 | 0 | 72 | 0 | 96 | 143 | 0 | 0 | 15 | 72 | 88 | 0 | 0 | 11 | 0 | 224 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 0 | 0 | 0 | 0 | 78 | 989 | 4,106 |
| 9:30 AM | 0 | 2 | 20 | 0 | 88 | 0 | 0 | 0 | 63 | 0 | 80 | 148 | 0 | 0 | 24 | 105 | 81 | 0 | 0 | 5 | 0 | 232 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 78 | 0 | 0 | 0 | 0 | 0 | 80 | 1,024 | 4,090 |
| 9:45 AM | 0 | 2 | 20 | 0 | 74 | 0 | 0 | 0 | 90 | 0 | 94 | 121 | 0 | 0 | 11 | 65 | 97 | 0 | 0 | 4 | 0 | 262 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 91 | 1,026 | 4,015 |
| Count Total | 0 | 17 | 202 | 0 | 1,205 | 0 | 0 | 0 | 1,405 | 0 | 1,288 | 1,283 | 2 | 0 | 248 | 984 | 1,165 | 0 | 0 | 87 | 0 | 2,532 | 0 | 183 | 0 | 0 | 0 | 0 | 0 | 885 | 0 | 0 | 0 | 0 | 0 | 993 | 12,479 | 0 |
| **Peak Hour All** | **0** | **5** | **56** | **0** | **451** | **0** | **0** | **0** | **582** | **0** | **461** | **382** | **2** | **0** | **113** | **368** | **426** | **0** | **0** | **19** | **0** | **783** | **0** | **69** | **0** | **0** | **0** | **0** | **0** | **300** | **0** | **0** | **0** | **0** | **0** | **340** | **4,357** | **0** |
| **HV** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **6** | **0** | **4** | **13** | **0** | **0** | **3** | **8** | **8** | **0** | **0** | **1** | **0** | **26** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **8** | **89** | **0** |
| **HV%** | **-** | **0%** | **0%** | **-** | **1%** | **-** | **-** | **-** | **1%** | **-** | **1%** | **3%** | **0%** | **-** | **3%** | **2%** | **2%** | **-** | **-** | **5%** | **-** | **3%** | **-** | **1%** | **-** | **-** | **-** | **-** | **-** | **2%** | **-** | **-** | **-** | **-** | **-** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

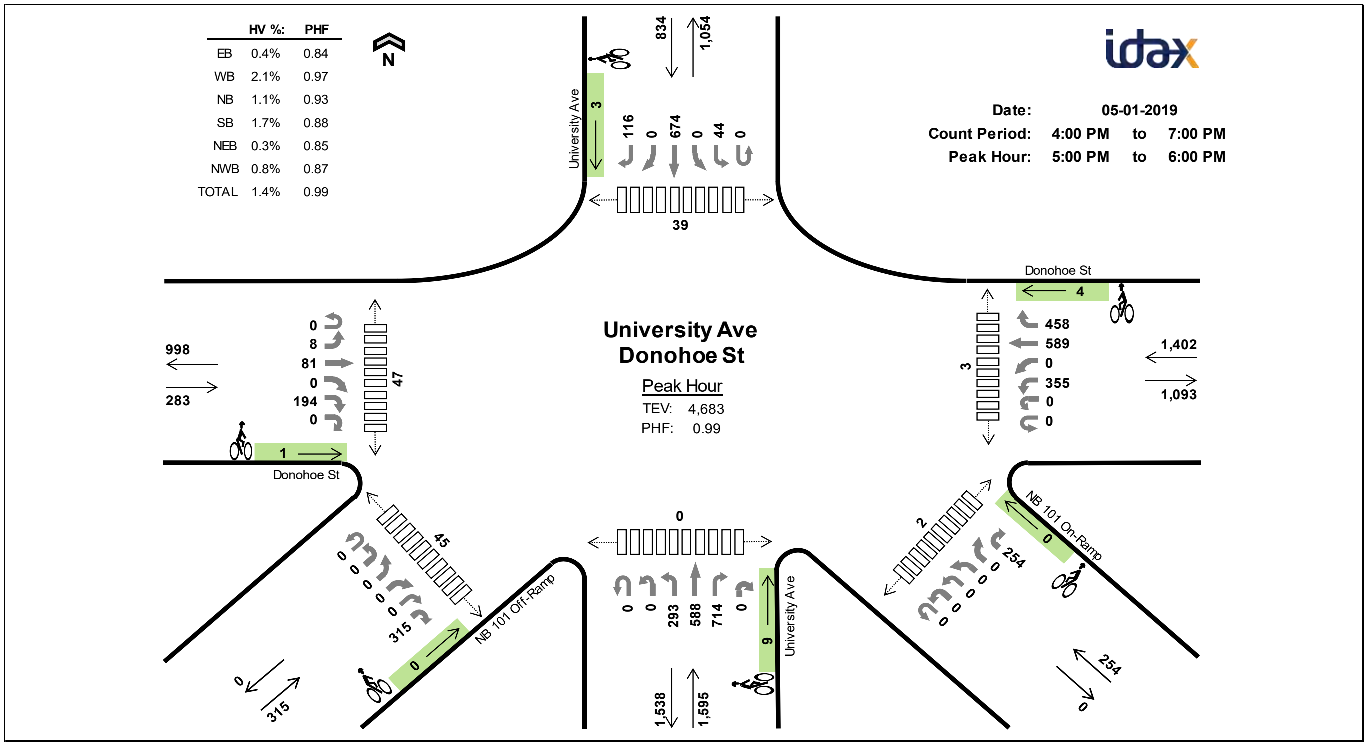
| Interval Start | Heavy Vehicle Totals | | | | | | | Bicycles | | | | | | | Pedestrians (Crossing Leg) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | NEB | NWB | Total | EB | WB | NB | SB | NEB | NWB | Total | East | West | North | South | SE | SW | Total |
| 7:00 AM | 6 | 6 | 7 | 8 | 0 | 2 | *29* | 1 | 0 | 0 | 1 | 0 | 0 | *2* | 0 | 8 | 6 | 0 | 0 | 7 | *21* |
| 7:15 AM | 1 | 5 | 10 | 4 | 2 | 1 | *23* | 0 | 1 | 3 | 1 | 0 | 0 | *5* | 0 | 18 | 11 | 0 | 0 | 17 | *46* |
| 7:30 AM | 2 | 3 | 5 | 8 | 1 | 3 | *22* | 0 | 0 | 0 | 2 | 0 | 0 | *2* | 0 | 14 | 3 | 0 | 0 | 13 | *30* |
| **7:45 AM** | **2** | **3** | **2** | **7** | **1** | **3** | ***18*** | **0** | **2** | **1** | **3** | **0** | **0** | ***6*** | **0** | **15** | **7** | **0** | **0** | **18** | ***40*** |
| **8:00 AM** | **0** | **6** | **7** | **3** | **2** | **2** | ***20*** | **0** | **2** | **0** | **6** | **0** | **0** | ***8*** | **0** | **12** | **8** | **0** | **0** | **14** | ***34*** |
| **8:15 AM** | **0** | **10** | **5** | **7** | **3** | **3** | ***28*** | **0** | **0** | **3** | **1** | **0** | **0** | ***5*** | **0** | **11** | **5** | **0** | **0** | **12** | ***28*** |
| **8:30 AM** | **2** | **4** | **5** | **11** | **1** | **0** | ***23*** | **0** | **0** | **1** | **1** | **0** | **0** | ***2*** | **0** | **5** | **8** | **0** | **0** | **6** | ***19*** |
| 8:45 AM | 2 | 9 | 3 | 10 | 0 | 1 | *25* | 0 | 2 | 0 | 1 | 0 | 0 | *3* | 0 | 8 | 6 | 0 | 0 | 9 | *23* |
| 9:00 AM | 6 | 13 | 6 | 18 | 0 | 0 | *43* | 1 | 0 | 0 | 3 | 0 | 0 | *4* | 0 | 11 | 3 | 0 | 0 | 11 | *25* |
| 9:15 AM | 7 | 8 | 8 | 27 | 1 | 2 | *53* | 1 | 1 | 2 | 4 | 0 | 0 | *8* | 0 | 8 | 7 | 0 | 0 | 8 | *23* |
| 9:30 AM | 5 | 8 | 6 | 13 | 2 | 5 | *39* | 1 | 0 | 1 | 3 | 0 | 0 | *5* | 0 | 6 | 4 | 0 | 0 | 7 | *17* |
| 9:45 AM | 5 | 7 | 4 | 12 | 0 | 1 | *29* | 0 | 0 | 2 | 1 | 0 | 0 | *3* | 0 | 4 | 6 | 0 | 0 | 4 | *14* |
| Count Total | 38 | 82 | 68 | 128 | 13 | 23 | *352* | 5 | 8 | 13 | 27 | 0 | 0 | *53* | 0 | 120 | 74 | 0 | 0 | 126 | *320* |
| **Peak Hr** | **4** | **23** | **19** | **28** | **7** | **8** | ***89*** | **1** | **4** | **5** | **11** | **0** | **0** | ***21*** | **0** | **43** | **28** | **0** | **0** | **50** | ***121*** |

**Three-Hour Count Summaries - Heavy Vehicles**

| Interval Start | Donohoe St | | | | | | Donohoe St | | | | | | University Ave | | | | | | University Ave | | | | | | NB 101 Off-Ramp | | | | | | NB 101 On-Ramp | | | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | | Westbound | | | | | | Northbound | | | | | | Southbound | | | | | | Northeastbound | | | | | | Northwestbound | | | | | | | |
| | UT | LT | TH | BR | RT | HR | UT | HL | LT | BL | TH | RT | UT | HL | LT | TH | RT | HR | UT | LT | BL | TH | BR | RT | UT | HL | BL | BR | RT | HR | UT | HL | LT | BL | BR | HR | | |
| 7:00 AM | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 29 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 3 | 3 | 4 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 23 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 22 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **18** | 92 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **2** | **2** | **0** | **0** | **2** | **4** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **2** | **20** | 83 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **7** | **0** | **0** | **0** | **2** | **3** | **0** | **0** | **1** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** | **28** | 88 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **2** | **1** | **0** | **0** | **1** | **2** | **2** | **0** | **0** | **0** | **0** | **10** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **23** | **89** |
| 8:45 AM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 5 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 7 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 25 | 96 |
| 9:00 AM | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 4 | 7 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 119 |
| 9:15 AM | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 1 | 0 | 25 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 53 | 144 |
| 9:30 AM | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 1 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 39 | 160 |
| 9:45 AM | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 2 | 4 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 29 | 164 |
| Count Total | 0 | 1 | 4 | 0 | 33 | 0 | 0 | 0 | 18 | 0 | 21 | 43 | 0 | 0 | 7 | 33 | 28 | 0 | 0 | 6 | 0 | 116 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 23 | 352 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **6** | **0** | **4** | **13** | **0** | **0** | **3** | **8** | **8** | **0** | **0** | **1** | **0** | **26** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **0** | **0** | **8** | 89 | **0** |

**Three-Hour Count Summaries - Bikes**

| Interval Start | Donohoe St | | | | | | Donohoe St | | | | | | University Ave | | | | | | University Ave | | | | | | NB 101 Off-Ramp | | | | | | NB 101 On-Ramp | | | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | | Westbound | | | | | | Northbound | | | | | | Southbound | | | | | | Northeastbound | | | | | | Northwestbound | | | | | | | |
| | UT | LT | TH | BR | RT | HR | UT | HL | LT | BL | TH | RT | UT | HL | LT | TH | RT | HR | UT | LT | BL | TH | BR | RT | UT | HL | BL | BR | RT | HR | UT | HL | LT | BL | BR | HR | | |
| 7:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | 15 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **5** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | 21 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | 21 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **21** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 18 |
| 9:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 14 |
| 9:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 17 |
| 9:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 20 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 20 |
| Count Total | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 1 | 7 | 5 | 0 | 0 | 1 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **1** | **0** | **0** | **1** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 21 | **0** |




**Three-Hour Count Summaries**

| Interval Start | Donohoe St Eastbound UT | LT | TH | BR | RT | HR | Donohoe St Westbound UT | HL | LT | BL | TH | RT | University Ave Northbound UT | HL | LT | TH | RT | HR | University Ave Southbound UT | LT | BL | TH | BR | RT | NB 101 Off-Ramp Northeastbound UT | HL | BL | BR | RT | HR | NB 101 On-Ramp Northwestbound UT | HL | LT | BL | BR | HR | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 2 | 7 | 0 | 37 | 0 | 0 | 0 | 70 | 0 | 123 | 166 | 0 | 0 | 65 | 193 | 176 | 0 | 0 | 9 | 0 | 131 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 | 0 | 80 | 1,139 | 0 |
| 4:15 PM | 0 | 4 | 13 | 0 | 24 | 0 | 0 | 0 | 70 | 0 | 143 | 124 | 0 | 0 | 69 | 172 | 158 | 0 | 0 | 12 | 0 | 134 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 70 | 1,076 | 0 |
| 4:30 PM | 0 | 4 | 17 | 0 | 38 | 0 | 0 | 0 | 79 | 0 | 131 | 155 | 0 | 0 | 58 | 198 | 166 | 0 | 0 | 8 | 0 | 141 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 76 | 1,155 | 0 |
| 4:45 PM | 0 | 3 | 24 | 0 | 52 | 0 | 0 | 0 | 69 | 0 | 165 | 126 | 0 | 0 | 67 | 183 | 155 | 0 | 0 | 14 | 0 | 142 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 51 | 1,146 | 4,516 |
| **5:00 PM** | **0** | **1** | **22** | **0** | **61** | **0** | **0** | **0** | **91** | **0** | **145** | **124** | **0** | **0** | **68** | **142** | **194** | **0** | **0** | **10** | **0** | **176** | **0** | **15** | **0** | **0** | **0** | **0** | **0** | **66** | **0** | **0** | **0** | **0** | **0** | **57** | **1,172** | 4,549 |
| **5:15 PM** | **0** | **3** | **25** | **0** | **48** | **0** | **0** | **0** | **94** | **0** | **157** | **111** | **0** | **0** | **62** | **140** | **172** | **0** | **0** | **10** | **0** | **164** | **0** | **30** | **0** | **0** | **0** | **0** | **0** | **80** | **0** | **0** | **0** | **0** | **0** | **73** | **1,169** | 4,642 |
| **5:30 PM** | **0** | **1** | **15** | **0** | **41** | **0** | **0** | **0** | **85** | **0** | **155** | **101** | **0** | **0** | **85** | **133** | **168** | **0** | **0** | **18** | **0** | **176** | **0** | **44** | **0** | **0** | **0** | **0** | **0** | **76** | **0** | **0** | **0** | **0** | **0** | **64** | **1,162** | 4,649 |
| **5:45 PM** | **0** | **3** | **19** | **0** | **44** | **0** | **0** | **0** | **85** | **0** | **132** | **122** | **0** | **0** | **78** | **173** | **180** | **0** | **0** | **6** | **0** | **158** | **0** | **27** | **0** | **0** | **0** | **0** | **0** | **93** | **0** | **0** | **0** | **0** | **0** | **60** | **1,180** | **4,683** |
| 6:00 PM | 0 | 3 | 19 | 0 | 30 | 0 | 0 | 0 | 86 | 0 | 123 | 147 | 0 | 0 | 55 | 153 | 151 | 0 | 0 | 13 | 0 | 152 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 54 | 1,100 | 4,611 |
| 6:15 PM | 0 | 3 | 23 | 0 | 31 | 0 | 0 | 0 | 93 | 0 | 125 | 126 | 0 | 0 | 63 | 145 | 164 | 0 | 0 | 17 | 0 | 132 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 56 | 1,095 | 4,537 |
| 6:30 PM | 0 | 3 | 27 | 0 | 38 | 0 | 0 | 0 | 67 | 0 | 122 | 136 | 0 | 0 | 66 | 119 | 131 | 0 | 0 | 15 | 0 | 120 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 98 | 0 | 0 | 0 | 0 | 0 | 68 | 1,043 | 4,418 |
| 6:45 PM | 0 | 4 | 21 | 0 | 31 | 0 | 0 | 0 | 95 | 0 | 123 | 152 | 0 | 0 | 46 | 133 | 142 | 0 | 0 | 9 | 0 | 136 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 98 | 0 | 0 | 0 | 0 | 0 | 68 | 1,090 | 4,328 |
| Count Total | 0 | 34 | 232 | 0 | 475 | 0 | 0 | 0 | 984 | 0 | 1,644 | 1,590 | 0 | 0 | 782 | 1,884 | 1,957 | 0 | 0 | 141 | 0 | 1,762 | 0 | 360 | 0 | 0 | 0 | 0 | 0 | 905 | 0 | 0 | 0 | 0 | 0 | 777 | 13,527 | 0 |
| Peak Hour All | **0** | **8** | **81** | **0** | **194** | **0** | **0** | **0** | **355** | **0** | **589** | **458** | **0** | **0** | **293** | **588** | **714** | **0** | **0** | **44** | **0** | **674** | **0** | **116** | **0** | **0** | **0** | **0** | **0** | **315** | **0** | **0** | **0** | **0** | **0** | **254** | **4,683** | **0** |
| Peak Hour HV | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **9** | **17** | **0** | **0** | **2** | **12** | **4** | **0** | **0** | **0** | **0** | **11** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **65** | **0** |
| Peak Hour HV% | - | 0% | 0% | - | 1% | - | - | - | 1% | - | 2% | 4% | - | - | 1% | 2% | 1% | - | - | 0% | - | 2% | - | 3% | - | - | - | - | - | 0% | - | - | - | - | - | 1% | 1% | 0 |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | NEB | NWB | Total | Bicycles EB | WB | NB | SB | NEB | NWB | Total | Pedestrians (Crossing Leg) East | West | North | South | SE | SW | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 6 | 8 | 3 | 0 | 1 | *18* | 0 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 13 | 8 | 0 | 0 | 8 | *29* |
| 4:15 PM | 0 | 10 | 6 | 4 | 2 | 2 | *24* | 0 | 0 | 3 | 0 | 0 | 0 | *3* | 0 | 17 | 13 | 0 | 0 | 18 | *48* |
| 4:30 PM | 0 | 7 | 4 | 5 | 0 | 1 | *17* | 0 | 0 | 3 | 0 | 0 | 0 | *3* | 0 | 6 | 5 | 0 | 0 | 7 | *18* |
| 4:45 PM | 1 | 7 | 2 | 3 | 0 | 0 | *13* | 0 | 2 | 4 | 0 | 0 | 0 | *6* | 1 | 18 | 18 | 0 | 1 | 17 | *55* |
| **5:00 PM** | **1** | **5** | **8** | **2** | **0** | **0** | ***16*** | **1** | **0** | **1** | **1** | **0** | **0** | ***3*** | **0** | **14** | **9** | **0** | **1** | **11** | ***35*** |
| **5:15 PM** | **0** | **4** | **4** | **3** | **0** | **2** | ***13*** | **0** | **3** | **6** | **0** | **0** | **0** | ***9*** | **1** | **14** | **10** | **0** | **0** | **15** | ***40*** |
| **5:30 PM** | **0** | **11** | **5** | **5** | **0** | **0** | ***21*** | **0** | **0** | **1** | **0** | **0** | **0** | ***1*** | **0** | **15** | **15** | **0** | **1** | **15** | ***46*** |
| **5:45 PM** | **0** | **9** | **1** | **4** | **1** | **0** | ***15*** | **0** | **1** | **1** | **2** | **0** | **0** | ***4*** | **2** | **4** | **5** | **0** | **0** | **4** | ***15*** |
| 6:00 PM | 0 | 3 | 3 | 2 | 0 | 0 | *8* | 0 | 1 | 1 | 1 | 0 | 0 | *3* | 0 | 15 | 7 | 0 | 0 | 15 | *37* |
| 6:15 PM | 2 | 4 | 2 | 3 | 0 | 0 | *11* | 0 | 1 | 3 | 2 | 0 | 0 | *6* | 0 | 14 | 13 | 1 | 0 | 17 | *45* |
| 6:30 PM | 1 | 6 | 5 | 4 | 0 | 1 | *17* | 1 | 0 | 1 | 2 | 0 | 0 | *4* | 0 | 8 | 3 | 0 | 0 | 3 | *14* |
| 6:45 PM | 0 | 5 | 3 | 2 | 0 | 0 | *10* | 0 | 0 | 3 | 0 | 0 | 0 | *3* | 0 | 10 | 6 | 0 | 0 | 7 | *23* |
| Count Total | 5 | 77 | 51 | 40 | 3 | 7 | *183* | 2 | 8 | 27 | 8 | 0 | 0 | *45* | 4 | 148 | 112 | 1 | 3 | 137 | *405* |
| **Peak Hr** | **1** | **29** | **18** | **14** | **1** | **2** | ***65*** | **1** | **4** | **9** | **3** | **0** | **0** | ***17*** | **3** | **47** | **39** | **0** | **2** | **45** | ***136*** |

**Three-Hour Count Summaries - Heavy Vehicles**

| Interval Start | Donohoe St Eastbound UT | LT | TH | BR | RT | HR | Donohoe St Westbound UT | HL | LT | BL | TH | RT | University Ave Northbound UT | HL | LT | TH | RT | HR | University Ave Southbound UT | LT | BL | TH | BR | RT | NB 101 Off-Ramp Northeastbound UT | HL | BL | BR | RT | HR | NB 101 On-Ramp Northwestbound UT | HL | LT | BL | BR | HR | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 18 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 24 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 0 |
| 4:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 72 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **2** | **0** | **0** | **1** | **5** | **2** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **16** | 70 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **13** | 59 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **6** | **0** | **0** | **1** | **2** | **2** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **21** | 63 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **6** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **15** | **65** |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 57 |
| 6:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 55 |
| 6:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 51 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 46 |
| Count Total | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 8 | 0 | 22 | 47 | 0 | 0 | 3 | 30 | 18 | 0 | 0 | 0 | 0 | 35 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 183 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **9** | **17** | **0** | **0** | **2** | **12** | **4** | **0** | **0** | **0** | **0** | **11** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **65** | **0** |

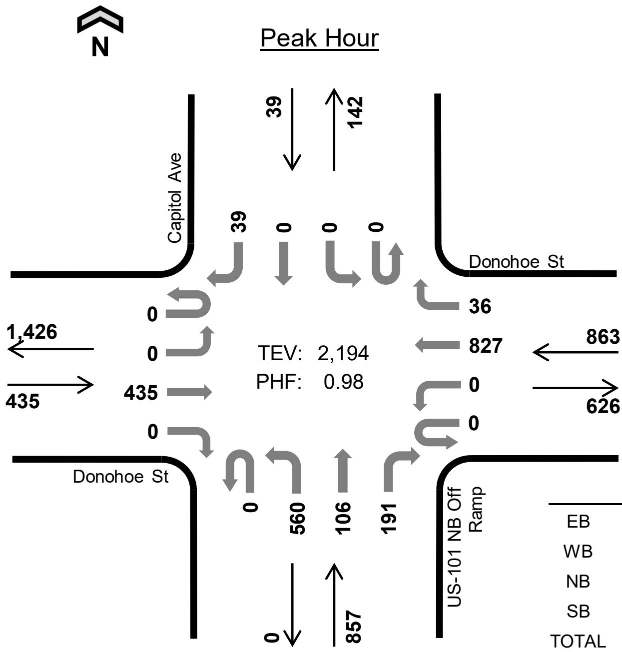
**Three-Hour Count Summaries - Bikes**

| Interval Start | Donohoe St Eastbound UT | LT | TH | BR | RT | HR | Donohoe St Westbound UT | HL | LT | BL | TH | RT | University Ave Northbound UT | HL | LT | TH | RT | HR | University Ave Southbound UT | LT | BL | TH | BR | RT | NB 101 Off-Ramp Northeastbound UT | HL | BL | BR | RT | HR | NB 101 On-Ramp Northwestbound UT | HL | LT | BL | BR | HR | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 12 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | 15 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **2** | **0** | **0** | **0** | **0** | **5** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **9** | 21 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 19 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **17** |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 17 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 14 |
| 6:30 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 17 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 16 |
| Count Total | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 2 | 2 | 0 | 0 | 2 | 16 | 9 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **2** | **0** | **0** | **0** | **0** | **8** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **17** | **0** |

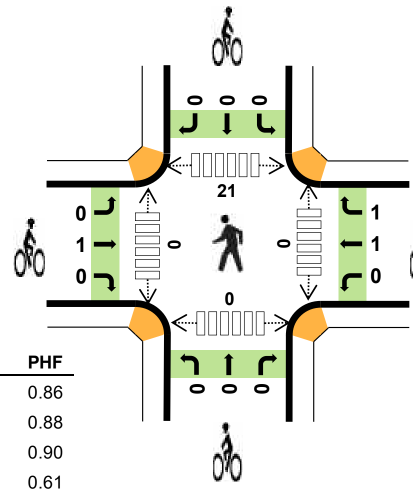
# US-101 NB Ramp
# Donohoe St

Date: 04-25-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 8:30 AM to 9:30 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.3% | 0.86 |
| WB | 1.7% | 0.88 |
| NB | 2.1% | 0.90 |
| SB | 7.7% | 0.61 |
| TOTAL | 2.1% | 0.98 |




## Three-Hour Count Summaries

| Interval Start | | Donohoe St Eastbound UT | LT | TH | RT | Donohoe St Westbound UT | LT | TH | RT | US-101 NB Off Ramp Northbound UT | LT | TH | RT | Capitol Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:30 AM | | 0 | 0 | 100 | 0 | 0 | 0 | 214 | 11 | 0 | 145 | 13 | 51 | 0 | 0 | 0 | 4 | 538 | 0 |
| 8:45 AM | | 0 | 0 | 95 | 0 | 0 | 0 | 238 | 7 | 0 | 125 | 24 | 45 | 0 | 0 | 0 | 8 | 542 | 0 |
| 9:00 AM | | 0 | 0 | 126 | 0 | 0 | 0 | 197 | 9 | 0 | 141 | 23 | 51 | 0 | 0 | 0 | 11 | 558 | 0 |
| 9:15 AM | | 0 | 0 | 114 | 0 | 0 | 0 | 178 | 9 | 0 | 149 | 46 | 44 | 0 | 0 | 0 | 16 | 556 | 2,194 |
| Peak Hour | All | 0 | 0 | 435 | 0 | 0 | 0 | 827 | 36 | 0 | 560 | 106 | 191 | 0 | 0 | 0 | 39 | 2,194 | 0 |
| | HV | 0 | 0 | 10 | 0 | 0 | 0 | 14 | 1 | 0 | 12 | 2 | 4 | 0 | 0 | 0 | 3 | 46 | 0 |
| | HV% | - | - | 2% | - | - | - | 2% | 3% | - | 2% | 2% | 2% | - | - | - | 8% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:30 AM | 2 | 7 | 3 | 0 | *12* | 1 | 1 | 0 | 0 | *2* | 0 | 0 | 7 | 0 | *7* |
| 8:45 AM | 3 | 3 | 2 | 0 | *8* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 9 | 0 | *9* |
| 9:00 AM | 3 | 3 | 8 | 1 | *15* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 3 | 0 | *3* |
| 9:15 AM | 2 | 2 | 5 | 2 | *11* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 2 | 0 | *2* |
| Peak Hour | 10 | 15 | 18 | 3 | *46* | 1 | 2 | 0 | 0 | *3* | 0 | 0 | 21 | 0 | *21* |

## Three-Hour Count Summaries

| Interval Start | Donohoe St | | | | Donohoe St | | | | US-101 NB Off Ramp | | | | Capitol Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 134 | 0 | 0 | 0 | 227 | 0 | 0 | 82 | 3 | 42 | 0 | 0 | 0 | 1 | 490 | 0 |
| 7:15 AM | 0 | 0 | 143 | 0 | 0 | 0 | 225 | 5 | 0 | 91 | 4 | 40 | 0 | 0 | 0 | 1 | 509 | 0 |
| 7:30 AM | 0 | 0 | 113 | 0 | 0 | 0 | 194 | 2 | 0 | 98 | 10 | 43 | 0 | 0 | 0 | 3 | 463 | 0 |
| 7:45 AM | 0 | 0 | 109 | 0 | 0 | 0 | 195 | 6 | 0 | 101 | 11 | 60 | 0 | 0 | 0 | 3 | 485 | 1,947 |
| 8:00 AM | 0 | 0 | 122 | 0 | 0 | 0 | 192 | 6 | 0 | 98 | 10 | 52 | 0 | 0 | 0 | 5 | 485 | 1,942 |
| 8:15 AM | 0 | 0 | 114 | 0 | 0 | 0 | 212 | 3 | 0 | 115 | 19 | 44 | 0 | 1 | 0 | 7 | 515 | 1,948 |
| **8:30 AM** | **0** | **0** | **100** | **0** | **0** | **0** | **214** | **11** | **0** | **145** | **13** | **51** | **0** | **0** | **0** | **4** | **538** | 2,023 |
| **8:45 AM** | **0** | **0** | **95** | **0** | **0** | **0** | **238** | **7** | **0** | **125** | **24** | **45** | **0** | **0** | **0** | **8** | **542** | 2,080 |
| **9:00 AM** | **0** | **0** | **126** | **0** | **0** | **0** | **197** | **9** | **0** | **141** | **23** | **51** | **0** | **0** | **0** | **11** | **558** | 2,153 |
| **9:15 AM** | **0** | **0** | **114** | **0** | **0** | **0** | **178** | **9** | **0** | **149** | **46** | **44** | **0** | **0** | **0** | **16** | **556** | **2,194** |
| 9:30 AM | 0 | 0 | 130 | 0 | 0 | 0 | 151 | 10 | 0 | 133 | 39 | 41 | 0 | 2 | 0 | 7 | 513 | 2,169 |
| 9:45 AM | 0 | 0 | 128 | 0 | 0 | 0 | 176 | 13 | 0 | 124 | 22 | 52 | 0 | 0 | 0 | 14 | 529 | 2,156 |
| Count Total | 0 | 1 | 1,428 | 0 | 0 | 0 | 2,399 | 81 | 0 | 1,402 | 224 | 565 | 0 | 3 | 0 | 80 | 6,183 | 0 |
| **Peak Hour All** | **0** | **0** | **435** | **0** | **0** | **0** | **827** | **36** | **0** | **560** | **106** | **191** | **0** | **0** | **0** | **39** | **2,194** | **0** |
| **Peak Hour HV** | **0** | **0** | **10** | **0** | **0** | **0** | **14** | **1** | **0** | **12** | **2** | **4** | **0** | **0** | **0** | **3** | **46** | **0** |
| **Peak Hour HV%** | **-** | **-** | **2%** | **-** | **-** | **-** | **2%** | **3%** | **-** | **2%** | **2%** | **2%** | **-** | **-** | **-** | **8%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 8 | 4 | 5 | 0 | *17* | 1 | 1 | 0 | 0 | *2* | 1 | 0 | 7 | 0 | *8* |
| 7:15 AM | 4 | 4 | 1 | 0 | *9* | 1 | 1 | 0 | 1 | *3* | 0 | 0 | 5 | 0 | *5* |
| 7:30 AM | 2 | 3 | 7 | 0 | *12* | 0 | 4 | 0 | 0 | *4* | 0 | 0 | 1 | 1 | *2* |
| 7:45 AM | 1 | 2 | 4 | 0 | *7* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 4 | 0 | *4* |
| 8:00 AM | 5 | 2 | 1 | 0 | *8* | 1 | 3 | 0 | 1 | *5* | 0 | 0 | 4 | 0 | *4* |
| 8:15 AM | 3 | 3 | 7 | 1 | *14* | 0 | 1 | 0 | 0 | *1* | 1 | 0 | 8 | 1 | *10* |
| **8:30 AM** | **2** | **7** | **3** | **0** | ***12*** | **1** | **1** | **0** | **0** | ***2*** | **0** | **0** | **7** | **0** | *7* |
| **8:45 AM** | **3** | **3** | **2** | **0** | ***8*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **9** | **0** | *9* |
| **9:00 AM** | **3** | **3** | **8** | **1** | ***15*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **3** | **0** | *3* |
| **9:15 AM** | **2** | **2** | **5** | **2** | ***11*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **2** | **0** | ***2*** |
| 9:30 AM | 4 | 6 | 7 | 0 | *17* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 3 | 0 | *3* |
| 9:45 AM | 2 | 7 | 7 | 1 | *17* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 6 | 0 | *6* |
| Count Total | 39 | 46 | 57 | 5 | *147* | 4 | 13 | 0 | 3 | *20* | 2 | 0 | 59 | 2 | *63* |
| **Peak Hour** | **10** | **15** | **18** | **3** | ***46*** | **1** | **2** | **0** | **0** | ***3*** | **0** | **0** | **21** | **0** | ***21*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Donohoe St Eastbound UT | LT | TH | RT | Donohoe St Westbound UT | LT | TH | RT | US-101 NB Off Ramp Northbound UT | LT | TH | RT | Capitol Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 8 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 17 | 0 |
| 7:15 AM | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 0 |
| 7:30 AM | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 12 | 0 |
| 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 45 |
| 8:00 AM | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 36 |
| 8:15 AM | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 14 | 41 |
| **8:30 AM** | **0** | **0** | **2** | **0** | **0** | **0** | **7** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **0** | **0** | **12** | 41 |
| **8:45 AM** | **0** | **0** | **3** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **8** | 42 |
| **9:00 AM** | **0** | **0** | **3** | **0** | **0** | **0** | **2** | **1** | **0** | **7** | **1** | **0** | **0** | **0** | **0** | **1** | **15** | 49 |
| **9:15 AM** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **0** | **3** | **1** | **1** | **0** | **0** | **0** | **2** | **11** | **46** |
| 9:30 AM | 0 | 0 | 4 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 17 | 51 |
| 9:45 AM | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 1 | 0 | 5 | 0 | 2 | 0 | 0 | 0 | 1 | 17 | 60 |
| Count Total | 0 | 0 | 39 | 0 | 0 | 0 | 44 | 2 | 0 | 44 | 3 | 10 | 0 | 0 | 0 | 5 | 147 | 0 |
| **Peak Hour** | **0** | **0** | **10** | **0** | **0** | **0** | **14** | **1** | **0** | **12** | **2** | **4** | **0** | **0** | **0** | **3** | **46** | **0** |

## Three-Hour Count Summaries - Bikes

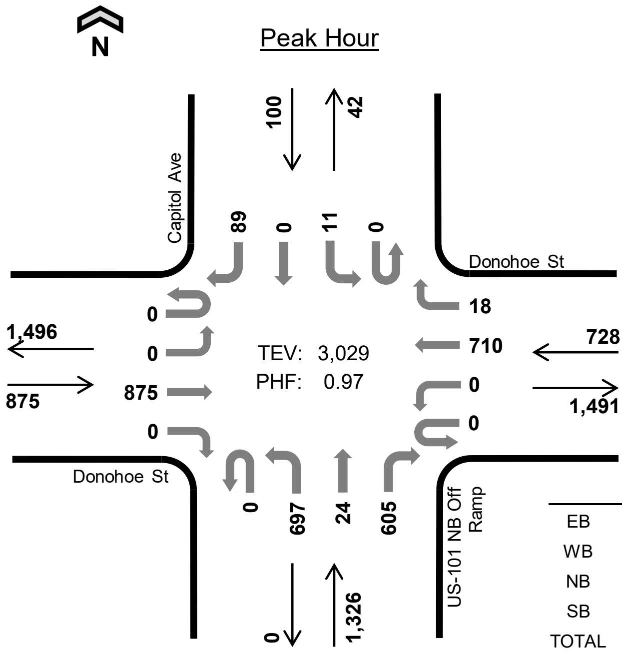
| Interval Start | Donohoe St Eastbound LT | TH | RT | Donohoe St Westbound LT | TH | RT | US-101 NB Off Ramp Northbound LT | TH | RT | Capitol Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 10 |
| 8:00 AM | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 13 |
| 8:15 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| **8:30 AM** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 9 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 8 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 4 |
| **9:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** |
| 9:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Count Total | 0 | 4 | 0 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 20 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

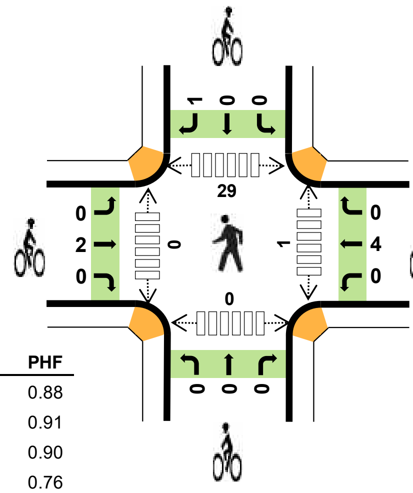
# US-101 NB Ramp
# Donohoe St

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:30 PM to 5:30 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.7% | 0.88 |
| WB | 1.0% | 0.91 |
| NB | 1.1% | 0.90 |
| SB | 0.0% | 0.76 |
| TOTAL | 0.9% | 0.97 |




## Three-Hour Count Summaries

| Interval Start | | Donohoe St | | | | Donohoe St | | | | US-101 NB Off Ramp | | | | Capitol Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:30 PM | | 0 | 0 | 188 | 0 | 0 | 0 | 196 | 3 | 0 | 189 | 9 | 150 | 0 | 2 | 0 | 17 | 754 | 0 |
| 4:45 PM | | 0 | 0 | 250 | 0 | 0 | 0 | 167 | 3 | 0 | 178 | 4 | 156 | 0 | 1 | 0 | 22 | 781 | 0 |
| 5:00 PM | | 0 | 0 | 204 | 0 | 0 | 0 | 161 | 7 | 0 | 177 | 6 | 185 | 0 | 4 | 0 | 21 | 765 | 0 |
| 5:15 PM | | 0 | 0 | 233 | 0 | 0 | 0 | 186 | 5 | 0 | 153 | 5 | 114 | 0 | 4 | 0 | 29 | 729 | 3,029 |
| Peak Hour | All | 0 | 0 | 875 | 0 | 0 | 0 | 710 | 18 | 0 | 697 | 24 | 605 | 0 | 11 | 0 | 89 | 3,029 | 0 |
| | HV | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 0 | 0 | 11 | 0 | 4 | 0 | 0 | 0 | 0 | 28 | 0 |
| | HV% | - | - | 1% | - | - | - | 1% | 0% | - | 2% | 0% | 1% | - | 0% | - | 0% | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:30 PM | 1 | 2 | 4 | 0 | *7* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 6 | 0 | *6* |
| 4:45 PM | 1 | 2 | 4 | 0 | *7* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 2 | 0 | *2* |
| 5:00 PM | 2 | 2 | 7 | 0 | *11* | 0 | 0 | 0 | 1 | *1* | 1 | 0 | 9 | 0 | *10* |
| 5:15 PM | 2 | 1 | 0 | 0 | *3* | 2 | 1 | 0 | 0 | *3* | 0 | 0 | 12 | 0 | *12* |
| Peak Hour | 6 | 7 | 15 | 0 | *28* | 2 | 4 | 0 | 1 | *7* | 1 | 0 | 29 | 0 | *30* |

## Three-Hour Count Summaries

| Interval Start | Donohoe St | | | | Donohoe St | | | | US-101 NB Off Ramp | | | | Capitol Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 205 | 0 | 0 | 0 | 180 | 5 | 0 | 169 | 2 | 128 | 0 | 0 | 0 | 16 | 705 | 0 |
| 4:15 PM | 0 | 0 | 210 | 0 | 0 | 0 | 184 | 3 | 0 | 155 | 4 | 121 | 0 | 1 | 0 | 17 | 695 | 0 |
| **4:30 PM** | **0** | **0** | **188** | **0** | **0** | **0** | **196** | **3** | **0** | **189** | **9** | **150** | **0** | **2** | **0** | **17** | **754** | 0 |
| **4:45 PM** | **0** | **0** | **250** | **0** | **0** | **0** | **167** | **3** | **0** | **178** | **4** | **156** | **0** | **1** | **0** | **22** | **781** | 2,935 |
| **5:00 PM** | **0** | **0** | **204** | **0** | **0** | **0** | **161** | **7** | **0** | **177** | **6** | **185** | **0** | **4** | **0** | **21** | **765** | 2,995 |
| **5:15 PM** | **0** | **0** | **233** | **0** | **0** | **0** | **186** | **5** | **0** | **153** | **5** | **114** | **0** | **4** | **0** | **29** | **729** | **3,029** |
| 5:30 PM | 0 | 0 | 179 | 0 | 0 | 0 | 144 | 8 | 0 | 158 | 4 | 173 | 0 | 2 | 0 | 26 | 694 | 2,969 |
| 5:45 PM | 0 | 0 | 214 | 0 | 0 | 0 | 148 | 3 | 0 | 147 | 9 | 148 | 0 | 0 | 0 | 20 | 689 | 2,877 |
| 6:00 PM | 0 | 0 | 189 | 0 | 0 | 0 | 154 | 4 | 0 | 168 | 1 | 175 | 0 | 1 | 0 | 26 | 718 | 2,830 |
| 6:15 PM | 0 | 0 | 203 | 0 | 0 | 0 | 171 | 4 | 0 | 173 | 1 | 137 | 0 | 1 | 0 | 24 | 714 | 2,815 |
| 6:30 PM | 0 | 0 | 158 | 0 | 0 | 0 | 146 | 5 | 0 | 155 | 3 | 125 | 0 | 0 | 0 | 27 | 619 | 2,740 |
| 6:45 PM | 0 | 0 | 188 | 0 | 0 | 0 | 133 | 1 | 0 | 147 | 1 | 102 | 0 | 1 | 0 | 25 | 598 | 2,649 |
| Count Total | 0 | 0 | 2,421 | 0 | 0 | 0 | 1,970 | 51 | 0 | 1,969 | 49 | 1,714 | 0 | 17 | 0 | 270 | 8,461 | 0 |
| **Peak Hour All** | **0** | **0** | **875** | **0** | **0** | **0** | **710** | **18** | **0** | **697** | **24** | **605** | **0** | **11** | **0** | **89** | **3,029** | **0** |
| **Peak Hour HV** | **0** | **0** | **6** | **0** | **0** | **0** | **7** | **0** | **0** | **11** | **0** | **4** | **0** | **0** | **0** | **0** | **28** | **0** |
| **Peak Hour HV%** | **-** | **-** | **1%** | **-** | **-** | **-** | **1%** | **0%** | **-** | **2%** | **0%** | **1%** | **-** | **0%** | **-** | **0%** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 6 | 2 | 3 | 0 | *11* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 12 | 2 | *14* |
| 4:15 PM | 5 | 4 | 6 | 1 | *16* | 1 | 1 | 0 | 0 | *2* | 2 | 0 | 10 | 1 | *13* |
| **4:30 PM** | **1** | **2** | **4** | **0** | ***7*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **6** | **0** | *6* |
| **4:45 PM** | **1** | **2** | **4** | **0** | ***7*** | **0** | **2** | **0** | **0** | ***2*** | **0** | **0** | **2** | **0** | *2* |
| **5:00 PM** | **2** | **2** | **7** | **0** | ***11*** | **0** | **0** | **0** | **1** | ***1*** | **1** | **0** | **9** | **0** | *10* |
| **5:15 PM** | **2** | **1** | **0** | **0** | ***3*** | **2** | **1** | **0** | **0** | ***3*** | **0** | **0** | **12** | **0** | ***12*** |
| 5:30 PM | 2 | 5 | 3 | 4 | *14* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 6 | 0 | *6* |
| 5:45 PM | 2 | 0 | 7 | 0 | *9* | 0 | 0 | 0 | 0 | *0* | 3 | 0 | 4 | 1 | *8* |
| 6:00 PM | 0 | 0 | 10 | 0 | *10* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 11 | 0 | *11* |
| 6:15 PM | 2 | 0 | 7 | 0 | *9* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 4 | 0 | *4* |
| 6:30 PM | 0 | 1 | 7 | 0 | *8* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 1 | 0 | *1* |
| 6:45 PM | 2 | 1 | 5 | 0 | *8* | 1 | 0 | 0 | 0 | *1* | 0 | 0 | 7 | 0 | *7* |
| Count Total | 25 | 20 | 63 | 5 | *113* | 9 | 7 | 0 | 1 | *17* | 6 | 0 | 84 | 4 | *94* |
| **Peak Hour** | **6** | **7** | **15** | **0** | ***28*** | **2** | **4** | **0** | **1** | ***7*** | **1** | **0** | **29** | **0** | ***30*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Donohoe St Eastbound UT | LT | TH | RT | Donohoe St Westbound UT | LT | TH | RT | US-101 NB Off Ramp Northbound UT | LT | TH | RT | Capitol Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | 0 |
| 4:15 PM | 0 | 0 | 5 | 0 | 0 | 0 | 4 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 0 |
| **4:30 PM** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **2** | **0** | **0** | **0** | **0** | **7** | 0 |
| **4:45 PM** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **3** | **0** | **1** | **0** | **0** | **0** | **0** | **7** | 41 |
| **5:00 PM** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **0** | **6** | **0** | **1** | **0** | **0** | **0** | **0** | **11** | 41 |
| **5:15 PM** | **0** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **28** |
| 5:30 PM | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 14 | 35 |
| 5:45 PM | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 37 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 10 | 36 |
| 6:15 PM | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 9 | 42 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 8 | 36 |
| 6:45 PM | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 8 | 35 |
| Count Total | 0 | 0 | 25 | 0 | 0 | 0 | 15 | 5 | 0 | 41 | 0 | 22 | 0 | 0 | 0 | 5 | 113 | 0 |
| **Peak Hour** | **0** | **0** | **6** | **0** | **0** | **0** | **7** | **0** | **0** | **11** | **0** | **4** | **0** | **0** | **0** | **0** | **28** | **0** |

## Three-Hour Count Summaries - Bikes

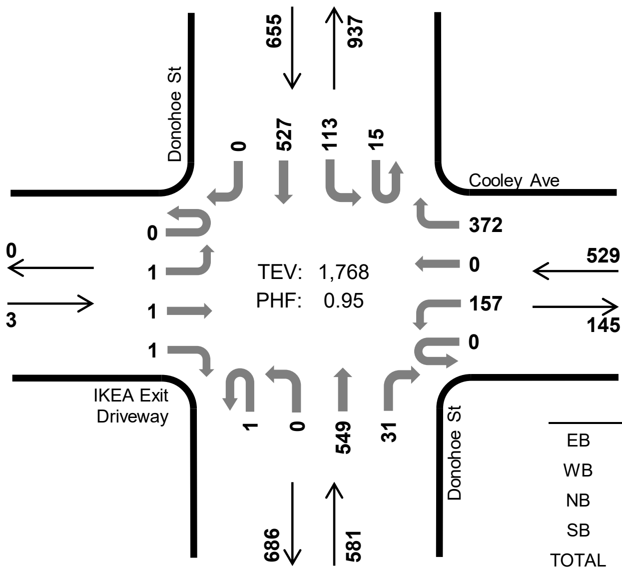
| Interval Start | Donohoe St Eastbound LT | TH | RT | Donohoe St Westbound LT | TH | RT | US-101 NB Off Ramp Northbound LT | TH | RT | Capitol Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 5 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | 6 |
| **5:15 PM** | **0** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **7** |
| 5:30 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 6:00 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 |
| 6:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 |
| 6:30 PM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| 6:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 |
| Count Total | 0 | 9 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 0 |
| **Peak Hour** | **0** | **2** | **0** | **0** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **7** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

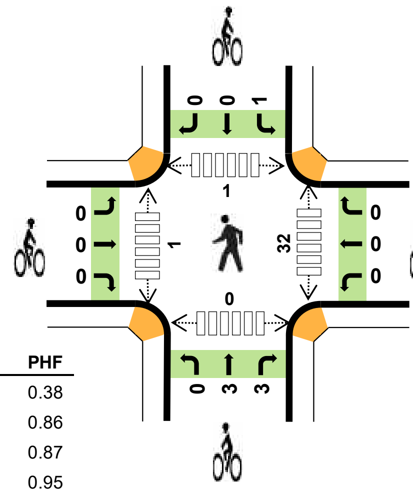
# Donohoe St
# Cooley Ave

Date: 06-05-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 7:45 AM to 8:45 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.38 |
| WB | 0.9% | 0.86 |
| NB | 2.2% | 0.87 |
| SB | 1.8% | 0.95 |
| TOTAL | 1.7% | 0.95 |




## Three-Hour Count Summaries

| Interval Start | | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:45 AM | | 0 | 1 | 1 | 0 | 0 | 27 | 0 | 103 | 0 | 0 | 146 | 6 | 4 | 36 | 131 | 0 | 455 | 0 |
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 95 | 0 | 0 | 138 | 11 | 2 | 27 | 130 | 0 | 427 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 85 | 1 | 0 | 155 | 11 | 5 | 31 | 136 | 0 | 466 | 0 |
| 8:30 AM | | 0 | 0 | 0 | 1 | 0 | 64 | 0 | 89 | 0 | 0 | 110 | 3 | 4 | 19 | 130 | 0 | 420 | 1,768 |
| Peak Hour | All | 0 | 1 | 1 | 1 | 0 | 157 | 0 | 372 | 1 | 0 | 549 | 31 | 15 | 113 | 527 | 0 | 1,768 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 13 | 0 | 0 | 0 | 12 | 0 | 30 | 0 |
| | HV% | - | 0% | 0% | 0% | - | 1% | - | 1% | 0% | - | 2% | 0% | 0% | 0% | 2% | - | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:45 AM | 0 | 1 | 2 | 5 | *8* | 0 | 0 | 2 | 0 | *2* | 11 | 0 | 0 | 0 | *11* |
| 8:00 AM | 0 | 2 | 8 | 1 | *11* | 0 | 0 | 0 | 1 | *1* | 9 | 0 | 0 | 0 | *9* |
| 8:15 AM | 0 | 2 | 2 | 4 | *8* | 0 | 0 | 2 | 0 | *2* | 5 | 0 | 0 | 0 | *5* |
| 8:30 AM | 0 | 0 | 1 | 2 | *3* | 0 | 0 | 2 | 0 | *2* | 7 | 1 | 1 | 0 | *9* |
| Peak Hour | 0 | 5 | 13 | 12 | *30* | 0 | 0 | 6 | 1 | *7* | 32 | 1 | 1 | 0 | *34* |

## Three-Hour Count Summaries

| Interval Start | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 51 | 0 | 0 | 121 | 8 | 4 | 16 | 108 | 0 | 328 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 31 | 0 | 72 | 0 | 0 | 133 | 9 | 5 | 15 | 140 | 0 | 406 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 75 | 0 | 0 | 151 | 6 | 2 | 17 | 125 | 0 | 405 | 0 |
| **7:45 AM** | **0** | **1** | **1** | **0** | **0** | **27** | **0** | **103** | **0** | **0** | **146** | **6** | **4** | **36** | **131** | **0** | **455** | 1,594 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **24** | **0** | **95** | **0** | **0** | **138** | **11** | **2** | **27** | **130** | **0** | **427** | 1,693 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **42** | **0** | **85** | **1** | **0** | **155** | **11** | **5** | **31** | **136** | **0** | **466** | 1,753 |
| **8:30 AM** | **0** | **0** | **0** | **1** | **0** | **64** | **0** | **89** | **0** | **0** | **110** | **3** | **4** | **19** | **130** | **0** | **420** | **1,768** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 61 | 0 | 0 | 146 | 17 | 5 | 24 | 125 | 0 | 429 | 1,742 |
| 9:00 AM | 0 | 0 | 0 | 1 | 0 | 34 | 0 | 52 | 0 | 0 | 126 | 8 | 11 | 22 | 156 | 0 | 410 | 1,725 |
| 9:15 AM | 0 | 3 | 0 | 4 | 0 | 36 | 0 | 36 | 0 | 0 | 135 | 17 | 11 | 20 | 157 | 0 | 419 | 1,678 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 28 | 0 | 0 | 129 | 17 | 6 | 17 | 133 | 0 | 368 | 1,626 |
| 9:45 AM | 0 | 0 | 0 | 1 | 0 | 45 | 0 | 29 | 0 | 0 | 125 | 10 | 8 | 22 | 155 | 0 | 395 | 1,592 |
| Count Total | 0 | 5 | 1 | 7 | 0 | 441 | 0 | 776 | 1 | 0 | 1,615 | 123 | 67 | 266 | 1,626 | 0 | 4,928 | 0 |
| **Peak Hour All** | **0** | **1** | **1** | **1** | **0** | **157** | **0** | **372** | **1** | **0** | **549** | **31** | **15** | **113** | **527** | **0** | **1,768** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **0** | **0** | **13** | **0** | **0** | **0** | **12** | **0** | **30** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **0%** | **0%** | **-** | **1%** | **-** | **1%** | **0%** | **-** | **2%** | **0%** | **0%** | **0%** | **2%** | **-** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 0 | 4 | 8 | *12* | 0 | 0 | 0 | 0 | *0* | 9 | 0 | 0 | 0 | *9* |
| 7:15 AM | 0 | 1 | 0 | 3 | *4* | 0 | 0 | 3 | 0 | *3* | 7 | 0 | 0 | 0 | *7* |
| 7:30 AM | 0 | 1 | 1 | 7 | *9* | 0 | 0 | 1 | 0 | *1* | 8 | 0 | 0 | 0 | *8* |
| **7:45 AM** | **0** | **1** | **2** | **5** | ***8*** | **0** | **0** | **2** | **0** | ***2*** | **11** | **0** | **0** | **0** | *11* |
| **8:00 AM** | **0** | **2** | **8** | **1** | ***11*** | **0** | **0** | **0** | **1** | ***1*** | **9** | **0** | **0** | **0** | *9* |
| **8:15 AM** | **0** | **2** | **2** | **4** | ***8*** | **0** | **0** | **2** | **0** | ***2*** | **5** | **0** | **0** | **0** | *5* |
| **8:30 AM** | **0** | **0** | **1** | **2** | ***3*** | **0** | **0** | **2** | **0** | ***2*** | **7** | **1** | **1** | **0** | ***9*** |
| 8:45 AM | 0 | 2 | 6 | 7 | *15* | 0 | 1 | 2 | 0 | *3* | 4 | 0 | 0 | 0 | *4* |
| 9:00 AM | 0 | 1 | 2 | 6 | *9* | 0 | 0 | 3 | 0 | *3* | 7 | 0 | 2 | 0 | *9* |
| 9:15 AM | 0 | 0 | 4 | 1 | *5* | 0 | 0 | 3 | 2 | *5* | 6 | 1 | 0 | 0 | *7* |
| 9:30 AM | 0 | 2 | 6 | 3 | *11* | 0 | 1 | 1 | 0 | *2* | 7 | 2 | 0 | 0 | *9* |
| 9:45 AM | 0 | 2 | 7 | 2 | *11* | 0 | 1 | 1 | 0 | *2* | 2 | 0 | 0 | 0 | *2* |
| Count Total | 0 | 14 | 43 | 49 | *106* | 0 | 3 | 20 | 3 | *26* | 82 | 4 | 3 | 0 | *89* |
| **Peak Hour** | **0** | **5** | **13** | **12** | ***30*** | **0** | **0** | **6** | **1** | ***7*** | **32** | **1** | **1** | **0** | ***34*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 7 | 0 | 12 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 5 | 0 | 9 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **5** | **0** | **8** | 33 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **8** | **0** | **0** | **0** | **1** | **0** | **11** | 32 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **0** | **0** | **4** | **0** | **8** | 36 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **3** | **30** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 0 | 15 | 37 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 4 | 0 | 9 | 35 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 5 | 32 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 3 | 0 | 11 | 40 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 5 | 2 | 0 | 0 | 2 | 0 | 11 | 36 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 40 | 3 | 2 | 3 | 44 | 0 | 106 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **0** | **0** | **13** | **0** | **0** | **0** | **12** | **0** | **30** | **0** |

## Three-Hour Count Summaries - Bikes

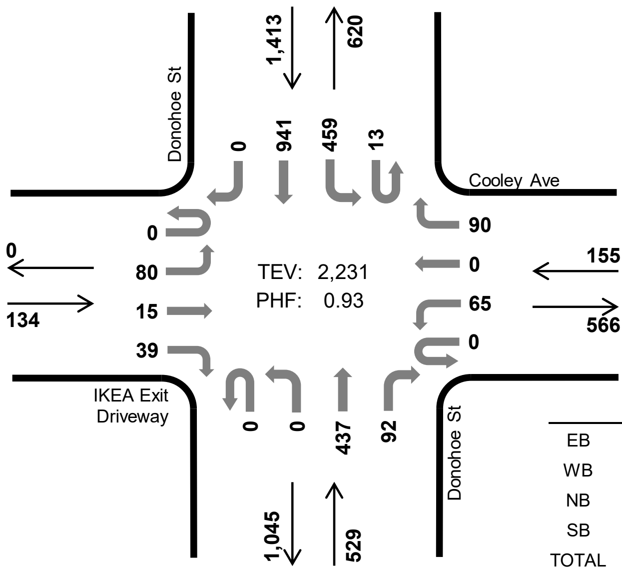
| Interval Start | IKEA Exit Driveway | | | Cooley Ave | | | Donohoe St | | | Donohoe St | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **2** | 6 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | 7 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | 6 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **2** | **7** |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 8 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 10 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 0 | 5 | 13 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 13 |
| 9:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 12 |
| Count Total | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 9 | 11 | 1 | 2 | 0 | 26 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **3** | **1** | **0** | **0** | **7** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

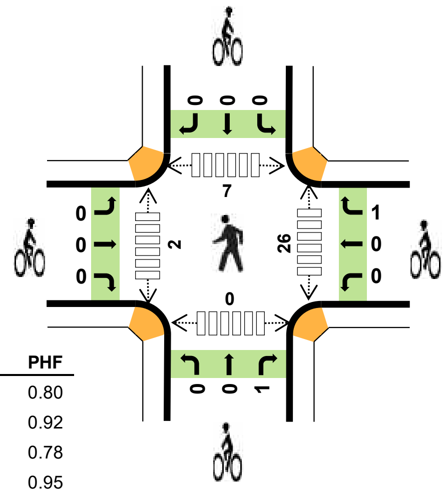
# Donohoe St
# Cooley Ave

**Date:** 06-05-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.80 |
| WB | 0.6% | 0.92 |
| NB | 0.9% | 0.78 |
| SB | 1.1% | 0.95 |
| TOTAL | 1.0% | 0.93 |




**Three-Hour Count Summaries**

| Interval Start | | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 24 | 5 | 13 | 0 | 17 | 0 | 25 | 0 | 0 | 97 | 20 | 7 | 95 | 243 | 0 | 546 | 0 |
| 4:15 PM | | 0 | 19 | 3 | 5 | 0 | 14 | 0 | 17 | 0 | 0 | 144 | 26 | 2 | 125 | 243 | 0 | 598 | 0 |
| 4:30 PM | | 0 | 19 | 4 | 12 | 0 | 17 | 0 | 24 | 0 | 0 | 93 | 22 | 3 | 118 | 216 | 0 | 528 | 0 |
| 4:45 PM | | 0 | 18 | 3 | 9 | 0 | 17 | 0 | 24 | 0 | 0 | 103 | 24 | 1 | 121 | 239 | 0 | 559 | 2,231 |
| Peak Hour | All | 0 | 80 | 15 | 39 | 0 | 65 | 0 | 90 | 0 | 0 | 437 | 92 | 13 | 459 | 941 | 0 | 2,231 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 6 | 10 | 0 | 22 | 0 |
| | HV% | - | 0% | 0% | 0% | - | 0% | - | 1% | - | - | 1% | 0% | 0% | 1% | 1% | - | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 1 | 0 | *1* | 8 | 1 | 4 | 0 | *13* |
| 4:15 PM | 0 | 0 | 0 | 9 | *9* | 0 | 0 | 0 | 0 | *0* | 4 | 0 | 0 | 0 | *4* |
| 4:30 PM | 0 | 1 | 0 | 2 | *3* | 0 | 1 | 0 | 0 | *1* | 9 | 0 | 1 | 0 | *10* |
| 4:45 PM | 0 | 0 | 3 | 3 | *6* | 0 | 0 | 0 | 0 | *0* | 5 | 1 | 2 | 0 | *8* |
| Peak Hour | 0 | 1 | 5 | 16 | 22 | 0 | 1 | 1 | 0 | 2 | 26 | 2 | 7 | 0 | *35* |

## Three-Hour Count Summaries

| Interval Start | | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | | **0** | **24** | **5** | **13** | **0** | **17** | **0** | **25** | **0** | **0** | **97** | **20** | **7** | **95** | **243** | **0** | **546** | 0 |
| **4:15 PM** | | **0** | **19** | **3** | **5** | **0** | **14** | **0** | **17** | **0** | **0** | **144** | **26** | **2** | **125** | **243** | **0** | **598** | 0 |
| **4:30 PM** | | **0** | **19** | **4** | **12** | **0** | **17** | **0** | **24** | **0** | **0** | **93** | **22** | **3** | **118** | **216** | **0** | **528** | 0 |
| **4:45 PM** | | **0** | **18** | **3** | **9** | **0** | **17** | **0** | **24** | **0** | **0** | **103** | **24** | **1** | **121** | **239** | **0** | **559** | **2,231** |
| 5:00 PM | | 0 | 9 | 0 | 4 | 0 | 18 | 0 | 25 | 0 | 0 | 110 | 33 | 1 | 131 | 197 | 0 | 528 | 2,213 |
| 5:15 PM | | 0 | 13 | 4 | 8 | 0 | 13 | 0 | 22 | 0 | 0 | 97 | 30 | 2 | 119 | 222 | 0 | 530 | 2,145 |
| 5:30 PM | | 0 | 15 | 3 | 4 | 0 | 19 | 0 | 26 | 0 | 0 | 101 | 21 | 3 | 128 | 225 | 0 | 545 | 2,162 |
| 5:45 PM | | 0 | 9 | 4 | 7 | 0 | 22 | 0 | 20 | 0 | 0 | 96 | 24 | 1 | 126 | 241 | 0 | 550 | 2,153 |
| 6:00 PM | | 0 | 22 | 3 | 6 | 0 | 16 | 0 | 28 | 0 | 0 | 90 | 32 | 5 | 114 | 245 | 0 | 561 | 2,186 |
| 6:15 PM | | 0 | 15 | 3 | 8 | 0 | 16 | 0 | 24 | 0 | 0 | 106 | 31 | 3 | 114 | 244 | 0 | 564 | 2,220 |
| 6:30 PM | | 0 | 14 | 2 | 5 | 0 | 19 | 0 | 26 | 0 | 0 | 86 | 36 | 4 | 93 | 228 | 0 | 513 | 2,188 |
| 6:45 PM | | 0 | 11 | 3 | 6 | 0 | 22 | 0 | 25 | 0 | 0 | 87 | 31 | 1 | 93 | 239 | 0 | 518 | 2,156 |
| Count Total | | 0 | 188 | 37 | 87 | 0 | 210 | 0 | 286 | 0 | 0 | 1,210 | 330 | 33 | 1,377 | 2,782 | 0 | 6,540 | 0 |
| **Peak Hour** | **All** | **0** | **80** | **15** | **39** | **0** | **65** | **0** | **90** | **0** | **0** | **437** | **92** | **13** | **459** | **941** | **0** | **2,231** | **0** |
| | **HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **5** | **0** | **0** | **6** | **10** | **0** | **22** | **0** |
| | **HV%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **-** | **1%** | **-** | **-** | **1%** | **0%** | **0%** | **1%** | **1%** | **-** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **4:00 PM** | **0** | **0** | **2** | **2** | ***4*** | **0** | **0** | **1** | **0** | ***1*** | **8** | **1** | **4** | **0** | *13* |
| **4:15 PM** | **0** | **0** | **0** | **9** | ***9*** | **0** | **0** | **0** | **0** | ***0*** | **4** | **0** | **0** | **0** | *4* |
| **4:30 PM** | **0** | **1** | **0** | **2** | ***3*** | **0** | **1** | **0** | **0** | ***1*** | **9** | **0** | **1** | **0** | *10* |
| **4:45 PM** | **0** | **0** | **3** | **3** | ***6*** | **0** | **0** | **0** | **0** | ***0*** | **5** | **1** | **2** | **0** | *8* |
| 5:00 PM | 0 | 0 | 2 | 3 | *5* | 0 | 0 | 0 | 0 | *0* | 7 | 0 | 0 | 0 | *7* |
| 5:15 PM | 0 | 0 | 1 | 4 | *5* | 0 | 1 | 1 | 1 | *3* | 11 | 1 | 1 | 0 | *13* |
| 5:30 PM | 0 | 0 | 1 | 4 | *5* | 1 | 0 | 1 | 2 | *4* | 9 | 1 | 2 | 1 | *13* |
| 5:45 PM | 0 | 0 | 3 | 2 | *5* | 0 | 1 | 1 | 0 | *2* | 7 | 1 | 0 | 0 | *8* |
| 6:00 PM | 0 | 0 | 1 | 6 | *7* | 0 | 0 | 1 | 0 | *1* | 9 | 4 | 0 | 0 | *13* |
| 6:15 PM | 0 | 0 | 0 | 3 | *3* | 0 | 0 | 1 | 0 | *1* | 8 | 0 | 3 | 1 | *12* |
| 6:30 PM | 0 | 0 | 1 | 6 | *7* | 0 | 1 | 0 | 1 | *2* | 4 | 0 | 0 | 0 | *4* |
| 6:45 PM | 0 | 0 | 2 | 3 | *5* | 0 | 0 | 2 | 1 | *3* | 15 | 0 | 0 | 0 | *15* |
| Count Total | 0 | 1 | 16 | 47 | *64* | 1 | 4 | 8 | 5 | *18* | 96 | 9 | 13 | 2 | *120* |
| **Peak Hour** | **0** | **1** | **5** | **16** | ***22*** | **0** | **1** | **1** | **0** | ***2*** | **26** | **2** | **7** | **0** | ***35*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | IKEA Exit Driveway | | | | Cooley Ave | | | | Donohoe St | | | | Donohoe St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **1** | **0** | **4** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **5** | **0** | **9** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **3** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **2** | **0** | **6** | **22** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 5 | 23 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 5 | 19 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 5 | 21 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 5 | 20 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 3 | 0 | 7 | 22 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 20 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 7 | 22 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 5 | 22 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 14 | 2 | 2 | 21 | 24 | 0 | 64 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **5** | **0** | **0** | **6** | **10** | **0** | **22** | **0** |

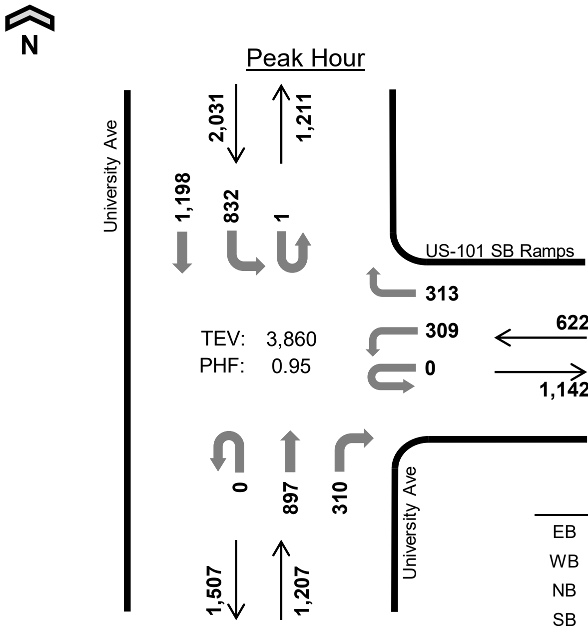
## Three-Hour Count Summaries - Bikes

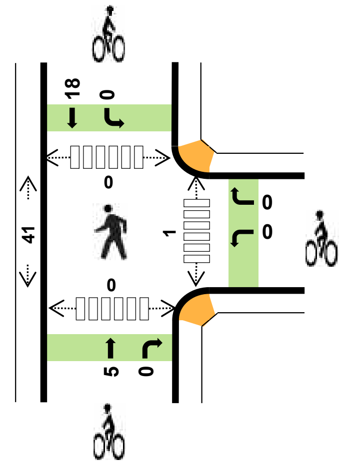
| Interval Start | IKEA Exit Driveway | | | Cooley Ave | | | Donohoe St | | | Donohoe St | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 4 |
| 5:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 4 | 7 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 9 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 10 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 8 |
| 6:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 6 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 7 |
| Count Total | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 2 | 6 | 0 | 5 | 0 | 18 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# US-101 SB Ramps

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 7:30 AM to 8:30 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 2.4% | 0.93 |
| NB | 2.1% | 0.98 |
| SB | 2.1% | 0.92 |
| TOTAL | 2.2% | 0.95 |

## Three-Hour Count Summaries

| Interval Start | | n/a | | | | US-101 SB Ramps | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:30 AM | | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 74 | 0 | 0 | 235 | 70 | 0 | 217 | 295 | 0 | 950 | 0 |
| 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 85 | 0 | 81 | 0 | 0 | 229 | 78 | 0 | 225 | 306 | 0 | 1,004 | 0 |
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 77 | 0 | 79 | 0 | 0 | 213 | 82 | 1 | 175 | 261 | 0 | 888 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 88 | 0 | 79 | 0 | 0 | 220 | 80 | 0 | 215 | 336 | 0 | 1,018 | 3,860 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 309 | 0 | 313 | 0 | 0 | 897 | 310 | 1 | 832 | 1,198 | 0 | 3,860 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 6 | 0 | 0 | 22 | 3 | 0 | 18 | 25 | 0 | 83 | 0 |
| | HV% | - | - | - | - | - | 3% | - | 2% | - | - | 2% | 1% | 0% | 2% | 2% | - | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:30 AM | 0 | 3 | 6 | 10 | *19* | 0 | 0 | 0 | 7 | *7* | 1 | 16 | 0 | 0 | *17* |
| 7:45 AM | 0 | 1 | 5 | 18 | *24* | 0 | 0 | 1 | 4 | *5* | 0 | 10 | 0 | 0 | *10* |
| 8:00 AM | 0 | 5 | 9 | 10 | *24* | 0 | 0 | 3 | 4 | *7* | 0 | 7 | 0 | 0 | *7* |
| 8:15 AM | 0 | 6 | 5 | 5 | *16* | 0 | 0 | 1 | 3 | *4* | 0 | 8 | 0 | 0 | *8* |
| Peak Hour | 0 | 15 | 25 | 43 | *83* | 0 | 0 | 5 | 18 | *23* | 1 | 41 | 0 | 0 | *42* |

## Three-Hour Count Summaries

| Interval Start | n/a | | | | US-101 SB Ramps | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 75 | 0 | 0 | 161 | 58 | 0 | 172 | 244 | 0 | 768 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 60 | 0 | 69 | 0 | 0 | 215 | 59 | 0 | 220 | 295 | 0 | 918 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **59** | **0** | **74** | **0** | **0** | **235** | **70** | **0** | **217** | **295** | **0** | **950** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **85** | **0** | **81** | **0** | **0** | **229** | **78** | **0** | **225** | **306** | **0** | **1,004** | 3,640 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **77** | **0** | **79** | **0** | **0** | **213** | **82** | **1** | **175** | **261** | **0** | **888** | 3,760 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **88** | **0** | **79** | **0** | **0** | **220** | **80** | **0** | **215** | **336** | **0** | **1,018** | **3,860** |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 69 | 0 | 0 | 194 | 83 | 0 | 206 | 310 | 0 | 929 | 3,839 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 87 | 0 | 0 | 187 | 63 | 0 | 202 | 295 | 0 | 907 | 3,742 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 89 | 0 | 0 | 194 | 73 | 0 | 209 | 309 | 0 | 944 | 3,798 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 101 | 0 | 0 | 163 | 89 | 0 | 211 | 272 | 0 | 908 | 3,688 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 94 | 0 | 0 | 199 | 80 | 0 | 227 | 303 | 0 | 970 | 3,729 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 83 | 0 | 100 | 0 | 0 | 182 | 74 | 0 | 195 | 266 | 0 | 900 | 3,722 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 859 | 0 | 997 | 0 | 0 | 2,392 | 889 | 1 | 2,474 | 3,492 | 0 | 11,104 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **309** | **0** | **313** | **0** | **0** | **897** | **310** | **1** | **832** | **1,198** | **0** | **3,860** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **6** | **0** | **0** | **22** | **3** | **0** | **18** | **25** | **0** | **83** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **3%** | **-** | **2%** | **-** | **-** | **2%** | **1%** | **0%** | **2%** | **2%** | **-** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 7 | 4 | 15 | *26* | 0 | 0 | 1 | 5 | *6* | 0 | 7 | 0 | 0 | *7* |
| 7:15 AM | 0 | 5 | 6 | 10 | *21* | 0 | 0 | 1 | 5 | *6* | 0 | 10 | 0 | 0 | *10* |
| **7:30 AM** | **0** | **3** | **6** | **10** | ***19*** | **0** | **0** | **0** | **7** | ***7*** | **1** | **16** | **0** | **0** | *17* |
| **7:45 AM** | **0** | **1** | **5** | **18** | ***24*** | **0** | **0** | **1** | **4** | ***5*** | **0** | **10** | **0** | **0** | *10* |
| **8:00 AM** | **0** | **5** | **9** | **10** | ***24*** | **0** | **0** | **3** | **4** | ***7*** | **0** | **7** | **0** | **0** | *7* |
| **8:15 AM** | **0** | **6** | **5** | **5** | ***16*** | **0** | **0** | **1** | **3** | ***4*** | **0** | **8** | **0** | **0** | ***8*** |
| 8:30 AM | 0 | 5 | 1 | 13 | *19* | 0 | 0 | 1 | 6 | *7* | 0 | 8 | 0 | 0 | *8* |
| 8:45 AM | 0 | 8 | 2 | 18 | *28* | 0 | 0 | 1 | 6 | *7* | 0 | 10 | 0 | 0 | *10* |
| 9:00 AM | 0 | 3 | 3 | 18 | *24* | 0 | 0 | 1 | 4 | *5* | 0 | 7 | 0 | 0 | *7* |
| 9:15 AM | 0 | 5 | 10 | 37 | *52* | 0 | 0 | 0 | 2 | *2* | 0 | 8 | 0 | 0 | *8* |
| 9:30 AM | 0 | 5 | 10 | 34 | *49* | 0 | 0 | 0 | 1 | *1* | 0 | 3 | 0 | 0 | *3* |
| 9:45 AM | 0 | 4 | 7 | 19 | *30* | 0 | 0 | 0 | 2 | *2* | 0 | 8 | 0 | 0 | *8* |
| Count Total | 0 | 57 | 68 | 207 | *332* | 0 | 0 | 10 | 49 | *59* | 1 | 102 | 0 | 0 | *103* |
| **Peak Hr** | **0** | **15** | **25** | **43** | ***83*** | **0** | **0** | **5** | **18** | ***23*** | **1** | **41** | **0** | **0** | ***42*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | US-101 SB Ramps | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 4 | 11 | 0 | 26 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 6 | 4 | 0 | 21 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **4** | **2** | **0** | **7** | **3** | **0** | **19** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **7** | **11** | **0** | **24** | 90 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** | **0** | **0** | **9** | **0** | **0** | **2** | **8** | **0** | **24** | 88 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **3** | **0** | **0** | **4** | **1** | **0** | **2** | **3** | **0** | **16** | **83** |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 9 | 4 | 0 | 19 | 83 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 11 | 7 | 0 | 28 | 87 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 11 | 7 | 0 | 24 | 87 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 6 | 4 | 0 | 21 | 16 | 0 | 52 | 123 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 5 | 5 | 0 | 21 | 13 | 0 | 49 | 153 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 5 | 2 | 0 | 14 | 5 | 0 | 30 | 155 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 31 | 0 | 0 | 53 | 15 | 0 | 115 | 92 | 0 | 332 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **6** | **0** | **0** | **22** | **3** | **0** | **18** | **25** | **0** | **83** | **0** |

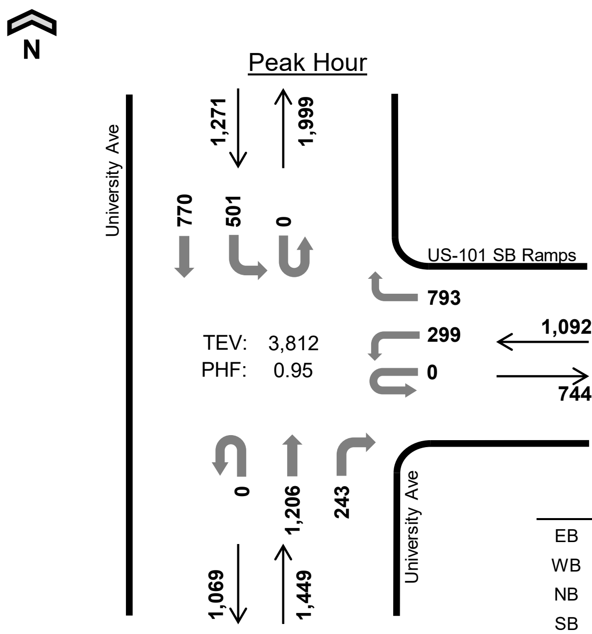
## Three-Hour Count Summaries - Bikes

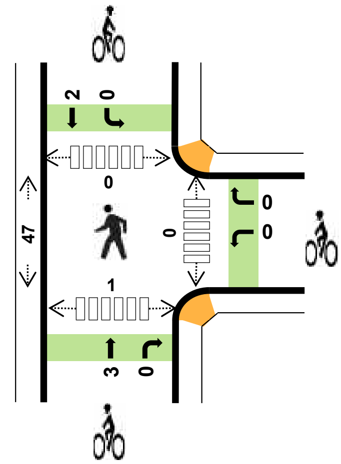
| Interval Start | n/a | | | US-101 SB Ramps | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 6 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 6 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **7** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **4** | **0** | **5** | 24 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **4** | **0** | **7** | 25 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **3** | **0** | **4** | **23** |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 7 | 23 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 7 | 25 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 5 | 23 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 21 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 15 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 10 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 49 | 0 | 59 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **18** | **0** | **23** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# US-101 SB Ramps

Date: 04-25-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 1.3% | 0.92 |
| NB | 1.9% | 0.95 |
| SB | 1.5% | 0.93 |
| TOTAL | 1.6% | 0.95 |

## Three-Hour Count Summaries

| Interval Start | | n/a Eastbound UT | LT | TH | RT | US-101 SB Ramps Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | 0 | 0 | 0 | 0 | 0 | 83 | 0 | 199 | 0 | 0 | 303 | 74 | 0 | 131 | 210 | 0 | 1,000 | 0 |
| 4:15 PM | | 0 | 0 | 0 | 0 | 0 | 69 | 0 | 182 | 0 | 0 | 295 | 44 | 0 | 135 | 185 | 0 | 910 | 0 |
| 4:30 PM | | 0 | 0 | 0 | 0 | 0 | 61 | 0 | 201 | 0 | 0 | 311 | 70 | 0 | 130 | 181 | 0 | 954 | 0 |
| 4:45 PM | | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 211 | 0 | 0 | 297 | 55 | 0 | 105 | 194 | 0 | 948 | 3,812 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 299 | 0 | 793 | 0 | 0 | 1,206 | 243 | 0 | 501 | 770 | 0 | 3,812 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 26 | 1 | 0 | 10 | 9 | 0 | 60 | 0 |
| | HV% | - | - | - | - | - | 0% | - | 2% | - | - | 2% | 0% | - | 2% | 1% | - | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 8 | 10 | 6 | *24* | 0 | 0 | 0 | 0 | *0* | 0 | 18 | 0 | 0 | *18* |
| 4:15 PM | 0 | 3 | 6 | 4 | *13* | 0 | 0 | 3 | 1 | *4* | 0 | 14 | 0 | 1 | *15* |
| 4:30 PM | 0 | 2 | 4 | 5 | *11* | 0 | 0 | 0 | 1 | *1* | 0 | 8 | 0 | 0 | *8* |
| 4:45 PM | 0 | 1 | 7 | 4 | *12* | 0 | 0 | 0 | 0 | *0* | 0 | 7 | 0 | 0 | *7* |
| Peak Hour | 0 | 14 | 27 | 19 | *60* | 0 | 0 | 3 | 2 | *5* | 0 | 47 | 0 | 1 | *48* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | US-101 SB Ramps Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **83** | **0** | **199** | **0** | **0** | **303** | **74** | **0** | **131** | **210** | **0** | **1,000** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **69** | **0** | **182** | **0** | **0** | **295** | **44** | **0** | **135** | **185** | **0** | **910** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **61** | **0** | **201** | **0** | **0** | **311** | **70** | **0** | **130** | **181** | **0** | **954** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **86** | **0** | **211** | **0** | **0** | **297** | **55** | **0** | **105** | **194** | **0** | **948** | **3,812** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 191 | 1 | 0 | 301 | 75 | 0 | 149 | 183 | 0 | 958 | 3,770 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 60 | 0 | 189 | 0 | 0 | 283 | 66 | 0 | 127 | 219 | 0 | 944 | 3,804 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 61 | 0 | 147 | 0 | 0 | 287 | 64 | 0 | 139 | 206 | 0 | 904 | 3,754 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 76 | 0 | 160 | 0 | 0 | 229 | 56 | 0 | 144 | 209 | 0 | 874 | 3,680 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 68 | 0 | 158 | 0 | 0 | 282 | 73 | 0 | 135 | 221 | 0 | 937 | 3,659 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 168 | 0 | 0 | 270 | 70 | 0 | 137 | 219 | 0 | 926 | 3,641 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 81 | 0 | 148 | 0 | 0 | 235 | 74 | 1 | 150 | 199 | 0 | 888 | 3,625 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 98 | 0 | 168 | 0 | 0 | 230 | 59 | 0 | 129 | 186 | 0 | 870 | 3,621 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 863 | 0 | 2,122 | 1 | 0 | 3,323 | 780 | 1 | 1,611 | 2,412 | 0 | 11,113 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **299** | **0** | **793** | **0** | **0** | **1,206** | **243** | **0** | **501** | **770** | **0** | **3,812** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **13** | **0** | **0** | **26** | **1** | **0** | **10** | **9** | **0** | **60** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **0%** | **-** | **2%** | **-** | **-** | **2%** | **0%** | **-** | **2%** | **1%** | **-** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **8** | **10** | **6** | ***24*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **18** | **0** | **0** | *18* |
| **4:15 PM** | **0** | **3** | **6** | **4** | ***13*** | **0** | **0** | **3** | **1** | ***4*** | **0** | **14** | **0** | **1** | *15* |
| **4:30 PM** | **0** | **2** | **4** | **5** | ***11*** | **0** | **0** | **0** | **1** | ***1*** | **0** | **8** | **0** | **0** | *8* |
| **4:45 PM** | **0** | **1** | **7** | **4** | ***12*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **7** | **0** | **0** | *7* |
| 5:00 PM | 0 | 1 | 7 | 2 | *10* | 0 | 0 | 0 | 0 | *0* | 0 | 4 | 0 | 0 | *4* |
| 5:15 PM | 0 | 3 | 6 | 5 | *14* | 0 | 0 | 4 | 1 | *5* | 0 | 2 | 0 | 0 | *2* |
| 5:30 PM | 0 | 1 | 2 | 10 | *13* | 0 | 0 | 5 | 0 | *5* | 0 | 9 | 0 | 0 | *9* |
| 5:45 PM | 0 | 2 | 7 | 3 | *12* | 0 | 0 | 4 | 0 | *4* | 0 | 10 | 0 | 0 | *10* |
| 6:00 PM | 0 | 0 | 5 | 2 | *7* | 0 | 0 | 3 | 3 | *6* | 0 | 5 | 0 | 0 | *5* |
| 6:15 PM | 0 | 2 | 4 | 4 | *10* | 0 | 0 | 1 | 0 | *1* | 0 | 4 | 0 | 0 | *4* |
| 6:30 PM | 0 | 1 | 3 | 2 | *6* | 0 | 0 | 0 | 2 | *2* | 0 | 7 | 0 | 0 | *7* |
| 6:45 PM | 0 | 3 | 1 | 3 | *7* | 0 | 0 | 1 | 0 | *1* | 0 | 6 | 0 | 0 | *6* |
| Count Total | 0 | 27 | 62 | 50 | *139* | 0 | 0 | 21 | 8 | *29* | 0 | 94 | 0 | 1 | *95* |
| **Peak Hr** | **0** | **14** | **27** | **19** | ***60*** | **0** | **0** | **3** | **2** | ***5*** | **0** | **47** | **0** | **1** | ***48*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | US-101 SB Ramps | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **7** | **0** | **0** | **10** | **0** | **0** | **3** | **3** | **0** | **24** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **6** | **0** | **0** | **1** | **3** | **0** | **13** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **3** | **1** | **0** | **4** | **1** | **0** | **11** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **7** | **0** | **0** | **2** | **2** | **0** | **12** | **60** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 1 | 1 | 0 | 10 | 46 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 5 | 1 | 0 | 2 | 3 | 0 | 14 | 47 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 4 | 6 | 0 | 13 | 49 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 6 | 1 | 0 | 1 | 2 | 0 | 12 | 49 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 1 | 1 | 0 | 7 | 46 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 1 | 0 | 10 | 42 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 6 | 35 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 7 | 30 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 24 | 0 | 0 | 58 | 4 | 0 | 23 | 27 | 0 | 139 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **13** | **0** | **0** | **26** | **1** | **0** | **10** | **9** | **0** | **60** | **0** |

## Three-Hour Count Summaries - Bikes

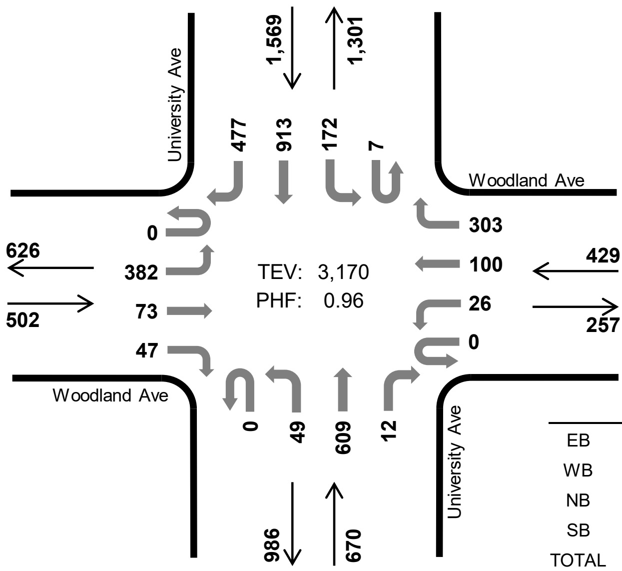
| Interval Start | n/a | | | US-101 SB Ramps | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **0** | **4** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 5 | 6 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 10 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 4 | 14 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 6 | 20 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 16 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 13 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 10 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 8 | 0 | 29 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **2** | **0** | **5** | **0** |

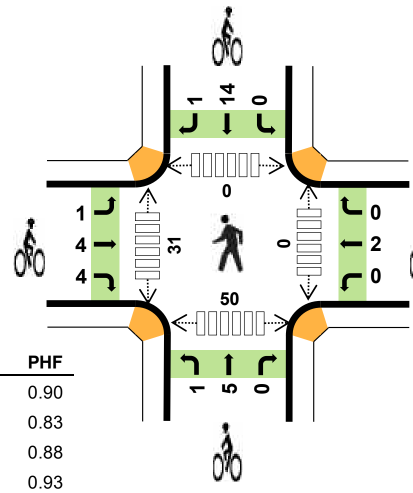
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# Woodland Ave

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 7:45 AM to 8:45 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.8% | 0.90 |
| WB | 1.6% | 0.83 |
| NB | 1.3% | 0.88 |
| SB | 2.4% | 0.93 |
| TOTAL | 2.1% | 0.96 |

**Three-Hour Count Summaries**

| Interval Start | | Woodland Ave | | | | Woodland Ave | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:45 AM | | 0 | 112 | 16 | 11 | 0 | 8 | 25 | 96 | 0 | 8 | 122 | 4 | 0 | 43 | 227 | 122 | 794 | 0 |
| 8:00 AM | | 0 | 95 | 18 | 15 | 0 | 6 | 24 | 85 | 0 | 19 | 142 | 1 | 4 | 35 | 200 | 114 | 758 | 0 |
| 8:15 AM | | 0 | 86 | 17 | 10 | 0 | 5 | 24 | 77 | 0 | 13 | 167 | 3 | 1 | 40 | 243 | 136 | 822 | 0 |
| 8:30 AM | | 0 | 89 | 22 | 11 | 0 | 7 | 27 | 45 | 0 | 9 | 178 | 4 | 2 | 54 | 243 | 105 | 796 | 3,170 |
| Peak Hour | All | 0 | 382 | 73 | 47 | 0 | 26 | 100 | 303 | 0 | 49 | 609 | 12 | 7 | 172 | 913 | 477 | 3,170 | 0 |
| | HV | 0 | 7 | 3 | 4 | 0 | 1 | 3 | 3 | 0 | 1 | 8 | 0 | 0 | 7 | 22 | 8 | 67 | 0 |
| | HV% | - | 2% | 4% | 9% | - | 4% | 3% | 1% | - | 2% | 1% | 0% | 0% | 4% | 2% | 2% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:45 AM | 2 | 3 | 5 | 10 | *20* | 3 | 0 | 1 | 2 | *6* | 0 | 11 | 0 | 12 | *23* |
| 8:00 AM | 7 | 3 | 1 | 10 | *21* | 3 | 0 | 2 | 5 | *10* | 0 | 6 | 0 | 14 | *20* |
| 8:15 AM | 2 | 1 | 2 | 9 | *14* | 1 | 1 | 1 | 3 | *6* | 0 | 8 | 0 | 15 | *23* |
| 8:30 AM | 3 | 0 | 1 | 8 | *12* | 2 | 1 | 2 | 5 | *10* | 0 | 6 | 0 | 9 | *15* |
| Peak Hour | 14 | 7 | 9 | 37 | *67* | 9 | 2 | 6 | 15 | *32* | 0 | 31 | 0 | 50 | *81* |

## Three-Hour Count Summaries

| Interval Start | | Woodland Ave Eastbound | | | | Woodland Ave Westbound | | | | University Ave Northbound | | | | University Ave Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | | 0 | 58 | 14 | 9 | 0 | 4 | 12 | 72 | 0 | 3 | 113 | 2 | 2 | 48 | 203 | 62 | 602 | 0 |
| 7:15 AM | | 0 | 107 | 13 | 12 | 0 | 2 | 21 | 105 | 0 | 5 | 81 | 0 | 0 | 55 | 223 | 100 | 724 | 0 |
| 7:30 AM | | 0 | 96 | 15 | 10 | 0 | 5 | 22 | 110 | 0 | 5 | 121 | 1 | 0 | 50 | 203 | 108 | 746 | 0 |
| **7:45 AM** | | **0** | **112** | **16** | **11** | **0** | **8** | **25** | **96** | **0** | **8** | **122** | **4** | **0** | **43** | **227** | **122** | **794** | 2,866 |
| **8:00 AM** | | **0** | **95** | **18** | **15** | **0** | **6** | **24** | **85** | **0** | **19** | **142** | **1** | **4** | **35** | **200** | **114** | **758** | 3,022 |
| **8:15 AM** | | **0** | **86** | **17** | **10** | **0** | **5** | **24** | **77** | **0** | **13** | **167** | **3** | **1** | **40** | **243** | **136** | **822** | 3,120 |
| **8:30 AM** | | **0** | **89** | **22** | **11** | **0** | **7** | **27** | **45** | **0** | **9** | **178** | **4** | **2** | **54** | **243** | **105** | **796** | **3,170** |
| 8:45 AM | | 0 | 66 | 23 | 15 | 0 | 4 | 25 | 55 | 0 | 13 | 155 | 1 | 2 | 36 | 224 | 103 | 722 | 3,098 |
| 9:00 AM | | 0 | 69 | 19 | 20 | 0 | 6 | 23 | 54 | 0 | 9 | 157 | 1 | 2 | 37 | 259 | 83 | 739 | 3,079 |
| 9:15 AM | | 0 | 73 | 21 | 5 | 0 | 2 | 9 | 41 | 0 | 10 | 154 | 2 | 29 | 28 | 238 | 91 | 703 | 2,960 |
| 9:30 AM | | 0 | 78 | 13 | 12 | 0 | 3 | 12 | 46 | 0 | 12 | 169 | 3 | 4 | 34 | 259 | 77 | 722 | 2,886 |
| 9:45 AM | | 0 | 75 | 16 | 13 | 1 | 3 | 12 | 46 | 0 | 7 | 146 | 2 | 0 | 41 | 241 | 94 | 697 | 2,861 |
| Count Total | | 0 | 1,004 | 207 | 143 | 1 | 55 | 236 | 832 | 0 | 113 | 1,705 | 24 | 46 | 501 | 2,763 | 1,195 | 8,825 | 0 |
| **Peak Hour** | **All** | **0** | **382** | **73** | **47** | **0** | **26** | **100** | **303** | **0** | **49** | **609** | **12** | **7** | **172** | **913** | **477** | **3,170** | **0** |
| | **HV** | **0** | **7** | **3** | **4** | **0** | **1** | **3** | **3** | **0** | **1** | **8** | **0** | **0** | **7** | **22** | **8** | **67** | **0** |
| | **HV%** | **-** | **2%** | **4%** | **9%** | **-** | **4%** | **3%** | **1%** | **-** | **2%** | **1%** | **0%** | **0%** | **4%** | **2%** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 6 | 2 | 2 | 14 | *24* | 0 | 0 | 1 | 5 | *6* | 0 | 9 | 0 | 9 | *18* |
| 7:15 AM | 2 | 6 | 3 | 7 | *18* | 1 | 0 | 1 | 6 | *8* | 0 | 11 | 0 | 11 | *22* |
| 7:30 AM | 6 | 2 | 2 | 5 | *15* | 0 | 0 | 0 | 6 | *6* | 0 | 13 | 0 | 13 | *26* |
| **7:45 AM** | **2** | **3** | **5** | **10** | ***20*** | **3** | **0** | **1** | **2** | ***6*** | **0** | **11** | **0** | **12** | *23* |
| **8:00 AM** | **7** | **3** | **1** | **10** | ***21*** | **3** | **0** | **2** | **5** | ***10*** | **0** | **6** | **0** | **14** | *20* |
| **8:15 AM** | **2** | **1** | **2** | **9** | ***14*** | **1** | **1** | **1** | **3** | ***6*** | **0** | **8** | **0** | **15** | *23* |
| **8:30 AM** | **3** | **0** | **1** | **8** | ***12*** | **2** | **1** | **2** | **5** | ***10*** | **0** | **6** | **0** | **9** | ***15*** |
| 8:45 AM | 2 | 5 | 3 | 13 | *23* | 2 | 1 | 2 | 7 | *12* | 0 | 13 | 0 | 18 | *31* |
| 9:00 AM | 5 | 2 | 2 | 8 | *17* | 2 | 1 | 1 | 4 | *8* | 1 | 3 | 0 | 8 | *12* |
| 9:15 AM | 4 | 2 | 5 | 17 | *28* | 1 | 0 | 0 | 4 | *5* | 0 | 7 | 0 | 5 | *12* |
| 9:30 AM | 2 | 1 | 9 | 16 | *28* | 0 | 4 | 1 | 2 | *7* | 1 | 8 | 0 | 8 | *17* |
| 9:45 AM | 2 | 2 | 5 | 9 | *18* | 1 | 1 | 0 | 3 | *5* | 0 | 4 | 0 | 7 | *11* |
| Count Total | 43 | 29 | 40 | 126 | *238* | 16 | 9 | 12 | 52 | *89* | 2 | 99 | 0 | 129 | *230* |
| **Peak Hour** | **14** | **7** | **9** | **37** | ***67*** | **9** | **2** | **6** | **15** | ***32*** | **0** | **31** | **0** | **50** | ***81*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Woodland Ave | | | | Woodland Ave | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 2 | 3 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 4 | 7 | 3 | 24 | 0 |
| 7:15 AM | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 4 | 18 | 0 |
| 7:30 AM | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 1 | 15 | 0 |
| **7:45 AM** | **0** | **1** | **0** | **1** | **0** | **1** | **2** | **0** | **0** | **1** | **4** | **0** | **0** | **3** | **3** | **4** | **20** | 77 |
| **8:00 AM** | **0** | **4** | **2** | **1** | **0** | **0** | **1** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **9** | **1** | **21** | 74 |
| **8:15 AM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **2** | **4** | **3** | **14** | 70 |
| **8:30 AM** | **0** | **0** | **1** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **2** | **6** | **0** | **12** | **67** |
| 8:45 AM | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 7 | 4 | 23 | 70 |
| 9:00 AM | 0 | 1 | 1 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 5 | 2 | 17 | 66 |
| 9:15 AM | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 5 | 0 | 1 | 2 | 12 | 2 | 28 | 80 |
| 9:30 AM | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 2 | 9 | 5 | 28 | 96 |
| 9:45 AM | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 1 | 5 | 3 | 18 | 91 |
| Count Total | 0 | 19 | 14 | 10 | 0 | 5 | 11 | 13 | 0 | 4 | 35 | 1 | 1 | 20 | 73 | 32 | 238 | 0 |
| **Peak Hour** | **0** | **7** | **3** | **4** | **0** | **1** | **3** | **3** | **0** | **1** | **8** | **0** | **0** | **7** | **22** | **8** | **67** | **0** |

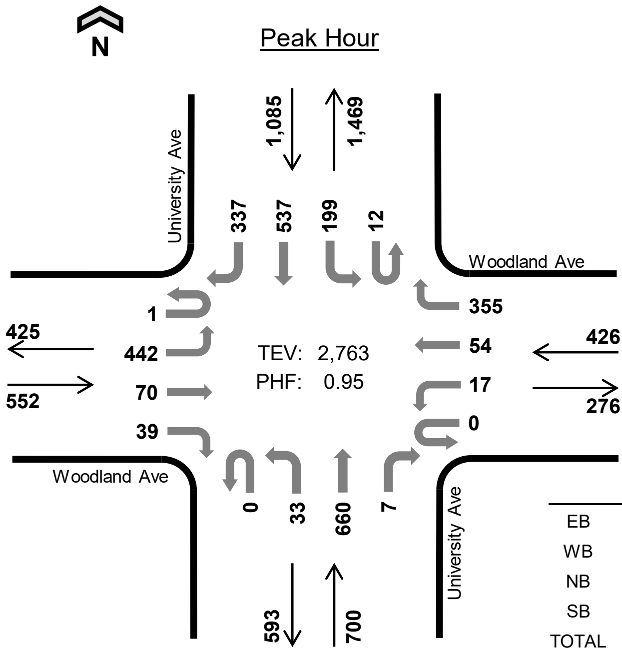
## Three-Hour Count Summaries - Bikes

| Interval Start | Woodland Ave | | | Woodland Ave | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 6 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 1 | 8 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 6 | 0 |
| **7:45 AM** | **1** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **6** | 26 |
| **8:00 AM** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **5** | **0** | **10** | 30 |
| **8:15 AM** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **3** | **0** | **6** | 28 |
| **8:30 AM** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | **2** | **0** | **0** | **4** | **1** | **10** | **32** |
| 8:45 AM | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 5 | 2 | 12 | 38 |
| 9:00 AM | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 8 | 36 |
| 9:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 5 | 35 |
| 9:30 AM | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 7 | 32 |
| 9:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 25 |
| Count Total | 2 | 8 | 6 | 5 | 4 | 0 | 4 | 7 | 1 | 1 | 46 | 5 | 89 | 0 |
| **Peak Hour** | **1** | **4** | **4** | **0** | **2** | **0** | **1** | **5** | **0** | **0** | **14** | **1** | **32** | **0** |

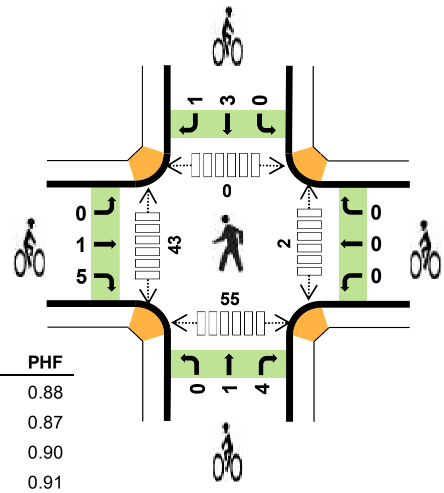
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# Woodland Ave

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM




| | HV %: | PHF |
|---|---|---|
| EB | 2.2% | 0.88 |
| WB | 3.3% | 0.87 |
| NB | 1.7% | 0.90 |
| SB | 1.3% | 0.91 |
| TOTAL | 1.9% | 0.95 |




**Three-Hour Count Summaries**

| Interval Start | | Woodland Ave Eastbound UT | LT | TH | RT | Woodland Ave Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | 0 | 129 | 22 | 6 | 0 | 6 | 11 | 66 | 0 | 8 | 181 | 2 | 6 | 53 | 143 | 95 | 728 | 0 |
| 4:15 PM | | 0 | 97 | 16 | 13 | 0 | 3 | 15 | 94 | 0 | 5 | 153 | 3 | 2 | 45 | 130 | 89 | 665 | 0 |
| 4:30 PM | | 0 | 109 | 14 | 10 | 0 | 4 | 10 | 95 | 0 | 10 | 184 | 1 | 2 | 45 | 123 | 64 | 671 | 0 |
| 4:45 PM | | 1 | 107 | 18 | 10 | 0 | 4 | 18 | 100 | 0 | 10 | 142 | 1 | 2 | 56 | 141 | 89 | 699 | 2,763 |
| Peak Hour | All | 1 | 442 | 70 | 39 | 0 | 17 | 54 | 355 | 0 | 33 | 660 | 7 | 12 | 199 | 537 | 337 | 2,763 | 0 |
| | HV | 0 | 6 | 3 | 3 | 0 | 1 | 2 | 11 | 0 | 2 | 10 | 0 | 0 | 3 | 8 | 3 | 52 | 0 |
| | HV% | 0% | 1% | 4% | 8% | - | 6% | 4% | 3% | - | 6% | 2% | 0% | 0% | 2% | 1% | 1% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 4 | 6 | 5 | 7 | *22* | 1 | 0 | 0 | 1 | *2* | 0 | 18 | 0 | 24 | *42* |
| 4:15 PM | 4 | 4 | 1 | 4 | *13* | 4 | 0 | 2 | 0 | *6* | 0 | 5 | 0 | 8 | *13* |
| 4:30 PM | 3 | 1 | 1 | 1 | *6* | 1 | 0 | 2 | 0 | *3* | 1 | 11 | 0 | 14 | *26* |
| 4:45 PM | 1 | 3 | 5 | 2 | *11* | 0 | 0 | 1 | 3 | *4* | 1 | 9 | 0 | 9 | *19* |
| Peak Hour | 12 | 14 | 12 | 14 | *52* | 6 | 0 | 5 | 4 | *15* | 2 | 43 | 0 | 55 | *100* |

## Three-Hour Count Summaries

| Interval Start | | Woodland Ave Eastbound UT | LT | TH | RT | Woodland Ave Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | | **0** | **129** | **22** | **6** | **0** | **6** | **11** | **66** | **0** | **8** | **181** | **2** | **6** | **53** | **143** | **95** | **728** | 0 |
| **4:15 PM** | | **0** | **97** | **16** | **13** | **0** | **3** | **15** | **94** | **0** | **5** | **153** | **3** | **2** | **45** | **130** | **89** | **665** | 0 |
| **4:30 PM** | | **0** | **109** | **14** | **10** | **0** | **4** | **10** | **95** | **0** | **10** | **184** | **1** | **2** | **45** | **123** | **64** | **671** | 0 |
| **4:45 PM** | | **1** | **107** | **18** | **10** | **0** | **4** | **18** | **100** | **0** | **10** | **142** | **1** | **2** | **56** | **141** | **89** | **699** | **2,763** |
| 5:00 PM | | 0 | 126 | 22 | 13 | 0 | 3 | 19 | 92 | 0 | 8 | 152 | 5 | 4 | 44 | 112 | 90 | 690 | 2,725 |
| 5:15 PM | | 0 | 105 | 15 | 11 | 0 | 2 | 16 | 68 | 0 | 10 | 170 | 5 | 0 | 52 | 136 | 94 | 684 | 2,744 |
| 5:30 PM | | 0 | 109 | 15 | 12 | 0 | 3 | 15 | 84 | 0 | 7 | 161 | 6 | 1 | 57 | 138 | 80 | 688 | 2,761 |
| 5:45 PM | | 0 | 104 | 16 | 10 | 0 | 4 | 17 | 66 | 0 | 8 | 111 | 6 | 1 | 56 | 140 | 90 | 629 | 2,691 |
| 6:00 PM | | 0 | 104 | 12 | 19 | 0 | 4 | 11 | 73 | 0 | 4 | 172 | 1 | 2 | 58 | 149 | 84 | 693 | 2,694 |
| 6:15 PM | | 0 | 93 | 13 | 17 | 0 | 2 | 9 | 66 | 0 | 12 | 184 | 6 | 6 | 48 | 167 | 74 | 697 | 2,707 |
| 6:30 PM | | 0 | 80 | 11 | 12 | 0 | 4 | 7 | 42 | 0 | 3 | 176 | 2 | 2 | 57 | 165 | 59 | 620 | 2,639 |
| 6:45 PM | | 0 | 80 | 14 | 9 | 0 | 2 | 12 | 42 | 0 | 11 | 154 | 2 | 6 | 60 | 163 | 74 | 629 | 2,639 |
| Count Total | | 1 | 1,243 | 188 | 142 | 0 | 41 | 160 | 888 | 0 | 96 | 1,940 | 40 | 34 | 631 | 1,707 | 982 | 8,093 | 0 |
| **Peak Hour** | **All** | **1** | **442** | **70** | **39** | **0** | **17** | **54** | **355** | **0** | **33** | **660** | **7** | **12** | **199** | **537** | **337** | **2,763** | **0** |
| | **HV** | **0** | **6** | **3** | **3** | **0** | **1** | **2** | **11** | **0** | **2** | **10** | **0** | **0** | **3** | **8** | **3** | **52** | **0** |
| | **HV%** | **0%** | **1%** | **4%** | **8%** | **-** | **6%** | **4%** | **3%** | **-** | **6%** | **2%** | **0%** | **0%** | **2%** | **1%** | **1%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **4** | **6** | **5** | **7** | ***22*** | **1** | **0** | **0** | **1** | ***2*** | **0** | **18** | **0** | **24** | *42* |
| **4:15 PM** | **4** | **4** | **1** | **4** | ***13*** | **4** | **0** | **2** | **0** | ***6*** | **0** | **5** | **0** | **8** | *13* |
| **4:30 PM** | **3** | **1** | **1** | **1** | ***6*** | **1** | **0** | **2** | **0** | ***3*** | **1** | **11** | **0** | **14** | *26* |
| **4:45 PM** | **1** | **3** | **5** | **2** | ***11*** | **0** | **0** | **1** | **3** | ***4*** | **1** | **9** | **0** | **9** | ***19*** |
| 5:00 PM | 6 | 5 | 4 | 1 | *16* | 1 | 0 | 0 | 2 | *3* | 0 | 7 | 0 | 15 | *22* |
| 5:15 PM | 4 | 0 | 4 | 3 | *11* | 1 | 0 | 4 | 4 | *9* | 1 | 5 | 0 | 12 | *18* |
| 5:30 PM | 1 | 0 | 1 | 6 | *8* | 2 | 1 | 5 | 3 | *11* | 0 | 9 | 0 | 7 | *16* |
| 5:45 PM | 2 | 3 | 3 | 3 | *11* | 1 | 0 | 4 | 0 | *5* | 1 | 13 | 0 | 10 | *24* |
| 6:00 PM | 4 | 0 | 5 | 1 | *10* | 1 | 0 | 2 | 4 | *7* | 0 | 9 | 0 | 10 | *19* |
| 6:15 PM | 0 | 1 | 4 | 2 | *7* | 1 | 1 | 0 | 0 | *2* | 0 | 7 | 0 | 6 | *13* |
| 6:30 PM | 0 | 1 | 3 | 1 | *5* | 1 | 1 | 0 | 3 | *5* | 0 | 15 | 0 | 12 | *27* |
| 6:45 PM | 0 | 0 | 1 | 3 | *4* | 2 | 1 | 2 | 0 | *5* | 0 | 9 | 0 | 9 | *18* |
| Count Total | 29 | 24 | 37 | 34 | *124* | 16 | 4 | 22 | 20 | *62* | 4 | 117 | 0 | 136 | *257* |
| **Peak Hour** | **12** | **14** | **12** | **14** | ***52*** | **6** | **0** | **5** | **4** | ***15*** | **2** | **43** | **0** | **55** | ***100*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Woodland Ave Eastbound UT | LT | TH | RT | Woodland Ave Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **1** | **3** | **0** | **0** | **0** | **0** | **6** | **0** | **1** | **4** | **0** | **0** | **2** | **3** | **2** | **22** | 0 |
| **4:15 PM** | **0** | **2** | **0** | **2** | **0** | **1** | **1** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **1** | **13** | 0 |
| **4:30 PM** | **0** | **2** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **6** | 0 |
| **4:45 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **2** | **0** | **1** | **4** | **0** | **0** | **1** | **1** | **0** | **11** | **52** |
| 5:00 PM | 0 | 2 | 2 | 2 | 0 | 0 | 2 | 3 | 0 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 16 | 46 |
| 5:15 PM | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 1 | 11 | 44 |
| 5:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 2 | 1 | 8 | 46 |
| 5:45 PM | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 1 | 11 | 46 |
| 6:00 PM | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 10 | 40 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 7 | 36 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 5 | 33 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 4 | 26 |
| Count Total | 0 | 17 | 6 | 6 | 0 | 1 | 5 | 18 | 0 | 8 | 29 | 0 | 0 | 8 | 19 | 7 | 124 | 0 |
| **Peak Hour** | **0** | **6** | **3** | **3** | **0** | **1** | **2** | **11** | **0** | **2** | **10** | **0** | **0** | **3** | **8** | **3** | **52** | **0** |

## Three-Hour Count Summaries - Bikes

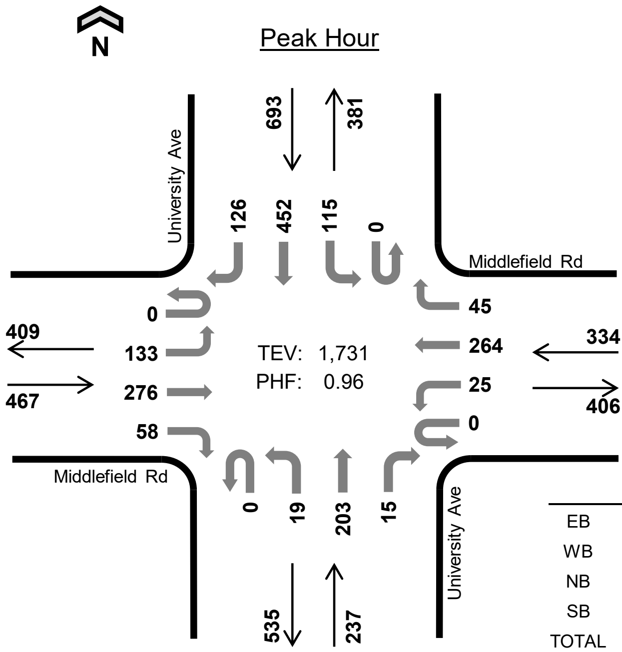
| Interval Start | Woodland Ave Eastbound LT | TH | RT | Woodland Ave Westbound LT | TH | RT | University Ave Northbound LT | TH | RT | University Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4:00 PM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **2** | 0 |
| **4:15 PM** | **0** | **1** | **3** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **6** | 0 |
| **4:30 PM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **3** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **3** | **0** | **4** | **15** |
| 5:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 16 |
| 5:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 9 | 19 |
| 5:30 PM | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 2 | 1 | 11 | 27 |
| 5:45 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 28 |
| 6:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 7 | 32 |
| 6:15 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 25 |
| 6:30 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 19 |
| 6:45 PM | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | 19 |
| Count Total | 1 | 6 | 9 | 0 | 3 | 1 | 0 | 17 | 5 | 0 | 13 | 7 | 62 | 0 |
| **Peak Hour** | **0** | **1** | **5** | **0** | **0** | **0** | **0** | **1** | **4** | **0** | **3** | **1** | **15** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

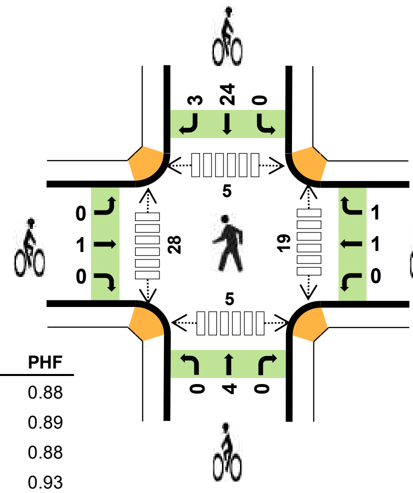
# University Ave
# Middlefield Rd

Date: 04-25-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 8:15 AM to 9:15 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.9% | 0.88 |
| WB | 1.8% | 0.89 |
| NB | 3.0% | 0.88 |
| SB | 2.7% | 0.93 |
| TOTAL | 2.1% | 0.96 |




## Three-Hour Count Summaries

| Interval Start | | Middlefield Rd Eastbound UT | LT | TH | RT | Middlefield Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | | 0 | 39 | 68 | 11 | 0 | 5 | 68 | 10 | 0 | 3 | 62 | 2 | 0 | 23 | 131 | 30 | 452 | 0 |
| 8:30 AM | | 0 | 35 | 75 | 22 | 0 | 7 | 51 | 12 | 0 | 5 | 50 | 5 | 0 | 27 | 116 | 43 | 448 | 0 |
| 8:45 AM | | 0 | 26 | 77 | 13 | 0 | 10 | 78 | 6 | 0 | 7 | 46 | 2 | 0 | 39 | 98 | 35 | 437 | 0 |
| 9:00 AM | | 0 | 33 | 56 | 12 | 0 | 3 | 67 | 17 | 0 | 4 | 45 | 6 | 0 | 26 | 107 | 18 | 394 | 1,731 |
| Peak Hour | All | 0 | 133 | 276 | 58 | 0 | 25 | 264 | 45 | 0 | 19 | 203 | 15 | 0 | 115 | 452 | 126 | 1,731 | 0 |
| | HV | 0 | 1 | 1 | 2 | 0 | 1 | 5 | 0 | 0 | 0 | 6 | 1 | 0 | 1 | 16 | 2 | 36 | 0 |
| | HV% | - | 1% | 0% | 3% | - | 4% | 2% | 0% | - | 0% | 3% | 7% | - | 1% | 4% | 2% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:15 AM | 0 | 1 | 1 | 6 | *8* | 0 | 0 | 1 | 5 | *6* | 10 | 6 | 3 | 3 | *22* |
| 8:30 AM | 0 | 1 | 1 | 2 | *4* | 0 | 1 | 1 | 5 | *7* | 0 | 11 | 1 | 2 | *14* |
| 8:45 AM | 3 | 3 | 3 | 6 | *15* | 1 | 1 | 2 | 10 | *14* | 4 | 7 | 0 | 0 | *11* |
| 9:00 AM | 1 | 1 | 2 | 5 | *9* | 0 | 0 | 0 | 7 | *7* | 5 | 4 | 1 | 0 | *10* |
| Peak Hour | 4 | 6 | 7 | 19 | *36* | 1 | 2 | 4 | 27 | *34* | 19 | 28 | 5 | 5 | *57* |

**Project Manager:** (415) 310-6469
project.manager.ca@idaxdata.com

## Three-Hour Count Summaries

| Interval Start | | Middlefield Rd Eastbound UT | LT | TH | RT | Middlefield Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | 0 | 15 | 38 | 9 | 0 | 2 | 12 | 8 | 0 | 2 | 30 | 0 | 0 | 24 | 84 | 20 | 244 | 0 |
| 7:15 AM | | 0 | 12 | 43 | 6 | 0 | 2 | 37 | 5 | 0 | 4 | 38 | 4 | 0 | 24 | 108 | 26 | 309 | 0 |
| 7:30 AM | | 0 | 16 | 57 | 7 | 0 | 4 | 47 | 9 | 0 | 4 | 46 | 5 | 0 | 22 | 97 | 29 | 343 | 0 |
| 7:45 AM | | 0 | 19 | 75 | 5 | 0 | 1 | 50 | 11 | 0 | 7 | 50 | 2 | 0 | 19 | 109 | 37 | 385 | 1,281 |
| 8:00 AM | | 0 | 28 | 59 | 8 | 0 | 9 | 66 | 13 | 0 | 5 | 46 | 1 | 0 | 31 | 89 | 35 | 390 | 1,427 |
| **8:15 AM** | | **0** | **39** | **68** | **11** | **0** | **5** | **68** | **10** | **0** | **3** | **62** | **2** | **0** | **23** | **131** | **30** | **452** | 1,570 |
| **8:30 AM** | | **0** | **35** | **75** | **22** | **0** | **7** | **51** | **12** | **0** | **5** | **50** | **5** | **0** | **27** | **116** | **43** | **448** | 1,675 |
| **8:45 AM** | | **0** | **26** | **77** | **13** | **0** | **10** | **78** | **6** | **0** | **7** | **46** | **2** | **0** | **39** | **98** | **35** | **437** | 1,727 |
| **9:00 AM** | | **0** | **33** | **56** | **12** | **0** | **3** | **67** | **17** | **0** | **4** | **45** | **6** | **0** | **26** | **107** | **18** | **394** | **1,731** |
| 9:15 AM | | 0 | 33 | 63 | 14 | 0 | 15 | 60 | 12 | 0 | 3 | 42 | 5 | 0 | 37 | 108 | 45 | 437 | 1,716 |
| 9:30 AM | | 0 | 28 | 62 | 13 | 0 | 12 | 61 | 18 | 0 | 3 | 48 | 2 | 0 | 26 | 109 | 28 | 410 | 1,678 |
| 9:45 AM | | 0 | 25 | 48 | 14 | 0 | 10 | 56 | 15 | 0 | 5 | 61 | 4 | 0 | 34 | 129 | 49 | 450 | 1,691 |
| Count Total | | 0 | 309 | 721 | 134 | 0 | 80 | 653 | 136 | 0 | 52 | 564 | 38 | 0 | 332 | 1,285 | 395 | 4,699 | 0 |
| **Peak Hour** | **All** | **0** | **133** | **276** | **58** | **0** | **25** | **264** | **45** | **0** | **19** | **203** | **15** | **0** | **115** | **452** | **126** | **1,731** | **0** |
| | **HV** | **0** | **1** | **1** | **2** | **0** | **1** | **5** | **0** | **0** | **0** | **6** | **1** | **0** | **1** | **16** | **2** | **36** | **0** |
| | **HV%** | **-** | **1%** | **0%** | **3%** | **-** | **4%** | **2%** | **0%** | **-** | **0%** | **3%** | **7%** | **-** | **1%** | **4%** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 3 | 1 | 1 | 7 | *12* | 1 | 1 | 0 | 4 | *6* | 4 | 7 | 2 | 1 | *14* |
| 7:15 AM | 1 | 1 | 1 | 4 | *7* | 0 | 0 | 0 | 5 | *5* | 1 | 7 | 0 | 1 | *9* |
| 7:30 AM | 0 | 2 | 2 | 5 | *9* | 0 | 2 | 1 | 4 | *7* | 1 | 2 | 0 | 0 | *3* |
| 7:45 AM | 2 | 4 | 2 | 2 | *10* | 0 | 0 | 0 | 7 | *7* | 2 | 7 | 1 | 3 | *13* |
| 8:00 AM | 1 | 3 | 3 | 6 | *13* | 1 | 0 | 0 | 2 | *3* | 3 | 8 | 2 | 3 | *16* |
| **8:15 AM** | **0** | **1** | **1** | **6** | ***8*** | **0** | **0** | **1** | **5** | ***6*** | **10** | **6** | **3** | **3** | *22* |
| **8:30 AM** | **0** | **1** | **1** | **2** | ***4*** | **0** | **1** | **1** | **5** | ***7*** | **0** | **11** | **1** | **2** | *14* |
| **8:45 AM** | **3** | **3** | **3** | **6** | ***15*** | **1** | **1** | **2** | **10** | ***14*** | **4** | **7** | **0** | **0** | *11* |
| **9:00 AM** | **1** | **1** | **2** | **5** | ***9*** | **0** | **0** | **0** | **7** | ***7*** | **5** | **4** | **1** | **0** | *10* |
| 9:15 AM | 2 | 2 | 4 | 10 | *18* | 0 | 0 | 1 | 2 | *3* | 4 | 6 | 2 | 1 | *13* |
| 9:30 AM | 2 | 2 | 6 | 6 | *16* | 0 | 0 | 0 | 8 | *8* | 1 | 2 | 0 | 0 | *3* |
| 9:45 AM | 3 | 2 | 4 | 8 | *17* | 0 | 1 | 0 | 4 | *5* | 4 | 4 | 0 | 0 | *8* |
| Count Total | 18 | 23 | 30 | 67 | *138* | 3 | 6 | 6 | 63 | *78* | 39 | 71 | 12 | 14 | *136* |
| **Peak Hour** | **4** | **6** | **7** | **19** | ***36*** | **1** | **2** | **4** | **27** | ***34*** | **19** | **28** | **5** | **5** | ***57*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Middlefield Rd Eastbound UT | LT | TH | RT | Middlefield Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 3 | 12 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 7 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 9 | 0 |
| 7:45 AM | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 10 | 38 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 4 | 2 | 13 | 39 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **5** | **1** | **8** | 40 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **4** | 35 |
| **8:45 AM** | **0** | **0** | **1** | **2** | **0** | **0** | **3** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **5** | **1** | **15** | 40 |
| **9:00 AM** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **1** | **4** | **0** | **9** | **36** |
| 9:15 AM | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 7 | 3 | 18 | 46 |
| 9:30 AM | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 0 | 0 | 2 | 3 | 1 | 16 | 58 |
| 9:45 AM | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 0 | 1 | 5 | 2 | 17 | 60 |
| Count Total | 0 | 4 | 4 | 10 | 0 | 2 | 17 | 4 | 0 | 2 | 27 | 1 | 0 | 8 | 45 | 14 | 138 | 0 |
| **Peak Hour** | **0** | **1** | **1** | **2** | **0** | **1** | **5** | **0** | **0** | **0** | **6** | **1** | **0** | **1** | **16** | **2** | **36** | **0** |

## Three-Hour Count Summaries - Bikes

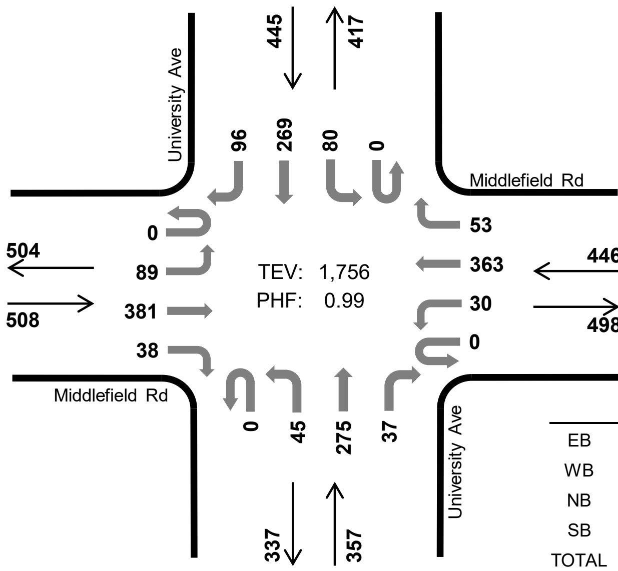
| Interval Start | Middlefield Rd Eastbound LT | TH | RT | Middlefield Rd Westbound LT | TH | RT | University Ave Northbound LT | TH | RT | University Ave Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 6 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 7 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 7 | 25 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 22 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **5** | **0** | **6** | 23 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **5** | **0** | **7** | 23 |
| **8:45 AM** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **2** | **0** | **0** | **8** | **2** | **14** | 30 |
| **9:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **1** | **7** | **34** |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 | 31 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 8 | 32 |
| 9:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 5 | 23 |
| Count Total | 0 | 3 | 0 | 0 | 5 | 1 | 0 | 5 | 1 | 1 | 57 | 5 | 78 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **1** | **1** | **0** | **4** | **0** | **0** | **24** | **3** | **34** | **0** |

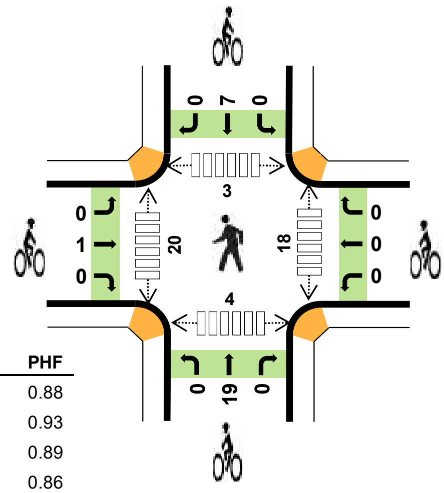
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# University Ave
# Middlefield Rd

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 5:00 PM to 6:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.6% | 0.88 |
| WB | 1.3% | 0.93 |
| NB | 2.0% | 0.89 |
| SB | 1.3% | 0.86 |
| TOTAL | 1.3% | 0.99 |

## Three-Hour Count Summaries

| Interval Start | | Middlefield Rd Eastbound | | | | Middlefield Rd Westbound | | | | University Ave Northbound | | | | University Ave Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 5:00 PM | | 0 | 25 | 96 | 11 | 0 | 7 | 83 | 10 | 0 | 15 | 74 | 11 | 0 | 19 | 70 | 16 | 437 | 0 |
| 5:15 PM | | 0 | 22 | 110 | 13 | 0 | 4 | 88 | 17 | 0 | 9 | 61 | 11 | 0 | 20 | 56 | 22 | 433 | 0 |
| 5:30 PM | | 0 | 22 | 90 | 8 | 0 | 10 | 97 | 10 | 0 | 8 | 63 | 8 | 0 | 19 | 74 | 36 | 445 | 0 |
| 5:45 PM | | 0 | 20 | 85 | 6 | 0 | 9 | 95 | 16 | 0 | 13 | 77 | 7 | 0 | 22 | 69 | 22 | 441 | 1,756 |
| Peak Hour | All | 0 | 89 | 381 | 38 | 0 | 30 | 363 | 53 | 0 | 45 | 275 | 37 | 0 | 80 | 269 | 96 | 1,756 | 0 |
| | HV | 0 | 1 | 0 | 2 | 0 | 1 | 4 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 6 | 0 | 22 | 0 |
| | HV% | - | 1% | 0% | 5% | - | 3% | 1% | 2% | - | 0% | 3% | 0% | - | 0% | 2% | 0% | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 5:00 PM | 0 | 2 | 2 | 2 | *6* | 0 | 0 | 0 | 2 | *2* | 0 | 5 | 0 | 1 | *6* |
| 5:15 PM | 2 | 1 | 2 | 1 | *6* | 0 | 0 | 8 | 0 | *8* | 6 | 11 | 2 | 1 | *20* |
| 5:30 PM | 0 | 1 | 2 | 1 | *4* | 0 | 0 | 7 | 3 | *10* | 6 | 2 | 0 | 0 | *8* |
| 5:45 PM | 1 | 2 | 1 | 2 | *6* | 1 | 0 | 4 | 2 | *7* | 6 | 2 | 1 | 2 | *11* |
| Peak Hour | 3 | 6 | 7 | 6 | *22* | 1 | 0 | 19 | 7 | *27* | 18 | 20 | 3 | 4 | *45* |

## Three-Hour Count Summaries

| Interval Start | Middlefield Rd Eastbound UT | LT | TH | RT | Middlefield Rd Westbound UT | LT | TH | RT | University Ave Northbound UT | LT | TH | RT | University Ave Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 17 | 116 | 8 | 0 | 9 | 71 | 14 | 0 | 8 | 59 | 6 | 0 | 17 | 56 | 20 | 401 | 0 |
| 4:15 PM | 0 | 26 | 82 | 15 | 0 | 10 | 75 | 8 | 0 | 8 | 84 | 9 | 0 | 18 | 55 | 29 | 419 | 0 |
| 4:30 PM | 0 | 14 | 94 | 17 | 0 | 9 | 83 | 13 | 0 | 15 | 56 | 11 | 0 | 16 | 55 | 25 | 408 | 0 |
| 4:45 PM | 0 | 16 | 111 | 10 | 0 | 5 | 68 | 14 | 0 | 22 | 64 | 8 | 0 | 19 | 55 | 18 | 410 | 1,638 |
| **5:00 PM** | **0** | **25** | **96** | **11** | **0** | **7** | **83** | **10** | **0** | **15** | **74** | **11** | **0** | **19** | **70** | **16** | **437** | 1,674 |
| **5:15 PM** | **0** | **22** | **110** | **13** | **0** | **4** | **88** | **17** | **0** | **9** | **61** | **11** | **0** | **20** | **56** | **22** | **433** | 1,688 |
| **5:30 PM** | **0** | **22** | **90** | **8** | **0** | **10** | **97** | **10** | **0** | **8** | **63** | **8** | **0** | **19** | **74** | **36** | **445** | 1,725 |
| **5:45 PM** | **0** | **20** | **85** | **6** | **0** | **9** | **95** | **16** | **0** | **13** | **77** | **7** | **0** | **22** | **69** | **22** | **441** | **1,756** |
| 6:00 PM | 0 | 19 | 89 | 10 | 0 | 9 | 75 | 26 | 0 | 13 | 69 | 13 | 0 | 23 | 64 | 20 | 430 | 1,749 |
| 6:15 PM | 0 | 22 | 78 | 13 | 0 | 4 | 75 | 17 | 0 | 7 | 62 | 11 | 0 | 18 | 96 | 21 | 424 | 1,740 |
| 6:30 PM | 0 | 28 | 67 | 14 | 0 | 5 | 59 | 12 | 0 | 5 | 68 | 8 | 0 | 8 | 81 | 21 | 376 | 1,671 |
| 6:45 PM | 0 | 19 | 65 | 10 | 0 | 4 | 60 | 17 | 0 | 12 | 65 | 3 | 0 | 14 | 74 | 25 | 368 | 1,598 |
| Count Total | 0 | 250 | 1,083 | 135 | 0 | 85 | 929 | 174 | 0 | 135 | 802 | 106 | 0 | 213 | 805 | 275 | 4,992 | 0 |
| **Peak Hour All** | **0** | **89** | **381** | **38** | **0** | **30** | **363** | **53** | **0** | **45** | **275** | **37** | **0** | **80** | **269** | **96** | **1,756** | **0** |
| **Peak Hour HV** | **0** | **1** | **0** | **2** | **0** | **1** | **4** | **1** | **0** | **0** | **7** | **0** | **0** | **0** | **6** | **0** | **22** | **0** |
| **Peak Hour HV%** | **-** | **1%** | **0%** | **5%** | **-** | **3%** | **1%** | **2%** | **-** | **0%** | **3%** | **0%** | **-** | **0%** | **2%** | **0%** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 1 | 1 | 1 | 3 | *6* | 1 | 0 | 2 | 2 | *5* | 4 | 2 | 2 | 1 | *9* |
| 4:15 PM | 1 | 0 | 2 | 3 | *6* | 1 | 0 | 2 | 4 | *7* | 2 | 4 | 0 | 5 | *11* |
| 4:30 PM | 1 | 2 | 2 | 2 | *7* | 1 | 0 | 2 | 1 | *4* | 7 | 7 | 2 | 1 | *17* |
| 4:45 PM | 0 | 2 | 5 | 1 | *8* | 0 | 0 | 0 | 3 | *3* | 5 | 2 | 1 | 2 | *10* |
| **5:00 PM** | **0** | **2** | **2** | **2** | ***6*** | **0** | **0** | **0** | **2** | ***2*** | **0** | **5** | **0** | **1** | *6* |
| **5:15 PM** | **2** | **1** | **2** | **1** | ***6*** | **0** | **0** | **8** | **0** | ***8*** | **6** | **11** | **2** | **1** | *20* |
| **5:30 PM** | **0** | **1** | **2** | **1** | ***4*** | **0** | **0** | **7** | **3** | ***10*** | **6** | **2** | **0** | **0** | *8* |
| **5:45 PM** | **1** | **2** | **1** | **2** | ***6*** | **1** | **0** | **4** | **2** | ***7*** | **6** | **2** | **1** | **2** | ***11*** |
| 6:00 PM | 2 | 2 | 3 | 2 | *9* | 1 | 0 | 3 | 1 | *5* | 11 | 6 | 2 | 1 | *20* |
| 6:15 PM | 1 | 1 | 1 | 2 | *5* | 1 | 0 | 0 | 2 | *3* | 4 | 6 | 2 | 2 | *14* |
| 6:30 PM | 0 | 0 | 2 | 1 | *3* | 0 | 2 | 0 | 2 | *4* | 14 | 3 | 3 | 7 | *27* |
| 6:45 PM | 1 | 1 | 2 | 0 | *4* | 2 | 1 | 2 | 1 | *6* | 4 | 7 | 1 | 1 | *13* |
| Count Total | 10 | 15 | 25 | 20 | *70* | 8 | 3 | 30 | 23 | *64* | 69 | 57 | 16 | 24 | *166* |
| **Peak Hour** | **3** | **6** | **7** | **6** | ***22*** | **1** | **0** | **19** | **7** | ***27*** | **18** | **20** | **3** | **4** | ***45*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Middlefield Rd | | | | Middlefield Rd | | | | University Ave | | | | University Ave | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 6 | 0 |
| 4:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 6 | 0 |
| 4:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 7 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 8 | 27 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **6** | 27 |
| **5:15 PM** | **0** | **1** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **6** | 27 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **4** | 24 |
| **5:45 PM** | **0** | **0** | **0** | **1** | **0** | **1** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **6** | **22** |
| 6:00 PM | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 9 | 25 |
| 6:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 5 | 24 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 23 |
| 6:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 21 |
| Count Total | 0 | 2 | 2 | 6 | 0 | 2 | 9 | 4 | 0 | 3 | 21 | 1 | 0 | 0 | 17 | 3 | 70 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **2** | **0** | **1** | **4** | **1** | **0** | **0** | **7** | **0** | **0** | **0** | **6** | **0** | **22** | **0** |

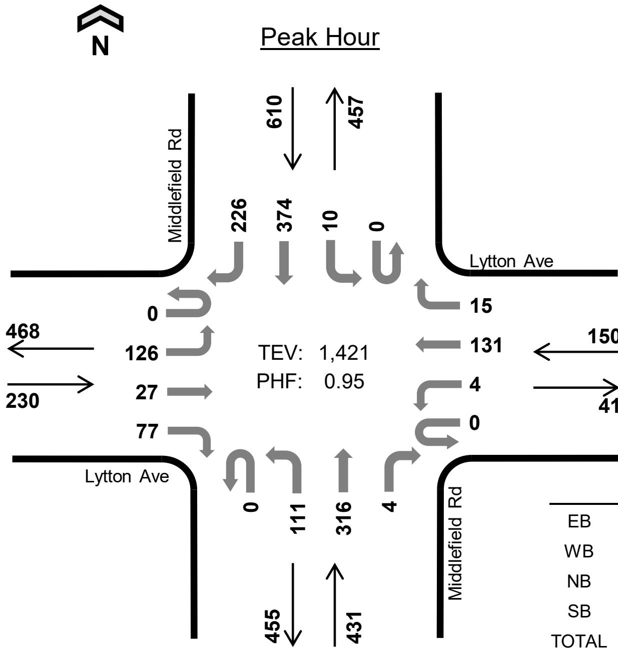
## Three-Hour Count Summaries - Bikes

| Interval Start | Middlefield Rd | | | Middlefield Rd | | | University Ave | | | University Ave | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 5 | 0 |
| 4:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 7 | 0 |
| 4:30 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 4 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 19 |
| **5:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **2** | 16 |
| **5:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **0** | **0** | **0** | **0** | **8** | 17 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **3** | **0** | **10** | 23 |
| **5:45 PM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **2** | **0** | **7** | **27** |
| 6:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 5 | 30 |
| 6:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 25 |
| 6:30 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 19 |
| 6:45 PM | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 6 | 18 |
| Count Total | 2 | 6 | 0 | 0 | 2 | 1 | 0 | 30 | 0 | 0 | 20 | 3 | 64 | 0 |
| **Peak Hour** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **19** | **0** | **0** | **7** | **0** | **27** | **0** |

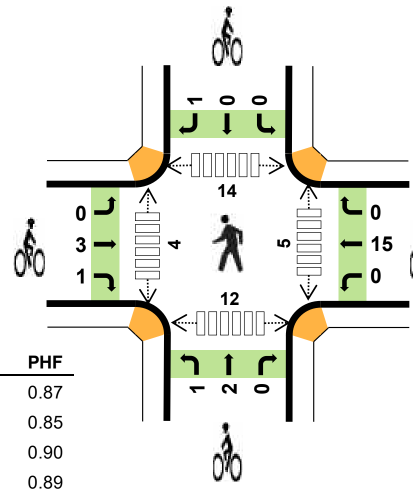
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Middlefield Rd
# Lytton Ave

**Date:** 04-25-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | 1.7% | 0.87 |
| WB | 1.3% | 0.85 |
| NB | 2.8% | 0.90 |
| SB | 1.0% | 0.89 |
| TOTAL | 1.7% | 0.95 |




## Three-Hour Count Summaries

| Interval Start | | Lytton Ave Eastbound | | | | Lytton Ave Westbound | | | | Middlefield Rd Northbound | | | | Middlefield Rd Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 8:00 AM | | 0 | 30 | 7 | 18 | 0 | 1 | 37 | 4 | 0 | 34 | 77 | 1 | 0 | 2 | 77 | 50 | 338 | 0 |
| 8:15 AM | | 0 | 28 | 5 | 11 | 0 | 3 | 36 | 5 | 0 | 29 | 72 | 0 | 0 | 2 | 100 | 54 | 345 | 0 |
| 8:30 AM | | 0 | 31 | 8 | 27 | 0 | 0 | 34 | 2 | 0 | 27 | 70 | 1 | 0 | 2 | 105 | 65 | 372 | 0 |
| 8:45 AM | | 0 | 37 | 7 | 21 | 0 | 0 | 24 | 4 | 0 | 21 | 97 | 2 | 0 | 4 | 92 | 57 | 366 | 1,421 |
| Peak Hour | All | 0 | 126 | 27 | 77 | 0 | 4 | 131 | 15 | 0 | 111 | 316 | 4 | 0 | 10 | 374 | 226 | 1,421 | 0 |
| | HV | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 3 | 9 | 0 | 0 | 0 | 1 | 5 | 24 | 0 |
| | HV% | - | 1% | 4% | 3% | - | 0% | 1% | 7% | - | 3% | 3% | 0% | - | 0% | 0% | 2% | 2% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 8:00 AM | 1 | 0 | 6 | 1 | *8* | 1 | 1 | 0 | 0 | *2* | 2 | 1 | 2 | 4 | *9* |
| 8:15 AM | 0 | 2 | 1 | 3 | *6* | 0 | 5 | 1 | 0 | *6* | 1 | 2 | 5 | 2 | *10* |
| 8:30 AM | 0 | 0 | 1 | 1 | *2* | 1 | 4 | 1 | 0 | *6* | 1 | 0 | 4 | 1 | *6* |
| 8:45 AM | 3 | 0 | 4 | 1 | *8* | 2 | 5 | 1 | 1 | *9* | 1 | 1 | 3 | 5 | *10* |
| Peak Hour | 4 | 2 | 12 | 6 | *24* | 4 | 15 | 3 | 1 | *23* | 5 | 4 | 14 | 12 | *35* |

## Three-Hour Count Summaries

| Interval Start | Lytton Ave | | | | Lytton Ave | | | | Middlefield Rd | | | | Middlefield Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 25 | 2 | 8 | 0 | 0 | 17 | 1 | 0 | 17 | 21 | 0 | 0 | 0 | 54 | 75 | 220 | 0 |
| 7:15 AM | 0 | 29 | 2 | 9 | 0 | 0 | 23 | 2 | 0 | 23 | 44 | 0 | 0 | 0 | 52 | 78 | 262 | 0 |
| 7:30 AM | 0 | 34 | 4 | 6 | 0 | 1 | 28 | 1 | 0 | 16 | 65 | 0 | 0 | 2 | 74 | 64 | 295 | 0 |
| 7:45 AM | 0 | 33 | 4 | 21 | 0 | 0 | 19 | 3 | 0 | 16 | 66 | 1 | 0 | 1 | 84 | 52 | 300 | 1,077 |
| **8:00 AM** | **0** | **30** | **7** | **18** | **0** | **1** | **37** | **4** | **0** | **34** | **77** | **1** | **0** | **2** | **77** | **50** | **338** | 1,195 |
| **8:15 AM** | **0** | **28** | **5** | **11** | **0** | **3** | **36** | **5** | **0** | **29** | **72** | **0** | **0** | **2** | **100** | **54** | **345** | 1,278 |
| **8:30 AM** | **0** | **31** | **8** | **27** | **0** | **0** | **34** | **2** | **0** | **27** | **70** | **1** | **0** | **2** | **105** | **65** | **372** | 1,355 |
| **8:45 AM** | **0** | **37** | **7** | **21** | **0** | **0** | **24** | **4** | **0** | **21** | **97** | **2** | **0** | **4** | **92** | **57** | **366** | **1,421** |
| 9:00 AM | 0 | 35 | 7 | 13 | 0 | 1 | 34 | 2 | 0 | 16 | 74 | 0 | 0 | 0 | 86 | 57 | 325 | 1,408 |
| 9:15 AM | 0 | 39 | 7 | 18 | 0 | 0 | 17 | 1 | 0 | 28 | 72 | 0 | 0 | 2 | 93 | 71 | 348 | 1,411 |
| 9:30 AM | 0 | 32 | 8 | 17 | 0 | 0 | 34 | 3 | 0 | 21 | 67 | 0 | 0 | 1 | 81 | 65 | 329 | 1,368 |
| 9:45 AM | 0 | 45 | 8 | 19 | 0 | 0 | 27 | 5 | 0 | 37 | 72 | 1 | 0 | 3 | 77 | 50 | 344 | 1,346 |
| Count Total | 0 | 398 | 69 | 188 | 0 | 6 | 330 | 33 | 0 | 285 | 797 | 6 | 0 | 19 | 975 | 738 | 3,844 | 0 |
| **Peak Hour All** | **0** | **126** | **27** | **77** | **0** | **4** | **131** | **15** | **0** | **111** | **316** | **4** | **0** | **10** | **374** | **226** | **1,421** | **0** |
| **Peak Hour HV** | **0** | **1** | **1** | **2** | **0** | **0** | **1** | **1** | **0** | **3** | **9** | **0** | **0** | **0** | **1** | **5** | **24** | **0** |
| **Peak Hour HV%** | **-** | **1%** | **4%** | **3%** | **-** | **0%** | **1%** | **7%** | **-** | **3%** | **3%** | **0%** | **-** | **0%** | **0%** | **2%** | **2%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 0 | 3 | 4 | *7* | 1 | 1 | 2 | 1 | *5* | 1 | 1 | 0 | 1 | *3* |
| 7:15 AM | 1 | 0 | 2 | 2 | *5* | 2 | 2 | 0 | 0 | *4* | 0 | 2 | 2 | 2 | *6* |
| 7:30 AM | 1 | 0 | 2 | 0 | *3* | 1 | 1 | 3 | 0 | *5* | 0 | 0 | 0 | 1 | *1* |
| 7:45 AM | 2 | 0 | 2 | 0 | *4* | 0 | 2 | 1 | 1 | *4* | 2 | 4 | 4 | 1 | *11* |
| **8:00 AM** | **1** | **0** | **6** | **1** | ***8*** | **1** | **1** | **0** | **0** | ***2*** | **2** | **1** | **2** | **4** | *9* |
| **8:15 AM** | **0** | **2** | **1** | **3** | ***6*** | **0** | **5** | **1** | **0** | ***6*** | **1** | **2** | **5** | **2** | *10* |
| **8:30 AM** | **0** | **0** | **1** | **1** | ***2*** | **1** | **4** | **1** | **0** | ***6*** | **1** | **0** | **4** | **1** | *6* |
| **8:45 AM** | **3** | **0** | **4** | **1** | ***8*** | **2** | **5** | **1** | **1** | ***9*** | **1** | **1** | **3** | **5** | ***10*** |
| 9:00 AM | 2 | 0 | 0 | 1 | *3* | 2 | 6 | 2 | 1 | *11* | 3 | 1 | 4 | 3 | *11* |
| 9:15 AM | 0 | 1 | 4 | 3 | *8* | 0 | 6 | 0 | 0 | *6* | 0 | 0 | 3 | 1 | *4* |
| 9:30 AM | 1 | 2 | 2 | 2 | *7* | 1 | 1 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 5 | 1 | 2 | 3 | *11* | 4 | 1 | 1 | 0 | *6* | 2 | 0 | 0 | 6 | *8* |
| Count Total | 16 | 6 | 29 | 21 | *72* | 15 | 35 | 12 | 4 | *66* | 13 | 12 | 27 | 27 | *79* |
| **Peak Hour** | **4** | **2** | **12** | **6** | ***24*** | **4** | **15** | **3** | **1** | ***23*** | **5** | **4** | **14** | **12** | ***35*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Lytton Ave Eastbound UT | LT | TH | RT | Lytton Ave Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 1 | 7 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 5 | 0 |
| 7:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 7:45 AM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 19 |
| **8:00 AM** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **4** | **0** | **0** | **0** | **1** | **0** | **8** | 20 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **3** | **6** | 21 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **2** | 20 |
| **8:45 AM** | **0** | **1** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **0** | **0** | **1** | **8** | **24** |
| 9:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 19 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 2 | 1 | 8 | 21 |
| 9:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 7 | 26 |
| 9:45 AM | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 11 | 29 |
| Count Total | 0 | 10 | 2 | 4 | 0 | 0 | 4 | 2 | 0 | 9 | 20 | 0 | 0 | 0 | 10 | 11 | 72 | 0 |
| **Peak Hour** | **0** | **1** | **1** | **2** | **0** | **0** | **1** | **1** | **0** | **3** | **9** | **0** | **0** | **0** | **1** | **5** | **24** | **0** |

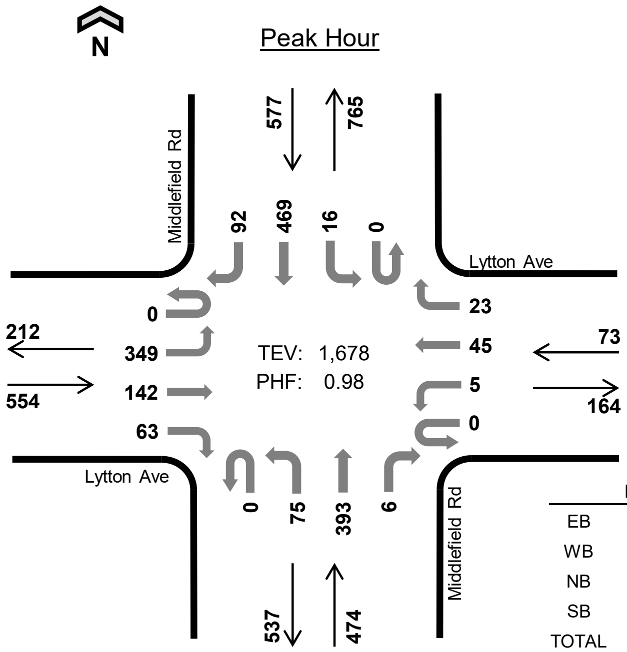
## Three-Hour Count Summaries - Bikes

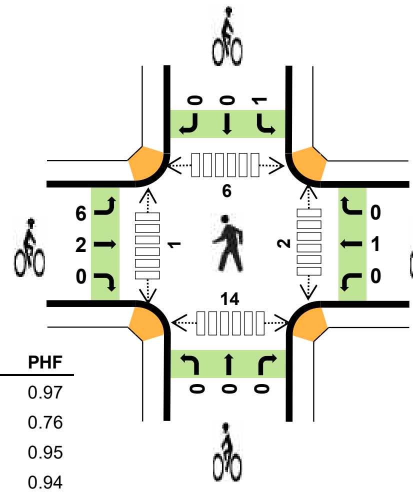
| Interval Start | Lytton Ave Eastbound LT | TH | RT | Lytton Ave Westbound LT | TH | RT | Middlefield Rd Northbound LT | TH | RT | Middlefield Rd Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 5 | 0 |
| 7:15 AM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 7:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 18 |
| **8:00 AM** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 15 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **6** | 17 |
| **8:30 AM** | **0** | **1** | **0** | **0** | **4** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **6** | 18 |
| **8:45 AM** | **0** | **1** | **1** | **0** | **5** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **9** | **23** |
| 9:00 AM | 2 | 0 | 0 | 0 | 6 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 11 | 32 |
| 9:15 AM | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 32 |
| 9:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 28 |
| 9:45 AM | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | 25 |
| Count Total | 9 | 5 | 1 | 0 | 33 | 2 | 6 | 6 | 0 | 1 | 2 | 1 | 66 | 0 |
| **Peak Hour** | **0** | **3** | **1** | **0** | **15** | **0** | **1** | **2** | **0** | **0** | **0** | **1** | **23** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Middlefield Rd
# Lytton Ave

**Date:** 04-25-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:30 PM to 5:30 PM




| | HV %: | PHF |
|---|---|---|
| EB | 1.6% | 0.97 |
| WB | 0.0% | 0.76 |
| NB | 1.5% | 0.95 |
| SB | 1.6% | 0.94 |
| TOTAL | 1.5% | 0.98 |

## Three-Hour Count Summaries

| Interval Start | | Lytton Ave Eastbound UT | LT | TH | RT | Lytton Ave Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM | | 0 | 89 | 35 | 16 | 0 | 2 | 12 | 4 | 0 | 22 | 102 | 0 | 0 | 4 | 107 | 29 | 422 | 0 |
| 4:45 PM | | 0 | 91 | 39 | 13 | 0 | 1 | 9 | 2 | 0 | 18 | 88 | 1 | 0 | 4 | 121 | 18 | 405 | 0 |
| 5:00 PM | | 0 | 84 | 36 | 17 | 0 | 1 | 10 | 8 | 0 | 16 | 107 | 2 | 0 | 5 | 115 | 20 | 421 | 0 |
| 5:15 PM | | 0 | 85 | 32 | 17 | 0 | 1 | 14 | 9 | 0 | 19 | 96 | 3 | 0 | 3 | 126 | 25 | 430 | 1,678 |
| Peak Hour | All | 0 | 349 | 142 | 63 | 0 | 5 | 45 | 23 | 0 | 75 | 393 | 6 | 0 | 16 | 469 | 92 | 1,678 | 0 |
| | HV | 0 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 7 | 25 | 0 |
| | HV% | - | 2% | 1% | 2% | - | 0% | 0% | 0% | - | 0% | 2% | 0% | - | 0% | 0% | 8% | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM | 2 | 0 | 3 | 3 | *8* | 1 | 1 | 0 | 0 | *2* | 0 | 1 | 2 | 4 | *7* |
| 4:45 PM | 2 | 0 | 2 | 1 | *5* | 3 | 0 | 0 | 0 | *3* | 2 | 0 | 4 | 4 | *10* |
| 5:00 PM | 2 | 0 | 1 | 2 | *5* | 2 | 0 | 0 | 1 | *3* | 0 | 0 | 0 | 6 | *6* |
| 5:15 PM | 3 | 0 | 1 | 3 | *7* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| **Peak Hour** | 9 | 0 | 7 | 9 | *25* | 8 | 1 | 0 | 1 | *10* | 2 | 1 | 6 | 14 | *23* |

## Three-Hour Count Summaries

| Interval Start | Lytton Ave Eastbound UT | LT | TH | RT | Lytton Ave Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 58 | 35 | 17 | 0 | 0 | 13 | 8 | 0 | 16 | 83 | 4 | 0 | 3 | 109 | 19 | 365 | 0 |
| 4:15 PM | 0 | 98 | 33 | 22 | 0 | 1 | 10 | 4 | 0 | 24 | 71 | 4 | 0 | 5 | 98 | 22 | 392 | 0 |
| **4:30 PM** | **0** | **89** | **35** | **16** | **0** | **2** | **12** | **4** | **0** | **22** | **102** | **0** | **0** | **4** | **107** | **29** | **422** | 0 |
| **4:45 PM** | **0** | **91** | **39** | **13** | **0** | **1** | **9** | **2** | **0** | **18** | **88** | **1** | **0** | **4** | **121** | **18** | **405** | 1,584 |
| **5:00 PM** | **0** | **84** | **36** | **17** | **0** | **1** | **10** | **8** | **0** | **16** | **107** | **2** | **0** | **5** | **115** | **20** | **421** | 1,640 |
| **5:15 PM** | **0** | **85** | **32** | **17** | **0** | **1** | **14** | **9** | **0** | **19** | **96** | **3** | **0** | **3** | **126** | **25** | **430** | **1,678** |
| 5:30 PM | 0 | 74 | 24 | 12 | 0 | 0 | 13 | 3 | 0 | 22 | 111 | 1 | 0 | 7 | 91 | 30 | 388 | 1,644 |
| 5:45 PM | 0 | 75 | 23 | 18 | 0 | 1 | 13 | 5 | 0 | 22 | 104 | 3 | 0 | 6 | 92 | 25 | 387 | 1,626 |
| 6:00 PM | 0 | 80 | 28 | 23 | 0 | 0 | 14 | 2 | 0 | 22 | 93 | 1 | 0 | 3 | 95 | 32 | 393 | 1,598 |
| 6:15 PM | 0 | 74 | 30 | 16 | 0 | 0 | 14 | 1 | 0 | 16 | 81 | 3 | 0 | 3 | 92 | 33 | 363 | 1,531 |
| 6:30 PM | 0 | 69 | 24 | 33 | 0 | 1 | 6 | 2 | 0 | 9 | 82 | 0 | 0 | 2 | 73 | 25 | 326 | 1,469 |
| 6:45 PM | 0 | 83 | 16 | 15 | 0 | 0 | 10 | 1 | 0 | 19 | 82 | 1 | 0 | 4 | 75 | 24 | 330 | 1,412 |
| Count Total | 0 | 960 | 355 | 219 | 0 | 8 | 138 | 49 | 0 | 225 | 1,100 | 23 | 0 | 49 | 1,194 | 302 | 4,622 | 0 |
| **Peak Hour All** | **0** | **349** | **142** | **63** | **0** | **5** | **45** | **23** | **0** | **75** | **393** | **6** | **0** | **16** | **469** | **92** | **1,678** | **0** |
| **Peak Hour HV** | **0** | **7** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **2** | **7** | **25** | **0** |
| **Peak Hour HV%** | **-** | **2%** | **1%** | **2%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **2%** | **0%** | **-** | **0%** | **0%** | **8%** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 2 | 0 | 1 | 1 | *4* | 1 | 1 | 0 | 1 | *3* | 0 | 1 | 2 | 2 | *5* |
| 4:15 PM | 2 | 0 | 2 | 2 | *6* | 2 | 0 | 0 | 0 | *2* | 0 | 0 | 5 | 1 | *6* |
| **4:30 PM** | **2** | **0** | **3** | **3** | ***8*** | **1** | **1** | **0** | **0** | ***2*** | **0** | **1** | **2** | **4** | *7* |
| **4:45 PM** | **2** | **0** | **2** | **1** | ***5*** | **3** | **0** | **0** | **0** | ***3*** | **2** | **0** | **4** | **4** | *10* |
| **5:00 PM** | **2** | **0** | **1** | **2** | ***5*** | **2** | **0** | **0** | **1** | ***3*** | **0** | **0** | **0** | **6** | *6* |
| **5:15 PM** | **3** | **0** | **1** | **3** | ***7*** | **2** | **0** | **0** | **0** | ***2*** | **0** | **0** | **0** | **0** | ***0*** |
| 5:30 PM | 2 | 0 | 0 | 0 | *2* | 2 | 3 | 0 | 0 | *5* | 1 | 0 | 2 | 3 | *6* |
| 5:45 PM | 1 | 0 | 1 | 3 | *5* | 3 | 0 | 0 | 1 | *4* | 5 | 1 | 5 | 5 | *16* |
| 6:00 PM | 2 | 0 | 3 | 3 | *8* | 2 | 0 | 1 | 1 | *4* | 2 | 0 | 2 | 5 | *9* |
| 6:15 PM | 1 | 0 | 0 | 3 | *4* | 4 | 3 | 1 | 1 | *9* | 1 | 3 | 1 | 5 | *10* |
| 6:30 PM | 1 | 0 | 0 | 1 | *2* | 1 | 0 | 2 | 0 | *3* | 1 | 3 | 2 | 3 | *9* |
| 6:45 PM | 0 | 0 | 1 | 0 | *1* | 4 | 1 | 0 | 2 | *7* | 1 | 0 | 0 | 7 | *8* |
| Count Total | 20 | 0 | 15 | 22 | *57* | 27 | 9 | 4 | 7 | *47* | 13 | 9 | 25 | 45 | *92* |
| **Peak Hour** | **9** | **0** | **7** | **9** | ***25*** | **8** | **1** | **0** | **1** | ***10*** | **2** | **1** | **6** | **14** | ***23*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Lytton Ave Eastbound UT | LT | TH | RT | Lytton Ave Westbound UT | LT | TH | RT | Middlefield Rd Northbound UT | LT | TH | RT | Middlefield Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 |
| 4:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 6 | 0 |
| **4:30 PM** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **1** | **2** | **8** | 0 |
| **4:45 PM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **1** | **5** | 23 |
| **5:00 PM** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **2** | **5** | 24 |
| **5:15 PM** | **0** | **2** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **2** | **7** | **25** |
| 5:30 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 19 |
| 5:45 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 5 | 19 |
| 6:00 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 1 | 8 | 22 |
| 6:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 19 |
| 6:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 19 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 15 |
| Count Total | 0 | 16 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 13 | 0 | 0 | 0 | 7 | 15 | 57 | 0 |
| **Peak Hour** | **0** | **7** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **7** | **0** | **0** | **0** | **2** | **7** | **25** | **0** |

## Three-Hour Count Summaries - Bikes

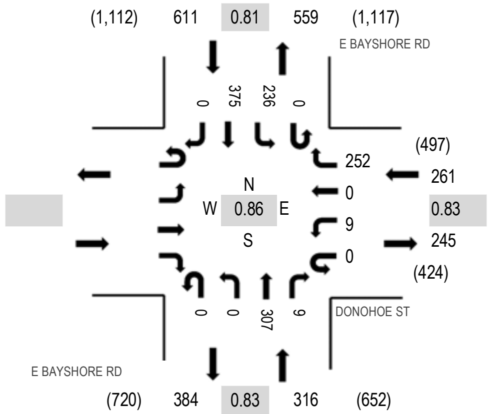
| Interval Start | Lytton Ave Eastbound LT | TH | RT | Lytton Ave Westbound LT | TH | RT | Middlefield Rd Northbound LT | TH | RT | Middlefield Rd Southbound LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 |
| 4:15 PM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| **4:30 PM** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | 0 |
| **4:45 PM** | **2** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | 10 |
| **5:00 PM** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **3** | 10 |
| **5:15 PM** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **10** |
| 5:30 PM | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 13 |
| 5:45 PM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 14 |
| 6:00 PM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 15 |
| 6:15 PM | 1 | 3 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 9 | 22 |
| 6:30 PM | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 20 |
| 6:45 PM | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 7 | 23 |
| Count Total | 15 | 11 | 1 | 0 | 6 | 3 | 1 | 1 | 2 | 2 | 4 | 1 | 47 | 0 |
| **Peak Hour** | **6** | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **10** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

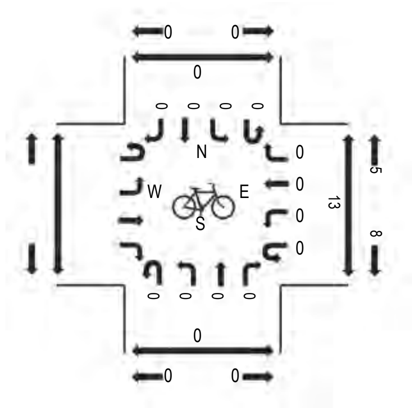
(303) 216-2439
www.alltrafficdata.net

Location: 7 E BAYSHORE RD & DONOHOE ST AM
Date: Tuesday, May 21, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

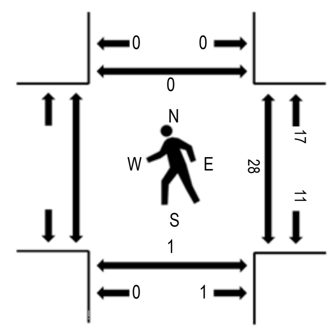
Peak Hour - All Vehicles




Peak Hour - Bicycles




Peak Hour - Pedestrians




Note: Total study counts contained in parentheses.

## Traffic Counts

| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | DONOHOE ST Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | E BAYSHORE RD Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | E BAYSHORE RD Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | | | | 0 | 3 | 0 | 62 | 0 | 0 | 91 | 3 | 0 | 46 | 104 | 0 | 309 | 1,188 | | 9 | 0 | 0 |
| 7:15 AM | | | | | 0 | 0 | 0 | 79 | 0 | 0 | 76 | 1 | 0 | 82 | 106 | 0 | 344 | 1,120 | | 7 | 0 | 0 |
| 7:30 AM | | | | | 0 | 4 | 0 | 64 | 0 | 0 | 74 | 1 | 0 | 59 | 87 | 0 | 289 | 1,038 | | 4 | 0 | 0 |
| 7:45 AM | | | | | 0 | 2 | 0 | 47 | 0 | 0 | 66 | 4 | 0 | 49 | 78 | 0 | 246 | 1,040 | | 8 | 1 | 0 |
| 8:00 AM | | | | | 0 | 3 | 0 | 44 | 0 | 0 | 67 | 2 | 0 | 47 | 78 | 0 | 241 | 1,073 | | 4 | 0 | 0 |
| 8:15 AM | | | | | 0 | 4 | 0 | 50 | 0 | 0 | 78 | 1 | 1 | 41 | 87 | 0 | 262 | | | 4 | 1 | 0 |
| 8:30 AM | | | | | 0 | 0 | 0 | 68 | 0 | 0 | 100 | 1 | 0 | 44 | 78 | 0 | 291 | | | 2 | 0 | 0 |
| 8:45 AM | | | | | 0 | 1 | 0 | 66 | 0 | 0 | 84 | 3 | 0 | 40 | 85 | 0 | 279 | | | 1 | 0 | 0 |

## Peak Rolling Hour Flow Rates

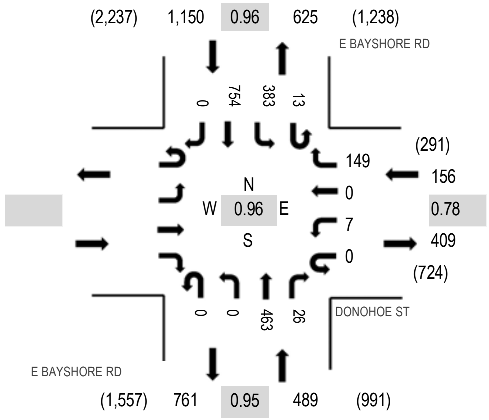
| Vehicle Type | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 4 | 0 | 10 |
| Bicycles on Road | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lights | | | | | 0 | 9 | 0 | 246 | 0 | 0 | 292 | 6 | 0 | 226 | 353 | 0 | 1,132 |
| Mediums | | | | | 0 | 0 | 0 | 6 | 0 | 0 | 10 | 3 | 0 | 9 | 18 | 0 | 46 |
| Total | | | | | 0 | 9 | 0 | 252 | 0 | 0 | 307 | 9 | 0 | 236 | 375 | 0 | 1,188 |

All Traffic Data Services Inc.

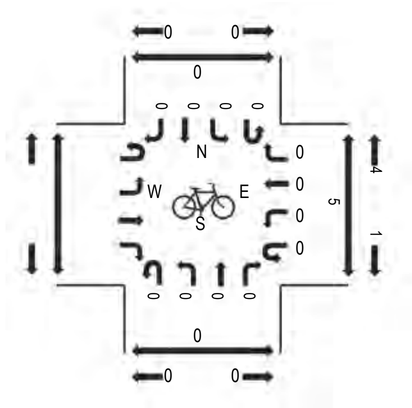
(303) 216-2439
www.alltrafficdata.net

Location: 7 E BAYSHORE RD & DONOHOE ST PM
Date: Tuesday, May 21, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

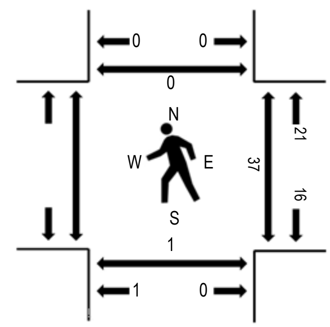
## Peak Hour - All Vehicles




## Peak Hour - Bicycles




## Peak Hour - Pedestrians




Note: Total study counts contained in parentheses.

## Traffic Counts

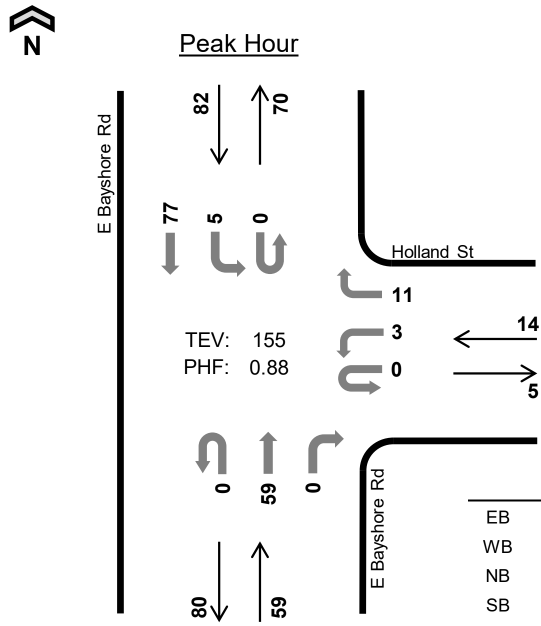
| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | DONOHOE ST Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | E BAYSHORE RD Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | E BAYSHORE RD Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | | | | 0 | 2 | 0 | 29 | 0 | 0 | 134 | 8 | 3 | 71 | 198 | 0 | 445 | 1,742 | | 7 | 0 | 0 |
| 4:15 PM | | | | | 0 | 3 | 0 | 35 | 0 | 0 | 136 | 5 | 0 | 70 | 188 | 0 | 437 | 1,765 | | 8 | 1 | 0 |
| 4:30 PM | | | | | 0 | 0 | 0 | 35 | 0 | 0 | 120 | 7 | 1 | 73 | 187 | 0 | 423 | 1,768 | | 17 | 0 | 0 |
| 4:45 PM | | | | | 0 | 0 | 0 | 35 | 0 | 0 | 120 | 7 | 3 | 107 | 165 | 0 | 437 | 1,795 | | 9 | 0 | 0 |
| 5:00 PM | | | | | 0 | 1 | 0 | 38 | 0 | 0 | 118 | 5 | 3 | 95 | 208 | 0 | 468 | 1,777 | | 11 | 0 | 0 |
| 5:15 PM | | | | | 0 | 3 | 0 | 29 | 0 | 0 | 104 | 9 | 2 | 105 | 188 | 0 | 440 | | | 10 | 0 | 0 |
| 5:30 PM | | | | | 0 | 3 | 0 | 47 | 0 | 0 | 121 | 5 | 5 | 76 | 193 | 0 | 450 | | | 7 | 1 | 0 |
| 5:45 PM | | | | | 1 | 1 | 0 | 29 | 0 | 0 | 89 | 3 | 2 | 77 | 217 | 0 | 419 | | | 17 | 0 | 0 |

## Peak Rolling Hour Flow Rates

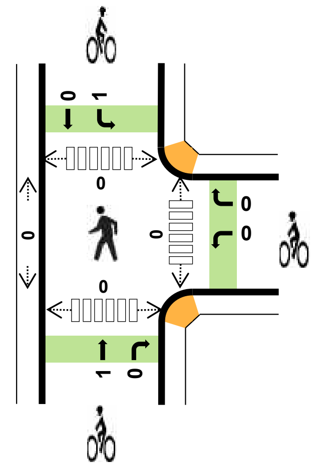
| Vehicle Type | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bicycles on Road | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lights | | | | | 0 | 7 | 0 | 147 | 0 | 0 | 461 | 23 | 12 | 379 | 753 | 0 | 1,782 |
| Mediums | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 3 | 1 | 4 | 1 | 0 | 13 |
| Total | | | | | 0 | 7 | 0 | 149 | 0 | 0 | 463 | 26 | 13 | 383 | 754 | 0 | 1,795 |

# E Bayshore Rd
# Holland St

**Date:** 06-05-2019
**Count Period:** 7:00 AM to 10:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 0.0% | 0.70 |
| NB | 0.0% | 0.78 |
| SB | 1.2% | 0.85 |
| TOTAL | 0.6% | 0.88 |




**Three-Hour Count Summaries**

| Interval Start | | n/a Eastbound UT | LT | TH | RT | Holland St Westbound UT | LT | TH | RT | E Bayshore Rd Northbound UT | LT | TH | RT | E Bayshore Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 16 | 0 | 0 | 3 | 21 | 0 | 44 | 0 |
| 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 19 | 0 | 0 | 0 | 21 | 0 | 43 | 0 |
| 8:30 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 1 | 16 | 0 | 31 | 0 |
| 8:45 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 12 | 0 | 0 | 1 | 19 | 0 | 37 | 155 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 59 | 0 | 0 | 5 | 77 | 0 | 155 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| | HV% | - | - | - | - | - | 0% | - | 0% | - | - | 0% | - | - | 0% | 1% | - | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8:00 AM | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:15 AM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 8:45 AM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |
| Peak Hour | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 1 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |

## Three-Hour Count Summaries

| Interval Start | n/a Eastbound UT | LT | TH | RT | Holland St Westbound UT | LT | TH | RT | E Bayshore Rd Northbound UT | LT | TH | RT | E Bayshore Rd Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 8 | 0 | 0 | 2 | 20 | 0 | 33 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 18 | 0 | 35 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 7 | 0 | 0 | 0 | 17 | 0 | 33 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 1 | 0 | 15 | 0 | 0 | 0 | 5 | 0 | 28 | 129 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **3** | **0** | **0** | **16** | **0** | **0** | **3** | **21** | **0** | **44** | 140 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **19** | **0** | **0** | **0** | **21** | **0** | **43** | 148 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **12** | **0** | **0** | **1** | **16** | **0** | **31** | 146 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **0** | **0** | **12** | **0** | **0** | **1** | **19** | **0** | **37** | **155** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 8 | 1 | 0 | 1 | 14 | 0 | 26 | 137 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 9 | 0 | 0 | 2 | 23 | 0 | 36 | 130 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 2 | 14 | 0 | 29 | 128 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 4 | 9 | 0 | 23 | 114 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 33 | 1 | 0 | 146 | 1 | 0 | 16 | 197 | 0 | 398 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **11** | **0** | **0** | **59** | **0** | **0** | **5** | **77** | **0** | **155** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **0%** | **-** | **0%** | **-** | **-** | **0%** | **-** | **-** | **0%** | **1%** | **-** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 2 | 0 | *2* | 2 | 0 | 0 | 0 | *2* |
| 7:15 AM | 0 | 0 | 2 | 1 | *3* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 0 | 1 | 0 | 1 | *2* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 7:45 AM | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| **8:00 AM** | **0** | **0** | **0** | **1** | ***1*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **8:15 AM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **8:30 AM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **0** | **0** | *0* |
| **8:45 AM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **1** | **1** | ***2*** | **0** | **0** | **0** | **0** | ***0*** |
| 9:00 AM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:15 AM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 0 | 0 | 1 | 0 | *1* | 0 | 2 | 0 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 0 | 1 | 4 | 5 | *10* | 0 | 2 | 5 | 2 | *9* | 2 | 0 | 0 | 0 | *2* |
| **Peak Hr** | **0** | **0** | **0** | **1** | ***1*** | **0** | **0** | **1** | **1** | ***2*** | **0** | **0** | **0** | **0** | ***0*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Holland St | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | 7 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 4 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 2 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 10 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | n/a | | | Holland St | | | E Bayshore Rd | | | E Bayshore Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **8:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **2** | **2** |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 1 | 1 | 0 | 9 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **2** | **0** |

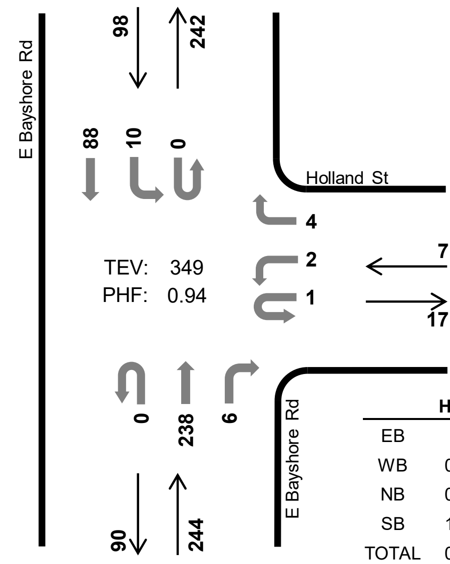
*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# E Bayshore Rd
# Holland St

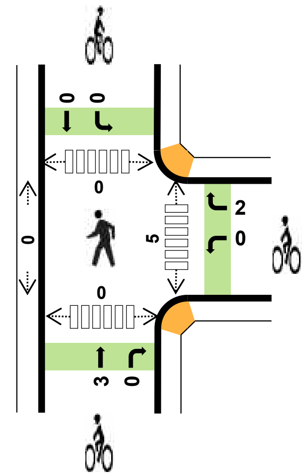
**Date:** 06-05-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 5:30 PM to 6:30 PM

N

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 0.0% | 0.44 |
| NB | 0.0% | 0.92 |
| SB | 1.0% | 0.74 |
| TOTAL | 0.3% | 0.94 |




**Three-Hour Count Summaries**

| Interval Start | | n/a | | | | Holland St | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 5:30 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 61 | 2 | 0 | 2 | 23 | 0 | 89 | 0 |
| 5:45 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 2 | 0 | 3 | 14 | 0 | 76 | 0 |
| 6:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 64 | 2 | 0 | 3 | 20 | 0 | 91 | 0 |
| 6:15 PM | | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 56 | 0 | 0 | 2 | 31 | 0 | 93 | 349 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 4 | 0 | 0 | 238 | 6 | 0 | 10 | 88 | 0 | 349 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| | HV% | - | - | - | - | 0% | 0% | - | 0% | - | - | 0% | 0% | - | 0% | 1% | - | 0% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 5:30 PM | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 1 | 0 | *2* | 3 | 0 | 0 | 0 | *3* |
| 5:45 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:00 PM | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 0 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| 6:15 PM | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 1 | 0 | *1* | 1 | 0 | 0 | 0 | *1* |
| Peak Hour | 0 | 0 | 0 | 1 | *1* | 0 | 2 | 3 | 0 | *5* | 5 | 0 | 0 | 0 | *5* |

## Three-Hour Count Summaries

| Interval Start | n/a | | | | Holland St | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 24 | 3 | 0 | 5 | 20 | 0 | 55 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 37 | 7 | 0 | 3 | 20 | 0 | 69 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 49 | 3 | 1 | 6 | 28 | 0 | 89 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 51 | 0 | 0 | 0 | 17 | 0 | 70 | 283 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 58 | 0 | 0 | 0 | 12 | 0 | 75 | 303 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 52 | 0 | 0 | 1 | 14 | 0 | 70 | 304 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **61** | **2** | **0** | **2** | **23** | **0** | **89** | 304 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **57** | **2** | **0** | **3** | **14** | **0** | **76** | 310 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **64** | **2** | **0** | **3** | **20** | **0** | **91** | 326 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **1** | **2** | **0** | **1** | **0** | **0** | **56** | **0** | **0** | **2** | **31** | **0** | **93** | **349** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 1 | 0 | 3 | 26 | 0 | 69 | 329 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 44 | 0 | 0 | 3 | 21 | 0 | 73 | 326 |
| Count Total | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 24 | 0 | 0 | 592 | 20 | 1 | 31 | 246 | 0 | 919 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **1** | **2** | **0** | **4** | **0** | **0** | **238** | **6** | **0** | **10** | **88** | **0** | **349** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **0%** | **0%** | **-** | **0%** | **-** | **-** | **0%** | **0%** | **-** | **0%** | **1%** | **-** | **0%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:15 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 4:30 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 3 | *3* | 0 | 0 | 0 | 0 | *0* |
| 4:45 PM | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 5:00 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 5:15 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| **5:30 PM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **1** | **1** | **0** | ***2*** | **3** | **0** | **0** | **0** | *3* |
| **5:45 PM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **0** | **1** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **6:00 PM** | **0** | **0** | **0** | **0** | ***0*** | **0** | **1** | **0** | **0** | ***1*** | **1** | **0** | **0** | **0** | *1* |
| **6:15 PM** | **0** | **0** | **0** | **1** | ***1*** | **0** | **0** | **1** | **0** | ***1*** | **1** | **0** | **0** | **0** | ***1*** |
| 6:30 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 6:45 PM | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 0 | 0 | *0* |
| Count Total | 0 | 0 | 0 | 1 | *1* | 0 | 3 | 3 | 5 | *11* | 5 | 0 | 0 | 0 | *5* |
| **Peak Hr** | **0** | **0** | **0** | **1** | ***1*** | **0** | **2** | **3** | **0** | ***5*** | **5** | **0** | **0** | **0** | ***5*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Holland St | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **1** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** |

## Three-Hour Count Summaries - Bikes

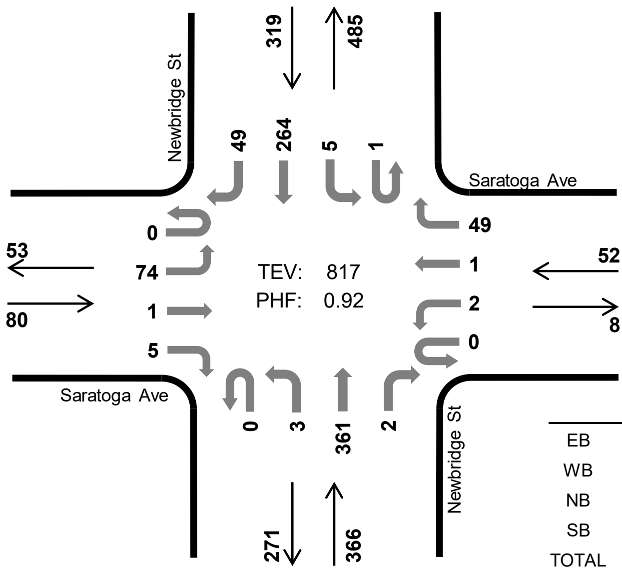
| Interval Start | n/a | | | Holland St | | | E Bayshore Rd | | | E Bayshore Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |
| **5:30 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **2** | 4 |
| **5:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | 4 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 5 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **5** |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 1 | 4 | 0 | 11 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **3** | **0** | **0** | **0** | **0** | **5** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

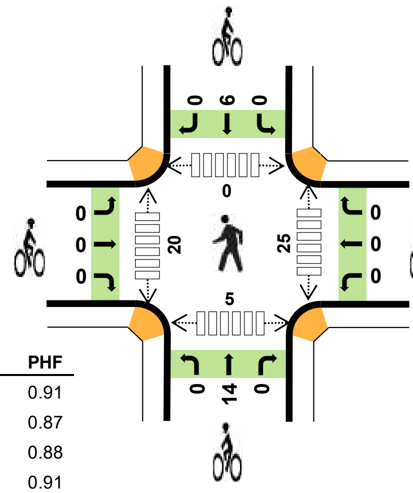
# Newbridge St
# Saratoga Ave

Date: 06-05-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 7:30 AM to 8:30 AM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 2.5% | 0.91 |
| WB | 0.0% | 0.87 |
| NB | 3.3% | 0.88 |
| SB | 3.8% | 0.91 |
| TOTAL | 3.2% | 0.92 |




## Three-Hour Count Summaries

| Interval Start | | Saratoga Ave Eastbound | | | | Saratoga Ave Westbound | | | | Newbridge St Northbound | | | | Newbridge St Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:30 AM | | 0 | 19 | 1 | 2 | 0 | 1 | 0 | 11 | 0 | 0 | 89 | 0 | 1 | 0 | 60 | 10 | 194 | 0 |
| 7:45 AM | | 0 | 18 | 0 | 1 | 0 | 1 | 0 | 14 | 0 | 2 | 89 | 1 | 0 | 2 | 66 | 7 | 201 | 0 |
| 8:00 AM | | 0 | 19 | 0 | 1 | 0 | 0 | 0 | 11 | 0 | 0 | 81 | 0 | 0 | 2 | 68 | 18 | 200 | 0 |
| 8:15 AM | | 0 | 18 | 0 | 1 | 0 | 0 | 1 | 13 | 0 | 1 | 102 | 1 | 0 | 1 | 70 | 14 | 222 | 817 |
| Peak Hour | All | 0 | 74 | 1 | 5 | 0 | 2 | 1 | 49 | 0 | 3 | 361 | 2 | 1 | 5 | 264 | 49 | 817 | 0 |
| | HV | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 10 | 2 | 26 | 0 |
| | HV% | - | 3% | 0% | 0% | - | 0% | 0% | 0% | - | 0% | 3% | 0% | 0% | 0% | 4% | 4% | 3% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:30 AM | 1 | 0 | 3 | 5 | *9* | 0 | 0 | 3 | 2 | *5* | 3 | 1 | 0 | 0 | *4* |
| 7:45 AM | 0 | 0 | 4 | 4 | *8* | 0 | 0 | 3 | 1 | *4* | 8 | 8 | 0 | 0 | *16* |
| 8:00 AM | 1 | 0 | 2 | 3 | *6* | 0 | 0 | 3 | 0 | *3* | 3 | 7 | 0 | 2 | *12* |
| 8:15 AM | 0 | 0 | 3 | 0 | *3* | 0 | 0 | 5 | 3 | *8* | 11 | 4 | 0 | 3 | *18* |
| Peak Hour | 2 | 0 | 12 | 12 | *26* | 0 | 0 | 14 | 6 | *20* | 25 | 20 | 0 | 5 | *50* |

## Three-Hour Count Summaries

| Interval Start | Saratoga Ave Eastbound | | | | Saratoga Ave Westbound | | | | Newbridge St Northbound | | | | Newbridge St Southbound | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 88 | 0 | 0 | 2 | 49 | 17 | 170 | 0 |
| 7:15 AM | 0 | 20 | 0 | 3 | 0 | 0 | 2 | 12 | 0 | 0 | 89 | 1 | 0 | 1 | 45 | 7 | 180 | 0 |
| **7:30 AM** | **0** | **19** | **1** | **2** | **0** | **1** | **0** | **11** | **0** | **0** | **89** | **0** | **1** | **0** | **60** | **10** | **194** | 0 |
| **7:45 AM** | **0** | **18** | **0** | **1** | **0** | **1** | **0** | **14** | **0** | **2** | **89** | **1** | **0** | **2** | **66** | **7** | **201** | 745 |
| **8:00 AM** | **0** | **19** | **0** | **1** | **0** | **0** | **0** | **11** | **0** | **0** | **81** | **0** | **0** | **2** | **68** | **18** | **200** | 775 |
| **8:15 AM** | **0** | **18** | **0** | **1** | **0** | **0** | **1** | **13** | **0** | **1** | **102** | **1** | **0** | **1** | **70** | **14** | **222** | **817** |
| 8:30 AM | 0 | 27 | 1 | 2 | 0 | 0 | 1 | 6 | 0 | 0 | 76 | 2 | 0 | 3 | 58 | 14 | 190 | 813 |
| 8:45 AM | 0 | 15 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 81 | 1 | 0 | 3 | 61 | 10 | 176 | 788 |
| 9:00 AM | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 62 | 2 | 0 | 2 | 67 | 14 | 167 | 755 |
| 9:15 AM | 0 | 11 | 1 | 0 | 0 | 0 | 2 | 5 | 0 | 1 | 51 | 1 | 0 | 0 | 63 | 18 | 153 | 686 |
| 9:30 AM | 0 | 6 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 51 | 0 | 0 | 2 | 41 | 13 | 117 | 613 |
| 9:45 AM | 0 | 12 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 53 | 3 | 1 | 1 | 56 | 12 | 142 | 579 |
| Count Total | 0 | 188 | 5 | 11 | 0 | 4 | 6 | 89 | 0 | 6 | 912 | 12 | 2 | 19 | 704 | 154 | 2,112 | 0 |
| **Peak Hour All** | **0** | **74** | **1** | **5** | **0** | **2** | **1** | **49** | **0** | **3** | **361** | **2** | **1** | **5** | **264** | **49** | **817** | **0** |
| **Peak Hour HV** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **12** | **0** | **0** | **0** | **10** | **2** | **26** | **0** |
| **Peak Hour HV%** | **-** | **3%** | **0%** | **0%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **3%** | **0%** | **0%** | **0%** | **4%** | **4%** | **3%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 1 | 0 | 6 | 3 | *10* | 0 | 0 | 2 | 1 | *3* | 5 | 2 | 0 | 0 | *7* |
| 7:15 AM | 1 | 0 | 5 | 4 | *10* | 0 | 0 | 0 | 0 | *0* | 9 | 3 | 0 | 2 | *14* |
| **7:30 AM** | **1** | **0** | **3** | **5** | ***9*** | **0** | **0** | **3** | **2** | ***5*** | **3** | **1** | **0** | **0** | *4* |
| **7:45 AM** | **0** | **0** | **4** | **4** | ***8*** | **0** | **0** | **3** | **1** | ***4*** | **8** | **8** | **0** | **0** | *16* |
| **8:00 AM** | **1** | **0** | **2** | **3** | ***6*** | **0** | **0** | **3** | **0** | ***3*** | **3** | **7** | **0** | **2** | *12* |
| **8:15 AM** | **0** | **0** | **3** | **0** | ***3*** | **0** | **0** | **5** | **3** | ***8*** | **11** | **4** | **0** | **3** | ***18*** |
| 8:30 AM | 0 | 0 | 2 | 2 | *4* | 1 | 0 | 8 | 0 | *9* | 3 | 3 | 0 | 0 | *6* |
| 8:45 AM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 3 | 4 | *7* | 6 | 0 | 0 | 0 | *6* |
| 9:00 AM | 0 | 0 | 2 | 2 | *4* | 1 | 0 | 6 | 2 | *9* | 8 | 1 | 0 | 1 | *10* |
| 9:15 AM | 0 | 0 | 4 | 4 | *8* | 2 | 0 | 4 | 1 | *7* | 2 | 2 | 0 | 0 | *4* |
| 9:30 AM | 1 | 0 | 1 | 2 | *4* | 0 | 0 | 1 | 1 | *2* | 9 | 0 | 0 | 0 | *9* |
| 9:45 AM | 1 | 1 | 1 | 1 | *4* | 0 | 0 | 2 | 0 | *2* | 6 | 3 | 0 | 1 | *10* |
| Count Total | 6 | 1 | 35 | 32 | *74* | 4 | 0 | 40 | 15 | *59* | 73 | 34 | 0 | 9 | *116* |
| **Peak Hour** | **2** | **0** | **12** | **12** | ***26*** | **0** | **0** | **14** | **6** | ***20*** | **25** | **20** | **0** | **5** | ***50*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Saratoga Ave | | | | Saratoga Ave | | | | Newbridge St | | | | Newbridge St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 3 | 0 | 10 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 4 | 0 | 10 | 0 |
| **7:30 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **5** | **0** | **9** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0** | **0** | **3** | **1** | **8** | 37 |
| **8:00 AM** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **1** | **6** | 33 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **3** | **26** |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 21 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 17 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 15 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 8 | 20 |
| 9:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 20 |
| 9:45 AM | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 20 |
| Count Total | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 29 | 3 | 74 | 0 |
| **Peak Hour** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **12** | **0** | **0** | **0** | **10** | **2** | **26** | **0** |

## Three-Hour Count Summaries - Bikes

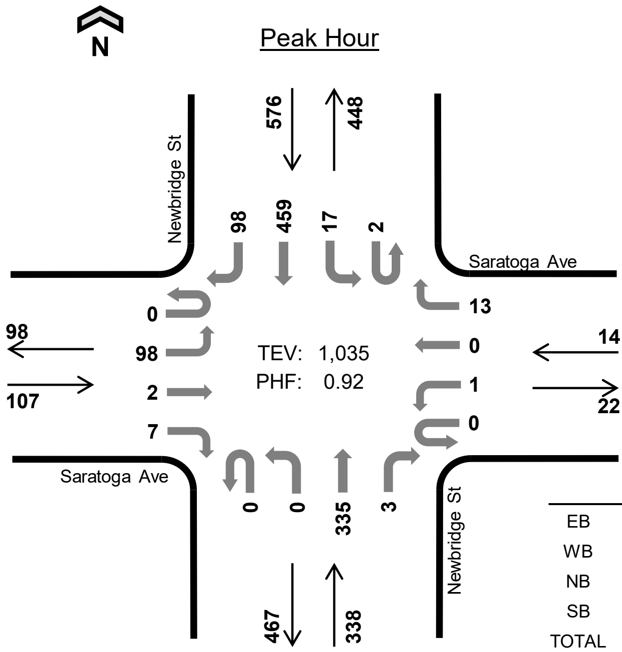
| Interval Start | Saratoga Ave | | | Saratoga Ave | | | Newbridge St | | | Newbridge St | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 3 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **2** | **0** | **5** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **1** | **0** | **4** | 12 |
| **8:00 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **3** | 12 |
| **8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **0** | **3** | **0** | **8** | **20** |
| 8:30 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 9 | 24 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 7 | 27 |
| 9:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 1 | 1 | 9 | 33 |
| 9:15 AM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 7 | 32 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 25 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 20 |
| Count Total | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 13 | 2 | 59 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **14** | **0** | **0** | **6** | **0** | **20** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

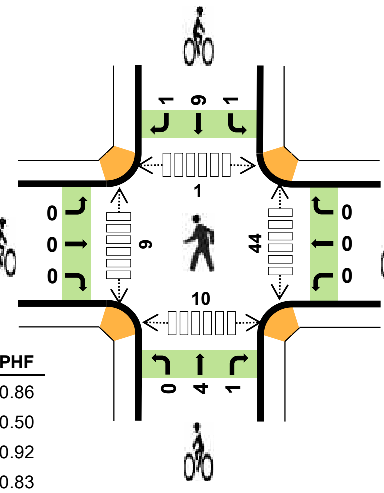
# Newbridge St
# Saratoga Ave

Date: 06-05-2019
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 6:00 PM to 7:00 PM

Peak Hour




| | HV %: | PHF |
|---|---|---|
| EB | 0.0% | 0.86 |
| WB | 0.0% | 0.50 |
| NB | 1.8% | 0.92 |
| SB | 1.0% | 0.83 |
| TOTAL | 1.2% | 0.92 |




## Three-Hour Count Summaries

| Interval Start | | Saratoga Ave Eastbound UT | LT | TH | RT | Saratoga Ave Westbound UT | LT | TH | RT | Newbridge St Northbound UT | LT | TH | RT | Newbridge St Southbound UT | LT | TH | RT | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6:00 PM | | 0 | 23 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 90 | 2 | 0 | 3 | 93 | 19 | 233 | 0 |
| 6:15 PM | | 0 | 25 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 89 | 0 | 1 | 4 | 112 | 27 | 263 | 0 |
| 6:30 PM | | 0 | 30 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 73 | 0 | 1 | 5 | 143 | 24 | 280 | 0 |
| 6:45 PM | | 0 | 20 | 0 | 4 | 0 | 1 | 0 | 6 | 0 | 0 | 83 | 1 | 0 | 5 | 111 | 28 | 259 | 1,035 |
| Peak Hour | All | 0 | 98 | 2 | 7 | 0 | 1 | 0 | 13 | 0 | 0 | 335 | 3 | 2 | 17 | 459 | 98 | 1,035 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 0 | 12 | 0 |
| | HV% | - | 0% | 0% | 0% | - | 0% | - | 0% | - | - | 2% | 0% | 0% | 0% | 1% | 0% | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals EB | WB | NB | SB | Total | Bicycles EB | WB | NB | SB | Total | Pedestrians (Crossing Leg) East | West | North | South | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6:00 PM | 0 | 0 | 1 | 2 | *3* | 0 | 0 | 1 | 3 | *4* | 13 | 3 | 0 | 5 | *21* |
| 6:15 PM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 2 | 2 | *4* | 11 | 1 | 0 | 3 | *15* |
| 6:30 PM | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 4 | *4* | 5 | 5 | 1 | 1 | *12* |
| 6:45 PM | 0 | 0 | 2 | 2 | *4* | 0 | 0 | 2 | 2 | *4* | 15 | 0 | 0 | 1 | *16* |
| Peak Hour | 0 | 0 | 6 | 6 | *12* | 0 | 0 | 5 | 11 | *16* | 44 | 9 | 1 | 10 | *64* |

## Three-Hour Count Summaries

| Interval Start | Saratoga Ave | | | | Saratoga Ave | | | | Newbridge St | | | | Newbridge St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 13 | 3 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 65 | 0 | 0 | 2 | 105 | 21 | 213 | 0 |
| 4:15 PM | 0 | 20 | 3 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 79 | 3 | 1 | 2 | 92 | 22 | 227 | 0 |
| 4:30 PM | 0 | 27 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 96 | 1 | 1 | 0 | 81 | 25 | 235 | 0 |
| 4:45 PM | 0 | 24 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 100 | 1 | 0 | 1 | 70 | 13 | 213 | 888 |
| 5:00 PM | 0 | 28 | 1 | 3 | 0 | 1 | 1 | 4 | 0 | 1 | 99 | 4 | 0 | 2 | 49 | 10 | 203 | 878 |
| 5:15 PM | 0 | 24 | 2 | 3 | 0 | 0 | 1 | 6 | 0 | 0 | 111 | 2 | 0 | 0 | 83 | 18 | 250 | 901 |
| 5:30 PM | 0 | 17 | 3 | 4 | 0 | 0 | 0 | 6 | 0 | 2 | 91 | 2 | 0 | 4 | 96 | 22 | 247 | 913 |
| 5:45 PM | 0 | 27 | 1 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 107 | 5 | 0 | 0 | 88 | 13 | 247 | 947 |
| **6:00 PM** | **0** | **23** | **0** | **2** | **0** | **0** | **0** | **1** | **0** | **0** | **90** | **2** | **0** | **3** | **93** | **19** | **233** | 977 |
| **6:15 PM** | **0** | **25** | **1** | **1** | **0** | **0** | **0** | **3** | **0** | **0** | **89** | **0** | **1** | **4** | **112** | **27** | **263** | 990 |
| **6:30 PM** | **0** | **30** | **1** | **0** | **0** | **0** | **0** | **3** | **0** | **0** | **73** | **0** | **1** | **5** | **143** | **24** | **280** | 1,023 |
| **6:45 PM** | **0** | **20** | **0** | **4** | **0** | **1** | **0** | **6** | **0** | **0** | **83** | **1** | **0** | **5** | **111** | **28** | **259** | **1,035** |
| Count Total | 0 | 278 | 17 | 21 | 0 | 5 | 6 | 37 | 0 | 5 | 1,083 | 21 | 4 | 28 | 1,123 | 242 | 2,870 | 0 |
| **Peak Hour All** | **0** | **98** | **2** | **7** | **0** | **1** | **0** | **13** | **0** | **0** | **335** | **3** | **2** | **17** | **459** | **98** | **1,035** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **6** | **0** | **12** | **0** |
| **Peak Hour HV%** | **-** | **0%** | **0%** | **0%** | **-** | **0%** | **-** | **0%** | **-** | **-** | **2%** | **0%** | **0%** | **0%** | **1%** | **0%** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 0 | 0 | 3 | 1 | *4* | 0 | 0 | 4 | 1 | *5* | 8 | 1 | 0 | 3 | *12* |
| 4:15 PM | 0 | 0 | 3 | 5 | *8* | 0 | 0 | 3 | 1 | *4* | 11 | 7 | 0 | 7 | *25* |
| 4:30 PM | 0 | 0 | 2 | 2 | *4* | 0 | 1 | 0 | 2 | *3* | 8 | 0 | 0 | 0 | *8* |
| 4:45 PM | 0 | 0 | 3 | 1 | *4* | 0 | 0 | 0 | 2 | *2* | 4 | 3 | 0 | 1 | *8* |
| 5:00 PM | 0 | 0 | 2 | 1 | *3* | 0 | 0 | 1 | 0 | *1* | 12 | 8 | 0 | 5 | *25* |
| 5:15 PM | 0 | 0 | 3 | 2 | *5* | 0 | 0 | 3 | 7 | *10* | 11 | 6 | 0 | 7 | *24* |
| 5:30 PM | 0 | 0 | 5 | 5 | *10* | 1 | 0 | 2 | 1 | *4* | 6 | 5 | 0 | 2 | *13* |
| 5:45 PM | 0 | 0 | 2 | 2 | *4* | 1 | 0 | 3 | 4 | *8* | 10 | 1 | 0 | 1 | *12* |
| **6:00 PM** | **0** | **0** | **1** | **2** | ***3*** | **0** | **0** | **1** | **3** | ***4*** | **13** | **3** | **0** | **5** | *21* |
| **6:15 PM** | **0** | **0** | **2** | **2** | ***4*** | **0** | **0** | **2** | **2** | ***4*** | **11** | **1** | **0** | **3** | *15* |
| **6:30 PM** | **0** | **0** | **1** | **0** | ***1*** | **0** | **0** | **0** | **4** | ***4*** | **5** | **5** | **1** | **1** | *12* |
| **6:45 PM** | **0** | **0** | **2** | **2** | ***4*** | **0** | **0** | **2** | **2** | ***4*** | **15** | **0** | **0** | **1** | ***16*** |
| Count Total | 0 | 0 | 29 | 25 | *54* | 2 | 1 | 21 | 29 | *53* | 114 | 40 | 1 | 36 | *191* |
| **Peak Hour** | **0** | **0** | **6** | **6** | ***12*** | **0** | **0** | **5** | **11** | ***16*** | **44** | **9** | **1** | **10** | ***64*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | Saratoga Ave | | | | Saratoga Ave | | | | Newbridge St | | | | Newbridge St | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 4 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 0 | 8 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 4 | 20 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 19 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 5 | 16 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 | 22 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 22 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **3** | 22 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **4** | 21 |
| **6:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | 12 |
| **6:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **4** | **12** |
| Count Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 0 | 25 | 0 | 54 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **6** | **0** | **12** | **0** |

## Three-Hour Count Summaries - Bikes

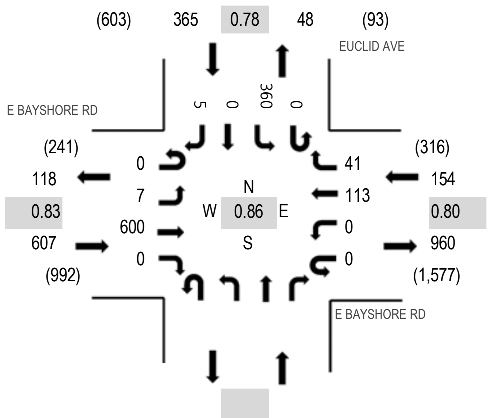
| Interval Start | Saratoga Ave | | | Saratoga Ave | | | Newbridge St | | | Newbridge St | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 5 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 4 | 0 |
| 4:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 14 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 10 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 6 | 1 | 10 | 16 |
| 5:30 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 4 | 17 |
| 5:45 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 8 | 23 |
| **6:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **2** | **0** | **4** | 26 |
| **6:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **2** | **0** | **4** | 20 |
| **6:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **4** | 20 |
| **6:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **1** | **4** | **16** |
| Count Total | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 19 | 2 | 2 | 25 | 2 | 53 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **1** | **1** | **9** | **1** | **16** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

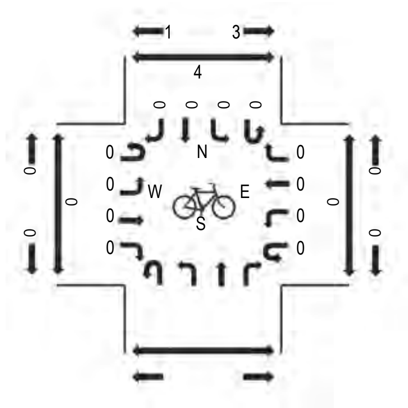
(303) 216-2439
www.alltrafficdata.net

Location: 5 EUCLID AVE & E BAYSHORE RD AM
Date: Tuesday, May 21, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

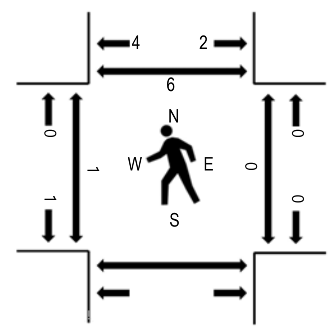
## Peak Hour - All Vehicles




## Peak Hour - Bicycles




## Peak Hour - Pedestrians




Note: Total study counts contained in parentheses.

## Traffic Counts

| Interval Start Time | E BAYSHORE RD Eastbound U-Turn | Left | Thru | Right | E BAYSHORE RD Westbound U-Turn | Left | Thru | Right | Northbound U-Turn | Left | Thru | Right | EUCLID AVE Southbound U-Turn | Left | Thru | Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 124 | 0 | 0 | 0 | 29 | 13 | | | | | 0 | 90 | 0 | 2 | 259 | 1,126 | 1 | 0 | | 2 |
| 7:15 AM | 0 | 5 | 165 | 0 | 0 | 0 | 37 | 4 | | | | | 0 | 115 | 0 | 2 | 328 | 1,051 | 0 | 0 | | 3 |
| 7:30 AM | 0 | 0 | 183 | 0 | 0 | 0 | 20 | 12 | | | | | 0 | 101 | 0 | 0 | 316 | 924 | 0 | 0 | | 1 |
| 7:45 AM | 0 | 1 | 128 | 0 | 0 | 0 | 27 | 12 | | | | | 0 | 54 | 0 | 1 | 223 | 802 | 0 | 0 | | 0 |
| 8:00 AM | 0 | 2 | 95 | 0 | 0 | 0 | 34 | 17 | | | | | 0 | 35 | 0 | 1 | 184 | 785 | 0 | 0 | | 4 |
| 8:15 AM | 0 | 0 | 103 | 0 | 0 | 0 | 32 | 10 | | | | | 0 | 55 | 0 | 1 | 201 | | 0 | 0 | | 0 |
| 8:30 AM | 0 | 0 | 95 | 0 | 0 | 0 | 21 | 8 | | | | | 0 | 70 | 0 | 0 | 194 | | 0 | 0 | | 2 |
| 8:45 AM | 0 | 0 | 90 | 0 | 0 | 0 | 32 | 8 | | | | | 0 | 74 | 0 | 2 | 206 | | 0 | 0 | | 0 |

## Peak Rolling Hour Flow Rates

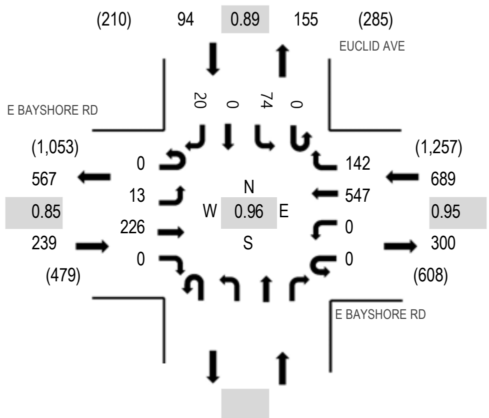
| Vehicle Type | Eastbound U-Turn | Left | Thru | Right | Westbound U-Turn | Left | Thru | Right | Northbound U-Turn | Left | Thru | Right | Southbound U-Turn | Left | Thru | Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 0 | 1 | 0 | 0 | 1 |
| Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 0 | 0 | 0 | 0 | 0 |
| Lights | 0 | 7 | 589 | 0 | 0 | 0 | 110 | 37 | | | | | 0 | 348 | 0 | 5 | 1,096 |
| Mediums | 0 | 0 | 11 | 0 | 0 | 0 | 3 | 4 | | | | | 0 | 11 | 0 | 0 | 29 |
| Total | 0 | 7 | 600 | 0 | 0 | 0 | 113 | 41 | | | | | 0 | 360 | 0 | 5 | 1,126 |

All Traffic Data Services Inc.

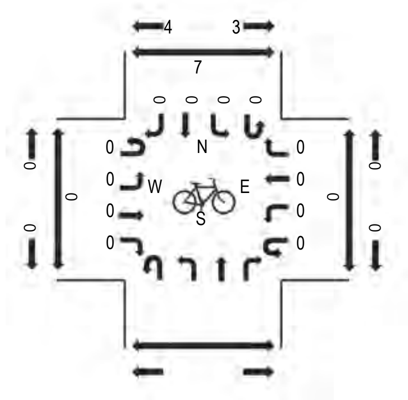
(303) 216-2439
www.alltrafficdata.net

Location: 5 EUCLID AVE & E BAYSHORE RD PM
Date: Tuesday, May 21, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

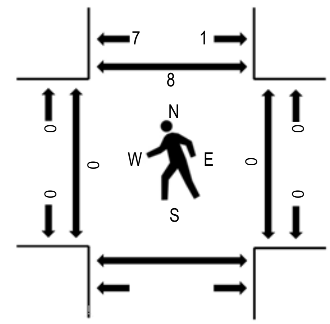
## Peak Hour - All Vehicles




## Peak Hour - Bicycles




## Peak Hour - Pedestrians




Note: Total study counts contained in parentheses.

## Traffic Counts

| Interval Start Time | E BAYSHORE RD Eastbound U-Turn | Left | Thru | Right | E BAYSHORE RD Westbound U-Turn | Left | Thru | Right | Northbound U-Turn | Left | Thru | Right | EUCLID AVE Southbound U-Turn | Left | Thru | Right | Total | Rolling Hour | Pedestrian Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | 0 | 5 | 52 | 0 | 0 | 0 | 110 | 22 | | | | | 0 | 23 | 0 | 4 | 216 | 924 | 0 | 0 | | 1 |
| 4:15 PM | 0 | 5 | 57 | 0 | 0 | 0 | 108 | 31 | | | | | 0 | 22 | 0 | 10 | 233 | 963 | 0 | 0 | | 1 |
| 4:30 PM | 0 | 3 | 45 | 0 | 0 | 0 | 118 | 31 | | | | | 0 | 25 | 0 | 6 | 228 | 995 | 0 | 0 | | 2 |
| 4:45 PM | 0 | 5 | 58 | 0 | 0 | 0 | 128 | 32 | | | | | 0 | 19 | 0 | 5 | 247 | 1,022 | 0 | 0 | | 2 |
| 5:00 PM | 0 | 2 | 49 | 0 | 0 | 0 | 138 | 39 | | | | | 0 | 17 | 0 | 10 | 255 | 1,022 | 0 | 0 | | 4 |
| 5:15 PM | 0 | 5 | 59 | 0 | 0 | 0 | 146 | 35 | | | | | 0 | 18 | 0 | 2 | 265 | | 0 | 0 | | 2 |
| 5:30 PM | 0 | 1 | 60 | 0 | 0 | 0 | 135 | 36 | | | | | 0 | 20 | 0 | 3 | 255 | | 0 | 0 | | 0 |
| 5:45 PM | 0 | 9 | 64 | 0 | 0 | 0 | 124 | 24 | | | | | 0 | 20 | 0 | 6 | 247 | | 0 | 0 | | 3 |

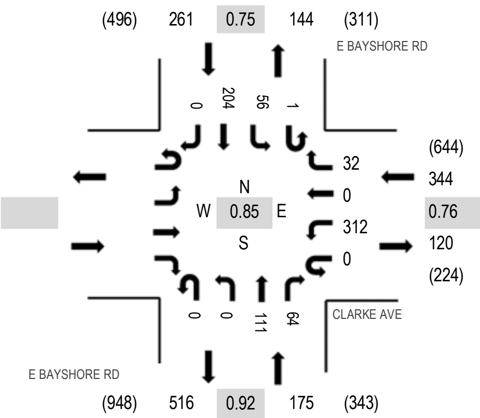
## Peak Rolling Hour Flow Rates

| Vehicle Type | Eastbound U-Turn | Left | Thru | Right | Westbound U-Turn | Left | Thru | Right | Northbound U-Turn | Left | Thru | Right | Southbound U-Turn | Left | Thru | Right | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | | | | 0 | 0 | 0 | 0 | 1 |
| Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 0 | 0 | 0 | 0 | 0 |
| Lights | 0 | 13 | 224 | 0 | 0 | 0 | 540 | 137 | | | | | 0 | 73 | 0 | 20 | 1,007 |
| Mediums | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 5 | | | | | 0 | 1 | 0 | 0 | 14 |
| Total | 0 | 13 | 226 | 0 | 0 | 0 | 547 | 142 | | | | | 0 | 74 | 0 | 20 | 1,022 |

Location: 1 E BAYSHORE RD & CLARKE AVE AM
Date: Tuesday, September 25, 2018
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

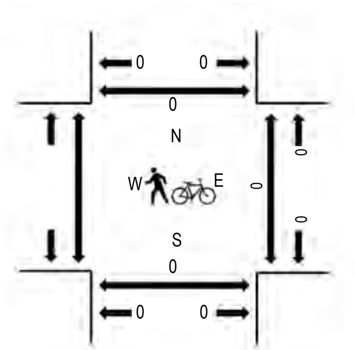
(303) 216-2439
www.alltrafficdata.net

## Peak Hour - All Vehicles




Note: Total study counts contained in parentheses.

## Peak Hour - Pedestrians/Bicycles on Crosswalk



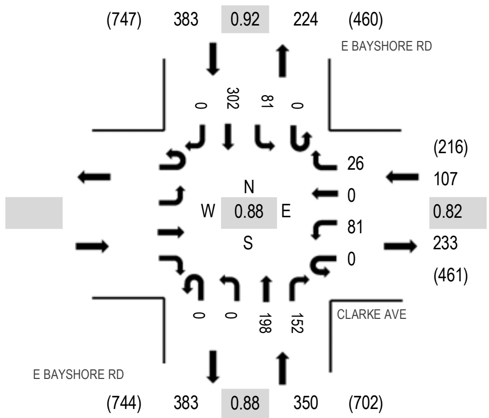

## Traffic Counts

| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | CLARKE AVE Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | E BAYSHORE RD Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | E BAYSHORE RD Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrain Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | | | | | 0 | 46 | 0 | 10 | 0 | 0 | 29 | 6 | 0 | 4 | 60 | 0 | 155 | 766 | 0 | 0 | 0 |
| 7:15 AM | | | | | 0 | 72 | 0 | 12 | 0 | 0 | 35 | 19 | 0 | 13 | 78 | 0 | 229 | 780 | 0 | 0 | 0 |
| 7:30 AM | | | | | 0 | 105 | 0 | 8 | 0 | 0 | 27 | 8 | 1 | 9 | 60 | 0 | 218 | 721 | 0 | 0 | 0 |
| 7:45 AM | | | | | 0 | 68 | 0 | 7 | 0 | 0 | 20 | 22 | 0 | 16 | 31 | 0 | 164 | 691 | 0 | 0 | 0 |
| 8:00 AM | | | | | 0 | 67 | 0 | 5 | 0 | 0 | 29 | 15 | 0 | 18 | 35 | 0 | 169 | 717 | 0 | 0 | 0 |
| 8:15 AM | | | | | 0 | 54 | 0 | 13 | 0 | 0 | 33 | 17 | 0 | 20 | 33 | 0 | 170 | | 5 | 0 | 0 |
| 8:30 AM | | | | | 0 | 71 | 0 | 12 | 0 | 0 | 34 | 13 | 0 | 16 | 42 | 0 | 188 | | 0 | 0 | 0 |
| 8:45 AM | | | | | 0 | 84 | 0 | 10 | 0 | 0 | 26 | 10 | 0 | 18 | 42 | 0 | 190 | | 2 | 0 | 0 |
| Count Total | | | | | 0 | 567 | 0 | 77 | 0 | 0 | 233 | 110 | 1 | 114 | 381 | 0 | 1,483 | | 7 | 0 | 0 |
| Peak Hour | | | | | 0 | 312 | 0 | 32 | 0 | 0 | 111 | 64 | 1 | 56 | 204 | 0 | 780 | | 0 | 0 | 0 |

(303) 216-2439
www.alltrafficdata.net

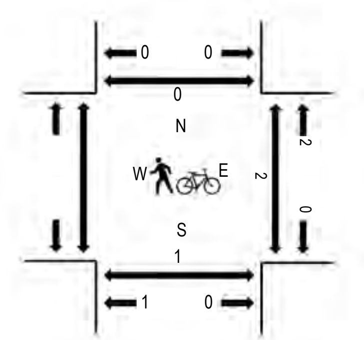
Location: 1 E BAYSHORE RD & CLARKE AVE PM
Date: Tuesday, September 25, 2018
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:15 PM - 04:30 PM

## Peak Hour - All Vehicles




Note: Total study counts contained in parentheses.

## Peak Hour - Pedestrians/Bicycles on Crosswalk

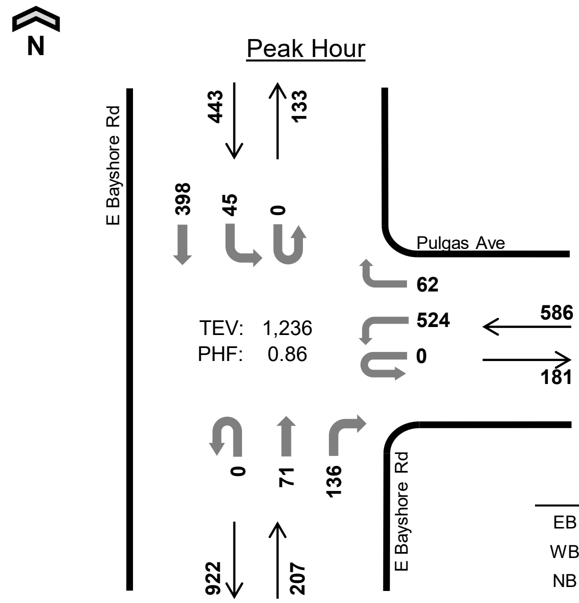



## Traffic Counts

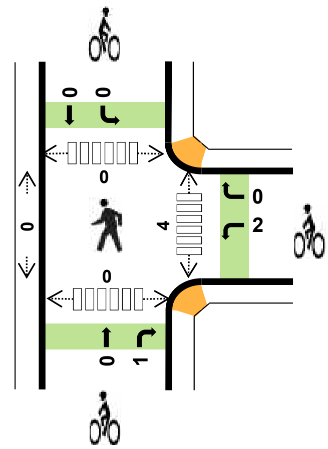
| Interval Start Time | Eastbound U-Turn | Eastbound Left | Eastbound Thru | Eastbound Right | CLARKE AVE Westbound U-Turn | Westbound Left | Westbound Thru | Westbound Right | E BAYSHORE RD Northbound U-Turn | Northbound Left | Northbound Thru | Northbound Right | E BAYSHORE RD Southbound U-Turn | Southbound Left | Southbound Thru | Southbound Right | Total | Rolling Hour | Pedestrain Crossings West | East | South | North |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:00 PM | | | | | 0 | 11 | 0 | 9 | 0 | 0 | 45 | 39 | 0 | 18 | 81 | 0 | 203 | 840 | 0 | 0 | 0 | |
| 4:15 PM | | | | | 0 | 29 | 0 | 5 | 0 | 0 | 62 | 40 | 0 | 25 | 79 | 0 | 240 | 821 | 1 | 0 | 0 | |
| 4:30 PM | | | | | 0 | 18 | 0 | 8 | 0 | 0 | 46 | 41 | 0 | 24 | 73 | 0 | 210 | 823 | 1 | 0 | 0 | |
| 4:45 PM | | | | | 0 | 23 | 0 | 4 | 0 | 0 | 45 | 32 | 0 | 14 | 69 | 0 | 187 | 807 | 0 | 0 | 0 | |
| 5:00 PM | | | | | 0 | 21 | 0 | 4 | 0 | 0 | 54 | 37 | 0 | 13 | 55 | 0 | 184 | 825 | 1 | 0 | 0 | |
| 5:15 PM | | | | | 0 | 25 | 0 | 7 | 0 | 0 | 59 | 40 | 0 | 17 | 94 | 0 | 242 | | 1 | 0 | 0 | |
| 5:30 PM | | | | | 0 | 20 | 0 | 6 | 0 | 0 | 45 | 28 | 0 | 28 | 67 | 0 | 194 | | 0 | 0 | 0 | |
| 5:45 PM | | | | | 0 | 18 | 0 | 8 | 0 | 0 | 53 | 36 | 0 | 29 | 61 | 0 | 205 | | 1 | 0 | 0 | |
| Count Total | | | | | 0 | 165 | 0 | 51 | 0 | 0 | 409 | 293 | 0 | 168 | 579 | 0 | 1,665 | | 5 | 0 | 0 | |
| Peak Hour | | | | | 0 | 81 | 0 | 26 | 0 | 0 | 198 | 152 | 0 | 81 | 302 | 0 | 840 | | 2 | 0 | 0 | |

# E Bayshore Rd
# Pulgas Ave

Date: 06-05-2019
Count Period: 7:00 AM to 10:00 AM
Peak Hour: 7:00 AM to 8:00 AM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 1.0% | 0.89 |
| NB | 2.4% | 0.78 |
| SB | 1.1% | 0.84 |
| TOTAL | 1.3% | 0.86 |




### Three-Hour Count Summaries

| Interval Start | | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 7:00 AM | | 0 | 0 | 0 | 0 | 0 | 133 | 0 | 17 | 0 | 0 | 15 | 26 | 0 | 10 | 87 | 0 | 288 | 0 |
| 7:15 AM | | 0 | 0 | 0 | 0 | 0 | 142 | 0 | 19 | 0 | 0 | 19 | 47 | 0 | 17 | 115 | 0 | 359 | 0 |
| 7:30 AM | | 0 | 0 | 0 | 0 | 0 | 147 | 0 | 17 | 0 | 0 | 16 | 31 | 0 | 8 | 106 | 0 | 325 | 0 |
| 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 102 | 0 | 9 | 0 | 0 | 21 | 32 | 0 | 10 | 90 | 0 | 264 | 1,236 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 524 | 0 | 62 | 0 | 0 | 71 | 136 | 0 | 45 | 398 | 0 | 1,236 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 4 | 1 | 0 | 16 | 0 |
| | HV% | - | - | - | - | - | 1% | - | 2% | - | - | 6% | 1% | - | 9% | 0% | - | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 7:00 AM | 0 | 1 | 1 | 2 | *4* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 7:15 AM | 0 | 1 | 1 | 1 | *3* | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 7:30 AM | 0 | 3 | 1 | 0 | *4* | 0 | 0 | 0 | 0 | *0* | 1 | 0 | 0 | 0 | *1* |
| 7:45 AM | 0 | 1 | 2 | 2 | *5* | 0 | 0 | 1 | 0 | *1* | 3 | 0 | 0 | 0 | *3* |
| Peak Hour | 0 | 6 | 5 | 5 | *16* | 0 | 2 | 1 | 0 | *3* | 4 | 0 | 0 | 0 | *4* |

## Three-Hour Count Summaries

| Interval Start | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **7:00 AM** | **0** | **0** | **0** | **0** | **0** | **133** | **0** | **17** | **0** | **0** | **15** | **26** | **0** | **10** | **87** | **0** | **288** | 0 |
| **7:15 AM** | **0** | **0** | **0** | **0** | **0** | **142** | **0** | **19** | **0** | **0** | **19** | **47** | **0** | **17** | **115** | **0** | **359** | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **147** | **0** | **17** | **0** | **0** | **16** | **31** | **0** | **8** | **106** | **0** | **325** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **102** | **0** | **9** | **0** | **0** | **21** | **32** | **0** | **10** | **90** | **0** | **264** | **1,236** |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 103 | 0 | 17 | 0 | 0 | 32 | 31 | 0 | 9 | 85 | 0 | 277 | 1,225 |
| 8:15 AM | 0 | 0 | 0 | 0 | 1 | 101 | 0 | 12 | 0 | 0 | 28 | 29 | 0 | 10 | 93 | 0 | 274 | 1,140 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 114 | 0 | 17 | 0 | 0 | 36 | 38 | 0 | 17 | 125 | 0 | 347 | 1,162 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 108 | 0 | 18 | 0 | 0 | 32 | 25 | 0 | 17 | 105 | 0 | 305 | 1,203 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 88 | 0 | 7 | 0 | 0 | 29 | 34 | 0 | 17 | 99 | 0 | 274 | 1,200 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 89 | 0 | 11 | 0 | 0 | 35 | 28 | 0 | 22 | 97 | 0 | 282 | 1,208 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 102 | 0 | 10 | 0 | 0 | 33 | 34 | 0 | 7 | 89 | 0 | 275 | 1,136 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 19 | 0 | 0 | 36 | 31 | 0 | 5 | 100 | 0 | 273 | 1,104 |
| Count Total | 0 | 0 | 0 | 0 | 1 | 1,311 | 0 | 173 | 0 | 0 | 332 | 386 | 0 | 149 | 1,191 | 0 | 3,543 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **524** | **0** | **62** | **0** | **0** | **71** | **136** | **0** | **45** | **398** | **0** | **1,236** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **1** | **0** | **0** | **4** | **1** | **0** | **4** | **1** | **0** | **16** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **1%** | **-** | **2%** | **-** | **-** | **6%** | **1%** | **-** | **9%** | **0%** | **-** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **7:00 AM** | **0** | **1** | **1** | **2** | ***4*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **7:15 AM** | **0** | **1** | **1** | **1** | ***3*** | **0** | **1** | **0** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **7:30 AM** | **0** | **3** | **1** | **0** | ***4*** | **0** | **0** | **0** | **0** | ***0*** | **1** | **0** | **0** | **0** | *1* |
| **7:45 AM** | **0** | **1** | **2** | **2** | ***5*** | **0** | **0** | **1** | **0** | ***1*** | **3** | **0** | **0** | **0** | ***3*** |
| 8:00 AM | 0 | 2 | 1 | 1 | *4* | 0 | 1 | 0 | 1 | *2* | 0 | 0 | 0 | 0 | *0* |
| 8:15 AM | 0 | 3 | 0 | 3 | *6* | 0 | 1 | 1 | 0 | *2* | 0 | 0 | 0 | 0 | *0* |
| 8:30 AM | 0 | 1 | 1 | 0 | *2* | 0 | 1 | 0 | 2 | *3* | 1 | 0 | 0 | 0 | *1* |
| 8:45 AM | 0 | 1 | 1 | 4 | *6* | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | *0* |
| 9:00 AM | 0 | 1 | 0 | 2 | *3* | 0 | 0 | 1 | 0 | *1* | 2 | 0 | 0 | 0 | *2* |
| 9:15 AM | 0 | 2 | 1 | 2 | *5* | 0 | 1 | 1 | 1 | *3* | 0 | 0 | 0 | 0 | *0* |
| 9:30 AM | 0 | 4 | 2 | 1 | *7* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 9:45 AM | 0 | 1 | 1 | 1 | *3* | 0 | 0 | 1 | 2 | *3* | 1 | 0 | 0 | 0 | *1* |
| Count Total | 0 | 21 | 12 | 19 | *52* | 0 | 6 | 6 | 6 | *18* | 8 | 0 | 0 | 0 | *8* |
| **Peak Hr** | **0** | **6** | **5** | **5** | ***16*** | **0** | **2** | **1** | **0** | ***3*** | **4** | **0** | **0** | **0** | ***4*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **7:00 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **1** | **0** | **4** | 0 |
| **7:15 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **3** | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **4** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **2** | **0** | **0** | **5** | **16** |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 16 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 6 | 19 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 17 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 6 | 18 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 17 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 5 | 16 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 7 | 21 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 18 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 6 | 0 | 0 | 7 | 5 | 0 | 10 | 9 | 0 | 52 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **5** | **0** | **1** | **0** | **0** | **4** | **1** | **0** | **4** | **1** | **0** | **16** | **0** |

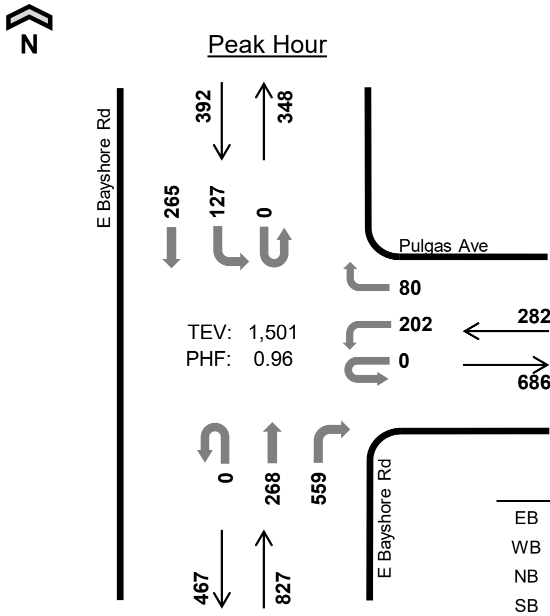
## Three-Hour Count Summaries - Bikes

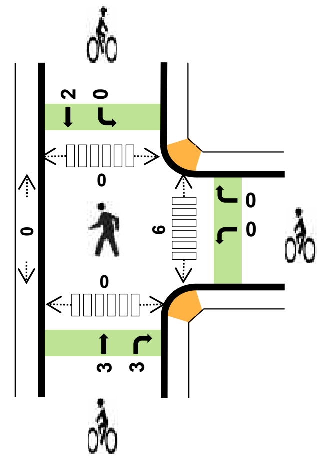
| Interval Start | n/a | | | Pulgas Ave | | | E Bayshore Rd | | | E Bayshore Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **7:00 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **7:15 AM** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | 0 |
| **7:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | 0 |
| **7:45 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **3** |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 4 |
| 8:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 5 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 8 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 6 |
| 9:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 7 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 5 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 8 |
| Count Total | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 3 | 3 | 0 | 6 | 0 | 18 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# E Bayshore Rd
# Pulgas Ave

**Date:** 06-05-2019
**Count Period:** 4:00 PM to 7:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM




| | HV %: | PHF |
|---|---|---|
| EB | - | - |
| WB | 0.7% | 0.97 |
| NB | 1.1% | 0.97 |
| SB | 0.8% | 0.92 |
| TOTAL | 0.9% | 0.96 |

## Three-Hour Count Summaries

| Interval Start | | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| 4:00 PM | | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 13 | 0 | 0 | 82 | 128 | 0 | 38 | 57 | 0 | 371 | 0 |
| 4:15 PM | | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 22 | 0 | 0 | 65 | 149 | 0 | 27 | 79 | 0 | 392 | 0 |
| 4:30 PM | | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 22 | 0 | 0 | 55 | 156 | 0 | 33 | 56 | 0 | 371 | 0 |
| 4:45 PM | | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 23 | 0 | 0 | 66 | 126 | 0 | 29 | 73 | 0 | 367 | 1,501 |
| Peak Hour | All | 0 | 0 | 0 | 0 | 0 | 202 | 0 | 80 | 0 | 0 | 268 | 559 | 0 | 127 | 265 | 0 | 1,501 | 0 |
| | HV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 8 | 0 | 3 | 0 | 0 | 14 | 0 |
| | HV% | - | - | - | - | - | 0% | - | 3% | - | - | 0% | 1% | - | 2% | 0% | - | 1% | 0 |

*Note: For all three-hour count summary, see next page.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| 4:00 PM | 0 | 1 | 2 | 1 | *4* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 4:15 PM | 0 | 0 | 4 | 1 | *5* | 0 | 0 | 2 | 0 | *2* | 1 | 0 | 0 | 0 | *1* |
| 4:30 PM | 0 | 1 | 3 | 0 | *4* | 0 | 0 | 1 | 1 | *2* | 4 | 0 | 0 | 0 | *4* |
| 4:45 PM | 0 | 0 | 0 | 1 | *1* | 0 | 0 | 2 | 1 | *3* | 1 | 0 | 0 | 0 | *1* |
| Peak Hour | 0 | 2 | 9 | 3 | *14* | 0 | 0 | 6 | 2 | *8* | 6 | 0 | 0 | 0 | *6* |

## Three-Hour Count Summaries

| Interval Start | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **53** | **0** | **13** | **0** | **0** | **82** | **128** | **0** | **38** | **57** | **0** | **371** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **50** | **0** | **22** | **0** | **0** | **65** | **149** | **0** | **27** | **79** | **0** | **392** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **49** | **0** | **22** | **0** | **0** | **55** | **156** | **0** | **33** | **56** | **0** | **371** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **50** | **0** | **23** | **0** | **0** | **66** | **126** | **0** | **29** | **73** | **0** | **367** | **1,501** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 17 | 0 | 0 | 72 | 136 | 0 | 21 | 58 | 0 | 366 | 1,496 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 57 | 0 | 29 | 0 | 0 | 77 | 125 | 0 | 26 | 66 | 0 | 380 | 1,484 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 23 | 0 | 0 | 64 | 137 | 0 | 25 | 50 | 0 | 352 | 1,465 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 18 | 0 | 0 | 62 | 152 | 0 | 29 | 46 | 0 | 351 | 1,449 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 20 | 0 | 0 | 67 | 145 | 0 | 23 | 51 | 0 | 357 | 1,440 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 19 | 0 | 0 | 66 | 146 | 0 | 35 | 48 | 0 | 355 | 1,415 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 20 | 0 | 0 | 67 | 130 | 0 | 27 | 42 | 0 | 337 | 1,400 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 12 | 0 | 0 | 78 | 132 | 0 | 46 | 34 | 0 | 352 | 1,401 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 611 | 0 | 238 | 0 | 0 | 821 | 1,662 | 0 | 359 | 660 | 0 | 4,351 | 0 |
| **Peak Hour All** | **0** | **0** | **0** | **0** | **0** | **202** | **0** | **80** | **0** | **0** | **268** | **559** | **0** | **127** | **265** | **0** | **1,501** | **0** |
| **Peak Hour HV** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **8** | **0** | **3** | **0** | **0** | **14** | **0** |
| **Peak Hour HV%** | **-** | **-** | **-** | **-** | **-** | **0%** | **-** | **3%** | **-** | **-** | **0%** | **1%** | **-** | **2%** | **0%** | **-** | **1%** | **0** |

*Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.*

| Interval Start | Heavy Vehicle Totals | | | | | Bicycles | | | | | Pedestrians (Crossing Leg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total | EB | WB | NB | SB | Total | East | West | North | South | Total |
| **4:00 PM** | **0** | **1** | **2** | **1** | ***4*** | **0** | **0** | **1** | **0** | ***1*** | **0** | **0** | **0** | **0** | *0* |
| **4:15 PM** | **0** | **0** | **4** | **1** | ***5*** | **0** | **0** | **2** | **0** | ***2*** | **1** | **0** | **0** | **0** | *1* |
| **4:30 PM** | **0** | **1** | **3** | **0** | ***4*** | **0** | **0** | **1** | **1** | ***2*** | **4** | **0** | **0** | **0** | *4* |
| **4:45 PM** | **0** | **0** | **0** | **1** | ***1*** | **0** | **0** | **2** | **1** | ***3*** | **1** | **0** | **0** | **0** | ***1*** |
| 5:00 PM | 0 | 1 | 0 | 0 | *1* | 0 | 0 | 1 | 1 | *2* | 1 | 0 | 0 | 0 | *1* |
| 5:15 PM | 0 | 1 | 1 | 0 | *2* | 0 | 0 | 1 | 1 | *2* | 3 | 0 | 0 | 0 | *3* |
| 5:30 PM | 0 | 1 | 0 | 0 | *1* | 0 | 1 | 3 | 1 | *5* | 5 | 0 | 0 | 0 | *5* |
| 5:45 PM | 0 | 1 | 1 | 1 | *3* | 0 | 0 | 2 | 0 | *2* | 2 | 0 | 0 | 0 | *2* |
| 6:00 PM | 0 | 1 | 2 | 0 | *3* | 0 | 1 | 0 | 1 | *2* | 1 | 0 | 0 | 0 | *1* |
| 6:15 PM | 0 | 0 | 1 | 1 | *2* | 0 | 0 | 1 | 0 | *1* | 0 | 0 | 0 | 0 | *0* |
| 6:30 PM | 0 | 1 | 2 | 0 | *3* | 0 | 0 | 0 | 2 | *2* | 8 | 0 | 0 | 0 | *8* |
| 6:45 PM | 0 | 0 | 1 | 1 | *2* | 0 | 0 | 0 | 0 | *0* | 2 | 0 | 0 | 0 | *2* |
| Count Total | 0 | 8 | 17 | 6 | *31* | 0 | 2 | 14 | 8 | *24* | 28 | 0 | 0 | 0 | *28* |
| **Peak Hr** | **0** | **2** | **9** | **3** | ***14*** | **0** | **0** | **6** | **2** | ***8*** | **6** | **0** | **0** | **0** | ***6*** |

## Three-Hour Count Summaries - Heavy Vehicles

| Interval Start | n/a | | | | Pulgas Ave | | | | E Bayshore Rd | | | | E Bayshore Rd | | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
| | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | UT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **0** | **4** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **1** | **0** | **0** | **5** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **4** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **14** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 8 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 7 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 9 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 9 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 11 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 10 |
| Count Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 0 | 4 | 13 | 0 | 5 | 1 | 0 | 31 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **1** | **8** | **0** | **3** | **0** | **0** | **14** | **0** |

## Three-Hour Count Summaries - Bikes

| Interval Start | n/a | | | Pulgas Ave | | | E Bayshore Rd | | | E Bayshore Rd | | | 15-min Total | Rolling One Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | | |
| | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT | | |
| **4:00 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | 0 |
| **4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **2** | 0 |
| **4:30 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **2** | 0 |
| **4:45 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **1** | **0** | **3** | **8** |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 9 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 9 |
| 5:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 5 | 12 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 11 |
| 6:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 11 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 10 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 7 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Count Total | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 4 | 0 | 8 | 0 | 24 | 0 |
| **Peak Hour** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **3** | **0** | **2** | **0** | **8** | **0** |

*Note: U-Turn volumes for bikes are included in Left-Turn, if any.*

# Appendix B
## Willow Road Microsimulation

HEXAGON TRANSPORTATION CONSULTANTS, INC.

## Memorandum

**Date:** September 16, 2020

**To:** Kirsten Chapman, ICF International

**From:** Trisha Dudala, Ollie Zhou

**Subject:** Willow Village – Willow Road Traffic Operations Analysis

## Introduction

This report presents the results of the corridor study conducted along Willow Road between Bayfront Expressway to the north and Durham Road to the south in the City of Menlo Park, California. The objective of the study was to quantify peak hour intersection operations taking into consideration the effect of vehicular queueing on Willow Road. Presented in this report are the results of a detailed analysis of the existing traffic operations at intersections along Willow Road. A map of the study area is shown on Figure 1.

## Scope of Study

This study was conducted for the purpose of documenting existing traffic operations along Willow Road. This corridor study includes an analysis of weekday AM (7-10 AM) and PM (4-7 PM) peak hour traffic conditions for the following nine signalized intersections along Willow Road. These intersections are shown on Figure 1.

### Study Intersections

1. Bayfront Expressway & Willow Road
2. Hamilton Avenue & Willow Road
3. Ivy Drive & Willow Road
4. O'Brien Drive & Willow Road
5. Newbridge Street & Willow Road
6. US 101 NB Ramps & Willow Road
7. US 101 SB Ramps & Willow Road
8. Bay Road & Willow Road
9. Hospital Plaza/Durham Street & Willow Road

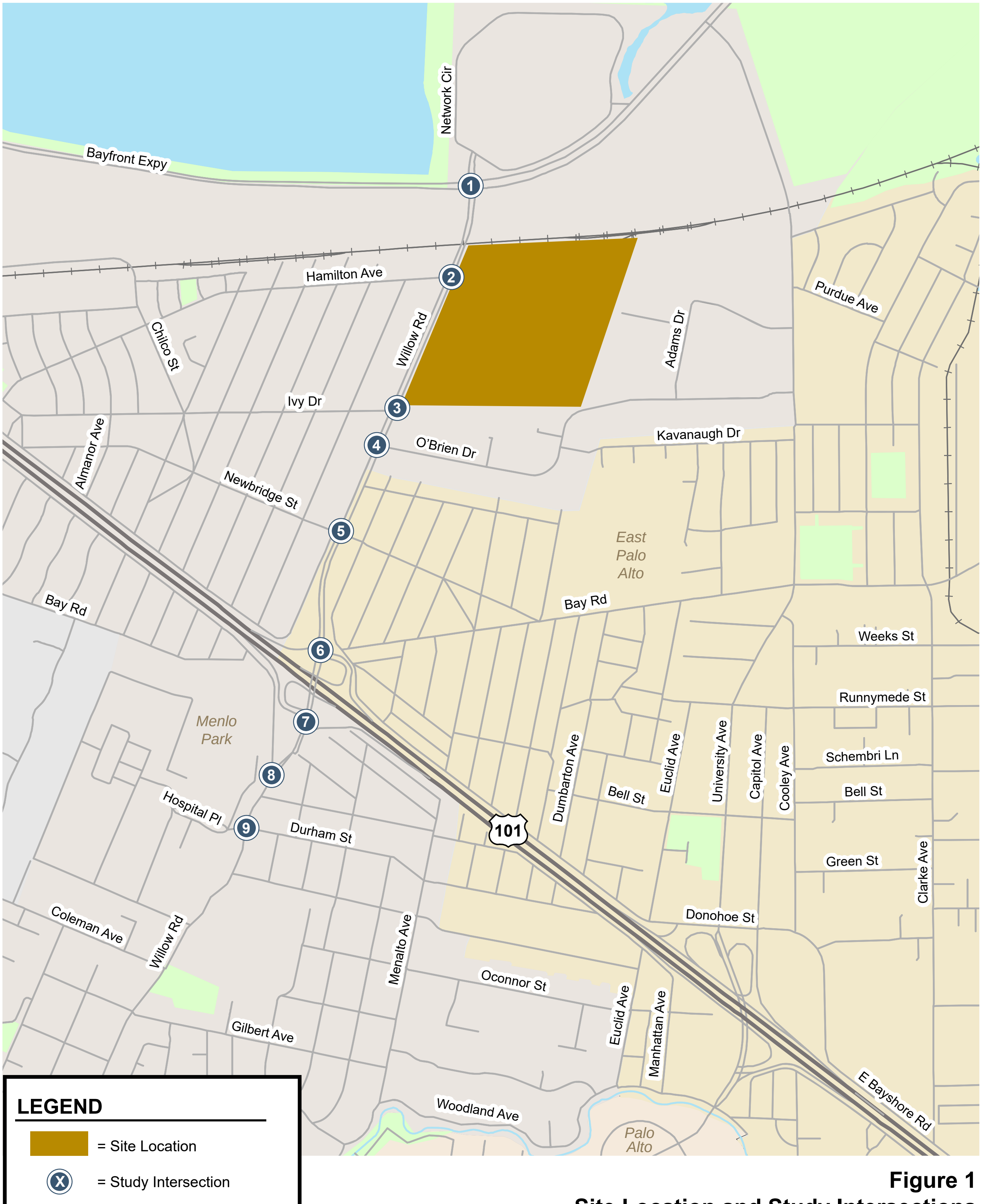



**Figure 1**
**Site Location and Study Intersections**

# Data Collection

Hexagon collected existing roadway geometry, peak hour intersection turning movement volumes, travel time runs and intersection queuing characteristics within the study area during March and April 2019. Most traffic congestion in the study area was observed to occur during the morning (7:00 – 10:00 AM) and evening (4:00 – 7:00 PM) peak commute hours. It is noted that during the time when the traffic counts were conducted, the US 101 improvements at the Willow Road interchange were not fully constructed. The existing conditions analysis was calibrated and validated based on the March/April 2019 lane geometry, traffic counts and field observations of queueing in the study area, when the US 101 interchange improvements were still under construction. Since then, US 101 interchange improvements at Willow Road have been completed. The lane geometry at the study intersections are shown on Figure 2.

## Intersection Turning Movements Counts

Traffic counts at the study intersections were not all conducted on the same day. Intersection turning movements counts at the intersections of Bayfront/Willow and Bay/Willow were conducted on April 23, 2019 for both the AM and PM peak hour durations. AM and PM peak hour turning movement counts for intersections at Hamilton/Willow, Ivy/Willow, O'Brien/Willow and Newbridge/Willow were conducted on March 21st, 2019. AM and PM peak hour turning movement counts at the US 101 NB/Willow and US 101/SB Willow intersections were conducted on March 13, 2019. AM and PM peak hour traffic counts at the Durham/Willow intersection were conducted on April 16, 2019.

The AM peak hour turning movement vehicular volumes at all study intersections are shown on Figure 3 and the PM peak hour turning movement vehicular volumes (occurring between 5:00 – 6:00pm) are shown on Figure 4 for all study intersections.

## Demand Volumes

As discussed below, field observations showed that queuing occurs for some turning movements, particularly during the PM peak period along the Willow Road corridor. The vehicles in queue represent unserved demand during the peak hour periods. In order to account for the unserved demand, turning movements counts at all study intersections along the corridor were balanced, and the turning movement volumes were adjusted by adding the number of queued vehicles to the count volumes. The number of queued vehicles were calculated based on how far vehicular queues extended on the roadways during some cycles observed during the peak hour. The demand volumes are also shown on Figure 3 and Figure 4.

# Field Observations

Hexagon conducted field observations of traffic congestion and vehicle queuing at the study intersections during the AM and PM peak periods in March 2019. Field observations showed that some operational problems currently occur during the peak commute hours. These problems are described below.

## Willow Road and Bayfront Expressway

During the AM peak hour, the eastbound left-turn queue exceeded the storage length. The eastbound left-turn traffic encroached into the closest eastbound through lane. The eastbound left-turn traffic required more than one cycle to clear the intersection. The northbound left-turn was observed to back up traffic (possibly) due to the westbound red light at the Willow Road/Hamilton Avenue intersection. This backup caused the westbound through lane to wait to clear the Willow

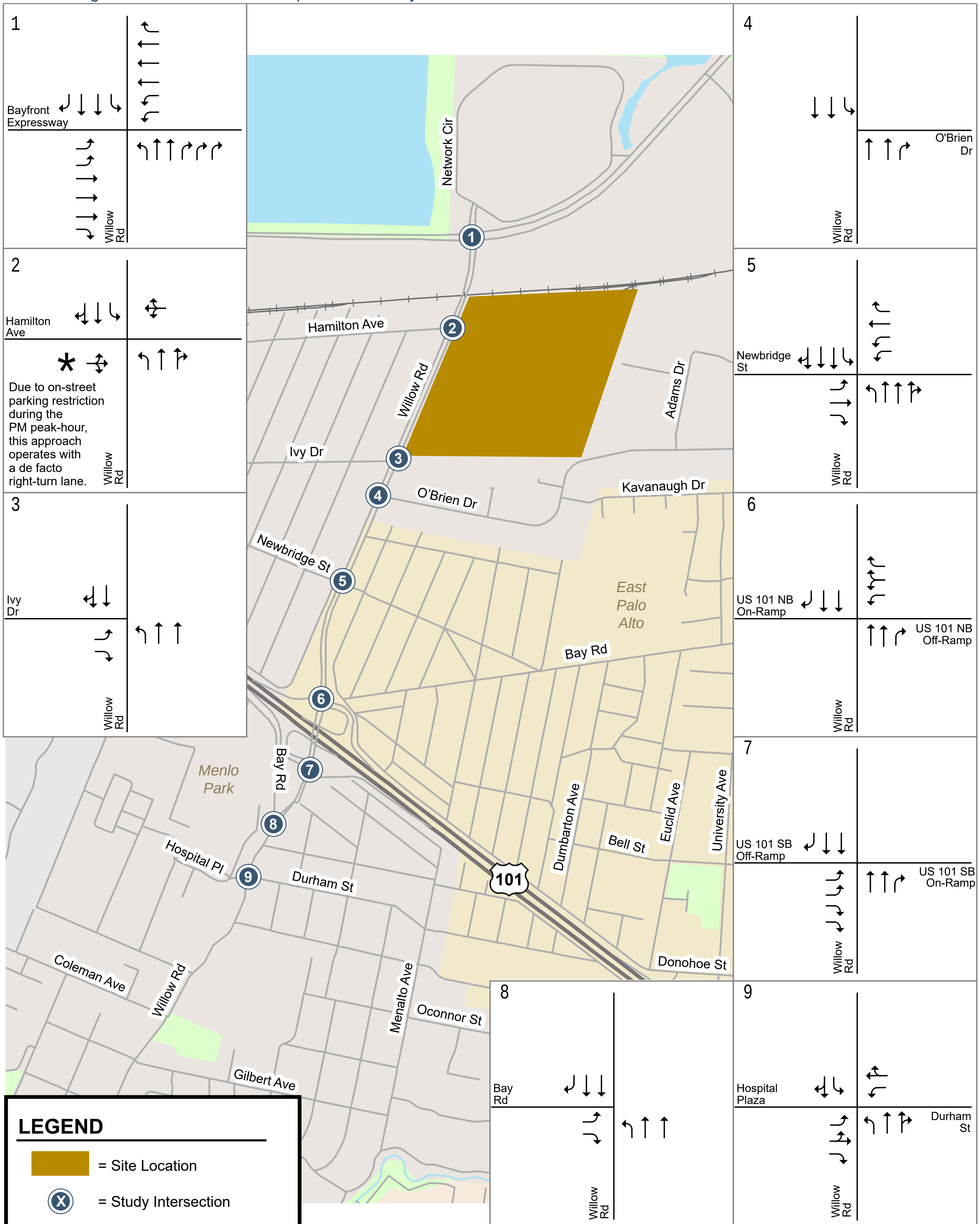
Road/Bayfront Expressway intersection until there was room to clear the intersection. The westbound through lane occasionally required more than one cycle to clear the intersection.

During the PM peak hour, the eastbound right-turn queue exceeded the storage length and spilled into the nearest through lane. The eastbound right-turn lane occasionally required more than one cycle to clear the intersection.

## Willow Road between Hamilton Avenue and Hospital Plaza/Durham Street

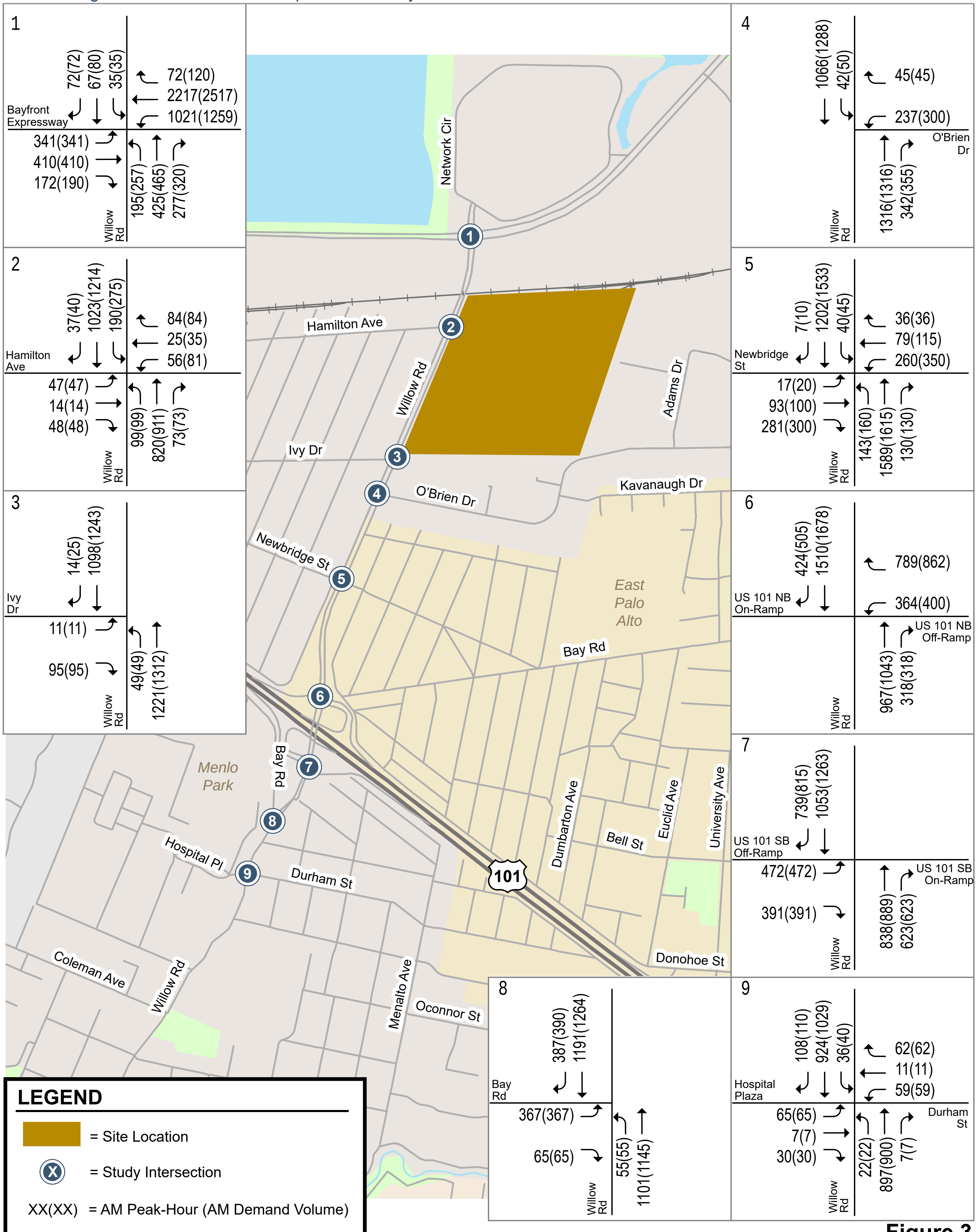
During the AM peak hour, there was heavy demand on westbound Willow Road along this corridor. Westbound vehicles often required multiple cycles to clear an intersection. As a result, the southbound right-turn and northbound left-turn movements on the side streets turning onto westbound Willow Road also required multiple cycles to clear the intersection. The westbound queue was usually able to clear at the Willow Road/Durham Street intersection due to the long through phase. The eastbound left-turn movement at the Newbridge Street intersection received heavy demand and occasionally required two signal cycles to clear. Vehicles at the US 101 northbound off-ramp turning right onto eastbound Willow Road frequently queued onto the auxiliary lane on US 101 and required multiple cycles to clear.

During the PM peak hour, there was heavy demand on eastbound Willow Road along this corridor. Eastbound vehicles often required multiple cycles to clear an intersection. As a result, the northbound right-turn and southbound left-turn movements on the side streets turning onto eastbound Willow Road also required multiple cycles to clear the intersection. The westbound left-turn movement at the Hamilton Avenue intersection received heavy demand that often required two signal cycles to clear. Vehicles at the US 101 northbound off-ramp turning right onto eastbound Willow Road frequently queued onto the auxiliary lane on US 101 and required multiple cycles to clear. Vehicles at the US 101 southbound off-ramp turning left onto eastbound Willow Road were often impacted by eastbound spillback queues and were observed to block the westbound through movement. The southbound left-turn queue extended onto US 101 southbound and impacted freeway operations.




Note: April 2019 Lane Geometry

**Figure 2**
**Existing Lane Geometry**




Note: March/April 2019 Counts

**Figure 3**
**AM Peak-Hour Volumes**

HEXAGON

NORTH
Not to Scale

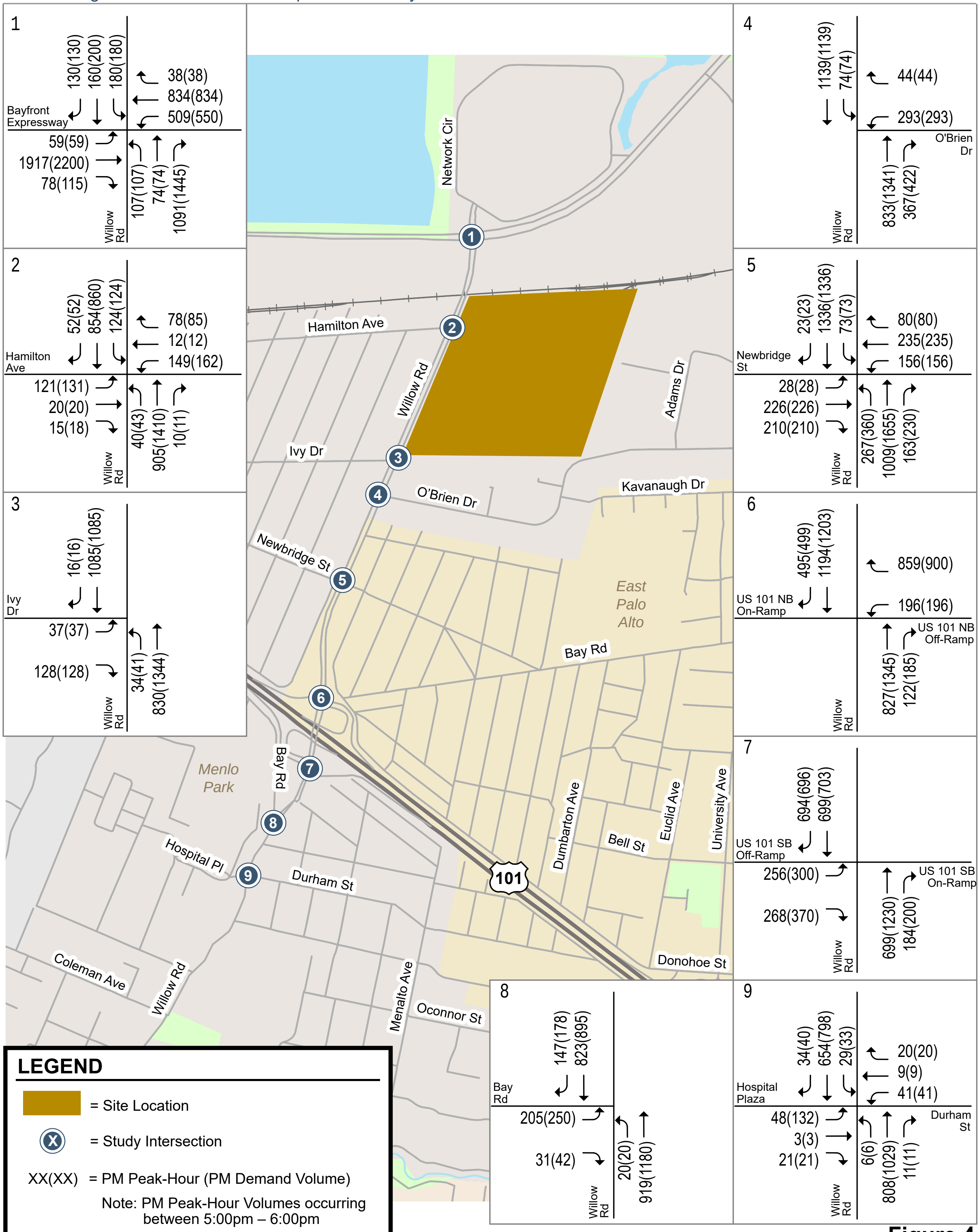



**Figure 4**
**PM Peak-Hour Volumes**

Note: March/April 2019 Counts



NORTH
Not to Scale

## Travel Time Runs

Hexagon collected Bluetooth travel time data on May 22, 2019 to determine the AM and PM peak hour travel time on eastbound and westbound Willow Road between Bayfront Expressway and Coleman Avenue. Bluetooth sensors were placed at nine locations along the study corridor. Two sensors were placed south of Bayfront Expressway to capture eastbound and westbound traffic on Willow Road near the intersection. Sensors capturing both directions of traffic were placed along Willow Road at the intersections of Hamilton Avenue, Ivy Drive, O'Brien Drive, Newbridge Street, Bay Road, Durham Street, and Coleman Avenue. These sensors anonymously record timestamps when vehicles with Bluetooth-capable devices pass them. In order to deem the data as valid, two requirements were applied to the data: a) sampled travel time cannot be lower than the free-flow travel time resulting from a speed of 40 mph, and b) sampled travel time cannot be longer than 3 signal cycles unless justified by field observations. Using these requirements, valid Bluetooth data at the intersections varied from 0.4% to 22% of the existing traffic counts. AM and PM peak hour travel times on eastbound and westbound Willow Road are summarized in Table 1.

As shown in Table 1, the travel time on eastbound Willow Road varied between 3 minutes and 26 minutes during the AM peak hour, with an average travel time of 9 minutes. During the PM peak hour, the travel varied between 8 minutes and 38 minutes, with an average travel time of 18 minutes. The travel time on westbound Willow Road varied between 4 minutes and 35 minutes with an average of 12 minutes during the AM peak hour and between 2 minutes and 31 minutes with an average travel time of 9 minutes during the PM peak hour. Field observations conducted during the PM peak hour indicated that the high demand for traffic on eastbound Willow Road to turn onto southbound Bayfront Expressway caused vehicular queues to extend through the upstream intersections affecting traffic progression on eastbound Willow Road.

## Table 1
## Willow Road Travel Time Runs

| Segments Along Willow Road | | | AM Peak Hour | | | | PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Travel Time Statistics (secs) | | Valid Samples Statistics [1] | | Travel Time Statistics (secs) | | Valid Samples Statistics [1] | |
| From | To | Dr. | Average | Range | Count | % of Roadway Traffic | Average | Range | Count | % of Roadway Traffic |
| Bayfront Expressway | Hamilton Avenue | WB | 112 | 17 - 478 | 189 | 15% | 112 | 14 - 387 | 102 | 11% |
| Hamilton Avenue | Ivy Drive | WB | 190 | 74 - 371 | 14 | 1% | 148 | 30 - 363 | 27 | 2% |
| Ivy Drive | O'Brien Drive | WB | 47 | 6 - 263 | 107 | 10% | 49 | 6 - 438 | 100 | 9% |
| O'Brien Drive | Newbridge Street | WB | 98 | 30 - 319 | 67 | 5% | 73 | 21 - 175 | 69 | 5% |
| Newbridge Street | Bay Road | WB | 215 | 101 - 321 | 6 | 0.4% | 92 | 46 - 120 | 8 | 1% |
| Bay Road | Durham Street | WB | 65 | 13 - 318 | 91 | 9% | 75 | 13 - 396 | 32 | 6% |
| | *Total Travel Time (secs)* | | ***727*** | *241 - 2070* | | | ***549*** | *130 - 1879* | | |
| | *Total Travel Time (mins)* | | ***12.12*** | *4 - 34.5* | | | ***9.15*** | *2.2 - 31.3* | | |
| Hamilton Avenue | Bayfront Expressway | EB | 112 | 15 - 463 | 124 | 14% | 127 | 17 - 318 | 245 | 22% |
| Ivy Drive | Hamilton Avenue | EB | 193 | 46 - 448 | 5 | 0.4% | 266 | 241 - 293 | 5 | 1% |
| O'Brien Drive | Ivy Drive | EB | 44 | 6 - 197 | 49 | 4% | 46 | 6 - 163 | 154 | 15% |
| Newbridge Street | O'Brien Drive | EB | 34 | 17 - 62 | 7 | 0.4% | 104 | 29 - 247 | 39 | 3% |
| Bay Road | Newbridge Street | EB | 92 | 47 - 138 | 6 | 0.4% | 392 | 142 - 775 | 12 | 1% |
| Durham Street | Bay Road | EB | 57 | 13 - 272 | 82 | 8% | 132 | 15 - 476 | 64 | 5% |
| | *Total Travel Time (secs)* | | ***532*** | *144 - 1580* | | | ***1067*** | *450 - 2272* | | |
| | *Total Travel Time (mins)* | | ***8.86*** | *2.4 - 26.3* | | | ***17.78*** | *7.5 - 37.9* | | |

Notes:
WB = Westbound, EB = Eastbound
[1] Two validity requirements were applied: a) sampled travel time cannot be lower than a free-flow travel time resulting from a speed of 40 mph, and b) sampled travel time cannot be longer than 3 signal cycles unless justified by field observations.

# Analysis Methodology

This section describes the methods and performance criteria use to evaluate traffic operations along the Willow Road corridor between Bayfront Expressway and Durham Street.

## Analysis Method

Due to the close spacing of the study intersections, the intersection analysis was conducted using the SimTraffic (version 10) software, using methodologies consistent with the *Highway Capacity Manual 2010* (Transportation Research Board, 2011). Unlike macroscopic models of isolated intersection operations, such as the *Highway Capacity Manual* intersection level of service methodology, SimTraffic is a microscopic model that measures the full impact of queuing and blocking attributed to closely spaced intersections. In addition to reporting statistics such as average vehicle delay, the simulation software produces visual animation files that depict traffic operations.

Per Caltrans guidelines, the simulation analysis reflects pent-up traffic demand that is unable to be served during the peak hour and thus is not reflected in existing intersection turning-movement counts. The existing traffic demand was estimated based on the turning-movement count volumes and the observed queue lengths. The existing conditions SimTraffic model was calibrated and validated to existing conditions based on existing lane geometry (as of March 2019), existing AM and PM peak hour traffic counts, observed peak-hour vehicular queues, and the observed signal timings. The procedures used are consistent with *Traffic Analysis Toolbox Volume III" Guidelines for Applying Traffic Microsimulation Modeling Software (*FHWA, 2004).

## Level of Service Criteria

The average delay time (measured in seconds per vehicle) calculated by the simulation model was correlated to Level of Service (LOS) based on the thresholds contained in the *2010 Highway Capacity Manual*. Level of Service is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The correlation between delay and level of service is shown on Table 2 for signalized intersections. All study intersections along Willow Road between Bayfront Expressway and US 101 interchange are under the jurisdiction of Caltrans. Caltrans maintains a minimum level of service (LOS) at the transition between LOS C and LOS D for all of its facilities. Where an existing facility is operating at less than the LOS C/D threshold, the existing LOS should be maintained. The study intersections of Willow/Bay and Willow/Hospital Plaza-Durham Street are under the jurisdiction of the City. The City of Menlo Park level of service standard is LOS D or better for all signalized study intersections.

## Measures of Effectiveness

The following Measures of Effectiveness (MOEs) computed with the SimTraffic model are used to quantify and validate traffic operations along Willow Road between Bayfront Expressway and Durham Street:

- Volume Served – The number of vehicles that can be served by the corridor during the analysis period. At locations where the demand exceeds capacity, the volume served will be less than the demand volume.
- Total Travel Time – The average time taken by all vehicles to travel through the corridor during the peak hour. It includes the average delay through the corridor, vehicles queues, and impedance caused by merging vehicles.

- LOS - The weighted average delay (measured in seconds per vehicle) calculated by the microscopic simulation model was correlated to LOS based on the thresholds contained in the *2010 Highway Capacity Manual*.

**Table 2**
**Signalized Intersection Level of Service Definitions Based on Control Delay**

| Level of Service | Description | Average Control Delay Per Vehicle (Sec.) |
|---|---|---|
| A | Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay. | 10.0 or less |
| B | Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay. | 10.1 to 20.0 |
| C | Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though may still pass through the intersection without stopping. | 20.1 to 35.0 |
| D | The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lenghts, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.1 to 55.0 |
| E | This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently. | 55.1 to 80.0 |
| F | This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes of such delay levels. | greater than 80.0 |

Source: Transportation Research Board, *2010 Highway Capacity Manual* .

## Existing Conditions Traffic Operations Analysis

This section describes the development, calibration and validation of the Synchro model that was used to evaluate existing peak hour conditions along Willow Road.

### Model Development and Calibration

The Synchro model was developed by drawing the roadway network using an aerial photo of the study area as a background image. Geometric information such as number of lanes, curvature, turn restrictions, and location of lane drops, and lane additions were based on aerial photographs and field observations conducted in March 2019. Intersection signal operations were based on signal timing information that was provided by the City. Adjustments were made to the signal timing based on measuring the cycle lengths and splits at each of the study intersections in the field. Where unsignalized driveways with heavy traffic turning into and out of the driveways are located on Willow

Road between the signalized intersections, saturation flow rates for Willow Road were adjusted. The existing AM and PM peak hour demand volumes were used as input volumes to develop the existing conditions model. It is noted that the Willow Road/US 101 interchange improvements were not completed when the traffic counts were done in March/April 2019. As a result, existing AM and PM peak hour conditions were calibrated and validated based on the lane geometry, traffic volumes, travel time runs and field observations that were conducted in 2019. Since then, the US 101/Willow Road interchange improvements have been completed. At both the US 101 off-ramps, no right-turn-on red was assumed.

The Synchro model was validated to existing conditions using the criteria described in *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software* (FHWA Department of Transportation, 2004). The software's default data on vehicle and driver characteristics were used. A number of iterations were required to successfully validate the existing conditions model to observed conditions. Further refinements were made at specific locations during the model calibration process. For example, for the eastbound Willow Road segment between Hamilton and Ivy Drive, the model showed a higher throughput for the eastbound traffic compared to the traffic counts during the PM peak hour. The headway factors for the eastbound through lanes were adjusted (to account for traffic turning in and out of the unsignalized driveways between Hamilton Avenue and Ivy Drive) so that the model served volume matched the traffic counts at this intersection. Increasing the headway factor for the eastbound approach on Willow Road caused vehicles to slow down resulting in longer travel time for eastbound Willow Road attributed to traffic slow down due to traffic turning into and out of the unsignalized driveways between Hamilton Avenue and Ivy Drive.

## Model Validation

During the validation process, the model estimates were compared to the field data to measure the model's accuracy. The following criteria were used:

- Turning movement volumes for more than 85% of the cases should have a GEH (Geoffrey E. Havers) statistic of less than 5. The GEH statistic is a measure of goodness of fit named after the statistician who developed it. The model served volume at each of the five study intersections was compared to the raw turning movement counts. The GEH statistic for the individual turning movements was calculated to be less than 5 at most of the locations, and the GEH statistic for the total volume through the intersection was also calculated to be less than 5 (see Table 3). The formula for GEH statistic is shown below:

$$GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$$

  - Where *M* is the hourly traffic volume from the Synchro model and *C* is the real-world hourly traffic count.

- Average travel time runs should fall within the range observed in the field. The model estimated average travel time on eastbound Willow Road was approximately 8 minutes during the AM peak hour and 23 minutes during the PM peak hour (see Table 4 and Table 6). The blue tooth travel time runs on eastbound Willow Road showed that the average travel time was approximately 9 minutes during the AM peak hour and 18 minutes during the PM peak hour. The model estimated average travel time on westbound Willow Road was approximately 13 minutes during the AM peak hour and 9 minutes during the PM peak hour (see Table 5 and Table 7). The Bluetooth travel time runs on westbound Willow Road showed that the travel time averaged approximately 12 minutes during the AM peak hour and 9 minutes during the PM peak hour. Although the average travel times between intersections varied widely between the model data and the Bluetooth data, the overall average travel time on eastbound and westbound Willow Road between Bayfront Expressway and Durham Road matched well during both the peak hours.

- The visual queuing shown in the model should match queues observed in the field. Queues shown in the model matched field observations. The model showed long queues on westbound Willow Road during the AM peak hour and on eastbound Willow Road during the PM peak hour in the study area. The queues extended from the Bayfront Expressway past Durham Road during the PM peak hour. The model queues matched the queues observed in the field.

**Table 3**
**Existing Peak Hour – Model Served Volumes**

| | Existing Conditions | | | | | | |
|---|---|---|---|---|---|---|---|
| | AM Peak Hour | | | | PM Peak Hour | | |
| Movement | Raw Count Volume | Model Served Volume | GEH Statistic | | Raw Count Volume | Model Served Volume | GEH Statistic |
| **1. Bayfront Expressway & Willow Road** | | | | | | | |
| SBL | 341 | 347 | 0.32 | 0 | 76 | 49 | 3.42 |
| SBT | 410 | 407 | 0.15 | 0 | 1899 | 1920 | 0.48 |
| SBR | 172 | 199 | 1.98 | 0 | 118 | 104 | 1.33 |
| NBL | 1021 | 1040 | 0.59 | 0 | 559 | 547 | 0.51 |
| NBT | 2217 | 2209 | 0.17 | 0 | 704 | 836 | 4.76 |
| NBR | 72 | 101 | 3.12 | 0 | 34 | 36 | 0.34 |
| EBL | 195 | 234 | 2.66 | 0 | 88 | 80 | 0.87 |
| EBT | 425 | 452 | 1.29 | 0 | 95 | 76 | 2.05 |
| EBR | 277 | 297 | 1.18 | 0 | 1112 | 1092 | 0.6 |
| WBL | 35 | 35 | 0 | 0 | 159 | 179 | 1.54 |
| WBT | 67 | 82 | 1.74 | 0 | 204 | 194 | 0.71 |
| WBR | 72 | 77 | 0.58 | 0 | 133 | 133 | 0 |
| **TOTAL** | **5304** | **5480** | **2.4** | **0** | **5181** | **5246** | **0.9** |
| **2. Hamilton Avenue & Willow Road** | | | | | | | |
| SBL | 47 | 44 | 0.44 | 0 | 83 | 133 | 4.81 |
| SBT | 14 | 13 | 0.27 | 0 | 17 | 21 | 0.92 |
| SBR | 48 | 48 | 0 | 0 | 35 | 19 | 3.08 |
| NBL | 56 | 79 | 2.8 | 0 | 193 | 160 | 2.48 |
| NBT | 25 | 34 | 1.66 | 0 | 18 | 12 | 1.55 |
| NBR | 84 | 83 | 0.11 | 0 | 99 | 90 | 0.93 |
| EBL | 99 | 93 | 0.61 | 0 | 43 | 29 | 2.33 |
| EBT | 820 | 842 | 0.76 | 0 | 1065 | 1017 | 1.49 |
| EBR | 73 | 67 | 0.72 | 0 | 7 | 8 | 0.37 |
| WBL | 190 | 241 | 3.47 | 0 | 138 | 118 | 1.77 |
| WBT | 1023 | 1074 | 1.58 | 0 | 707 | 853 | 5.23 |
| WBR | 37 | 35 | 0.33 | 0 | 54 | 52 | 0.27 |
| **TOTAL** | **2516** | **2653** | **2.69** | **0** | **2459** | **2512** | **1.06** |
| **3. Ivy Drive & Willow Road** | | | | | | | |
| SBL | 11 | 9 | 0.63 | 0 | 32 | 37 | 0.85 |
| SBR | 95 | 83 | 1.27 | 0 | 114 | 130 | 1.45 |
| EBL | 49 | 41 | 1.19 | 0 | 44 | 33 | 1.77 |
| EBT | 1221 | 1223 | 0.06 | 0 | 933 | 989 | 1.81 |
| WBT | 1098 | 1047 | 1.56 | 0 | 1106 | 1074 | 0.97 |
| WBR | 14 | 21 | 1.67 | 0 | 24 | 18 | 1.31 |
| **Total** | **2488** | **2424** | **1.29** | **0** | **2253** | **2281** | **0.59** |
| **4. O'Brien Drive & Willow Road** | | | | | | | |
| NBL | 237 | 239 | 0.13 | 0 | 274 | 177 | 6.46 |
| NBR | 45 | 36 | 1.41 | 0 | 45 | 26 | 3.19 |
| EBT | 1316 | 1235 | 2.27 | 0 | 1000 | 1006 | 0.19 |
| EBR | 342 | 333 | 0.49 | 0 | 352 | 330 | 1.19 |
| WBL | 42 | 40 | 0.31 | 0 | 57 | 78 | 2.56 |
| WBT | 1066 | 1077 | 0.34 | 0 | 1065 | 1125 | 1.81 |
| **Total** | **3048** | **2960** | **1.61** | **0** | **2793** | **2742** | **0.97** |

**Table 4(Contd.)**
**Existing Peak Hour – Model Served Volumes**

| | Existing Conditions | | | | | |
|---|---|---|---|---|---|---|
| | AM Peak Hour | | | PM Peak Hour | | |
| Movement | Raw Count Volume | Model Served Volume | GEH Statistic | Raw Count Volume | Model Served Volume | GEH Statistic |
| **5. Newbridge Road & Willow Road** | | | | | | |
| SBL | 17 | 20 | 0.7 | 27 | 28 | 0.19 |
| SBT | 93 | 102 | 0.91 | 170 | 231 | 4.31 |
| SBR | 281 | 302 | 1.23 | 206 | 215 | 0.62 |
| NBL | 260 | 294 | 2.04 | 160 | 158 | 0.16 |
| NBT | 79 | 98 | 2.02 | 255 | 238 | 1.08 |
| NBR | 36 | 32 | 0.69 | 56 | 80 | 2.91 |
| EBL | 143 | 150 | 0.58 | 268 | 278 | 0.61 |
| EBT | 1589 | 1519 | 1.78 | 1310 | 1244 | 1.85 |
| EBR | 130 | 124 | 0.53 | 138 | 174 | 2.88 |
| WBL | 40 | 35 | 0.82 | 78 | 67 | 1.29 |
| WBT | 1202 | 1226 | 0.69 | 1171 | 1221 | 1.45 |
| WBR | 7 | 9 | 0.71 | 26 | 22 | 0.82 |
| **TOTAL** | **3877** | **3911** | **0.54** | **3865** | **3956** | **1.46** |
| **6. US 101 NB & Willow Road** | | | | | | |
| NBL | 364 | 359 | 0.26 | 196 | 195 | 0.07 |
| NBR | 789 | 764 | 0.9 | 859 | 874 | 0.51 |
| EBT | 967 | 1037 | 2.21 | 827 | 928 | 3.41 |
| EBR | 318 | 322 | 0.22 | 122 | 128 | 0.54 |
| WBT | 1510 | 1371 | 3.66 | 1194 | 1121 | 2.15 |
| WBR | 424 | 414 | 0.49 | 495 | 460 | 1.6 |
| **TOTAL** | **4372** | **4267** | **1.6** | **3693** | **3706** | **0.21** |
| **7. US 101 SB & Willow Road** | | | | | | |
| SBL | 472 | 468 | 0.18 | 285 | 246 | 2.39 |
| SBR | 391 | 392 | 0.05 | 352 | 347 | 0.27 |
| EBT | 838 | 892 | 1.84 | 651 | 836 | 6.78 |
| EBR | 623 | 625 | 0.08 | 199 | 138 | 4.7 |
| WBT | 1053 | 1076 | 0.7 | 766 | 662 | 3.89 |
| WBR | 739 | 647 | 3.49 | 633 | 637 | 0.16 |
| **TOTAL** | **4116** | **4100** | **0.25** | **2886** | **2866** | **0.37** |
| **8. Bay Road & Willow Road** | | | | | | |
| SBL | 367 | 363 | 0.21 | 241 | 148 | 6.67 |
| SBR | 65 | 66 | 0.12 | 40 | 27 | 2.25 |
| EBL | 55 | 48 | 0.98 | 20 | 15 | 1.2 |
| EBT | 1101 | 1153 | 1.55 | 1201 | 869 | 10.32 |
| WBT | 1191 | 1125 | 1.94 | 678 | 837 | 5.78 |
| WBR | 387 | 342 | 2.36 | 100 | 162 | 5.42 |
| **TOTAL** | **3166** | **3097** | **1.23** | **2280** | **2058** | **4.77** |
| **9. Hospital Plaza/Durham St & Willow Road** | | | | | | |
| SBL | 65 | 64 | 0.12 | 132 | 119 | 1.16 |
| SBT | 7 | 6 | 0.39 | 1 | 3 | 1.41 |
| SBR | 30 | 31 | 0.18 | 31 | 21 | 1.96 |
| NBL | 59 | 56 | 0.4 | 21 | 41 | 3.59 |
| NBT | 11 | 10 | 0.31 | 6 | 8 | 0.76 |
| NBR | 62 | 65 | 0.38 | 17 | 19 | 0.47 |
| EBL | 22 | 21 | 0.22 | 9 | 5 | 1.51 |
| EBT | 897 | 905 | 0.27 | 1029 | 786 | 8.07 |
| EBR | 7 | 6 | 0.39 | 4 | 8 | 1.63 |
| WBL | 36 | 35 | 0.17 | 29 | 32 | 0.54 |
| WBT | 924 | 924 | 0 | 522 | 761 | 9.44 |
| WBR | 108 | 99 | 0.88 | 18 | 39 | 3.93 |
| **TOTAL** | **2228** | **2222** | **0.13** | **1819** | **1842** | **0.54** |

**Table 4**
**Model Estimated Travel Times – Willow Road Eastbound (AM Peak Hour)**

| Willow Road (Eastbound) - AM Peak Hour Travel Time | | | | | | |
|---|---|---|---|---|---|---|
| **Willow Road (Eastbound)** | | **Node** | **Bluetooth** | **Model** | **% Match** | **Diff** |
| **From** | **To** | 27 | | | | |
| Durham | Bay RD | 33 | 57 | 32.7 | 57% | -24.3 |
| Bay Rd | Newbridge St | 26 | 92 | 92.6 | 101% | 0.6 |
| Newbridge St | O'Brien Dr | 45 | 34 | 61.2 | 180% | 27.2 |
| O'Brien Dr | Ivy Dr | 25 | 44 | 21.4 | 49% | -22.6 |
| Ivy Dr | Hamilton Ave | 24 | 193 | 172.9 | 90% | -20.1 |
| Hamilton Ave | Bayfront Expwy | 23 | 112 | 108.5 | 97% | -3.5 |
| | | **Total (in seconds)** | **532** | **489.3** | 92% | -42.7 |
| | | **Total (in minutes)** | **8.87** | **8.16** | | |

*Note:- The bluetooth data showed that the travel time on eastbound Willow Road varied between 3 minutes and 26 minutes during the AM peak hour, with an average travel time of approximately 9 minutes. The travel time from the model falls within this range.*

**Table 5**
**Model Estimated Travel Times – Willow Road Westbound (AM Peak Hour)**

| Willow Road (Westbound) - AM Peak Hour Travel Time | | | | | | |
|---|---|---|---|---|---|---|
| **Willow Road (Westbound)** | | **Node** | **Bluetooth** | **Model** | **% Match** | **Diff** |
| **From** | **To** | 17 | | | | |
| Bayfront Expwy | Hamilton Ave | 18 | 65 | 51.7 | 80% | -13.3 |
| Hamilton Ave | Ivy Dr | 21 | 215 | 149.3 | 69% | -65.7 |
| Ivy Dr | O'Brien Dr | 22 | 98 | 45.6 | 47% | -52.4 |
| O'Brien Dr | Newbridge St | 23 | 47 | 152.3 | 324% | 105.3 |
| Newbridge St | Bay Rd | 26 | 190 | 302.7 | 159% | 112.7 |
| Bay Rd | Durham | 27 | 112 | 70.2 | 63% | -41.8 |
| | | **Total (in seconds)** | **727** | **771.8** | 106% | 44.8 |
| | | **Total (in minutes)** | **12.12** | **12.86** | | |

*Note:- The bluetooth data showed that the travel time on westbound Willow Road varied between 4 minutes and 35 minutes during the AM peak hour, with an average travel time of approximately 12 minutes. The travel time from the model falls within this range.*

**Table 6**
**Model Estimated Travel Times – Willow Road Eastbound (PM Peak Hour)**

| Willow Road (Eastbound) - PM Peak Hour Travel Time | | | | | | |
|---|---|---|---|---|---|---|
| Willow Road (Eastbound) | | Node | Bluetooth | Model | % Match | Diff |
| **From** | **To** | 27 | | | | |
| Durham | Bay RD | 33 | 132 | 103.1 | 78% | -28.9 |
| Bay Rd | Newbridge St | 26 | 392 | 442.6 | 113% | 50.6 |
| Newbridge St | O'Brien Dr | 45 | 104 | 201.4 | 194% | 97.4 |
| O'Brien Dr | Ivy Dr | 25 | 46 | 66.5 | 145% | 20.5 |
| Ivy Dr | Hamilton Ave | 24 | 266 | 434.5 | 163% | 168.5 |
| Hamilton Ave | Bayfront Expwy | 23 | 127 | 138.8 | 109% | 11.8 |
| | **Total (in seconds)** | | **1067** | **1386.9** | 130% | 319.9 |
| | **Total (in minutes)** | | **17.78** | **23.12** | | |
| *Note:- The bluetooth data showed that the travel time on eastbound Willow Road varied between 8 minutes and 38 minutes during the PM peak hour, with an average travel time of approximately 18 minutes. The travel time from the model falls within this range.* | | | | | | |

**Table 7**
**Model Estimated Travel Times – Willow Road Westbound (PM Peak Hour)**

| Willow Road (Westbound) - PM Peak Hour Travel Time | | | | | | |
|---|---|---|---|---|---|---|
| Willow Road (Westbound) | | Node | Bluetooth | Model | % Match | Diff |
| **From** | **To** | 17 | | | | |
| Bayfront Expwy | Hamilton Ave | 18 | 75 | 27.6 | 37% | -47.4 |
| Hamilton Ave | Ivy Dr | 21 | 92 | 38.8 | 42% | -53.2 |
| Ivy Dr | O'Brien Dr | 22 | 73 | 19.8 | 27% | -53.2 |
| O'Brien Dr | Newbridge St | 23 | 49 | 131.6 | 269% | 82.6 |
| Newbridge St | Bay Rd | 26 | 148 | 211.1 | 143% | 63.1 |
| Bay Rd | Durham | 27 | 112 | 97.4 | 87% | -14.6 |
| | **Total (in seconds)** | | **549** | **526.3** | 96% | -22.7 |
| | **Total (in minutes)** | | **9.15** | **8.77** | | |
| *Note:- The bluetooth data showed that the travel time on westbound Willow Road varied between 2 minutes and 31 minutes during the PM peak hour, with an average travel time of approximately 9 minutes. The travel time from the model falls within this range.* | | | | | | |

## Existing Conditions Level of Service Analysis

The calibrated and validated SimTraffic model was used to analyze traffic operations at the nine study intersections along the corridor. Table 8 shows the average weighted delay and the corresponding LOS during the AM and PM peak hour periods under existing conditions. The weighted average delay (measured in seconds per vehicle) calculated by the microscopic simulation model was correlated to LOS based on the thresholds contained in the *2010 Highway Capacity Manual*. Also provided in the table is the delay and LOS at the study intersections that were reported in previous studies using Vistro software. The large variance in the delay and LOS is primarily because the Vistro model did not take into account the delay caused by downstream queues on Willow Road during the AM and PM peak hours. The simulation analysis showed that all study intersections along Willow Road between Bayfront Expressway and Durham Street operate at unacceptable levels of service during at least one of the peak hours.

The analysis showed that during the AM peak hour, all study intersection along Willow Road between Bayfront Expressway and US 101 northbound off-ramp currently operate at unacceptable LOS E or F. During the PM peak hour, the analysis showed that all study intersections along Willow Road currently operate at unacceptable LOS E or F except for the intersection of Willow Road and Ivy Drive. During the PM peak hour, the poor levels of service along Willow Road is attributed to the heavy demand on eastbound Willow Road. Due to the close proximity of the traffic signal at Ivy Drive to the traffic signal at O'Brien Drive, the queues on eastbound Willow Road at Ivy Drive spill over into the upstream intersection at O'Brien Drive. The delay caused by this spill over queue is reflected in the delay reported for the Willow Road/O'Brien Drive intersection. The delay reported for the Willow Road/Ivy Drive intersection reflects delay for the eastbound approach only between Ivy Drive and O'Brien Drive, which is a short segment that measures approximately 270 feet in length.

**Table 8**
**Existing Conditions Level of Service Analysis**

| | | | | | Existing Conditions | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SimTraffic | | Vistro [1] | |
| # | Intersection | Control | Peak Hour | Count Date | Avg. Delay [2] | LOS | Avg. Delay [2] | LOS |
| 1 | Bayfront Expwy & Willow Rd | Signal | AM | 04/23/19 | **175.7** | **F** | **158.5** | **F** |
| | | | PM | 04/23/19 | **142.0** | **F** | **64.8** | **E** |
| 2 | Hamilton Ave & Willow Rd | Signal | AM | 03/21/19 | **73.7** | **E** | **64.7** | **E** |
| | | | PM | 03/21/19 | **155.5** | **F** | 26.7 | C |
| 3 | Ivy Dr & Willow Rd | Signal | AM | 03/21/19 | **75.2** | **E** | 17.1 | B |
| | | | PM | 03/21/19 | 40.2 | D | 11.9 | B |
| 4 | O'Brien Dr & Willow Rd | Signal | AM | 03/21/19 | **58.9** | **E** | 14.6 | B |
| | | | PM | 03/21/19 | **147.5** | **F** | 12.3 | B |
| 5 | Newbridge St & Willow Rd | Signal | AM | 03/21/19 | **93.3** | **F** | 42.5 | D |
| | | | PM | 03/21/19 | **133.9** | **F** | 41.3 | D |
| 6 | US 101 NB Ramps & Willow Rd | Signal | AM | 03/13/19 | **92.3** | **F** | N/A | |
| | | | PM | 03/13/19 | **83.8** | **F** | N/A | |
| 7 | US 101 SB Ramps & Willow Rd | Signal | AM | 03/13/19 | 38.5 | D | N/A | |
| | | | PM | 03/13/19 | **99.8** | **F** | N/A | |
| 8 | Bay Rd & Willow Rd | Signal | AM | 04/23/19 | 45.9 | D | 12.4 | B |
| | | | PM | 04/23/19 | **113.3** | **F** | 16.7 | B |
| 9 | Hospital Plaza/Durham St & Willow Rd | Signal | AM | 04/16/19 | 43.5 | D | 19.0 | B |
| | | | PM | 04/16/19 | **167.7** | **F** | 16.6 | B |

Notes:
Avg Delay = Average Delay in seconds; LOS = Level of Service
[1] Average delay was obtained from the Vistro files provided by Kittleson & Associates.
[2] At signalized intersections, delay shown is the weighted average delay for all vehicles entering the intersection.
**Bold** indicates a substandard level of service.

# Appendix C
## Level of Service Analysis

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro
Report File: \...\Existing AM.pdf

Scenario 16 Existing AM (2019 vols)
12/9/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.838 | 19.0 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.696 | 18.5 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.711 | 35.3 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.641 | 19.7 | B |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.667 | 36.1 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.351 | 12.5 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.727 | 11.4 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.108 | 175.5 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Left | 0.981 | 73.3 | E |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | EB Right | 1.065 | 75.2 | E |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.109 | 58.9 | E |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | SB Right | 1.128 | 93.4 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SWB Thru | 0.977 | 45.3 | D |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | NB Left | 0.862 | 43.6 | D |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.782 | 18.6 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | EB Left | 0.684 | 19.7 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.561 | 61.6 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.727 | 15.8 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 0.280 | 9.2 | A |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.816 | 50.5 | D |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.276 | 38.5 | D |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.417 | 92.8 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.760 | 10.9 | B |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.621 | 8.4 | A |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.775 | 7.9 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | SB Thru | 0.504 | 11.8 | B |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.888 | 10.0 | A |
| 207 | Chilco St/Constitution Dr | All-way stop | HCM 6th Edition | SB Right | 0.985 | 32.1 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | SB Thru | 0.846 | 50.6 | D |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.106 | 17.3 | C |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.025 | 11.5 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.838 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 891 | 1462 | 217 | 1123 | 436 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 891 | 1462 | 217 | 1123 | 436 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 227 | 373 | 54 | 286 | 111 |
| Total Analysis Volume [veh/h] | 0 | 909 | 1492 | 217 | 1146 | 445 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 46 | 44 | 30 | 30 |
| g / C, Green / Cycle | 0.57 | 0.54 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.42 | 0.34 | 0.28 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2283 | 1914 | 1257 | 586 |
| d1, Uniform Delay [s] | 9.52 | 14.40 | 23.80 | 21.91 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.52 | 3.22 | 1.14 | 4.30 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.40 | 0.78 | 0.91 | 0.76 |
| d, Delay for Lane Group [s/veh] | 10.04 | 17.62 | 24.94 | 26.21 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.95 | 9.95 | 9.78 | 7.55 |
| 50th-Percentile Queue Length [ft/ln] | 98.65 | 248.63 | 244.40 | 188.71 |
| 95th-Percentile Queue Length [veh/ln] | 7.10 | 15.12 | 14.90 | 12.05 |
| 95th-Percentile Queue Length [ft/ln] | 177.56 | 377.93 | 372.59 | 301.35 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 10.04 | 17.62 | 0.00 | 24.94 | 26.21 |
| Movement LOS | | B | B | | C | C |
| d_A, Approach Delay [s/veh] | 10.04 | | 17.62 | | 25.30 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 18.95 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.838 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.936 | 0.000 | 2.509 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.310 | 2.791 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.696 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 1050 | 7 | 448 | 1189 | 272 | 13 | 4 | 58 | 225 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 1050 | 7 | 448 | 1189 | 272 | 13 | 4 | 0 | 225 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 292 | 2 | 124 | 330 | 76 | 4 | 1 | 0 | 63 | 5 | 0 |
| Total Analysis Volume [veh/h] | 27 | 1167 | 8 | 498 | 1321 | 302 | 14 | 4 | 0 | 250 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 5 | 107 | 107 | 121 | 114 | 114 | 6 | 6 | 27 | 27 |
| g / C, Green / Cycle | 0.03 | 0.67 | 0.67 | 0.76 | 0.71 | 0.71 | 0.04 | 0.04 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.22 | 0.22 | 0.43 | 0.44 | 0.47 | 0.01 | 0.00 | 0.14 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1848 | 1162 | 1840 | 1727 | 1829 | 2572 | 1785 | 1900 |
| c, Capacity [veh/h] | 56 | 2363 | 1236 | 877 | 1311 | 1231 | 72 | 101 | 296 | 315 |
| d1, Uniform Delay [s] | 76.05 | 11.20 | 11.20 | 8.14 | 11.80 | 12.45 | 74.49 | 0.00 | 64.63 | 56.20 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.23 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.66 | 0.37 | 0.70 | 2.66 | 2.20 | 2.78 | 1.34 | 0.00 | 12.90 | 0.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.48 | 0.33 | 0.33 | 0.57 | 0.62 | 0.66 | 0.25 | 0.00 | 0.84 | 0.07 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 80.71 | 11.57 | 11.91 | 10.80 | 14.00 | 15.23 | 75.83 | 0.00 | 77.53 | 56.26 |
| Lane Group LOS | F | B | B | B | B | B | E | A | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.17 | 5.84 | 6.23 | 2.81 | 14.82 | 15.73 | 0.75 | 0.00 | 11.05 | 0.74 |
| 50th-Percentile Queue Length [ft/ln] | 29.17 | 146.00 | 155.75 | 70.19 | 370.38 | 393.27 | 18.86 | 0.00 | 276.37 | 18.39 |
| 95th-Percentile Queue Length [veh/ln] | 2.10 | 9.80 | 10.32 | 5.05 | 21.13 | 22.24 | 1.36 | 0.00 | 16.51 | 1.32 |
| 95th-Percentile Queue Length [ft/ln] | 52.50 | 245.09 | 258.08 | 126.34 | 528.20 | 555.89 | 33.94 | 0.00 | 412.69 | 33.10 |

**Movement, Approach, & Intersection Results**

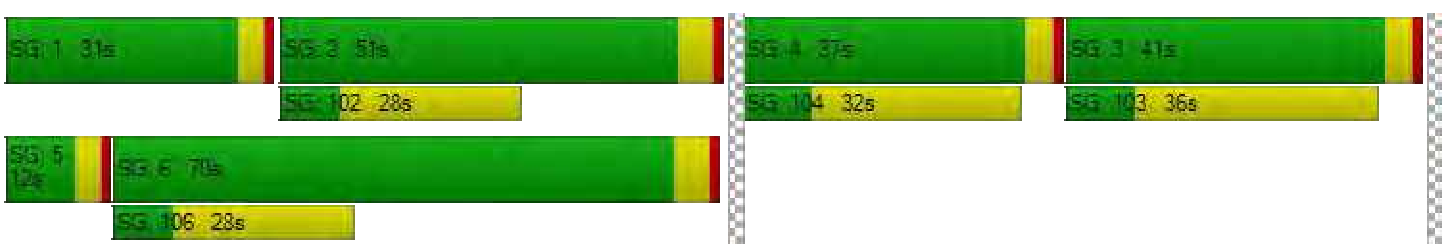
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 80.71 | 11.68 | 11.91 | 10.80 | 14.47 | 15.23 | 75.83 | 75.83 | 0.00 | 77.53 | 56.26 | 56.26 |
| Movement LOS | F | B | B | B | B | B | E | E | A | E | E | E |
| d_A, Approach Delay [s/veh] | 13.24 | | | 13.72 | | | 75.83 | | | 75.88 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 18.53 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.696 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.40 | 68.40 | 69.33 | 69.33 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.033 | 3.205 | 2.992 | 2.131 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.59 | 28.16 | 47.39 | 50.52 |
| I_b,int, Bicycle LOS Score for Intersection | 2.221 | 3.309 | 1.687 | 2.007 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 35.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.711 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 114 | 804 | 80 | 29 | 1007 | 413 | 496 | 47 | 137 | 35 | 15 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 114 | 804 | 80 | 29 | 1007 | 413 | 496 | 47 | 122 | 35 | 15 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 29 | 207 | 21 | 7 | 260 | 106 | 128 | 12 | 31 | 9 | 4 | 6 |
| Total Analysis Volume [veh/h] | 118 | 829 | 82 | 30 | 1038 | 426 | 511 | 48 | 126 | 36 | 15 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 104 | 104 | 5 | 96 | 96 | 31 | 31 | 31 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.65 | 0.65 | 0.03 | 0.60 | 0.60 | 0.19 | 0.19 | 0.19 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.25 | 0.25 | 0.02 | 0.42 | 0.43 | 0.16 | 0.16 | 0.08 | 0.03 | 0.03 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1809 | 1704 | 1823 | 1647 | 1717 | 1702 | 1523 | 1439 | 1192 |
| c, Capacity [veh/h] | 142 | 1220 | 1177 | 58 | 1101 | 994 | 332 | 329 | 294 | 104 | 86 |
| d1, Uniform Delay [s] | 72.35 | 12.96 | 12.98 | 75.88 | 21.51 | 21.96 | 62.21 | 62.20 | 56.61 | 70.61 | 71.29 |
| k, delay calibration | 0.48 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 39.14 | 0.90 | 0.94 | 2.58 | 3.54 | 4.28 | 4.52 | 4.53 | 0.73 | 1.48 | 3.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.83 | 0.38 | 0.38 | 0.51 | 0.69 | 0.71 | 0.85 | 0.85 | 0.43 | 0.35 | 0.48 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 111.48 | 13.86 | 13.92 | 78.45 | 25.05 | 26.24 | 66.74 | 66.72 | 57.35 | 72.08 | 74.33 |
| Lane Group LOS | F | B | B | E | C | C | E | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.32 | 7.94 | 7.72 | 1.26 | 19.95 | 19.08 | 11.56 | 11.44 | 4.61 | 1.47 | 1.71 |
| 50th-Percentile Queue Length [ft/ln] | 157.93 | 198.53 | 192.92 | 31.42 | 498.66 | 477.06 | 288.91 | 286.02 | 115.18 | 36.66 | 42.75 |
| 95th-Percentile Queue Length [veh/ln] | 10.44 | 12.56 | 12.27 | 2.26 | 27.27 | 26.25 | 17.13 | 16.99 | 8.13 | 2.64 | 3.08 |
| 95th-Percentile Queue Length [ft/ln] | 260.98 | 314.07 | 306.81 | 56.56 | 681.78 | 656.16 | 428.29 | 424.70 | 203.19 | 65.99 | 76.95 |

**Movement, Approach, & Intersection Results**

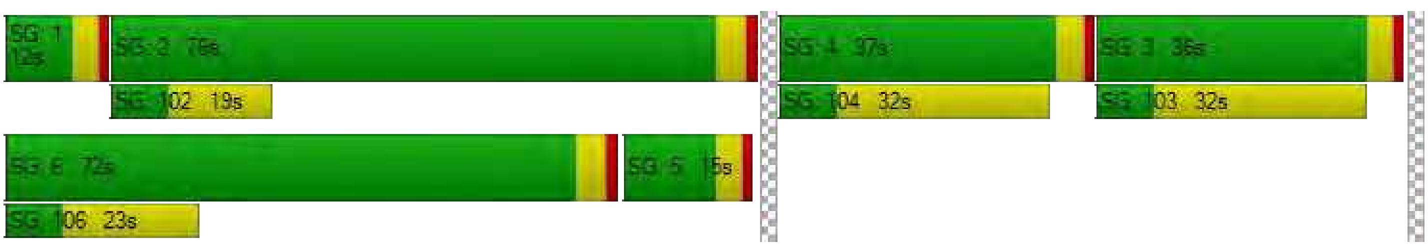
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 111.48 | 13.88 | 13.92 | 78.45 | 25.37 | 26.24 | 66.73 | 66.72 | 57.35 | 72.08 | 74.33 | 74.33 |
| Movement LOS | F | B | B | E | C | C | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 25.08 | | | 26.68 | | | 65.00 | | | 73.28 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 35.26 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.711 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.906 | 3.022 | 2.435 | 2.032 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.409 | 2.792 | 2.715 | 1.687 |
| Bicycle LOS | B | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.641 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 810 | 82 | 267 | 755 | 47 | 139 | 63 | 2 | 39 | 19 | 202 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 810 | 82 | 267 | 755 | 47 | 139 | 63 | 2 | 39 | 19 | 202 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 207 | 21 | 68 | 193 | 12 | 35 | 16 | 1 | 10 | 5 | 52 |
| Total Analysis Volume [veh/h] | 0 | 827 | 84 | 272 | 770 | 48 | 142 | 64 | 2 | 40 | 19 | 206 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 33 | 33 | 16 | 52 | 52 | 24 | 24 |
| g / C, Green / Cycle | 0.41 | 0.41 | 0.20 | 0.65 | 0.65 | 0.30 | 0.30 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.16 | 0.23 | 0.23 | 0.19 | 0.17 |
| s, saturation flow rate [veh/h] | 1882 | 1654 | 1708 | 1807 | 1763 | 1082 | 1605 |
| c, Capacity [veh/h] | 812 | 674 | 342 | 1166 | 1137 | 397 | 529 |
| d1, Uniform Delay [s] | 18.95 | 18.96 | 30.47 | 6.54 | 6.55 | 25.25 | 23.77 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.24 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.23 | 4.48 | 4.20 | 0.84 | 0.87 | 2.34 | 1.57 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.60 | 0.63 | 0.79 | 0.35 | 0.36 | 0.52 | 0.50 |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 22.19 | 23.44 | 34.67 | 7.38 | 7.42 | 27.59 | 25.34 |
| Lane Group LOS | C | C | C | A | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.29 | 6.61 | 5.15 | 2.83 | 2.78 | 3.75 | 4.29 |
| 50th-Percentile Queue Length [ft/ln] | 182.32 | 165.34 | 128.70 | 70.71 | 69.54 | 93.69 | 107.30 |
| 95th-Percentile Queue Length [veh/ln] | 11.72 | 10.83 | 8.87 | 5.09 | 5.01 | 6.75 | 7.69 |
| 95th-Percentile Queue Length [ft/ln] | 293.05 | 270.78 | 221.72 | 127.27 | 125.17 | 168.65 | 192.24 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 22.19 | 22.70 | 23.44 | 34.67 | 7.40 | 7.42 | 27.59 | 27.59 | 27.59 | 25.34 | 25.34 | 25.34 |
| Movement LOS | C | C | C | C | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 22.77 | | | 14.20 | | | 27.59 | | | 25.34 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 19.68 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.641 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.79 | 29.79 | 29.79 | 19.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.671 | 3.011 | 1.820 | 2.026 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.70 | 8.68 | 17.47 | 17.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.311 | 2.459 | 1.903 | 1.997 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## Intersection Level Of Service Report
## Intersection 9: Middlefield Rd/Ravenswood Ave

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.667 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 422 | 456 | 400 | 416 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 456 | 400 | 416 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 121 | 106 | 111 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 485 | 426 | 443 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.27 | 0.23 | 0.31 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1768 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 999 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.50 | 2.11 | 16.53 |
| k, delay calibration | 0.08 | 0.08 | 0.45 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 38.73 | 0.44 | 2.22 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.00 | 0.27 | 0.55 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 82.23 | 2.55 | 18.75 |
| Lane Group LOS | D | A | F | A | B |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 19.31 | 1.50 | 9.79 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 482.67 | 37.40 | 244.72 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 26.51 | 2.69 | 14.92 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 662.82 | 67.32 | 373.00 |

**Movement, Approach, & Intersection Results**

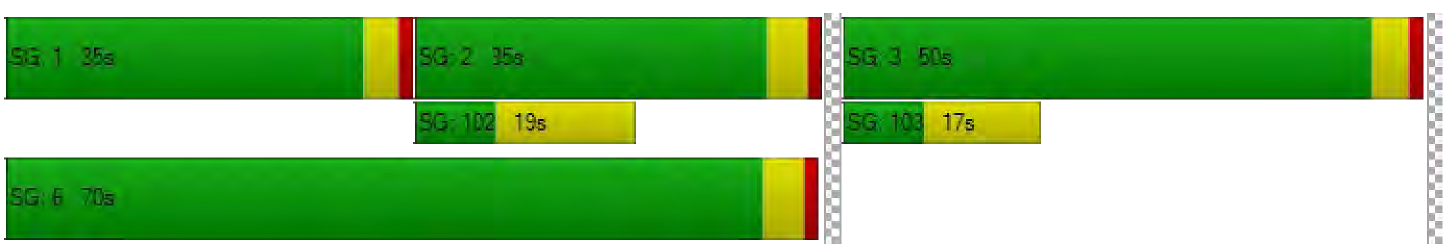
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 82.23 | 2.55 | 18.75 | 18.75 |
| Movement LOS | D | A | F | A | B | B |
| d_A, Approach Delay [s/veh] | 52.11 | | 44.97 | | 18.75 | |
| Approach LOS | D | | D | | B | |
| d_I, Intersection Delay [s/veh] | 36.07 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.667 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.925 | 2.814 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.063 | 2.474 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.351 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 269 | 21 | 561 | 114 | 193 | 619 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 47 | 21 | 561 | 18 | 193 | 619 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 13 | 6 | 149 | 5 | 51 | 165 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 50 | 22 | 597 | 19 | 205 | 659 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

### Phasing & Timing

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | 24 | 92 | 81 | 81 | 89 | 83 | 83 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.20 | 0.77 | 0.67 | 0.67 | 0.75 | 0.69 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.03 | 0.03 | 0.17 | 0.01 | 0.23 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1401 | 1737 | 1277 | 1481 | 792 | 3526 | 1475 | 899 | 1840 | 1768 |
| c, Capacity [veh/h] | 120 | 347 | 310 | 296 | 645 | 2379 | 995 | 711 | 1278 | 1228 |
| d1, Uniform Delay [s] | 55.18 | 38.93 | 46.16 | 39.71 | 4.25 | 7.64 | 6.42 | 4.69 | 6.98 | 7.00 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 0.07 | 1.40 | 0.26 | 0.02 | 0.25 | 0.04 | 1.02 | 0.56 | 0.59 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.06 | 0.54 | 0.17 | 0.03 | 0.25 | 0.02 | 0.29 | 0.29 | 0.29 |
| d, Delay for Lane Group [s/veh] | 55.34 | 39.01 | 47.55 | 39.97 | 4.27 | 7.89 | 6.46 | 5.72 | 7.54 | 7.59 |
| Lane Group LOS | E | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.55 | 4.77 | 1.25 | 0.12 | 2.87 | 0.16 | 1.45 | 3.42 | 3.33 |
| 50th-Percentile Queue Length [ft/ln] | 4.57 | 13.68 | 119.22 | 31.25 | 3.09 | 71.71 | 3.97 | 36.28 | 85.39 | 83.35 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 0.99 | 8.35 | 2.25 | 0.22 | 5.16 | 0.29 | 2.61 | 6.15 | 6.00 |
| 95th-Percentile Queue Length [ft/ln] | 8.23 | 24.63 | 208.76 | 56.25 | 5.56 | 129.08 | 7.14 | 65.30 | 153.71 | 150.02 |

**Movement, Approach, & Intersection Results**

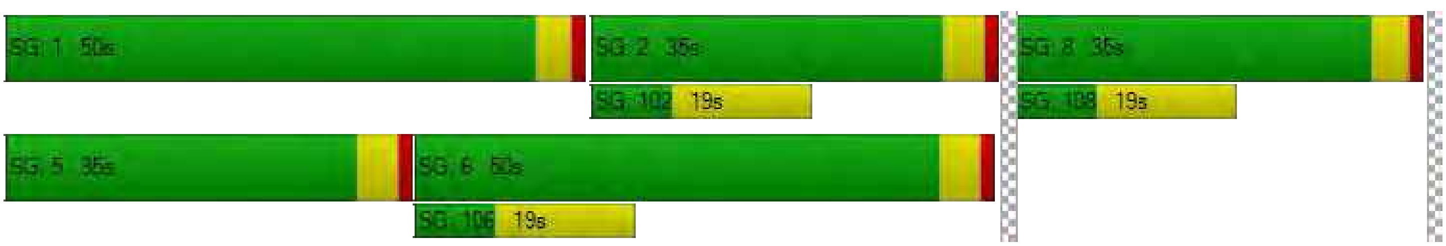
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.34 | 39.01 | 39.01 | 47.55 | 47.55 | 39.97 | 4.27 | 7.89 | 6.46 | 5.72 | 7.56 | 7.59 |
| Movement LOS | E | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 42.51 | | | 45.81 | | | 7.72 | | | 7.16 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 12.55 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.351 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.007 | 2.715 | 3.090 | 2.731 |
| Crosswalk LOS | B | B | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.284 | 2.165 | 2.322 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.727 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 829 | 67 | 1148 | 2695 | 205 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 829 | 67 | 1148 | 2695 | 205 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 214 | 17 | 296 | 695 | 53 | 107 |
| Total Analysis Volume [veh/h] | 855 | 69 | 1184 | 2778 | 211 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 63 | 63 | 63 | 63 | 63 | 63 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 18 | 25 | 46 | 7 | 36 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.39 | 0.74 | 0.11 | 0.56 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.04 | 0.34 | 0.55 | 0.06 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1549 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1415 | 442 | 1365 | 3716 | 370 | 2349 |
| d1, Uniform Delay [s] | 19.46 | 16.85 | 17.62 | 4.89 | 26.79 | 6.69 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.51 | 0.20 | 0.68 | 0.37 | 0.52 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.60 | 0.16 | 0.87 | 0.75 | 0.57 | 0.18 |
| d, Delay for Lane Group [s/veh] | 19.97 | 17.04 | 18.30 | 5.26 | 27.31 | 6.70 |
| Lane Group LOS | B | B | B | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.99 | 0.64 | 6.06 | 1.37 | 1.43 | 0.72 |
| 50th-Percentile Queue Length [ft/ln] | 74.72 | 15.91 | 151.47 | 34.24 | 35.83 | 18.10 |
| 95th-Percentile Queue Length [veh/ln] | 5.38 | 1.15 | 10.10 | 2.47 | 2.58 | 1.30 |
| 95th-Percentile Queue Length [ft/ln] | 134.50 | 28.64 | 252.38 | 61.64 | 64.49 | 32.58 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

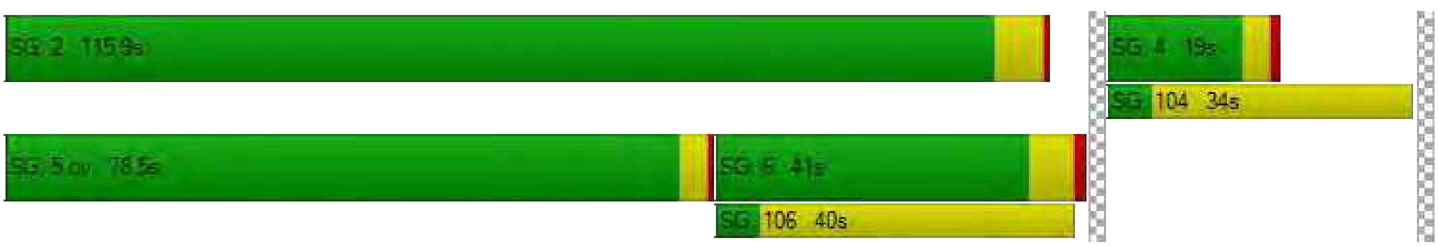
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.97 | 17.04 | 18.30 | 5.26 | 27.31 | 6.70 |
| Movement LOS | B | B | B | A | C | A |
| d_A, Approach Delay [s/veh] | 19.75 | | 9.16 | | 13.49 | |
| Approach LOS | B | | A | | B | |
| d_I, Intersection Delay [s/veh] | 11.43 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.727 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 23.14 | 0.00 | 23.14 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.576 | 0.000 | 2.885 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1111 | 444 | 476 |
| d_b, Bicycle Delay [s] | 6.22 | 19.07 | 18.29 |
| I_b,int, Bicycle LOS Score for Intersection | 2.068 | 3.739 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 175.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.108 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 195 | 425 | 277 | 35 | 67 | 72 | 341 | 410 | 172 | 1021 | 2217 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 195 | 425 | 277 | 35 | 67 | 56 | 341 | 410 | 66 | 1021 | 2217 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 50 | 108 | 71 | 9 | 17 | 14 | 87 | 105 | 17 | 260 | 566 | 18 |
| Total Analysis Volume [veh/h] | 199 | 434 | 283 | 36 | 68 | 57 | 348 | 418 | 67 | 1042 | 2262 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 2 | | | 3 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 3 | | | 2 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 4 | | | 0 | | | 3 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 3 | | | 0 | | | 4 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 0 | | | 0 | | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.20 | 0.07 | 0.05 | 0.02 | 0.05 | 0.23 | 0.08 | 0.05 | 0.38 | 0.45 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1577 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 57.49 | 55.76 | 57.36 | 50.09 | 24.48 | 23.48 | 50.58 | 38.08 | 24.07 |
| k, delay calibration | 0.50 | 0.27 | 0.11 | 0.16 | 0.11 | 0.15 | 0.11 | 0.11 | 0.11 | 0.40 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 283.13 | 94.19 | 0.05 | 28.34 | 1.05 | 17.46 | 62.52 | 0.05 | 0.08 | 427.00 | 63.16 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.55 | 1.18 | 0.18 | 0.75 | 0.35 | 0.74 | 1.12 | 0.21 | 0.11 | 1.94 | 1.14 | 0.11 |
| d, Delay for Lane Group [s/veh] | 335.27 | 146.72 | 24.51 | 85.83 | 56.81 | 74.82 | 112.61 | 24.53 | 23.56 | 477.58 | 101.23 | 24.15 |
| Lane Group LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 14.06 | 10.56 | 1.81 | 1.52 | 1.08 | 2.18 | 7.61 | 2.75 | 1.28 | 40.38 | 31.73 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 351.45 | 263.90 | 45.13 | 38.07 | 26.97 | 54.60 | 190.28 | 68.82 | 31.98 | 1009.39 | 793.28 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 23.77 | 17.06 | 3.25 | 2.74 | 1.94 | 3.93 | 12.77 | 4.95 | 2.30 | 64.33 | 44.75 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 594.29 | 426.44 | 81.24 | 68.52 | 48.55 | 98.28 | 319.14 | 123.87 | 57.56 | 1608.20 | 1118.76 | 63.55 |

**Movement, Approach, & Intersection Results**

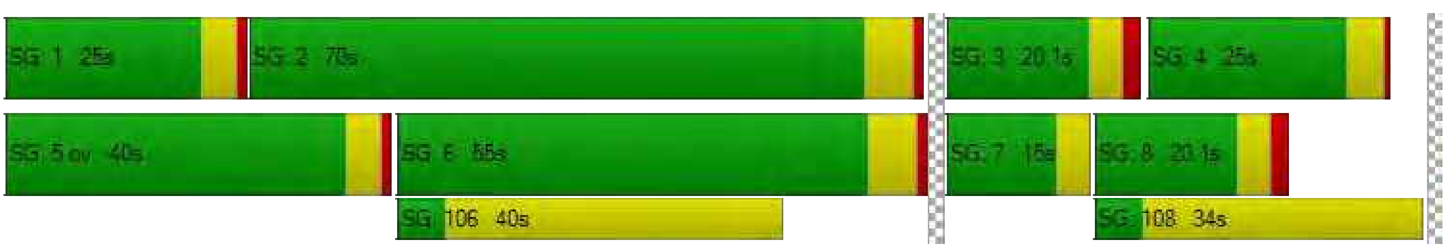
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 335.27 | 146.72 | 24.51 | 85.83 | 56.81 | 74.82 | 112.61 | 24.53 | 23.56 | 477.58 | 101.23 | 24.15 |
| Movement LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | 149.93 | | | 69.68 | | | 61.25 | | | 215.69 | | |
| Approach LOS | F | | | E | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 175.52 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.108 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.43 | 0.00 | 54.43 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.109 | 0.000 | 3.328 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.19 | 49.00 | 23.62 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.315 | 1.706 | 2.076 | 3.417 |
| Bicycle LOS | B | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 73.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.981 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 99 | 820 | 73 | 190 | 1023 | 37 | 47 | 14 | 48 | 56 | 25 | 84 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 99 | 820 | 73 | 190 | 1023 | 37 | 47 | 14 | 48 | 56 | 25 | 84 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 220 | 20 | 51 | 275 | 10 | 13 | 4 | 13 | 15 | 7 | 23 |
| Total Analysis Volume [veh/h] | 106 | 882 | 78 | 204 | 1100 | 40 | 51 | 15 | 52 | 60 | 27 | 90 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 93 | 76 | 76 | 93 | 82 | 82 | 30 | 30 |
| g / C, Green / Cycle | 0.71 | 0.58 | 0.58 | 0.71 | 0.63 | 0.63 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.60 | 0.61 | 0.34 | 0.61 | 0.62 | 0.21 | 0.23 |
| s, saturation flow rate [veh/h] | 523 | 808 | 779 | 605 | 934 | 917 | 555 | 758 |
| c, Capacity [veh/h] | 152 | 471 | 454 | 179 | 590 | 579 | 168 | 199 |
| d1, Uniform Delay [s] | 32.18 | 27.12 | 27.12 | 48.05 | 22.76 | 23.05 | 49.87 | 46.81 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.33 | 0.42 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 23.46 | 50.67 | 53.78 | 109.75 | 30.53 | 32.47 | 14.87 | 35.17 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.70 | 1.03 | 1.04 | 1.14 | 0.97 | 0.98 | 0.70 | 0.89 |
| d, Delay for Lane Group [s/veh] | 55.64 | 77.79 | 80.90 | 157.81 | 53.29 | 55.52 | 64.74 | 81.98 |
| Lane Group LOS | E | F | F | F | D | E | E | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.84 | 19.83 | 19.52 | 7.13 | 20.42 | 20.67 | 4.53 | 7.42 |
| 50th-Percentile Queue Length [ft/ln] | 46.08 | 495.76 | 487.93 | 178.24 | 510.51 | 516.86 | 113.29 | 185.39 |
| 95th-Percentile Queue Length [veh/ln] | 3.32 | 27.88 | 27.66 | 12.56 | 27.83 | 28.13 | 8.02 | 11.88 |
| 95th-Percentile Queue Length [ft/ln] | 82.94 | 697.04 | 691.61 | 313.94 | 695.79 | 703.28 | 200.57 | 297.03 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.64 | 79.19 | 80.90 | 157.81 | 54.36 | 55.52 | 64.74 | 64.74 | 64.74 | 81.98 | 81.98 | 81.98 |
| Movement LOS | E | E | F | F | D | E | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | | 76.97 | | | 70.10 | | | 64.74 | | | 81.98 | |
| Approach LOS | | E | | | E | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | 73.35 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.981 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.30 | 56.30 | 54.45 | 54.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.213 | 2.929 | 1.948 | 2.099 |
| Crosswalk LOS | C | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1123 | 1077 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.58 | 14.10 | 36.42 | 36.38 |
| I_b,int, Bicycle LOS Score for Intersection | 2.439 | 2.668 | 1.754 | 1.852 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 75.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.065 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 49 | 1221 | 1098 | 14 | 11 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 1221 | 1098 | 14 | 11 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 332 | 298 | 4 | 3 | 26 |
| Total Analysis Volume [veh/h] | 53 | 1327 | 1193 | 15 | 12 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 9 | 104 | 92 | 92 | 19 | 19 |
| g / C, Green / Cycle | 0.07 | 0.80 | 0.70 | 0.70 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.86 | 0.77 | 0.78 | 0.01 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 777 | 1744 | 779 |
| c, Capacity [veh/h] | 55 | 1233 | 551 | 548 | 259 | 116 |
| d1, Uniform Delay [s] | 60.22 | 13.13 | 19.14 | 19.14 | 47.40 | 54.02 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.50 | 0.04 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 25.85 | 48.86 | 67.56 | 69.60 | 0.03 | 41.16 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 1.08 | 1.10 | 1.10 | 0.05 | 0.89 |
| d, Delay for Lane Group [s/veh] | 86.07 | 61.99 | 86.70 | 88.74 | 47.42 | 95.18 |
| Lane Group LOS | F | F | F | F | D | F |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.11 | 20.47 | 24.00 | 24.19 | 0.34 | 4.61 |
| 50th-Percentile Queue Length [ft/ln] | 52.83 | 511.86 | 599.92 | 604.66 | 8.46 | 115.30 |
| 95th-Percentile Queue Length [veh/ln] | 3.80 | 29.71 | 34.58 | 34.95 | 0.61 | 8.13 |
| 95th-Percentile Queue Length [ft/ln] | 95.10 | 742.86 | 864.46 | 873.82 | 15.22 | 203.34 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 86.07 | 61.99 | 87.71 | 88.74 | 47.42 | 95.18 |
| Movement LOS | F | F | F | F | D | F |
| d_A, Approach Delay [s/veh] | 62.92 | | 87.72 | | 90.19 | |
| Approach LOS | E | | F | | F | |
| d_I, Intersection Delay [s/veh] | 75.16 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.065 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.015 | 2.978 | 2.017 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.698 | 2.556 | 1.560 |
| Bicycle LOS | B | B | A |

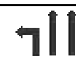
## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 58.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.109 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1316 | 342 | 42 | 1066 | 237 | 45 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1316 | 342 | 42 | 1066 | 237 | 45 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 350 | 91 | 11 | 284 | 63 | 12 |
| Total Analysis Volume [veh/h] | 1400 | 364 | 45 | 1134 | 252 | 48 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 100 | 100 | 4 | 107 | 15 | 15 |
| g / C, Green / Cycle | 0.77 | 0.77 | 0.03 | 0.83 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.90 | 0.25 | 0.03 | 0.76 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 1549 | 1480 | 1704 | 1494 | 1312 | 1630 |
| c, Capacity [veh/h] | 1193 | 1140 | 57 | 1236 | 154 | 192 |
| d1, Uniform Delay [s] | 14.92 | 4.48 | 62.26 | 8.06 | 56.27 | 56.30 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.09 | 0.09 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 87.12 | 0.74 | 8.38 | 12.21 | 10.91 | 9.50 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 0.32 | 0.78 | 0.92 | 0.86 | 0.87 |
| d, Delay for Lane Group [s/veh] | 102.04 | 5.22 | 70.64 | 20.27 | 67.18 | 65.80 |
| Lane Group LOS | F | A | E | C | E | E |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.31 | 2.59 | 1.59 | 8.95 | 4.77 | 5.88 |
| 50th-Percentile Queue Length [ft/ln] | 682.76 | 64.86 | 39.79 | 223.64 | 119.22 | 146.92 |
| 95th-Percentile Queue Length [veh/ln] | 40.84 | 4.67 | 2.86 | 13.85 | 8.35 | 9.85 |
| 95th-Percentile Queue Length [ft/ln] | 1020.98 | 116.75 | 71.61 | 346.27 | 208.76 | 246.31 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 102.04 | 5.22 | 70.64 | 20.27 | 66.55 | 65.80 |
| Movement LOS | F | A | E | C | E | E |
| d_A, Approach Delay [s/veh] | 82.07 | | 22.19 | | 66.42 | |
| Approach LOS | F | | C | | E | |
| d_I, Intersection Delay [s/veh] | 58.85 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.109 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.188 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.17 | 3.45 | 44.18 |
| I_b,int, Bicycle LOS Score for Intersection | 3.015 | 2.532 | 2.055 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 93.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.128 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1589 | 130 | 40 | 1202 | 7 | 17 | 93 | 281 | 260 | 79 | 36 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1589 | 130 | 40 | 1202 | 7 | 17 | 93 | 237 | 260 | 79 | 2 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 423 | 35 | 11 | 320 | 2 | 5 | 25 | 63 | 69 | 21 | 1 |
| Total Analysis Volume [veh/h] | 152 | 1690 | 138 | 43 | 1279 | 7 | 18 | 99 | 252 | 277 | 84 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 65 | 65 | 4 | 56 | 56 | 26 | 26 | 26 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.50 | 0.50 | 0.03 | 0.43 | 0.43 | 0.20 | 0.20 | 0.20 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.35 | 0.36 | 0.02 | 0.57 | 0.57 | 0.01 | 0.06 | 0.19 | 0.18 | 0.11 | 0.00 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1733 | 1781 | 1491 | 780 | 1420 | 1577 | 1312 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 176 | 1728 | 867 | 55 | 644 | 337 | 285 | 317 | 264 | 234 | 122 | 102 |
| d1, Uniform Delay [s] | 57.68 | 25.02 | 25.18 | 62.52 | 36.90 | 36.90 | 42.04 | 44.29 | 50.90 | 55.09 | 52.17 | 46.82 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.14 | 0.07 | 0.15 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.16 | 2.41 | 4.90 | 8.31 | 150.45 | 159.54 | 0.03 | 0.21 | 20.15 | 88.70 | 9.27 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.70 | 0.71 | 0.78 | 1.31 | 1.31 | 0.06 | 0.31 | 0.96 | 1.18 | 0.69 | 0.02 |
| d, Delay for Lane Group [s/veh] | 62.85 | 27.43 | 30.08 | 70.83 | 187.35 | 196.44 | 42.07 | 44.49 | 71.05 | 143.78 | 61.43 | 46.85 |
| Lane Group LOS | E | C | C | E | F | F | D | D | E | F | E | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.10 | 14.34 | 15.24 | 1.55 | 23.60 | 25.56 | 0.48 | 2.76 | 9.50 | 6.71 | 2.91 | 0.06 |
| 50th-Percentile Queue Length [ft/ln] | 127.62 | 358.40 | 380.97 | 38.81 | 589.92 | 638.92 | 11.90 | 69.04 | 237.52 | 167.82 | 72.85 | 1.41 |
| 95th-Percentile Queue Length [veh/ln] | 8.81 | 20.55 | 21.64 | 2.79 | 37.15 | 39.90 | 0.86 | 4.97 | 14.56 | 11.71 | 5.24 | 0.10 |
| 95th-Percentile Queue Length [ft/ln] | 220.26 | 513.64 | 541.02 | 69.86 | 928.65 | 997.60 | 21.43 | 124.27 | 363.90 | 292.72 | 131.12 | 2.54 |

**Movement, Approach, & Intersection Results**

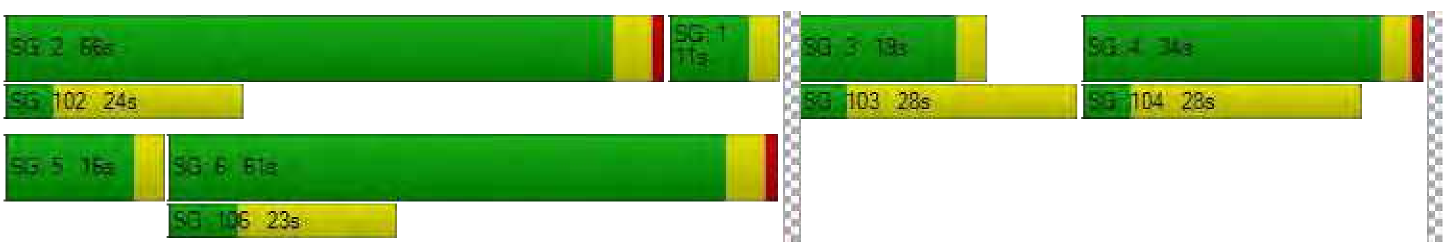
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.85 | 28.18 | 30.08 | 70.83 | 190.44 | 196.44 | 42.07 | 44.49 | 71.05 | 143.78 | 61.43 | 46.85 |
| Movement LOS | E | C | C | E | F | F | D | D | E | F | E | D |
| d_A, Approach Delay [s/veh] | 30.97 | | | 186.60 | | | 62.51 | | | 124.19 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 93.41 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.128 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.325 | 2.970 | 2.371 | 2.499 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.649 | 2.291 | 2.241 | 2.215 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 45.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.977 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1080 | 1186 | 423 | 352 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1080 | 1186 | 124 | 352 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 270 | 297 | 31 | 88 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1080 | 1186 | 124 | 352 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 35 | 35 |
| g / C, Green / Cycle | 0.06 | 0.50 | 0.40 | 0.40 | 0.39 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.41 | 0.43 | 0.10 | 0.38 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 77 | 1300 | 1107 | 492 | 366 | 631 |
| d1, Uniform Delay [s] | 41.97 | 19.38 | 27.02 | 17.99 | 26.56 | 0.00 |
| k, delay calibration | 0.04 | 0.15 | 0.15 | 0.15 | 0.40 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.86 | 2.03 | 38.24 | 0.38 | 33.49 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.84 | 0.83 | 1.07 | 0.25 | 0.96 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.83 | 21.42 | 65.26 | 18.37 | 60.05 | 0.00 |
| Lane Group LOS | D | C | F | B | E | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 9.26 | 16.82 | 1.68 | 10.35 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 40.02 | 231.38 | 420.53 | 42.08 | 258.67 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 14.24 | 24.66 | 3.03 | 15.62 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 72.04 | 356.12 | 616.49 | 75.74 | 390.56 | 0.00 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.83 | 21.42 | 65.26 | 18.37 | 60.05 | 0.00 |
| Movement LOS | D | C | F | B | E | A |
| d_A, Approach Delay [s/veh] | 23.08 | | 60.83 | | 60.05 | |
| Approach LOS | C | | E | | E | |
| d_I, Intersection Delay [s/veh] | 45.33 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.977 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.62 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.347 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 801 | 801 | 801 |
| d_b, Bicycle Delay [s] | 16.16 | 16.17 | 16.16 |
| I_b,int, Bicycle LOS Score for Intersection | 2.504 | 2.887 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 43.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.862 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 897 | 7 | 36 | 924 | 108 | 65 | 7 | 30 | 59 | 11 | 62 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 897 | 7 | 36 | 924 | 108 | 65 | 7 | 24 | 59 | 11 | 62 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 234 | 2 | 9 | 241 | 28 | 17 | 2 | 6 | 15 | 3 | 16 |
| Total Analysis Volume [veh/h] | 23 | 934 | 7 | 38 | 963 | 113 | 68 | 7 | 25 | 61 | 11 | 65 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 3 | 97 | 97 | 6 | 100 | 12 | 12 | 12 | 13 | 13 |
| g / C, Green / Cycle | 0.02 | 0.66 | 0.66 | 0.04 | 0.68 | 0.08 | 0.08 | 0.08 | 0.09 | 0.09 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.28 | 0.28 | 0.04 | 0.70 | 0.03 | 0.03 | 0.02 | 0.06 | 0.06 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1387 | 1340 | 952 | 1208 |
| c, Capacity [veh/h] | 23 | 953 | 1250 | 42 | 1043 | 80 | 117 | 113 | 86 | 109 |
| d1, Uniform Delay [s] | 71.86 | 11.88 | 11.89 | 70.17 | 23.64 | 63.79 | 63.78 | 62.71 | 65.12 | 65.04 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 86.75 | 0.65 | 0.50 | 45.99 | 36.21 | 2.94 | 2.01 | 0.97 | 10.26 | 7.76 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.00 | 0.43 | 0.43 | 0.92 | 1.03 | 0.38 | 0.38 | 0.22 | 0.71 | 0.70 |
| d, Delay for Lane Group [s/veh] | 158.62 | 12.53 | 12.38 | 116.16 | 59.86 | 66.73 | 65.79 | 63.68 | 75.38 | 72.81 |
| Lane Group LOS | F | B | B | F | F | E | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.43 | 6.52 | 8.50 | 1.97 | 44.31 | 1.19 | 1.69 | 0.93 | 2.49 | 3.03 |
| 50th-Percentile Queue Length [ft/ln] | 35.81 | 162.91 | 212.42 | 49.30 | 1107.76 | 29.67 | 42.24 | 23.25 | 62.36 | 75.86 |
| 95th-Percentile Queue Length [veh/ln] | 2.58 | 10.70 | 13.28 | 3.55 | 56.83 | 2.14 | 3.04 | 1.67 | 4.49 | 5.46 |
| 95th-Percentile Queue Length [ft/ln] | 64.45 | 267.57 | 331.93 | 88.74 | 1420.72 | 53.40 | 76.03 | 41.86 | 112.26 | 136.55 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.62 | 12.45 | 12.38 | 116.16 | 59.86 | 59.86 | 66.22 | 65.79 | 63.68 | 75.38 | 72.81 | 72.81 |
| Movement LOS | F | B | B | F | E | E | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 15.93 | | | 61.78 | | | 65.55 | | | 73.95 | | |
| Approach LOS | B | | | E | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 43.57 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.862 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 62.93 | 62.93 | 62.93 | 62.93 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.565 | 2.772 | 2.184 | 2.015 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 272 | 272 | 408 | 408 |
| d_b, Bicycle Delay [s] | 54.93 | 54.90 | 46.72 | 46.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.355 | 3.398 | 1.735 | 1.786 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

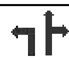
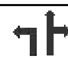
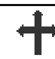
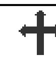
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.782 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 28 | 783 | 7 | 4 | 878 | 107 | 161 | 6 | 56 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 28 | 783 | 7 | 4 | 878 | 107 | 161 | 6 | 56 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 206 | 2 | 1 | 231 | 28 | 42 | 2 | 15 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 29 | 824 | 7 | 4 | 924 | 113 | 169 | 6 | 59 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 114 | 114 | 114 | 114 | 27 | 27 |
| g / C, Green / Cycle | 0.76 | 0.76 | 0.76 | 0.76 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.46 | 0.01 | 0.58 | 0.17 | 0.01 |
| s, saturation flow rate [veh/h] | 533 | 1826 | 671 | 1801 | 1381 | 1686 |
| c, Capacity [veh/h] | 278 | 1395 | 419 | 1376 | 292 | 333 |
| d1, Uniform Delay [s] | 25.60 | 7.67 | 15.06 | 9.85 | 60.04 | 50.46 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.23 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.75 | 1.88 | 0.04 | 3.87 | 10.09 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 0.60 | 0.01 | 0.75 | 0.80 | 0.03 |
| d, Delay for Lane Group [s/veh] | 26.35 | 9.55 | 15.10 | 13.72 | 70.13 | 50.49 |
| Lane Group LOS | C | A | B | B | E | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.70 | 11.71 | 0.07 | 18.52 | 9.59 | 0.29 |
| 50th-Percentile Queue Length [ft/ln] | 17.57 | 292.68 | 1.70 | 463.05 | 239.78 | 7.18 |
| 95th-Percentile Queue Length [veh/ln] | 1.27 | 17.32 | 0.12 | 25.58 | 14.67 | 0.52 |
| 95th-Percentile Queue Length [ft/ln] | 31.63 | 432.96 | 3.07 | 639.50 | 366.76 | 12.93 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 26.35 | 9.55 | 9.55 | 15.10 | 13.72 | 13.72 | 70.13 | 70.13 | 70.13 | 50.49 | 50.49 | 50.49 |
| Movement LOS | C | A | A | B | B | B | E | E | E | D | D | D |
| d_A, Approach Delay [s/veh] | 10.12 | | | 13.73 | | | 70.13 | | | 50.49 | | |
| Approach LOS | B | | | B | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 18.59 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.782 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.35 | 64.35 | 64.35 | 64.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.465 | 2.868 | 1.965 | 1.755 |
| Crosswalk LOS | B | C | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1400 | 1400 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.77 | 6.76 | 42.86 | 42.61 |
| I_b,int, Bicycle LOS Score for Intersection | 2.979 | 3.277 | 1.946 | 1.574 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.684 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 686 | 68 | 52 | 905 | 0 | 20 | 82 | 11 | 88 | 94 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 686 | 68 | 52 | 905 | 0 | 20 | 82 | 11 | 88 | 94 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 186 | 18 | 14 | 246 | 0 | 5 | 22 | 3 | 24 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 746 | 74 | 57 | 984 | 0 | 22 | 89 | 12 | 96 | 102 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 117 | 117 | 117 | 117 | 25 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.78 | 0.78 | 0.78 | 0.78 | 0.17 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.46 | 0.09 | 0.53 | 0.02 | 0.05 | 0.08 | 0.12 |
| s, saturation flow rate [veh/h] | 581 | 1789 | 638 | 1846 | 1169 | 1839 | 1258 | 1710 |
| c, Capacity [veh/h] | 352 | 1393 | 422 | 1438 | 91 | 306 | 175 | 284 |
| d1, Uniform Delay [s] | 17.28 | 6.77 | 14.10 | 7.85 | 70.90 | 55.10 | 65.63 | 59.09 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 1.83 | 0.66 | 2.66 | 1.37 | 0.62 | 2.68 | 4.63 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.02 | 0.59 | 0.14 | 0.68 | 0.24 | 0.33 | 0.55 | 0.71 |
| d, Delay for Lane Group [s/veh] | 17.40 | 8.60 | 14.76 | 10.51 | 72.27 | 55.73 | 68.31 | 63.72 |
| Lane Group LOS | B | A | B | B | E | E | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.15 | 10.63 | 0.99 | 14.87 | 0.87 | 3.48 | 3.75 | 7.75 |
| 50th-Percentile Queue Length [ft/ln] | 3.78 | 265.70 | 24.76 | 371.73 | 21.86 | 86.99 | 93.67 | 193.78 |
| 95th-Percentile Queue Length [veh/ln] | 0.27 | 15.97 | 1.78 | 21.19 | 1.57 | 6.26 | 6.74 | 12.32 |
| 95th-Percentile Queue Length [ft/ln] | 6.80 | 399.36 | 44.57 | 529.83 | 39.35 | 156.57 | 168.60 | 307.93 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.40 | 8.60 | 8.60 | 14.76 | 10.51 | 10.51 | 72.27 | 55.73 | 55.73 | 68.31 | 63.72 | 63.72 |
| Movement LOS | B | A | A | B | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 8.68 | | | 10.74 | | | 58.69 | | | 65.20 | | |
| Approach LOS | A | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 19.68 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.684 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.621 | 2.575 | 2.039 | 2.186 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.85 | 4.86 | 48.32 | 48.32 |
| I_b,int, Bicycle LOS Score for Intersection | 2.926 | 3.277 | 1.763 | 2.053 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 61.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.561 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 271 | 112 | 374 | 92 | 416 | 101 | 344 | 170 | 314 | 329 | 19 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 271 | 0 | 374 | 92 | 0 | 101 | 344 | 170 | 314 | 329 | 19 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 71 | 0 | 97 | 24 | 0 | 26 | 90 | 44 | 82 | 86 | 5 |
| Total Analysis Volume [veh/h] | 28 | 282 | 0 | 390 | 96 | 0 | 105 | 358 | 177 | 327 | 343 | 20 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 26 | 26 | 26 | 63 | 63 | 63 | 19 | 19 | 19 | 19 | 24 | 24 | 24 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.17 | 0.42 | 0.42 | 0.42 | 0.13 | 0.13 | 0.13 | 0.13 | 0.16 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.15 | 0.00 | 0.14 | 0.14 | 0.00 | 0.06 | 0.10 | 0.10 | 0.11 | 0.13 | 0.13 | 0.13 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1569 | 1772 | 1805 | 1567 | 1774 | 1892 | 1850 | 1487 | 1734 | 1808 | 1634 |
| c, Capacity [veh/h] | 313 | 316 | 271 | 744 | 758 | 658 | 222 | 237 | 232 | 186 | 276 | 288 | 260 |
| d1, Uniform Delay [s] | 52.06 | 60.62 | 0.00 | 29.19 | 29.19 | 0.00 | 60.94 | 63.73 | 63.78 | 63.86 | 61.12 | 61.10 | 61.20 |
| k, delay calibration | 0.11 | 0.30 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.13 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 20.25 | 0.00 | 1.15 | 1.13 | 0.00 | 1.56 | 6.25 | 6.73 | 12.06 | 6.61 | 6.28 | 7.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.89 | 0.00 | 0.32 | 0.32 | 0.00 | 0.47 | 0.80 | 0.81 | 0.85 | 0.84 | 0.83 | 0.84 |
| d, Delay for Lane Group [s/veh] | 52.18 | 80.87 | 0.00 | 30.35 | 30.33 | 0.00 | 62.49 | 69.98 | 70.51 | 75.92 | 67.73 | 67.38 | 68.71 |
| Lane Group LOS | D | F | A | C | C | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.91 | 12.30 | 0.00 | 6.24 | 6.35 | 0.00 | 3.84 | 7.50 | 7.41 | 6.52 | 9.06 | 9.40 | 8.68 |
| 50th-Percentile Queue Length [ft/ln] | 22.69 | 307.44 | 0.00 | 156.01 | 158.74 | 0.00 | 95.97 | 187.4 | 185.3 | 163.0 | 226.43 | 234.88 | 216.94 |
| 95th-Percentile Queue Length [veh/ln] | 1.63 | 18.05 | 0.00 | 10.34 | 10.48 | 0.00 | 6.91 | 11.99 | 11.88 | 10.71 | 13.99 | 14.42 | 13.51 |
| 95th-Percentile Queue Length [ft/ln] | 40.85 | 451.22 | 0.00 | 258.43 | 262.05 | 0.00 | 172.7 | 299.6 | 296.9 | 267.7 | 349.82 | 360.55 | 337.71 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.18 | 80.87 | 0.00 | 30.34 | 30.33 | 0.00 | 62.49 | 70.23 | 75.92 | 67.63 | 68.15 | 68.71 |
| Movement LOS | D | F | A | C | C | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 78.28 | | | 30.34 | | | 70.37 | | | 67.92 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 61.58 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.561 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.45 | 63.45 | 63.45 | 63.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.483 | 4.278 | 4.304 | 2.728 |
| Crosswalk LOS | B | E | E | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 458 |
| d_b, Bicycle Delay [s] | 49.74 | 39.79 | 50.30 | 45.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.267 | 4.012 | 2.913 | 2.129 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.727 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1415 | 0 | 0 | 858 | 771 | 657 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1415 | 0 | 0 | 858 | 771 | 657 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 365 | 0 | 0 | 221 | 199 | 169 |
| Total Analysis Volume [veh/h] | 1459 | 0 | 0 | 885 | 795 | 677 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 53 | 53 | 23 | 23 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.28 | 0.28 |
| (v / s)_i Volume / Saturation Flow Rate | 0.42 | 0.26 | 0.23 | 0.25 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2303 | 2290 | 981 | 783 |
| d1, Uniform Delay [s] | 7.92 | 6.18 | 26.60 | 27.14 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.34 | 0.49 | 0.62 | 1.16 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.39 | 0.81 | 0.87 |
| d, Delay for Lane Group [s/veh] | 9.26 | 6.68 | 27.22 | 28.30 |
| Lane Group LOS | A | A | C | C |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.28 | 2.93 | 6.80 | 5.96 |
| 50th-Percentile Queue Length [ft/ln] | 157.07 | 73.27 | 169.90 | 148.95 |
| 95th-Percentile Queue Length [veh/ln] | 10.39 | 5.28 | 11.07 | 9.96 |
| 95th-Percentile Queue Length [ft/ln] | 259.84 | 131.89 | 276.79 | 249.03 |

**Movement, Approach, & Intersection Results**

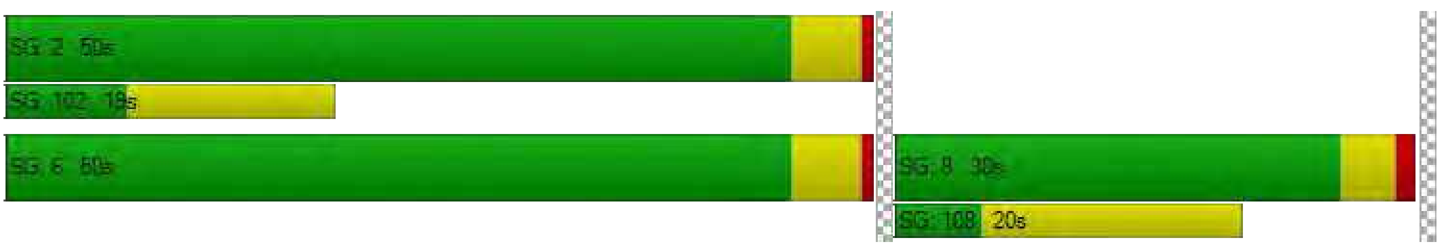
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.26 | 0.00 | 0.00 | 6.68 | 27.22 | 28.30 |
| Movement LOS | A | | | A | C | C |
| d_A, Approach Delay [s/veh] | 9.26 | | 6.68 | | 27.72 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 15.78 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.727 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.863 | 2.483 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.45 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 2.763 | 2.290 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 9.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.280 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 88 | 10 | 50 | 79 | 15 | 37 | 41 | 16 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 88 | 10 | 50 | 79 | 15 | 37 | 41 | 16 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 23 | 3 | 16 | 25 | 5 | 12 | 13 | 5 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 92 | 10 | 63 | 99 | 19 | 47 | 52 | 20 | 24 | 56 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 722 | 730 | 726 | 801 |
| Degree of Utilization, x | 0.16 | 0.25 | 0.16 | 0.28 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.57 | 0.97 | 0.58 | 1.15 |
| 95th-Percentile Queue Length [ft] | 14.25 | 24.37 | 14.59 | 28.64 |
| Approach Delay [s/veh] | 8.94 | 9.55 | 8.93 | 9.23 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 9.21 | | | |
| Intersection LOS | A | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 50.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.816 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1502 | 10 | 30 | 7 | 8 | 196 | 296 | 1931 | 371 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1502 | 10 | 30 | 7 | 8 | 196 | 296 | 1931 | 371 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 391 | 3 | 8 | 2 | 2 | 51 | 77 | 503 | 97 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1565 | 10 | 31 | 7 | 8 | 204 | 308 | 2011 | 386 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 19 | 88 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.12 | 0.55 | 0.18 | 0.18 | 0.22 | 0.22 | 0.22 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.38 | 0.01 | 0.01 | 0.07 | 0.07 | 0.21 | 0.40 | 0.24 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1621 | 1480 | 1443 | 5075 | 1787 |
| c, Capacity [veh/h] | 215 | 2160 | 339 | 293 | 360 | 329 | 321 | 2120 | 746 |
| d1, Uniform Delay [s] | 69.75 | 29.01 | 54.28 | 54.32 | 51.96 | 51.96 | 60.93 | 44.91 | 35.48 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.11 | 0.11 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 42.53 | 2.16 | 0.03 | 0.04 | 0.48 | 0.52 | 30.18 | 10.68 | 3.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.91 | 0.72 | 0.07 | 0.08 | 0.31 | 0.31 | 0.96 | 0.95 | 0.56 |
| d, Delay for Lane Group [s/veh] | 112.27 | 31.16 | 54.31 | 54.36 | 52.44 | 52.48 | 91.11 | 55.60 | 38.55 |
| Lane Group LOS | F | C | D | D | D | D | F | E | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.57 | 15.72 | 0.86 | 0.78 | 3.82 | 3.49 | 14.97 | 27.60 | 13.29 |
| 50th-Percentile Queue Length [ft/ln] | 264.21 | 393.09 | 21.43 | 19.47 | 95.45 | 87.21 | 374.29 | 690.04 | 332.24 |
| 95th-Percentile Queue Length [veh/ln] | 15.90 | 22.23 | 1.54 | 1.40 | 6.87 | 6.28 | 21.32 | 36.22 | 19.27 |
| 95th-Percentile Queue Length [ft/ln] | 397.50 | 555.66 | 38.58 | 35.04 | 171.82 | 156.97 | 532.94 | 905.44 | 481.70 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 112.27 | 112.27 | 31.16 | 54.31 | 54.34 | 54.36 | 52.44 | 52.46 | 91.11 | 55.60 | 38.55 | 38.55 |
| Movement LOS | F | F | C | D | D | D | D | D | F | E | D | D |
| d_A, Approach Delay [s/veh] | 40.23 | | | 54.33 | | | 75.35 | | | 52.65 | | |
| Approach LOS | D | | | D | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 50.55 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.816 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.423 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 4.467 | 1.599 | 1.989 | 5.572 |
| Bicycle LOS | E | A | A | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 38.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.276 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 838 | 623 | 0 | 1053 | 739 | 0 | 0 | 0 | 472 | 0 | 391 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 838 | 623 | 0 | 1053 | 739 | 0 | 0 | 0 | 472 | 0 | 391 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 216 | 156 | 0 | 271 | 190 | 0 | 0 | 0 | 118 | 0 | 109 |
| Total Analysis Volume [veh/h] | 0 | 864 | 623 | 0 | 1086 | 762 | 0 | 0 | 0 | 472 | 0 | 434 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 56 | 56 | 56 | | 16 | 16 |
| g / C, Green / Cycle | 0.70 | 0.70 | 0.70 | | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.21 | 0.87 | | 0.13 | 0.15 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 3534 | 3534 | 614 | | 704 | 573 |
| d1, Uniform Delay [s] | 4.35 | 4.59 | 11.44 | | 29.48 | 30.08 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 0.23 | 122.14 | | 1.12 | 2.09 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.24 | 0.31 | 1.24 | | 0.67 | 0.76 |
| d, Delay for Lane Group [s/veh] | 4.51 | 4.82 | 133.59 | | 30.59 | 32.17 |
| Lane Group LOS | A | A | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.37 | 1.82 | 28.21 | | 4.16 | 3.97 |
| 50th-Percentile Queue Length [ft/ln] | 34.28 | 45.55 | 705.29 | | 103.98 | 99.17 |
| 95th-Percentile Queue Length [veh/ln] | 2.47 | 3.28 | 43.41 | | 7.49 | 7.14 |
| 95th-Percentile Queue Length [ft/ln] | 61.70 | 82.00 | 1085.34 | | 187.17 | 178.51 |

**Movement, Approach, & Intersection Results**

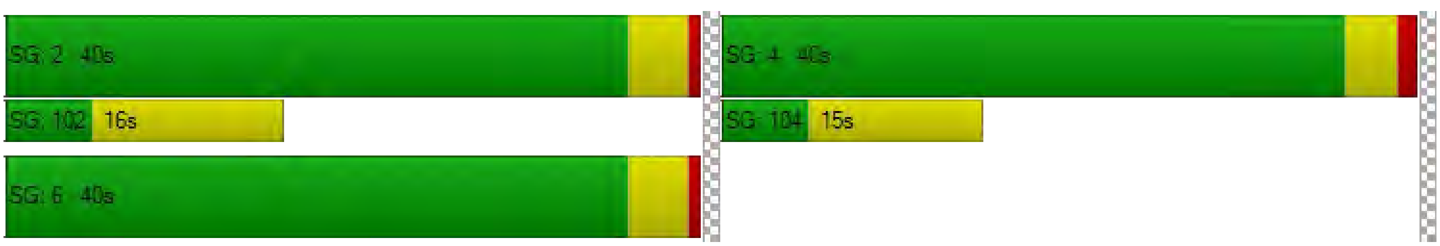
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 4.51 | 0.00 | 0.00 | 4.82 | 133.59 | 0.00 | 0.00 | 0.00 | 30.59 | 0.00 | 32.17 |
| Movement LOS | | A | | | A | F | | | | C | | C |
| d_A, Approach Delay [s/veh] | 4.51 | | | 57.91 | | | 0.00 | | | 31.35 | | |
| Approach LOS | A | | | E | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 38.51 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 1.276 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.922 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.035 | 2.576 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 92.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.417 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 967 | 318 | 0 | 1510 | 424 | 0 | 0 | 0 | 364 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 967 | 318 | 0 | 1510 | 424 | 0 | 0 | 0 | 364 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 249 | 82 | 0 | 389 | 106 | 0 | 0 | 0 | 91 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 997 | 328 | 0 | 1557 | 424 | 0 | 0 | 0 | 364 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.21 | 0.57 | | 0.10 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 15.10 | 15.24 | 21.97 | | 13.45 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.63 | 2.27 | 130.69 | | 0.07 | 113.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.47 | 1.28 | | 0.23 | 1.24 |
| d, Delay for Lane Group [s/veh] | 15.73 | 17.51 | 152.65 | | 13.52 | 135.29 |
| Lane Group LOS | B | B | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 4.00 | 4.30 | 21.66 | | 1.91 | 17.06 |
| 50th-Percentile Queue Length [ft/ln] | 100.05 | 107.39 | 541.43 | | 47.71 | 426.42 |
| 95th-Percentile Queue Length [veh/ln] | 7.20 | 7.69 | 34.06 | | 3.43 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 180.09 | 192.36 | 851.44 | | 85.87 | 680.84 |

### Movement, Approach, & Intersection Results

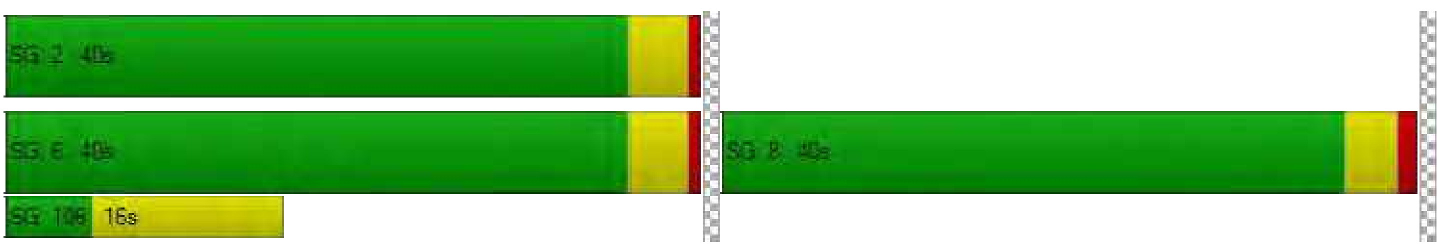
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 15.73 | 17.51 | 0.00 | 152.65 | 0.00 | 0.00 | 0.00 | 0.00 | 13.52 | 0.00 | 135.29 |
| Movement LOS | | B | B | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 16.17 | | | 152.65 | | | 0.00 | | | 99.58 | | |
| Approach LOS | B | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 92.82 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.417 | | | | | | | | | | | |

### Other Modes

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.288 | 2.416 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.760 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 102 | 221 | 1174 | 492 | 287 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 102 | 221 | 1174 | 492 | 287 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 58 | 309 | 129 | 76 | 517 |
| Total Analysis Volume [veh/h] | 107 | 233 | 1236 | 518 | 302 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 47 | 47 | 47 | 47 | 47 | 47 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 10 | 10 | 17 | 17 | 28 | 28 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.36 | 0.36 | 0.58 | 0.58 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.18 | 0.25 | 0.33 | 0.37 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 820 | 5020 |
| c, Capacity [veh/h] | 721 | 278 | 1812 | 564 | 609 | 2916 |
| d1, Uniform Delay [s] | 15.28 | 17.97 | 12.76 | 14.41 | 7.66 | 7.09 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.03 | 2.58 | 0.17 | 2.66 | 0.23 | 0.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.15 | 0.84 | 0.68 | 0.92 | 0.50 | 0.71 |
| d, Delay for Lane Group [s/veh] | 15.31 | 20.54 | 12.93 | 17.07 | 7.89 | 7.21 |
| Lane Group LOS | B | C | B | B | A | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.42 | 2.32 | 2.54 | 3.98 | 0.76 | 2.32 |
| 50th-Percentile Queue Length [ft/ln] | 10.45 | 58.07 | 63.42 | 99.44 | 18.88 | 57.97 |
| 95th-Percentile Queue Length [veh/ln] | 0.75 | 4.18 | 4.57 | 7.16 | 1.36 | 4.17 |
| 95th-Percentile Queue Length [ft/ln] | 18.81 | 104.53 | 114.15 | 179.00 | 33.98 | 104.34 |

**Movement, Approach, & Intersection Results**

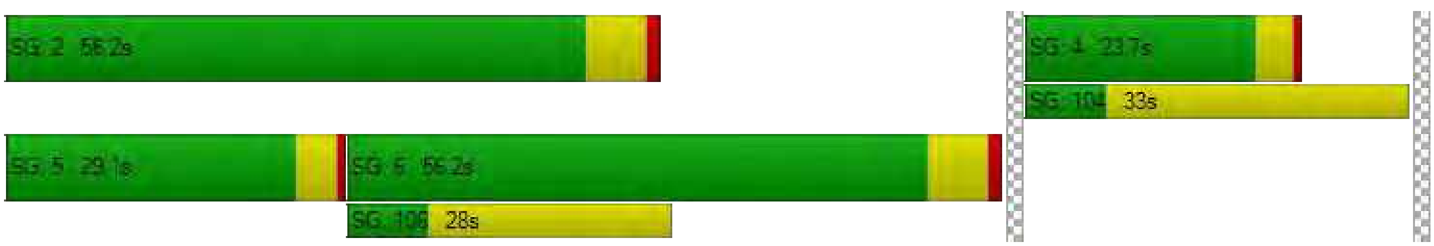
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.31 | 20.54 | 12.93 | 17.07 | 7.89 | 7.21 |
| Movement LOS | B | C | B | B | A | A |
| d_A, Approach Delay [s/veh] | 18.90 | | 14.16 | | 7.30 | |
| Approach LOS | B | | B | | A | |
| d_I, Intersection Delay [s/veh] | 10.88 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.760 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 13.96 | 13.96 | 13.96 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.664 | 3.486 | 3.359 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 844 | 2111 | 2111 |
| d_b, Bicycle Delay [s] | 7.91 | 0.07 | 0.07 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.524 | 2.862 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 8.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.621 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 115 | 47 | 1510 | 117 | 101 | 2050 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 115 | 47 | 1510 | 117 | 101 | 2050 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 30 | 12 | 389 | 30 | 26 | 528 |
| Total Analysis Volume [veh/h] | 119 | 48 | 1557 | 121 | 104 | 2113 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 34 | 34 | 34 | 34 | 34 | 34 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 4 | 4 | 12 | 12 | 3 | 19 |
| g / C, Green / Cycle | 0.12 | 0.12 | 0.36 | 0.36 | 0.09 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.03 | 0.31 | 0.08 | 0.06 | 0.42 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1492 | 1810 | 5024 |
| c, Capacity [veh/h] | 371 | 177 | 1769 | 532 | 168 | 2858 |
| d1, Uniform Delay [s] | 13.93 | 13.85 | 10.37 | 7.73 | 15.01 | 5.51 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.18 | 0.30 | 0.59 | 0.08 | 1.38 | 0.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.32 | 0.27 | 0.88 | 0.23 | 0.62 | 0.74 |
| d, Delay for Lane Group [s/veh] | 14.11 | 14.15 | 10.96 | 7.81 | 16.39 | 5.66 |
| Lane Group LOS | B | B | B | A | B | A |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.36 | 0.30 | 2.04 | 0.35 | 0.62 | 0.70 |
| 50th-Percentile Queue Length [ft/ln] | 9.12 | 7.50 | 50.97 | 8.73 | 15.61 | 17.58 |
| 95th-Percentile Queue Length [veh/ln] | 0.66 | 0.54 | 3.67 | 0.63 | 1.12 | 1.27 |
| 95th-Percentile Queue Length [ft/ln] | 16.42 | 13.50 | 91.75 | 15.71 | 28.09 | 31.64 |

**Movement, Approach, & Intersection Results**

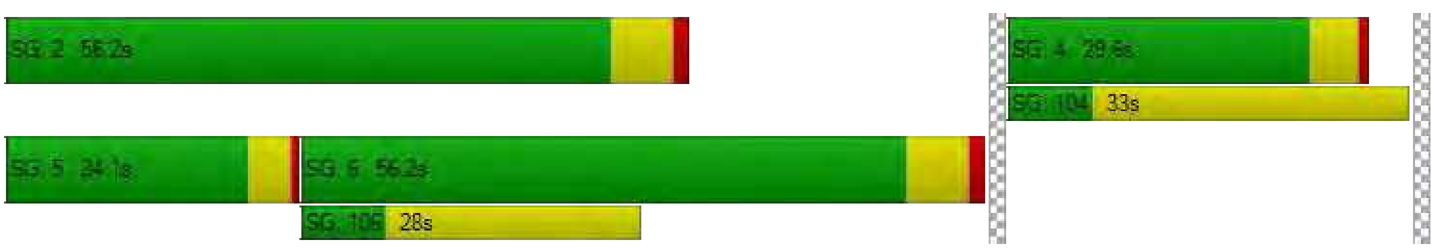
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.11 | 14.15 | 10.96 | 7.81 | 16.39 | 5.66 |
| Movement LOS | B | B | B | A | B | A |
| d_A, Approach Delay [s/veh] | 14.12 | | 10.73 | | 6.16 | |
| Approach LOS | B | | B | | A | |
| d_I, Intersection Delay [s/veh] | 8.38 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.621 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 7.90 | 7.90 | 7.90 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.151 | 3.380 | 3.333 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1459 | 2918 | 2918 |
| d_b, Bicycle Delay [s] | 1.25 | 3.61 | 3.61 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.483 | 2.779 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 7.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.775 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 95 | 74 | 1055 | 449 | 280 | 2198 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 95 | 74 | 1055 | 449 | 280 | 2198 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 25 | 19 | 275 | 117 | 73 | 572 |
| Total Analysis Volume [veh/h] | 99 | 77 | 1099 | 468 | 292 | 2290 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 38 | 38 | 38 | 38 | 38 | 38 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 4 | 4 | 15 | 15 | 24 | 24 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.39 | 0.39 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.08 | 0.26 | 0.35 | 0.19 | 0.51 |
| s, saturation flow rate [veh/h] | 1172 | 1057 | 4231 | 1320 | 1511 | 4496 |
| c, Capacity [veh/h] | 132 | 119 | 1654 | 516 | 1113 | 2813 |
| d1, Uniform Delay [s] | 16.14 | 16.20 | 9.48 | 10.87 | 4.18 | 5.40 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.38 | 2.99 | 0.17 | 2.56 | 0.05 | 0.22 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.69 | 0.72 | 0.66 | 0.91 | 0.26 | 0.81 |
| d, Delay for Lane Group [s/veh] | 18.52 | 19.19 | 9.65 | 13.43 | 4.23 | 5.62 |
| Lane Group LOS | B | B | A | B | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.72 | 0.69 | 1.42 | 2.42 | 0.07 | 0.62 |
| 50th-Percentile Queue Length [ft/ln] | 17.97 | 17.34 | 35.62 | 60.40 | 1.63 | 15.49 |
| 95th-Percentile Queue Length [veh/ln] | 1.29 | 1.25 | 2.56 | 4.35 | 0.12 | 1.12 |
| 95th-Percentile Queue Length [ft/ln] | 32.34 | 31.21 | 64.12 | 108.72 | 2.94 | 27.89 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

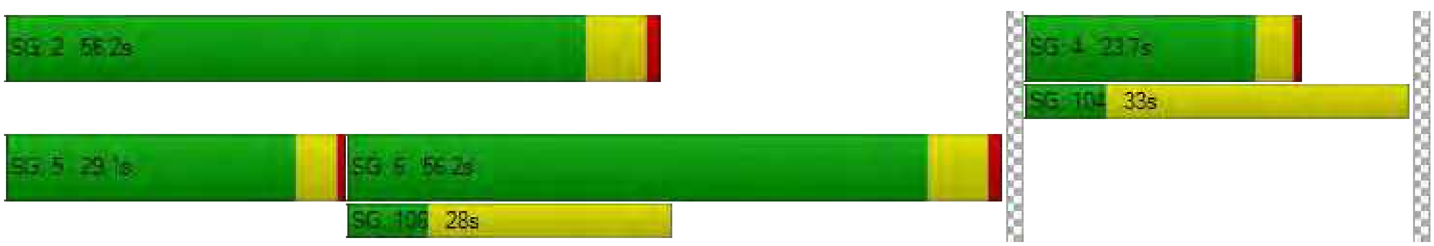
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 18.59 | 19.19 | 9.65 | 13.43 | 4.23 | 5.62 |
| Movement LOS | B | B | A | B | A | A |
| d_A, Approach Delay [s/veh] | 18.84 | | 10.78 | | 5.46 | |
| Approach LOS | B | | B | | A | |
| d_I, Intersection Delay [s/veh] | 7.93 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.775 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 9.47 | 9.47 | 9.47 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.491 | 3.368 | 3.360 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1060 | 2651 | 2651 |
| d_b, Bicycle Delay [s] | 4.16 | 2.00 | 2.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.850 | 2.421 | 2.980 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 11.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.504 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 200 | 96 | 9 | 319 | 128 | 16 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 200 | 96 | 9 | 319 | 128 | 16 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 27 | 3 | 91 | 36 | 5 |
| Total Analysis Volume [veh/h] | 227 | 109 | 10 | 363 | 145 | 18 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 763 | 740 | 630 |
| Degree of Utilization, x | 0.44 | 0.50 | 0.26 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 2.27 | 2.87 | 1.03 |
| 95th-Percentile Queue Length [ft] | 56.68 | 71.73 | 25.75 |
| Approach Delay [s/veh] | 11.39 | 12.70 | 10.71 |
| Approach LOS | B | B | B |
| Intersection Delay [s/veh] | 11.82 | | |
| Intersection LOS | B | | |

# Intersection Level Of Service Report
## Intersection 201: Bayfront Expwy/Bldg 20

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.888 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 70 | 909 | 265 | 98 | 2486 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 70 | 909 | 265 | 98 | 2486 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 19 | 242 | 70 | 26 | 661 |
| Total Analysis Volume [veh/h] | 0 | 74 | 967 | 282 | 104 | 2645 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 66 | 66 | 66 | 66 | 66 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 8 | 39 | 39 | 48 | 48 |
| g / C, Green / Cycle | 0.13 | 0.59 | 0.59 | 0.72 | 0.72 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.23 | 0.21 | 0.16 | 0.60 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 654 | 4426 |
| c, Capacity [veh/h] | 56 | 2487 | 776 | 565 | 3195 |
| d1, Uniform Delay [s] | 28.94 | 7.30 | 7.17 | 3.39 | 6.39 |
| k, delay calibration | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 154.82 | 0.04 | 0.11 | 0.06 | 0.22 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.31 | 0.39 | 0.36 | 0.18 | 0.83 |
| d, Delay for Lane Group [s/veh] | 183.76 | 7.34 | 7.27 | 3.45 | 6.61 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.32 | 1.68 | 1.46 | 0.18 | 3.45 |
| 50th-Percentile Queue Length [ft/ln] | 83.06 | 42.10 | 36.52 | 4.53 | 86.20 |
| 95th-Percentile Queue Length [veh/ln] | 5.98 | 3.03 | 2.63 | 0.33 | 6.21 |
| 95th-Percentile Queue Length [ft/ln] | 149.50 | 75.77 | 65.73 | 8.16 | 155.15 |

**Movement, Approach, & Intersection Results**

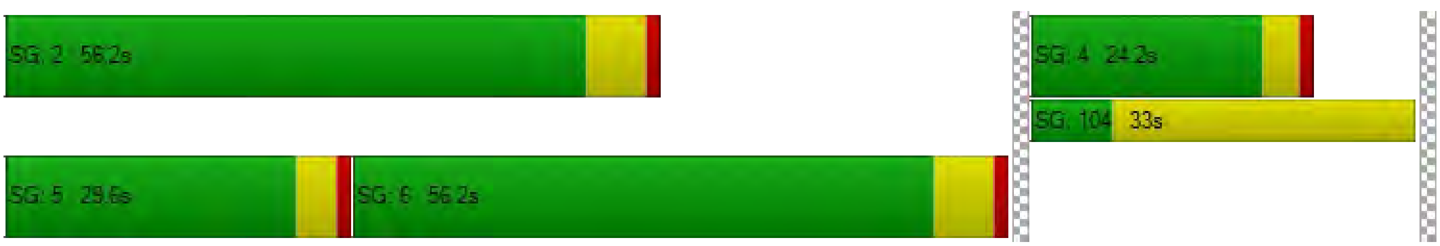
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 183.76 | 7.34 | 7.27 | 3.45 | 6.61 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 183.76 | | 7.33 | | 6.49 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 9.97 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.888 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 23.09 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.391 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 603 | 1507 | 1507 |
| d_b, Bicycle Delay [s] | 16.19 | 2.01 | 2.01 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.247 | 3.072 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 32.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.985 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 72 | 207 | 46 | 175 | 193 | 423 | 69 | 20 | 73 | 34 | 28 | 43 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 10.10 | 6.80 | 2.30 | 3.40 | 0.00 | 40.00 | 40.00 | 29.40 | 14.30 | 37.50 | 7.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 72 | 207 | 46 | 175 | 193 | 423 | 69 | 20 | 73 | 34 | 28 | 43 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 18 | 53 | 12 | 45 | 49 | 108 | 18 | 5 | 19 | 9 | 7 | 11 |
| Total Analysis Volume [veh/h] | 73 | 211 | 47 | 179 | 197 | 432 | 70 | 20 | 74 | 35 | 29 | 44 |
| Pedestrian Volume [ped/h] | 21 | | | 0 | | | 0 | | | 152 | | |

**Intersection Settings**

**Lanes**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 494 | 534 | 541 | 639 | 415 | 487 | 463 |
| Degree of Utilization, x | 0.15 | 0.48 | 0.33 | 0.99 | 0.22 | 0.15 | 0.23 |

**Movement, Approach, & Intersection Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.52 | 2.60 | 1.44 | 14.77 | 0.81 | 0.53 | 0.90 |
| 95th-Percentile Queue Length [ft] | 12.88 | 65.11 | 35.91 | 369.34 | 20.37 | 13.30 | 22.39 |
| Approach Delay [s/veh] | 14.61 | | 45.67 | | 12.70 | | 13.14 |
| Approach LOS | B | | E | | B | | B |
| Intersection Delay [s/veh] | 32.06 | | | | | | |
| Intersection LOS | D | | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 50.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.846 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 79 | 368 | 19 | 15 | 234 | 211 | 36 | 20 | 100 | 2 | 153 | 19 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 79 | 368 | 19 | 15 | 234 | 211 | 36 | 20 | 100 | 2 | 153 | 19 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 102 | 5 | 4 | 65 | 59 | 10 | 6 | 28 | 1 | 43 | 5 |
| Total Analysis Volume [veh/h] | 88 | 409 | 21 | 17 | 260 | 234 | 40 | 22 | 111 | 2 | 170 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 29 | 29 | 16 | 30 | 30 |
| g / C, Green / Cycle | 0.34 | 0.33 | 0.33 | 0.19 | 0.34 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.01 | 0.32 | 0.17 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 1421 | 1357 | 1566 | 1040 | 1466 | 1279 |
| c, Capacity [veh/h] | 534 | 453 | 522 | 196 | 543 | 437 |
| d1, Uniform Delay [s] | 29.88 | 19.73 | 28.47 | 34.68 | 20.43 | 20.47 |
| k, delay calibration | 0.50 | 0.11 | 0.39 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 32.36 | 0.03 | 23.99 | 12.30 | 0.17 | 0.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.97 | 0.04 | 0.95 | 0.88 | 0.19 | 0.21 |
|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 62.23 | 19.77 | 52.46 | 46.98 | 20.60 | 20.71 |
| Lane Group LOS | E | B | D | D | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 15.50 | 0.23 | 13.11 | 4.17 | 1.46 | 1.32 |
| 50th-Percentile Queue Length [ft/ln] | 387.45 | 5.85 | 327.63 | 104.33 | 36.50 | 32.93 |
| 95th-Percentile Queue Length [veh/ln] | 21.95 | 0.42 | 19.04 | 7.51 | 2.63 | 2.37 |
| 95th-Percentile Queue Length [ft/ln] | 548.85 | 10.52 | 476.06 | 187.80 | 65.70 | 59.27 |

**Movement, Approach, & Intersection Results**

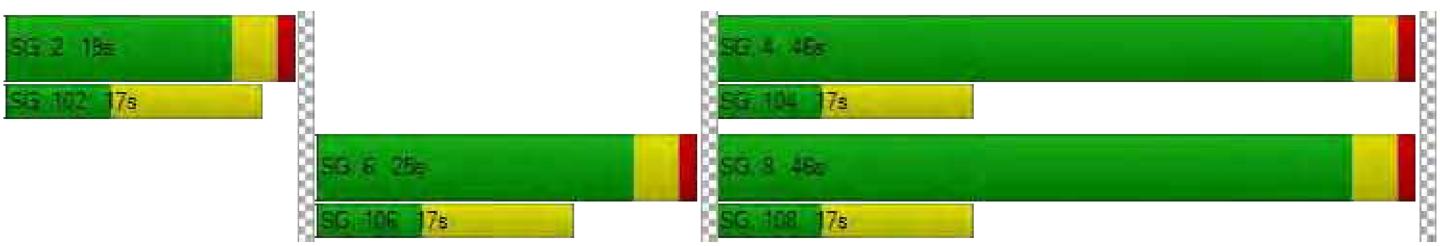
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.23 | 62.23 | 62.23 | 19.77 | 52.46 | 52.46 | 46.98 | 46.98 | 46.98 | 20.60 | 20.64 | 20.71 |
| Movement LOS | E | E | E | B | D | D | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 62.23 | | | 51.37 | | | 46.98 | | | 20.65 | | |
| Approach LOS | E | | | D | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 50.61 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.846 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.49 | 33.49 | 33.49 | 33.49 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.204 | 2.122 | 2.102 | 2.223 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 959 | 479 | 342 | 959 |
| d_b, Bicycle Delay [s] | 11.87 | 25.32 | 30.08 | 11.87 |
| I_b,int, Bicycle LOS Score for Intersection | 2.414 | 2.403 | 1.845 | 1.719 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.106 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 72 | 86 | 80 | 276 | 28 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 72 | 86 | 80 | 276 | 28 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 23 | 28 | 26 | 90 | 9 |
| Total Analysis Volume [veh/h] | 38 | 94 | 112 | 104 | 358 | 36 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.11 | 0.14 | 0.10 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 17.29 | 12.64 | 8.48 | 0.00 | 0.00 | 0.00 |
| Movement LOS | C | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.97 | 0.97 | 0.32 | 0.32 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 24.26 | 24.26 | 8.09 | 8.09 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 13.98 | | 4.39 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.77 | | | | | |
| Intersection LOS | C | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.025 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 38 | 42 | 60 | 103 | 13 | 65 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 38 | 42 | 60 | 103 | 13 | 65 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 12 | 18 | 30 | 4 | 19 |
| Total Analysis Volume [veh/h] | 45 | 49 | 71 | 121 | 15 | 76 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.00 | 0.02 | 0.09 |
| d_M, Delay for Movement [s/veh] | 7.82 | 0.00 | 0.00 | 0.00 | 11.52 | 10.07 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.00 | 0.00 | 0.40 | 0.40 |
| 95th-Percentile Queue Length [ft/ln] | 2.64 | 2.64 | 0.00 | 0.00 | 10.01 | 10.01 |
| d_A, Approach Delay [s/veh] | 3.74 | | 0.00 | | 10.31 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 3.42 | | | | | |
| Intersection LOS | B | | | | | |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro | Scenario 16 Existing AM (2019 vols)
Report File: \...\Existing AM.pdf | 12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 891 | 1462 | 1123 | 436 | 3912 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 24 | 1050 | 7 | 448 | 1189 | 272 | 13 | 4 | 58 | 225 | 19 | 0 | 3309 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 114 | 804 | 80 | 29 | 1007 | 413 | 496 | 47 | 137 | 35 | 15 | 25 | 3202 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 810 | 82 | 267 | 755 | 47 | 139 | 63 | 2 | 39 | 19 | 202 | 2425 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 422 | 456 | 400 | 416 | 104 | 1885 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 269 | 21 | 561 | 114 | 193 | 619 | 56 | 2016 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 829 | 67 | 1148 | 2695 | 205 | 416 | 5360 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 195 | 425 | 277 | 35 | 67 | 72 | 341 | 410 | 172 | 1021 | 2217 | 72 | 5304 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 99 | 820 | 73 | 190 | 1023 | 37 | 47 | 14 | 48 | 56 | 25 | 84 | 2516 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 49 | 1221 | 1098 | 14 | 11 | 95 | 2488 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1316 | 342 | 42 | 1066 | 237 | 45 | 3048 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1589 | 130 | 40 | 1202 | 7 | 17 | 93 | 281 | 260 | 79 | 36 | 3877 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1080 | 1186 | 423 | 352 | 60 | 3166 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 897 | 7 | 36 | 924 | 108 | 65 | 7 | 30 | 59 | 11 | 62 | 2228 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 28 | 783 | 7 | 4 | 878 | 107 | 161 | 6 | 56 | 1 | 2 | 6 | 2039 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 686 | 68 | 52 | 905 | 0 | 20 | 82 | 11 | 88 | 94 | 93 | 2106 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 271 | 112 | 374 | 92 | 416 | 101 | 344 | 170 | 314 | 329 | 19 | 2569 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1415 | 858 | 771 | 657 | 3701 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 88 | 10 | 50 | 79 | 15 | 37 | 41 | 16 | 22 | 51 | 131 | 553 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1502 | 10 | 30 | 7 | 8 | 196 | 296 | 1931 | 371 | 34 | 4574 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 838 | 623 | 1053 | 739 | 472 | 391 | 4116 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 967 | 318 | 1510 | 424 | 364 | 789 | 4372 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 102 | 221 | 1174 | 492 | 287 | 1963 | 4239 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 115 | 47 | 1510 | 117 | 101 | 2050 | 3940 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 95 | 74 | 1055 | 449 | 280 | 2198 | 4151 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 200 | 96 | 9 | 319 | 128 | 16 | 768 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 70 | 909 | 265 | 98 | 2486 | 3828 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 72 | 207 | 46 | 175 | 193 | 423 | 69 | 20 | 73 | 34 | 28 | 43 | 1383 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 79 | 368 | 19 | 15 | 234 | 211 | 36 | 20 | 100 | 2 | 153 | 19 | 1256 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 29 | 72 | 86 | 80 | 276 | 28 | 571 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 38 | 42 | 60 | 103 | 13 | 65 | 321 |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro
Report File: \...\Existing AM.pdf

Scenario 16 Existing AM (2019 vols)
12/9/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 891 | 1462 | 1123 | 436 | 3912 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **891** | **1462** | **1123** | **436** | **3912** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 24 | 1050 | 7 | 448 | 1189 | 272 | 13 | 4 | 58 | 225 | 19 | 0 | 3309 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **1050** | **7** | **448** | **1189** | **272** | **13** | **4** | **58** | **225** | **19** | **0** | **3309** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 114 | 804 | 80 | 29 | 1007 | 413 | 496 | 47 | 137 | 35 | 15 | 25 | 3202 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **114** | **804** | **80** | **29** | **1007** | **413** | **496** | **47** | **137** | **35** | **15** | **25** | **3202** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 810 | 82 | 267 | 755 | 47 | 139 | 63 | 2 | 39 | 19 | 202 | 2425 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **810** | **82** | **267** | **755** | **47** | **139** | **63** | **2** | **39** | **19** | **202** | **2425** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 422 | 456 | 400 | 416 | 104 | 1885 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **422** | **456** | **400** | **416** | **104** | **1885** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 269 | 21 | 561 | 114 | 193 | 619 | 56 | 2016 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **269** | **21** | **561** | **114** | **193** | **619** | **56** | **2016** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 829 | 67 | 1148 | 2695 | 205 | 416 | 5360 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **829** | **67** | **1148** | **2695** | **205** | **416** | **5360** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 195 | 425 | 277 | 35 | 67 | 72 | 341 | 410 | 172 | 1021 | 2217 | 72 | 5304 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **195** | **425** | **277** | **35** | **67** | **72** | **341** | **410** | **172** | **1021** | **2217** | **72** | **5304** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 99 | 820 | 73 | 190 | 1023 | 37 | 47 | 14 | 48 | 56 | 25 | 84 | 2516 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **99** | **820** | **73** | **190** | **1023** | **37** | **47** | **14** | **48** | **56** | **25** | **84** | **2516** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 49 | 1221 | 1098 | 14 | 11 | 95 | 2488 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **49** | **1221** | **1098** | **14** | **11** | **95** | **2488** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1316 | 342 | 42 | 1066 | 237 | 45 | 3048 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1316** | **342** | **42** | **1066** | **237** | **45** | **3048** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1589 | 130 | 40 | 1202 | 7 | 17 | 93 | 281 | 260 | 79 | 36 | 3877 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1589** | **130** | **40** | **1202** | **7** | **17** | **93** | **281** | **260** | **79** | **36** | **3877** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1080 | 1186 | 423 | 352 | 60 | 3166 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1080** | **1186** | **423** | **352** | **60** | **3166** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 897 | 7 | 36 | 924 | 108 | 65 | 7 | 30 | 59 | 11 | 62 | 2228 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **897** | **7** | **36** | **924** | **108** | **65** | **7** | **30** | **59** | **11** | **62** | **2228** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 28 | 783 | 7 | 4 | 878 | 107 | 161 | 6 | 56 | 1 | 2 | 6 | 2039 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **28** | **783** | **7** | **4** | **878** | **107** | **161** | **6** | **56** | **1** | **2** | **6** | **2039** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 686 | 68 | 52 | 905 | 0 | 20 | 82 | 11 | 88 | 94 | 93 | 2106 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **686** | **68** | **52** | **905** | **0** | **20** | **82** | **11** | **88** | **94** | **93** | **2106** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 271 | 112 | 374 | 92 | 416 | 101 | 344 | 170 | 314 | 329 | 19 | 2569 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **271** | **112** | **374** | **92** | **416** | **101** | **344** | **170** | **314** | **329** | **19** | **2569** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1415 | 858 | 771 | 657 | 3701 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1415** | **858** | **771** | **657** | **3701** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 88 | 10 | 50 | 79 | 15 | 37 | 41 | 16 | 22 | 51 | 131 | 553 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **88** | **10** | **50** | **79** | **15** | **37** | **41** | **16** | **22** | **51** | **131** | **553** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1502 | 10 | 30 | 7 | 8 | 196 | 296 | 1931 | 371 | 34 | 4574 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1502** | **10** | **30** | **7** | **8** | **196** | **296** | **1931** | **371** | **34** | **4574** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 838 | 623 | 1053 | 739 | 472 | 391 | 4116 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **838** | **623** | **1053** | **739** | **472** | **391** | **4116** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 967 | 318 | 1510 | 424 | 364 | 789 | 4372 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **967** | **318** | **1510** | **424** | **364** | **789** | **4372** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 102 | 221 | 1174 | 492 | 287 | 1963 | 4239 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **102** | **221** | **1174** | **492** | **287** | **1963** | **4239** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 115 | 47 | 1510 | 117 | 101 | 2050 | 3940 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **115** | **47** | **1510** | **117** | **101** | **2050** | **3940** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 95 | 74 | 1055 | 449 | 280 | 2198 | 4151 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **95** | **74** | **1055** | **449** | **280** | **2198** | **4151** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 200 | 96 | 9 | 319 | 128 | 16 | 768 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **200** | **96** | **9** | **319** | **128** | **16** | **768** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 70 | 909 | 265 | 98 | 2486 | 3828 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **70** | **909** | **265** | **98** | **2486** | **3828** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 72 | 207 | 46 | 175 | 193 | 423 | 69 | 20 | 73 | 34 | 28 | 43 | 1383 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **72** | **207** | **46** | **175** | **193** | **423** | **69** | **20** | **73** | **34** | **28** | **43** | **1383** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 79 | 368 | 19 | 15 | 234 | 211 | 36 | 20 | 100 | 2 | 153 | 19 | 1256 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **79** | **368** | **19** | **15** | **234** | **211** | **36** | **20** | **100** | **2** | **153** | **19** | **1256** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 29 | 72 | 86 | 80 | 276 | 28 | 571 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **72** | **86** | **80** | **276** | **28** | **571** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 38 | 42 | 60 | 103 | 13 | 65 | 321 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **38** | **42** | **60** | **103** | **13** | **65** | **321** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 111 | 144 | 204 | 94 |
| 2 | 108 | 140 | 198 | 91 |
| 3 | 105 | 137 | 194 | 89 |
| 4 | 99 | 128 | 182 | 84 |
| 5 | 88 | 114 | 161 | 74 |
| 6 | 87 | 112 | 159 | 73 |
| 7 | 85 | 111 | 157 | 72 |
| 8 | 78 | 101 | 143 | 66 |
| 9 | 77 | 99 | 141 | 65 |
| 10 | 75 | 98 | 139 | 64 |
| 11 | 65 | 85 | 120 | 55 |
| 12 | 61 | 79 | 112 | 52 |
| 13 | 60 | 78 | 110 | 51 |
| 14 | 44 | 58 | 82 | 38 |
| 15 | 44 | 58 | 82 | 38 |
| 16 | 31 | 40 | 57 | 26 |
| 17 | 18 | 23 | 33 | 15 |
| 18 | 18 | 23 | 33 | 15 |
| 19 | 10 | 13 | 18 | 8 |
| 20 | 6 | 7 | 10 | 5 |
| 21 | 3 | 4 | 6 | 3 |
| 22 | 1 | 1 | 2 | 1 |
| 23 | 1 | 1 | 2 | 1 |
| 24 | 1 | 1 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 255 | 1 | 204 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 248 | 1 | 198 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 242 | 1 | 194 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 227 | 1 | 182 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 202 | 1 | 161 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 199 | 1 | 159 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 196 | 1 | 157 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 179 | 1 | 143 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 176 | 1 | 141 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 173 | 1 | 139 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 150 | 1 | 120 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 140 | 1 | 112 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 138 | 1 | 110 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 102 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 102 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 71 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 41 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 41 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 23 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 13 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 7 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 2 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 2 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 2 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.2 | 8.9 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:31 | 0:13 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 204 | 94 |
| High Minor Volume Condition Met | Yes | No |
| Total Entering Volume on All Approaches During Same Hour | 553 | 553 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 328 | 296 | 144 |
| 2 | 318 | 287 | 140 |
| 3 | 312 | 281 | 137 |
| 4 | 292 | 263 | 128 |
| 5 | 259 | 234 | 114 |
| 6 | 256 | 231 | 112 |
| 7 | 253 | 228 | 111 |
| 8 | 230 | 207 | 101 |
| 9 | 226 | 204 | 99 |
| 10 | 223 | 201 | 98 |
| 11 | 194 | 175 | 85 |
| 12 | 180 | 163 | 79 |
| 13 | 177 | 160 | 78 |
| 14 | 131 | 118 | 58 |
| 15 | 131 | 118 | 58 |
| 16 | 92 | 83 | 40 |
| 17 | 52 | 47 | 23 |
| 18 | 52 | 47 | 23 |
| 19 | 30 | 27 | 13 |
| 20 | 16 | 15 | 7 |
| 21 | 10 | 9 | 4 |
| 22 | 3 | 3 | 1 |
| 23 | 3 | 3 | 1 |
| 24 | 3 | 3 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 624 | 1 | 144 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 605 | 1 | 140 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 3 | 1 | 593 | 1 | 137 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 4 | 1 | 555 | 1 | 128 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 5 | 1 | 493 | 1 | 114 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 1 | 487 | 1 | 112 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 1 | 481 | 1 | 111 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 1 | 437 | 1 | 101 | No | No | No | Yes | No | No | No | Yes | No | No |
| 9 | 1 | 430 | 1 | 99 | No | No | No | Yes | No | No | No | Yes | No | No |
| 10 | 1 | 424 | 1 | 98 | No | No | No | Yes | No | No | No | Yes | No | No |
| 11 | 1 | 369 | 1 | 85 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 1 | 343 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 337 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 249 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 249 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 175 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 99 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 99 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 57 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 31 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 19 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 11 | 0 | 2 | 4 | 10 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | E |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:25 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 144 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 768 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 207: Chilco St/Constitution Dr

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N, S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | E | W | N | S |
| 1 | 105 | 162 | 791 | 325 |
| 2 | 102 | 157 | 767 | 315 |
| 3 | 100 | 154 | 751 | 309 |
| 4 | 93 | 144 | 704 | 289 |
| 5 | 83 | 128 | 625 | 257 |
| 6 | 82 | 126 | 617 | 254 |
| 7 | 81 | 125 | 609 | 250 |
| 8 | 74 | 113 | 554 | 227 |
| 9 | 72 | 112 | 546 | 224 |
| 10 | 71 | 110 | 538 | 221 |
| 11 | 62 | 96 | 467 | 192 |
| 12 | 58 | 89 | 435 | 179 |
| 13 | 57 | 87 | 427 | 176 |
| 14 | 42 | 65 | 316 | 130 |
| 15 | 42 | 65 | 316 | 130 |
| 16 | 29 | 45 | 221 | 91 |
| 17 | 17 | 26 | 127 | 52 |
| 18 | 17 | 26 | 127 | 52 |
| 19 | 9 | 15 | 71 | 29 |
| 20 | 5 | 8 | 40 | 16 |
| 21 | 3 | 5 | 24 | 10 |
| 22 | 1 | 2 | 8 | 3 |
| 23 | 1 | 2 | 8 | 3 |
| 24 | 1 | 2 | 8 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 267 | 2 | 791 | No | No | No | No | No | No | No | No | Yes | Yes |
| 2 | 2 | 259 | 2 | 767 | No | No | No | No | No | No | No | No | Yes | Yes |
| 3 | 2 | 254 | 2 | 751 | No | No | No | No | No | No | No | No | Yes | Yes |
| 4 | 2 | 237 | 2 | 704 | No | No | No | No | No | No | No | No | Yes | Yes |
| 5 | 2 | 211 | 2 | 625 | No | No | No | No | No | No | No | No | Yes | Yes |
| 6 | 2 | 208 | 2 | 617 | No | No | No | No | No | No | No | No | Yes | Yes |
| 7 | 2 | 206 | 2 | 609 | No | No | No | No | No | No | No | No | Yes | Yes |
| 8 | 2 | 187 | 2 | 554 | No | No | No | No | No | No | No | No | Yes | No |
| 9 | 2 | 184 | 2 | 546 | No | No | No | No | No | No | No | No | Yes | No |
| 10 | 2 | 181 | 2 | 538 | No | No | No | No | No | No | No | No | Yes | No |
| 11 | 2 | 158 | 2 | 467 | No | No | No | No | No | No | No | No | Yes | No |
| 12 | 2 | 147 | 2 | 435 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 144 | 2 | 427 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 107 | 2 | 316 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 107 | 2 | 316 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 74 | 2 | 221 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 43 | 2 | 127 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 43 | 2 | 127 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 24 | 2 | 71 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 13 | 2 | 40 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 8 | 2 | 24 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 3 | 2 | 8 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 3 | 2 | 8 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 3 | 2 | 8 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 7 |

## Warrant 3 Condition A

| Orientation | N | S |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 45.7 | 14.6 |
| Number of Lanes on Minor Street Approach | 2 | 2 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 10:02 | 1:19 |
| Delay Condition Met | Yes | No |
| Volume on Minor Street Approach During Same Hour | 791 | 325 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1383 | 1383 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | Yes | No |
| **Warrant Met for Intersection** | **Yes** | |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 304 | 166 | 101 |
| 2 | 295 | 161 | 98 |
| 3 | 289 | 158 | 96 |
| 4 | 271 | 148 | 90 |
| 5 | 240 | 131 | 80 |
| 6 | 237 | 129 | 79 |
| 7 | 234 | 128 | 78 |
| 8 | 213 | 116 | 71 |
| 9 | 210 | 115 | 70 |
| 10 | 207 | 113 | 69 |
| 11 | 179 | 98 | 60 |
| 12 | 167 | 91 | 56 |
| 13 | 164 | 90 | 55 |
| 14 | 122 | 66 | 40 |
| 15 | 122 | 66 | 40 |
| 16 | 85 | 46 | 28 |
| 17 | 49 | 27 | 16 |
| 18 | 49 | 27 | 16 |
| 19 | 27 | 15 | 9 |
| 20 | 15 | 8 | 5 |
| 21 | 9 | 5 | 3 |
| 22 | 3 | 2 | 1 |
| 23 | 3 | 2 | 1 |
| 24 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 470 | 1 | 101 | No | No | No | Yes | No | No | No | Yes | No | No |
| 2 | 1 | 456 | 1 | 98 | No | No | No | Yes | No | No | No | Yes | No | No |
| 3 | 1 | 447 | 1 | 96 | No | No | No | Yes | No | No | No | Yes | No | No |
| 4 | 1 | 419 | 1 | 90 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 1 | 371 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 366 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 362 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 329 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 325 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 320 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 277 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 258 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 254 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 188 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 188 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 131 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 76 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 76 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 42 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 23 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 14 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 14 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:23 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 101 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 571 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 80 | 163 | 78 |
| 2 | 78 | 158 | 76 |
| 3 | 76 | 155 | 74 |
| 4 | 71 | 145 | 69 |
| 5 | 63 | 129 | 62 |
| 6 | 62 | 127 | 61 |
| 7 | 62 | 126 | 60 |
| 8 | 56 | 114 | 55 |
| 9 | 55 | 112 | 54 |
| 10 | 54 | 111 | 53 |
| 11 | 47 | 96 | 46 |
| 12 | 44 | 90 | 43 |
| 13 | 43 | 88 | 42 |
| 14 | 32 | 65 | 31 |
| 15 | 32 | 65 | 31 |
| 16 | 22 | 46 | 22 |
| 17 | 13 | 26 | 12 |
| 18 | 13 | 26 | 12 |
| 19 | 7 | 15 | 7 |
| 20 | 4 | 8 | 4 |
| 21 | 2 | 5 | 2 |
| 22 | 1 | 2 | 1 |
| 23 | 1 | 2 | 1 |
| 24 | 1 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 243 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 236 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 231 | 1 | 74 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 216 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 192 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 189 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 188 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 170 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 167 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 165 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 143 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 134 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 131 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 97 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 97 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 68 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 39 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 39 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 22 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 78 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 321 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

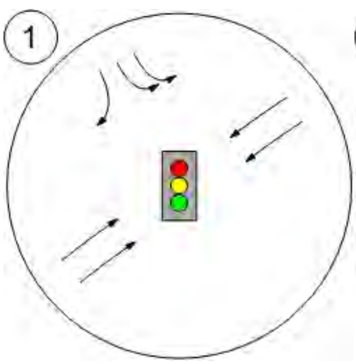
Study Intersections

Generated with PTV VISTRO

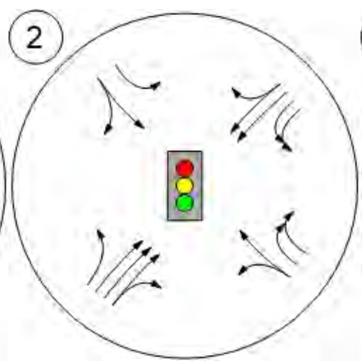
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

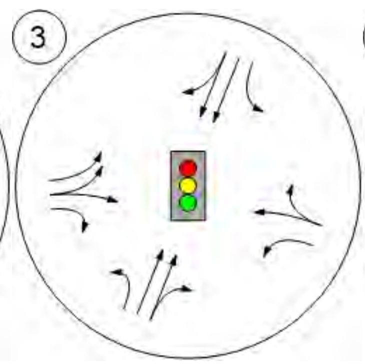

Marsh Rd (SR 84)/US 101 S



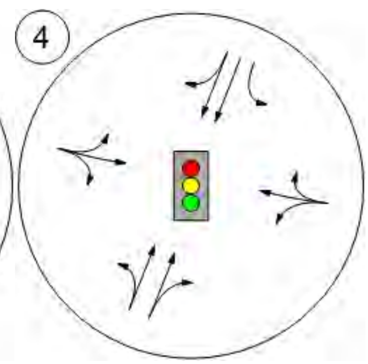
Marsh Rd/Rolison Rd-Scott D



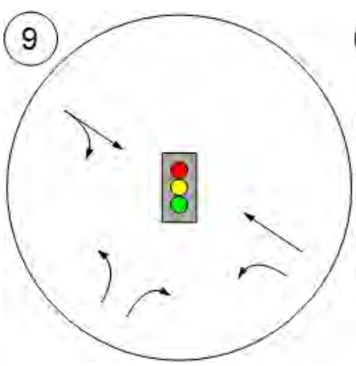
Marsh Rd/Florence St-Bohan



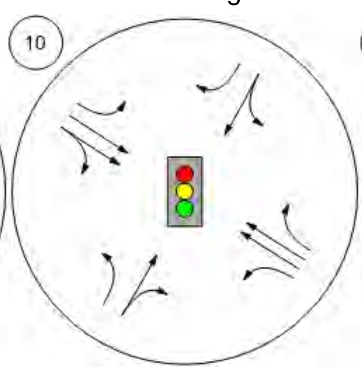
Marsh Rd/Bay Rd



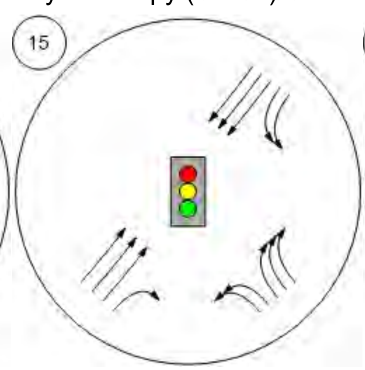
Middlefield Rd/Ravenswood



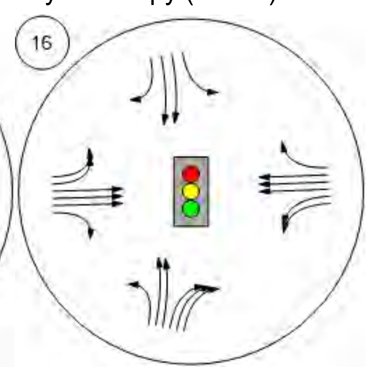
Middlefield Rd/Ringswood Av



Bayfront Expy (SR 84)/Univer



Bayfront Expy (SR 84)/Willow

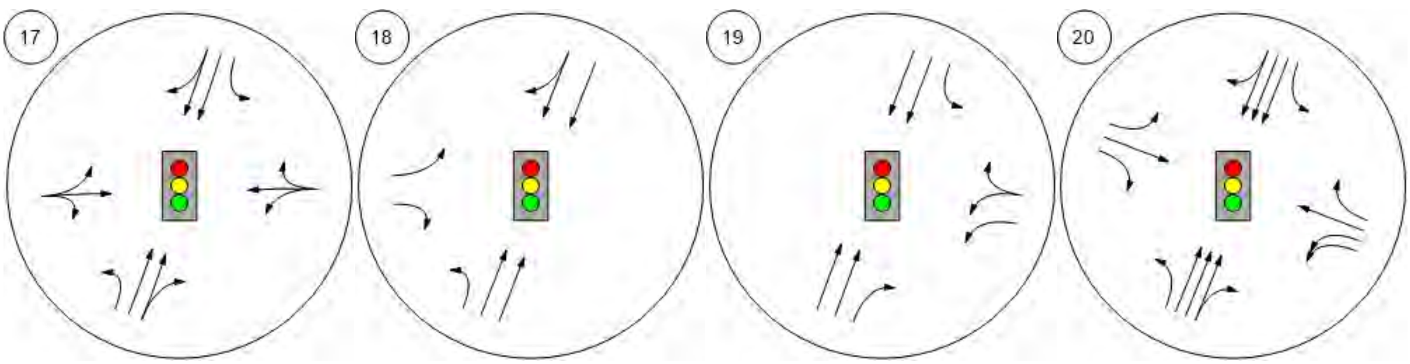


Generated with PTV VISTRO

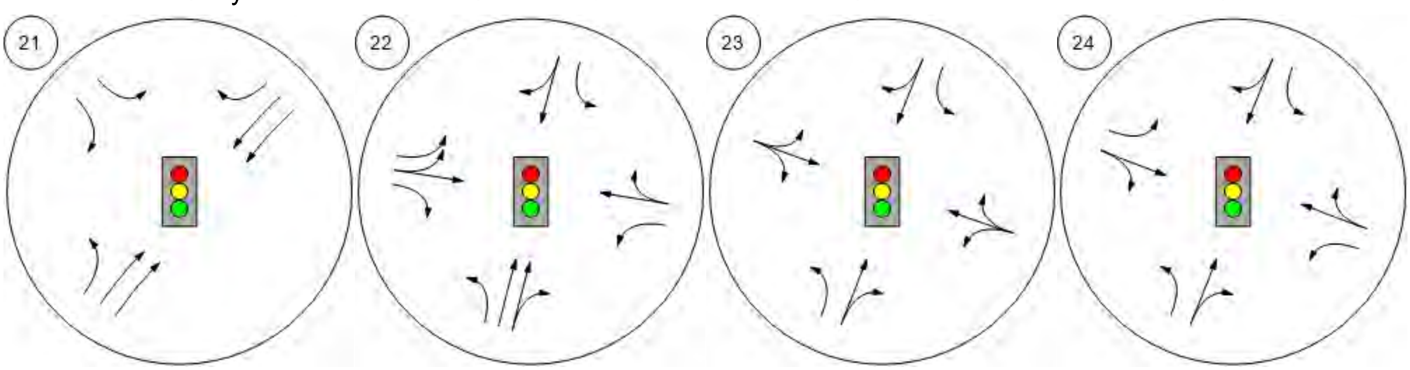
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control


Willow Rd (SR 114)/Hamilton | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/O'Brien | Willow Rd (SR 114)/Newbrid




Willow Rd/Bay Rd | Willow Rd/Durham St-VA Me | Willow Rd/Coleman Ave | Willow Rd/Gilbert Ave

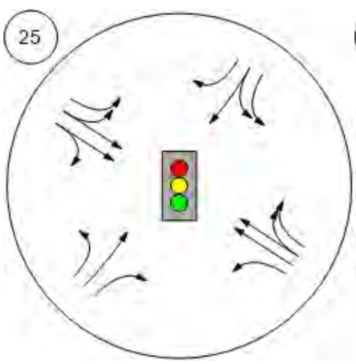


Generated with PTV VISTRO

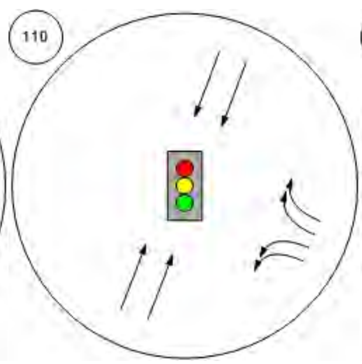
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

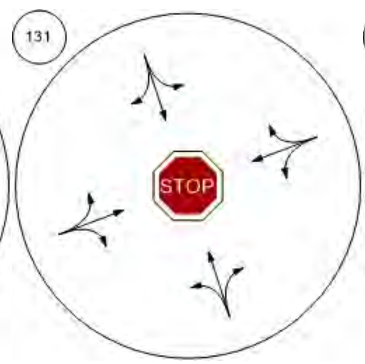

Middlefield Rd-Willow Rd



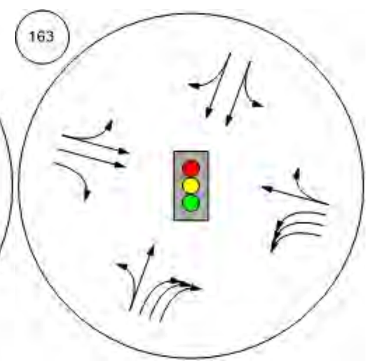

Marsh Road and US 101 NB



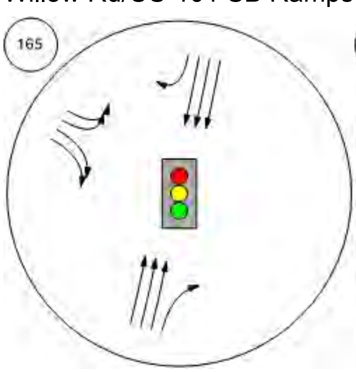

Chilco Street/Hamilton Avenu



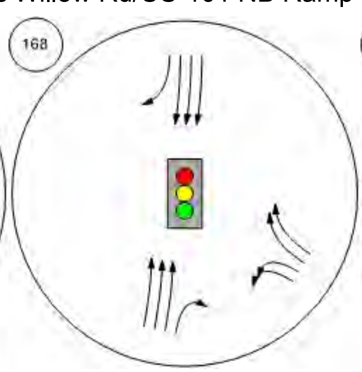

Bayfront Expy/Marsh Rd



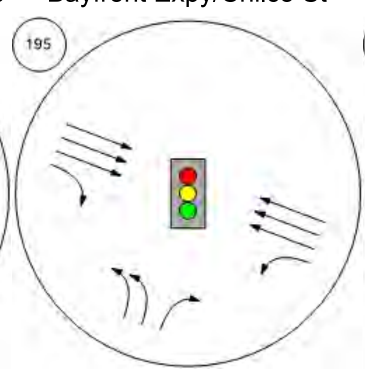

Willow Rd/US-101 SB Ramps



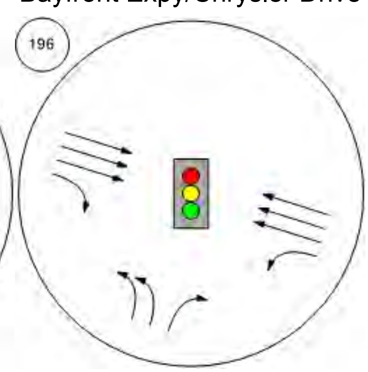

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St



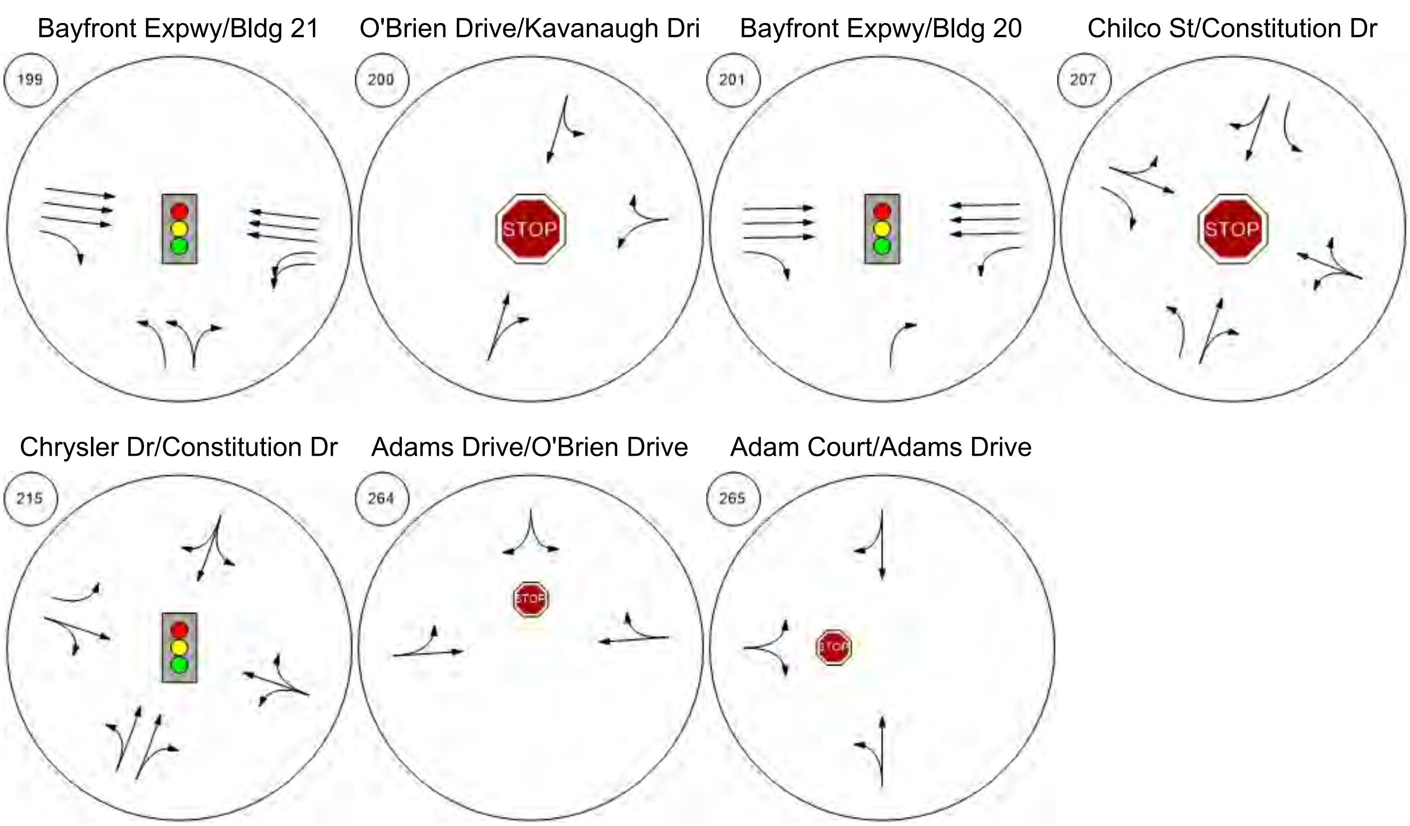

Bayfront Expy/Chrysler Drive



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

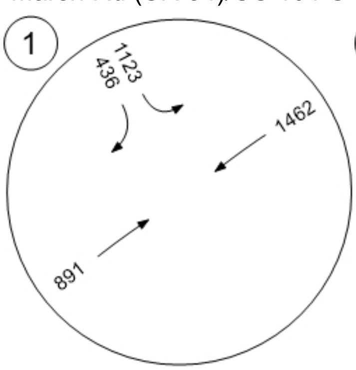



Generated with PTV VISTRO

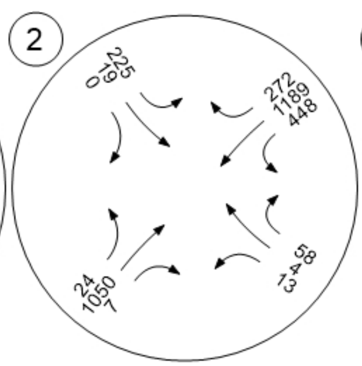
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

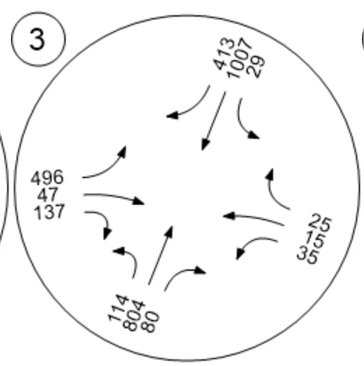

Marsh Rd (SR 84)/US 101 S



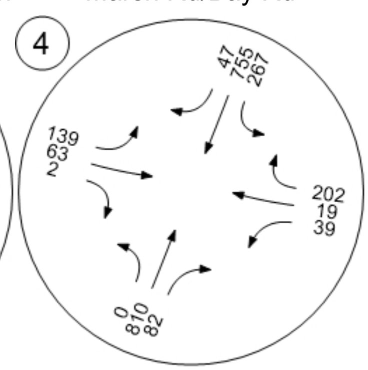

Marsh Rd/Rolison Rd-Scott D



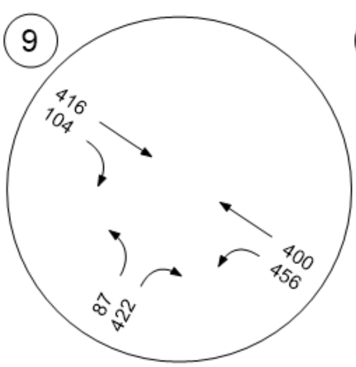

Marsh Rd/Florence St-Bohan



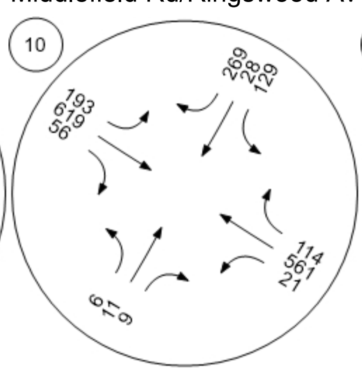

Marsh Rd/Bay Rd



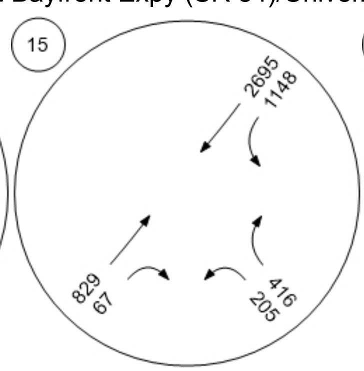

Middlefield Rd/Ravenswood



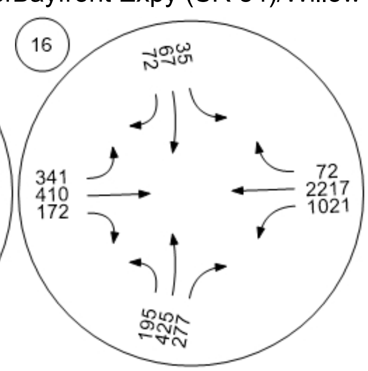

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer

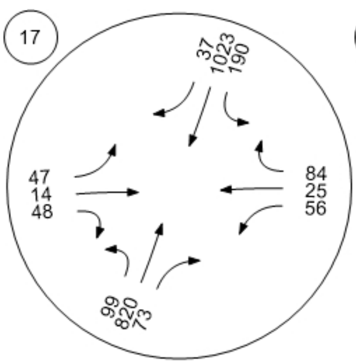



Bayfront Expy (SR 84)/Willow

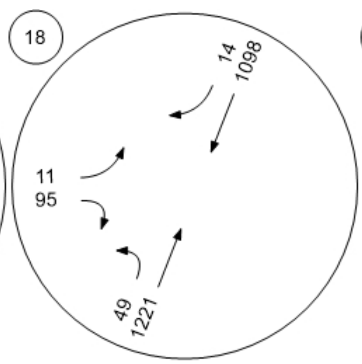


## Traffic Volume - Base Volume

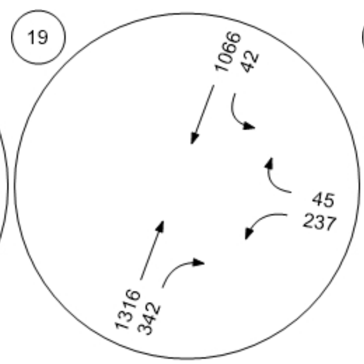

Willow Rd (SR 114)/Hamilton



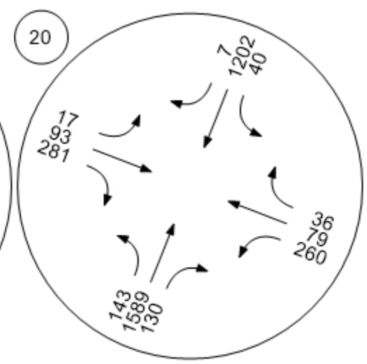

Willow Rd (SR 114)/Ivy Dr



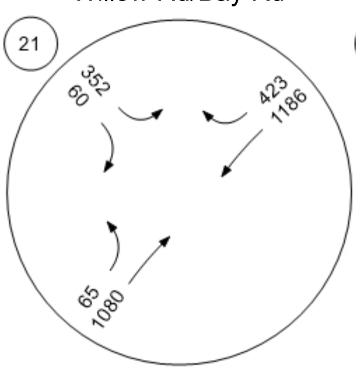

Willow Rd (SR 114)/O'Brien



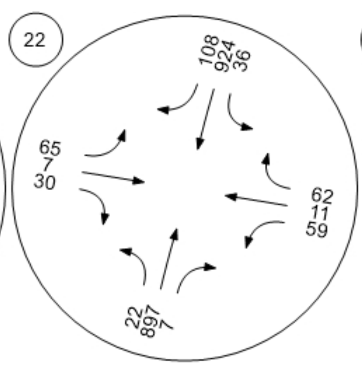

Willow Rd (SR 114)/Newbrid



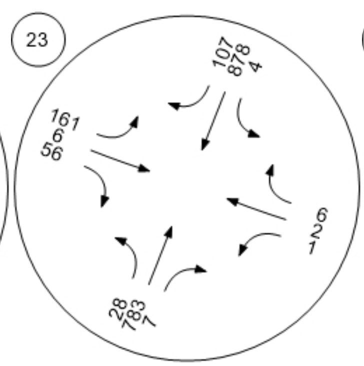

Willow Rd/Bay Rd



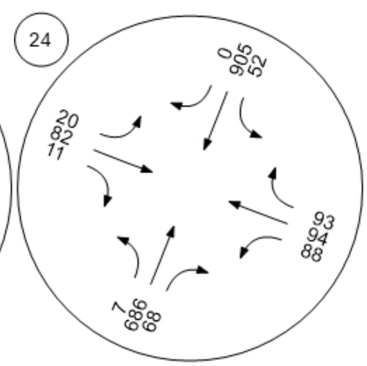

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

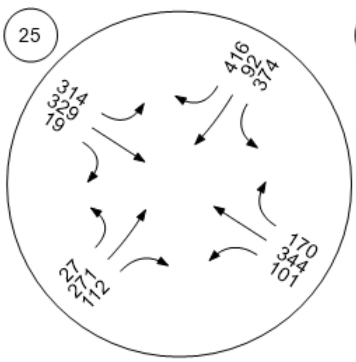


Generated with PTV VISTRO

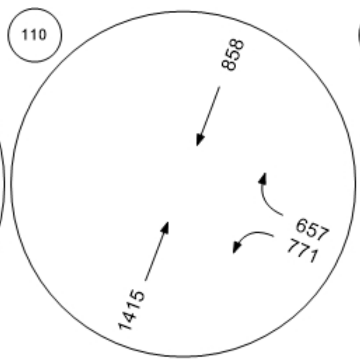
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

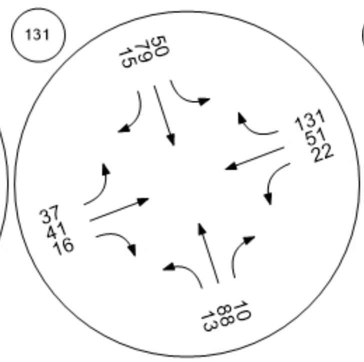

Middlefield Rd-Willow Rd



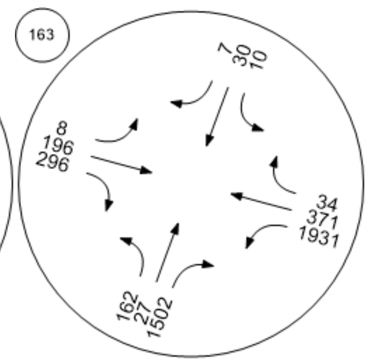

Marsh Road and US 101 NB



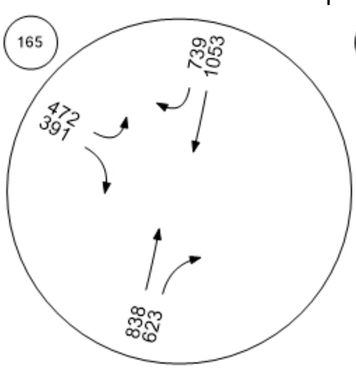

Chilco Street/Hamilton Avenu



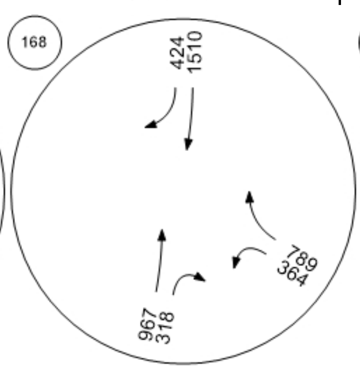

Bayfront Expy/Marsh Rd



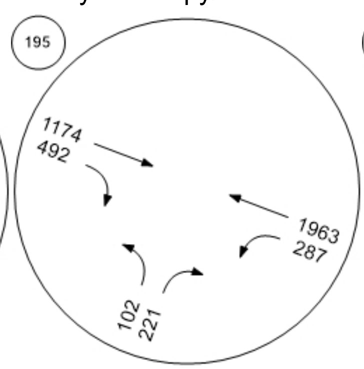

Willow Rd/US-101 SB Ramps



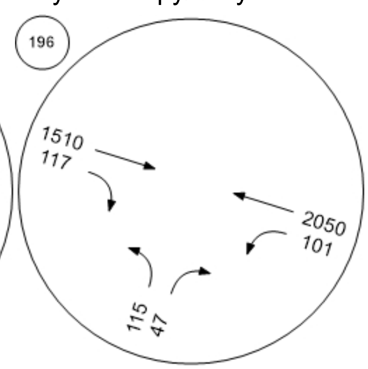

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

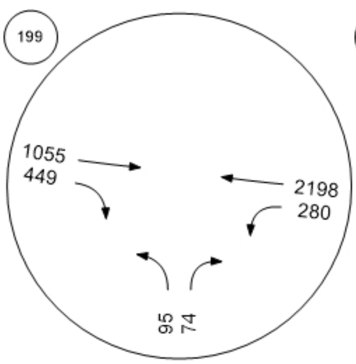


Generated with PTV VISTRO

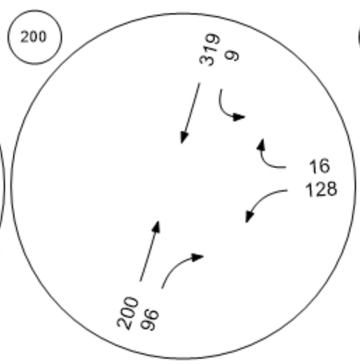
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

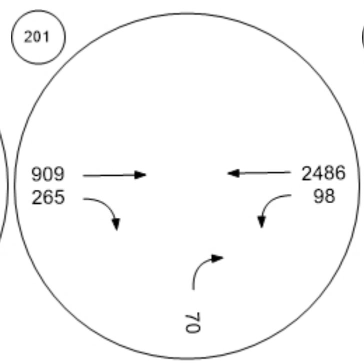

Bayfront Expwy/Bldg 21



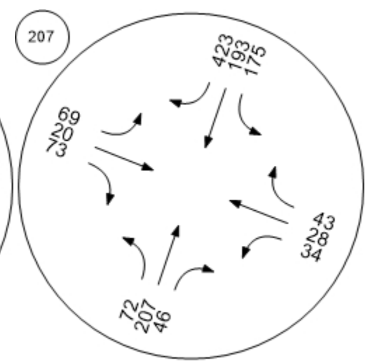

O'Brien Drive/Kavanaugh Dri



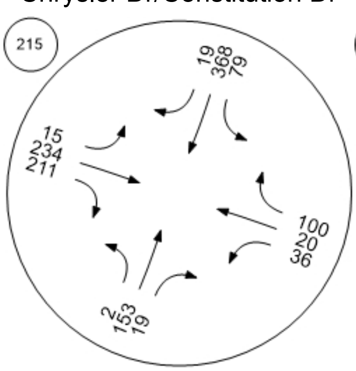

Bayfront Expwy/Bldg 20



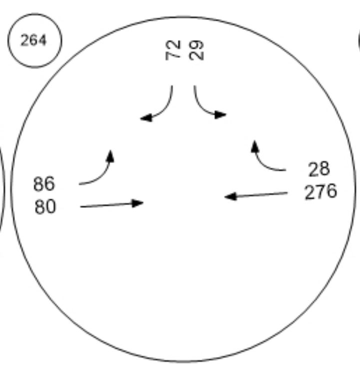

Chilco St/Constitution Dr



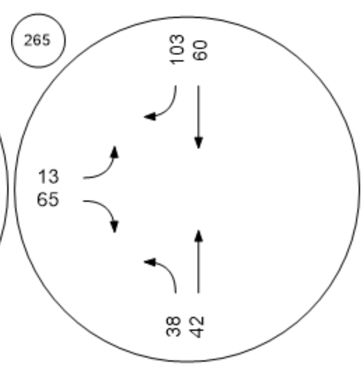

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/Adams Drive

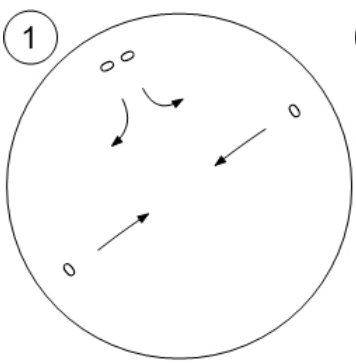


Generated with PTV VISTRO

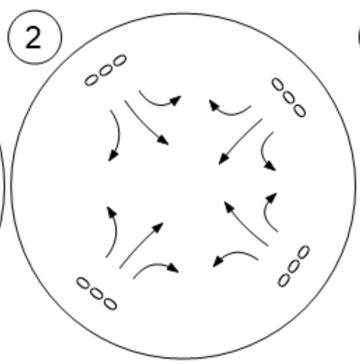
Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

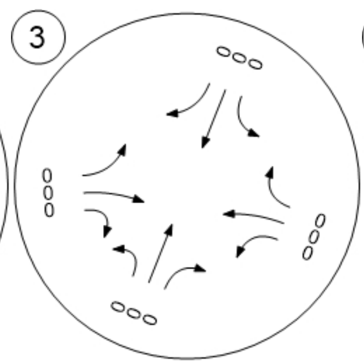

Marsh Rd (SR 84)/US 101 S



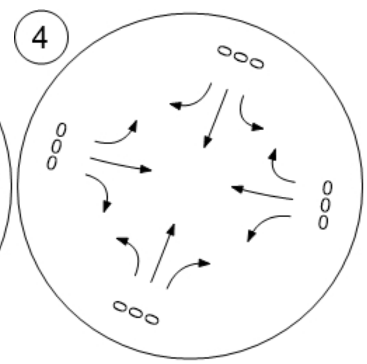

Marsh Rd/Rolison Rd-Scott D



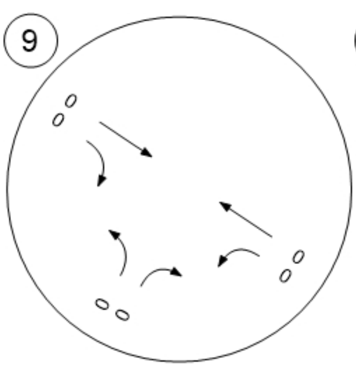

Marsh Rd/Florence St-Bohan



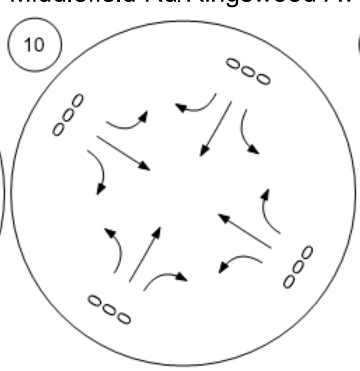

Marsh Rd/Bay Rd



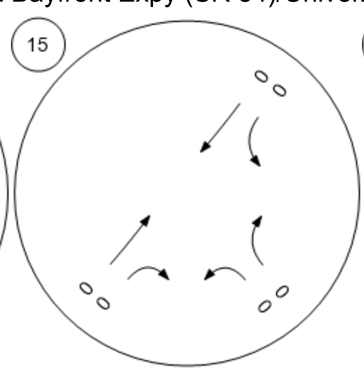

Middlefield Rd/Ravenswood



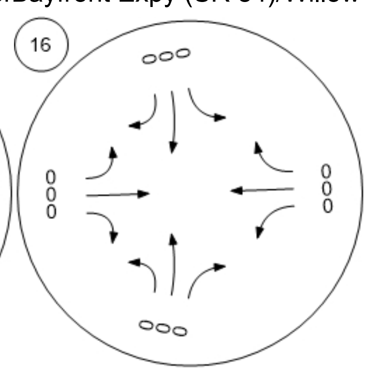

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

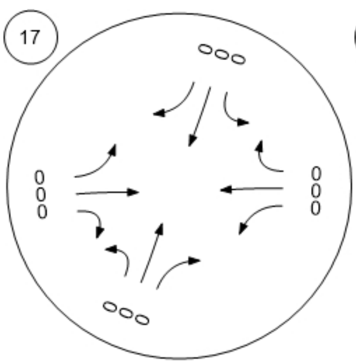


Generated with PTV VISTRO

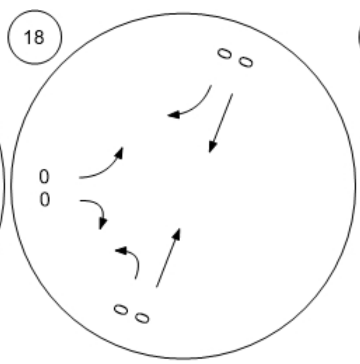
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

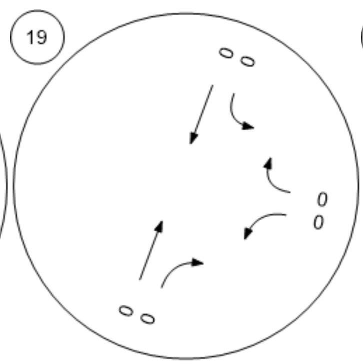

Willow Rd (SR 114)/Hamilton



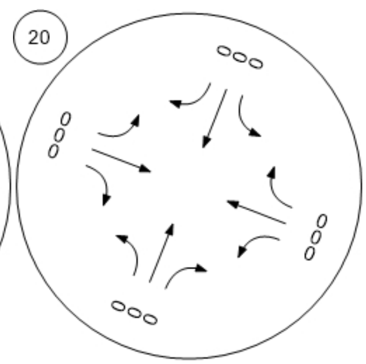

Willow Rd (SR 114)/Ivy Dr



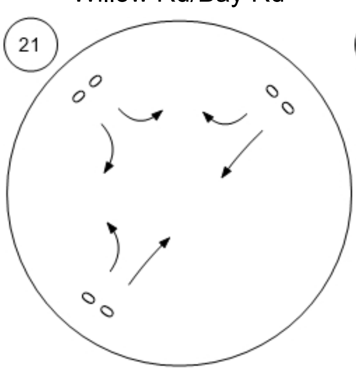

Willow Rd (SR 114)/O'Brien



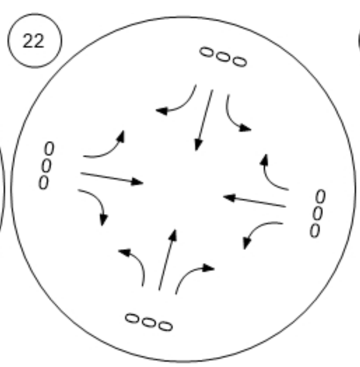

Willow Rd (SR 114)/Newbrid



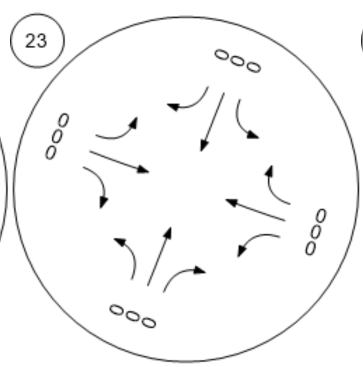

Willow Rd/Bay Rd



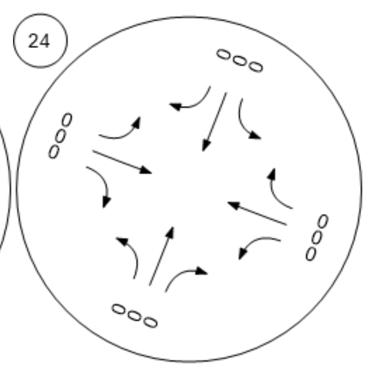

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

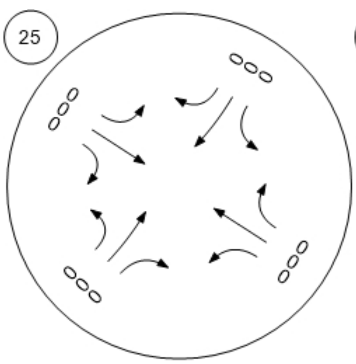


Generated with PTV VISTRO

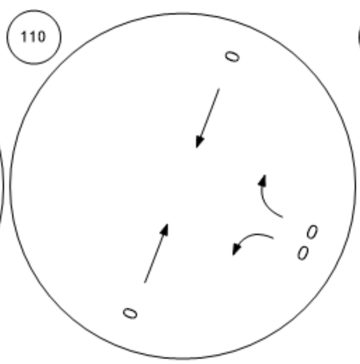
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

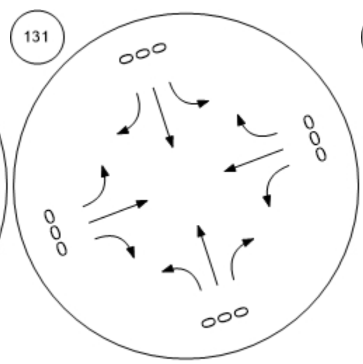

Middlefield Rd-Willow Rd



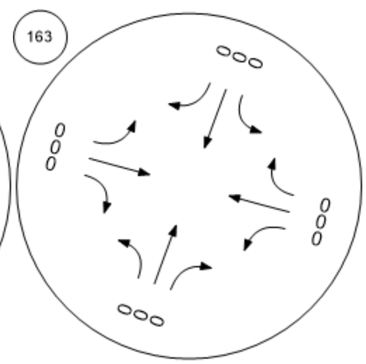

Marsh Road and US 101 NB



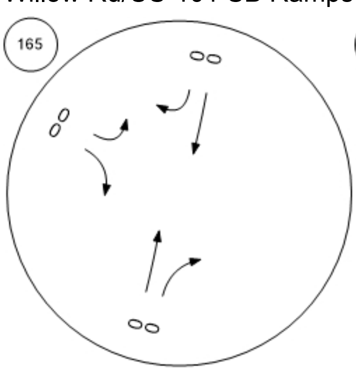

Chilco Street/Hamilton Avenu



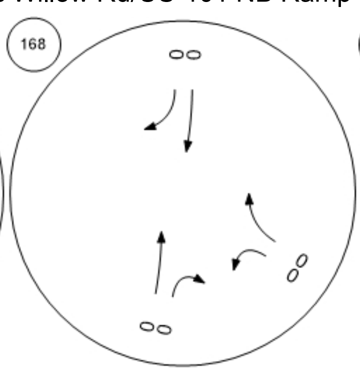

Bayfront Expy/Marsh Rd



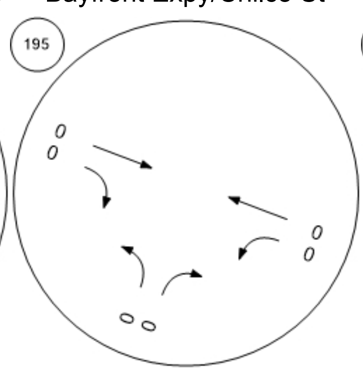

Willow Rd/US-101 SB Ramps



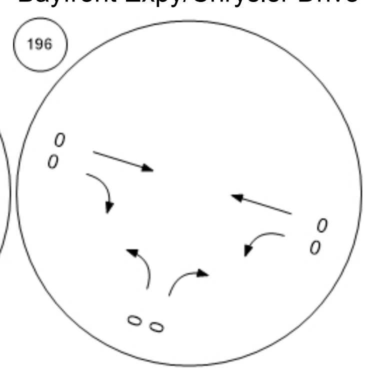

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

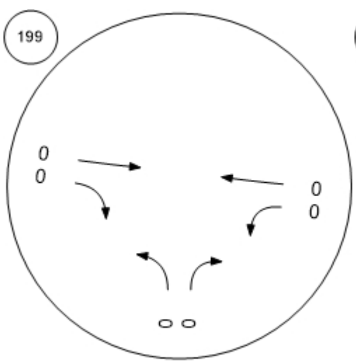


Generated with PTV VISTRO

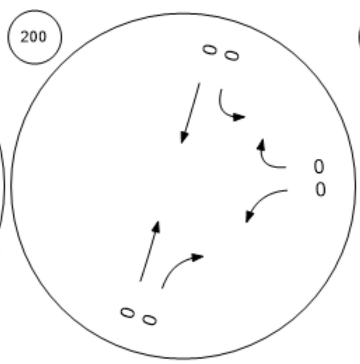
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

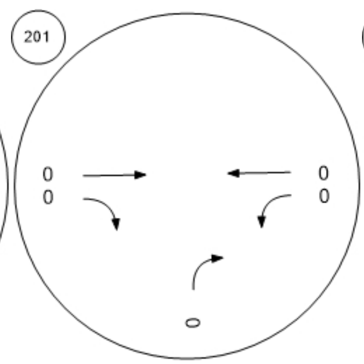

Bayfront Expwy/Bldg 21



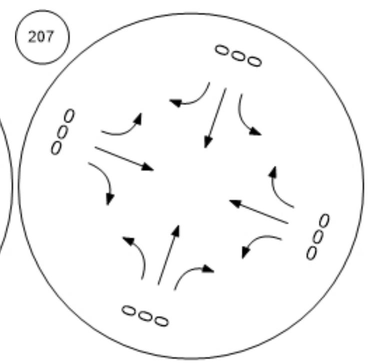

O'Brien Drive/Kavanaugh Dri



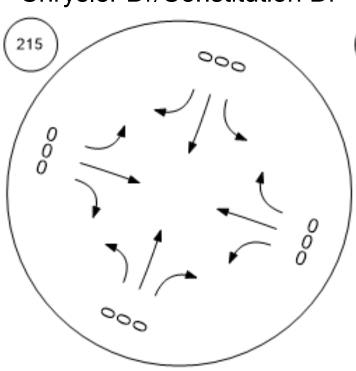

Bayfront Expwy/Bldg 20



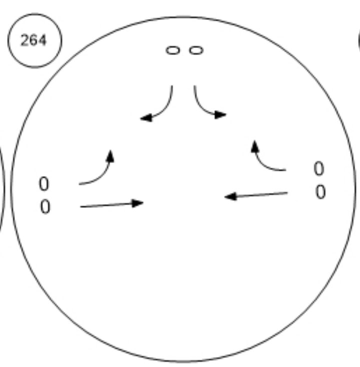

Chilco St/Constitution Dr



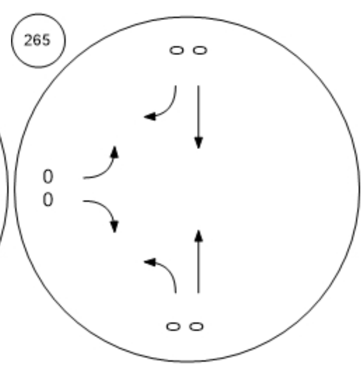

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/Adams Drive



Generated with PTV VISTRO

Version 2021 (SP 0-4)

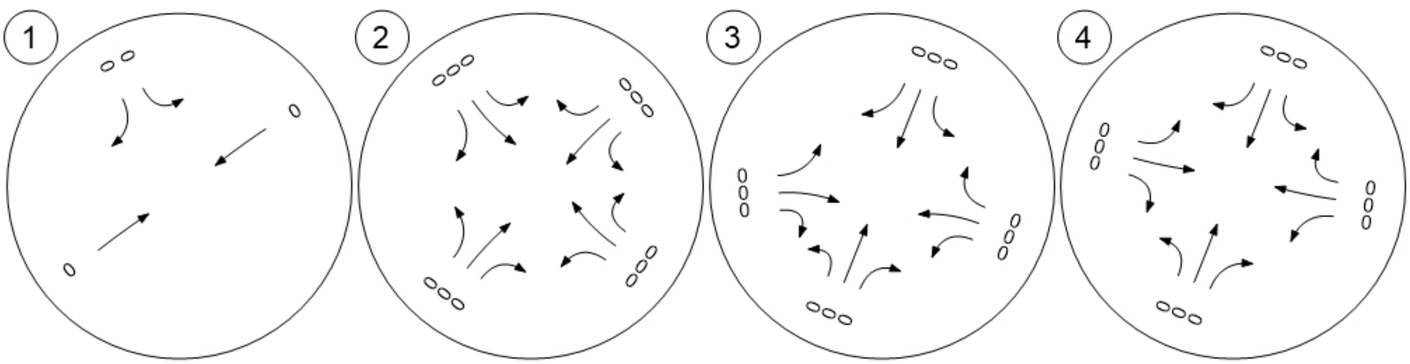
Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S

Marsh Rd/Rolison Rd-Scott D

Marsh Rd/Florence St-Bohan

Marsh Rd/Bay Rd

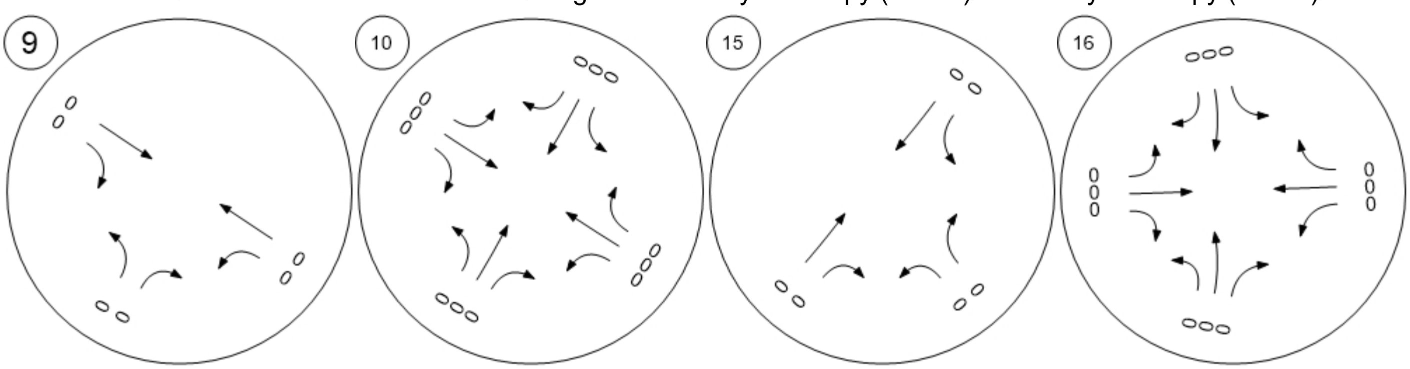



Middlefield Rd/Ravenswood

Middlefield Rd/Ringswood Av

Bayfront Expy (SR 84)/Univer

Bayfront Expy (SR 84)/Willow

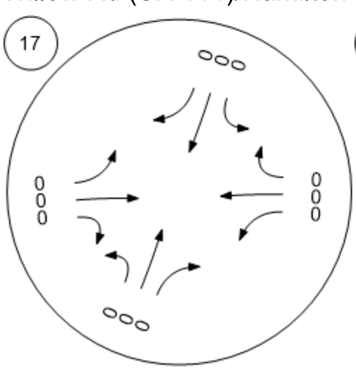


Generated with PTV VISTRO

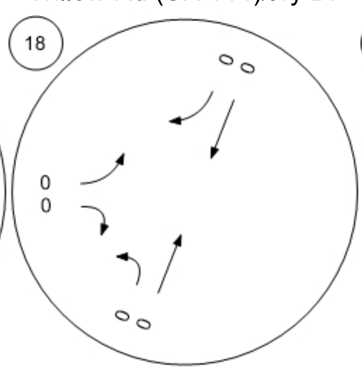
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

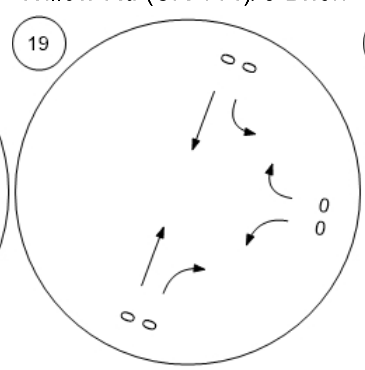

Willow Rd (SR 114)/Hamilton



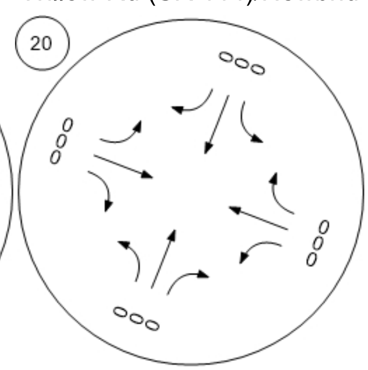

Willow Rd (SR 114)/Ivy Dr



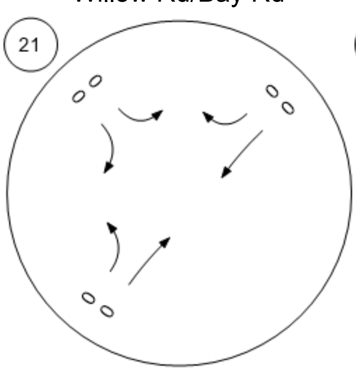

Willow Rd (SR 114)/O'Brien



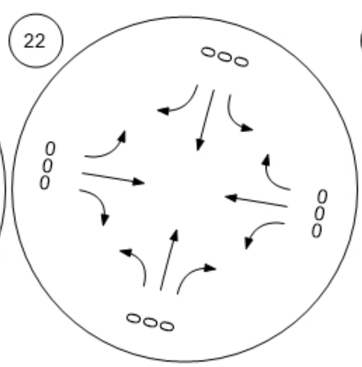

Willow Rd (SR 114)/Newbrid



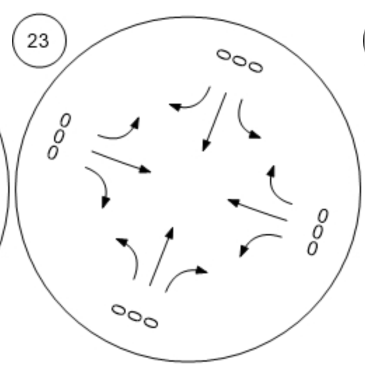

Willow Rd/Bay Rd



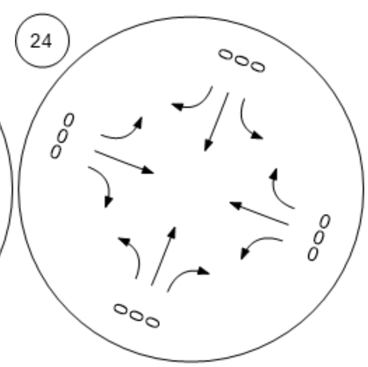

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

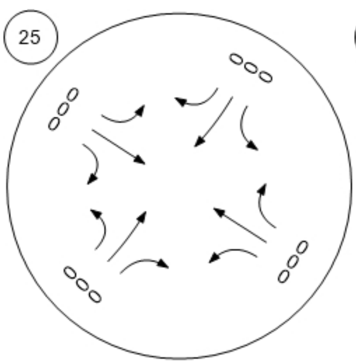


Generated with PTV VISTRO

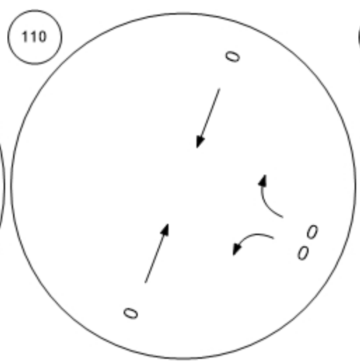
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

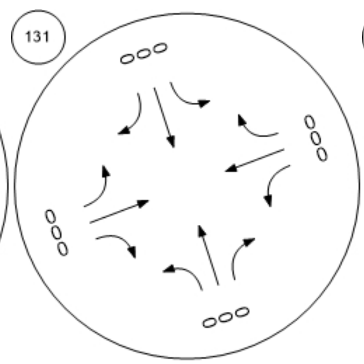

Middlefield Rd-Willow Rd



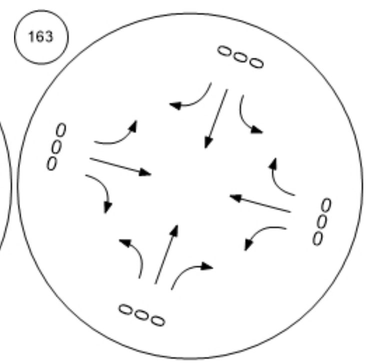

Marsh Road and US 101 NB



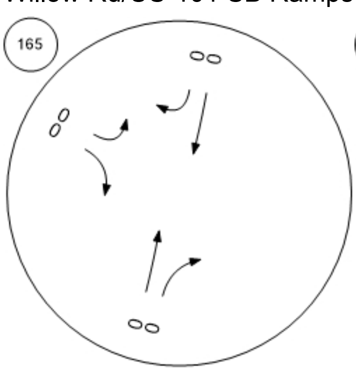

Chilco Street/Hamilton Avenu



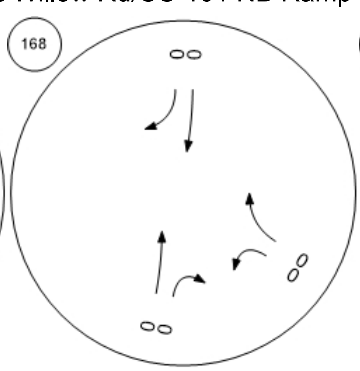

Bayfront Expy/Marsh Rd



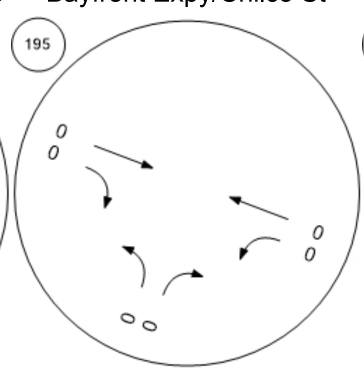

Willow Rd/US-101 SB Ramps



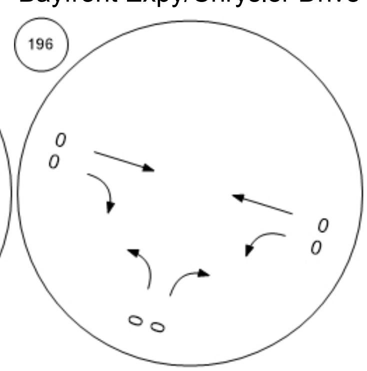

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

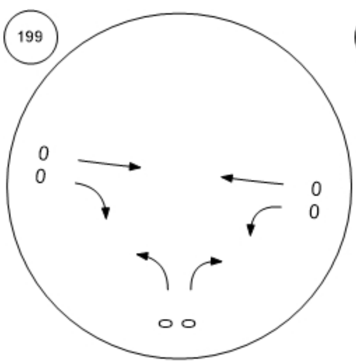


Generated with PTV VISTRO

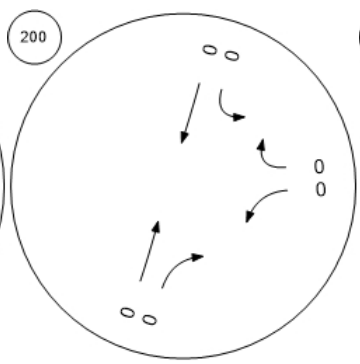
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

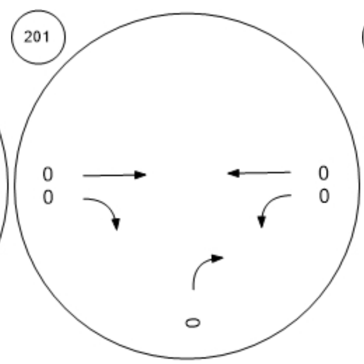

Bayfront Expwy/Bldg 21



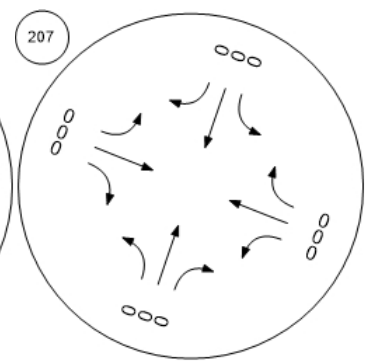

O'Brien Drive/Kavanaugh Dri



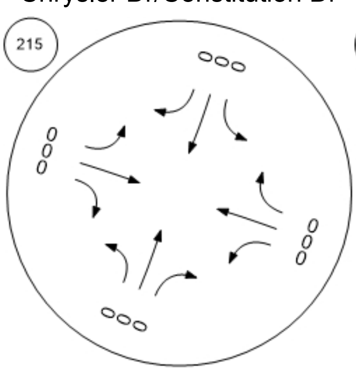

Bayfront Expwy/Bldg 20



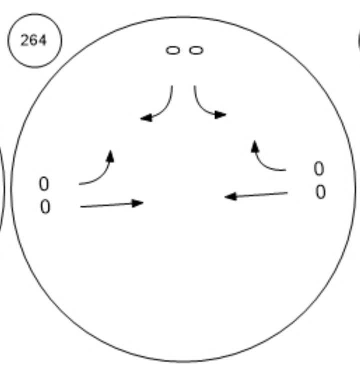

Chilco St/Constitution Dr



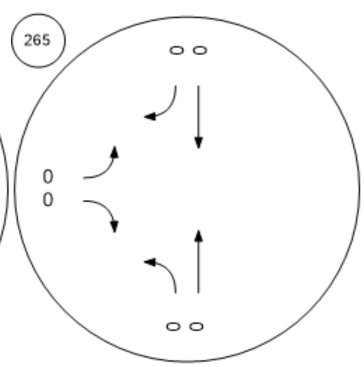

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive

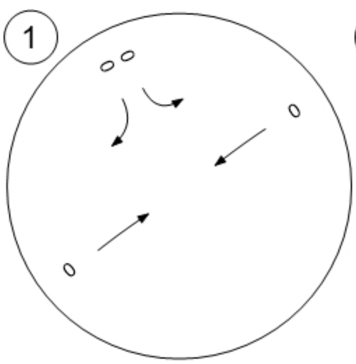



Adam Court/Adams Drive

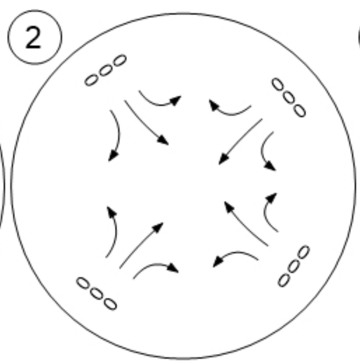


Traffic Volume - Other Volume

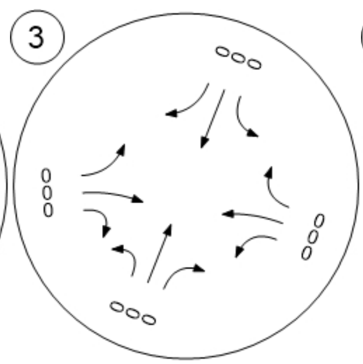

Marsh Rd (SR 84)/US 101 S



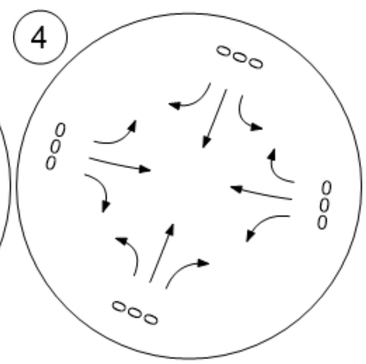

Marsh Rd/Rolison Rd-Scott D



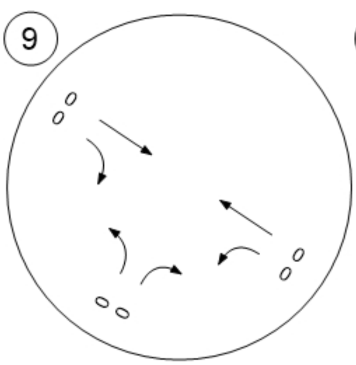

Marsh Rd/Florence St-Bohan



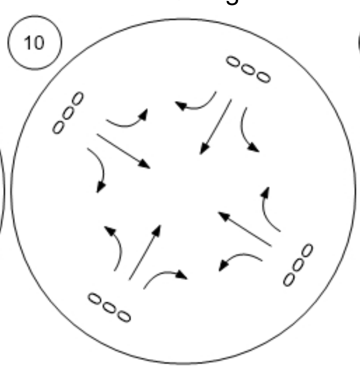

Marsh Rd/Bay Rd



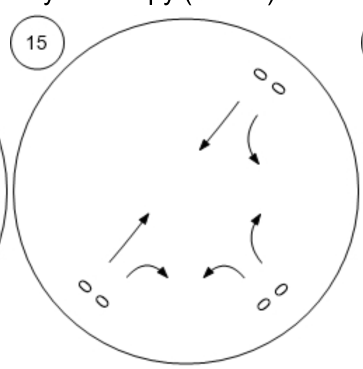

Middlefield Rd/Ravenswood



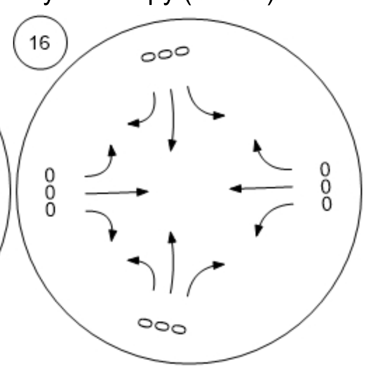

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer



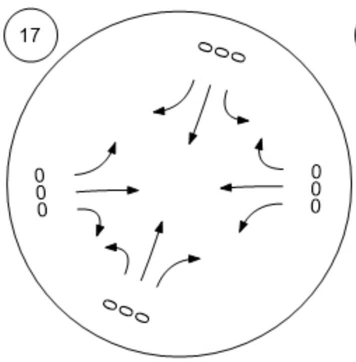

Bayfront Expy (SR 84)/Willow



## Traffic Volume - Other Volume

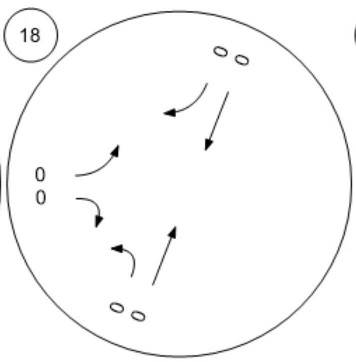

Willow Rd (SR 114)/Hamilton

17



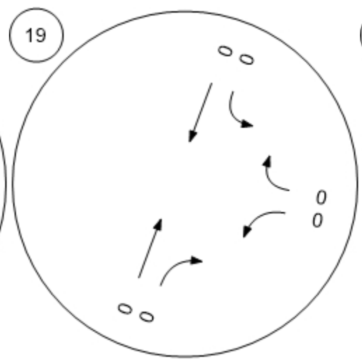

Willow Rd (SR 114)/Ivy Dr

18



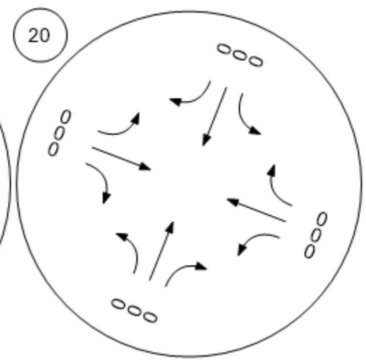

Willow Rd (SR 114)/O'Brien

19



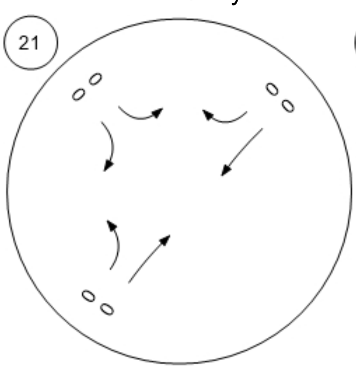

Willow Rd (SR 114)/Newbrid

20



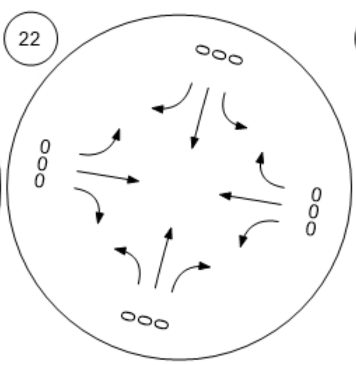

Willow Rd/Bay Rd

21



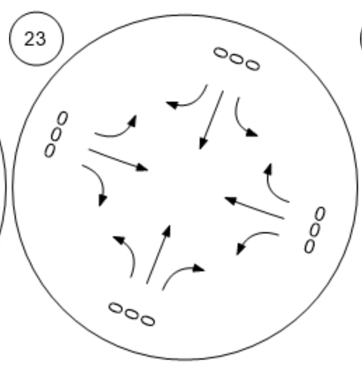

Willow Rd/Durham St-VA Me

22



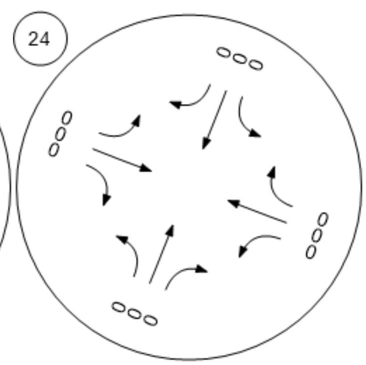

Willow Rd/Coleman Ave

23




Willow Rd/Gilbert Ave

24

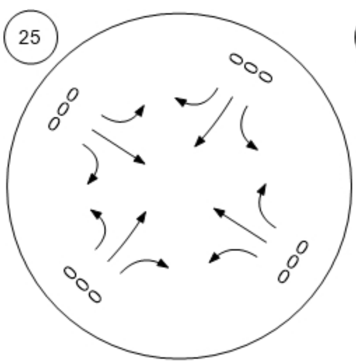


Generated with PTV VISTRO

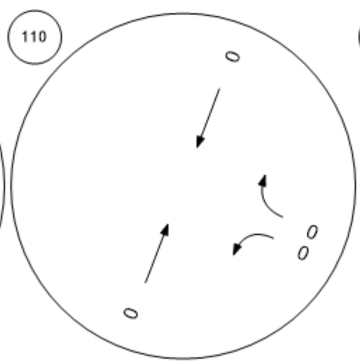
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

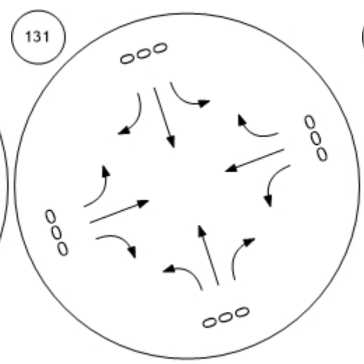

Middlefield Rd-Willow Rd



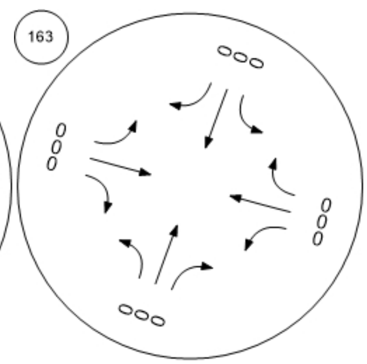

Marsh Road and US 101 NB



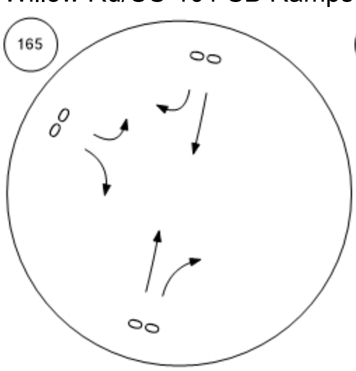

Chilco Street/Hamilton Avenu



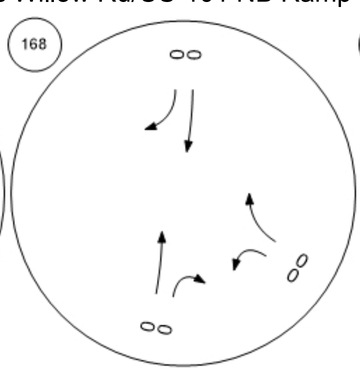

Bayfront Expy/Marsh Rd



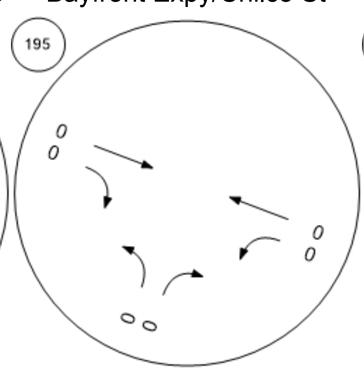

Willow Rd/US-101 SB Ramps



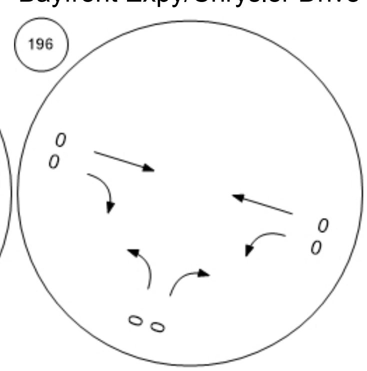

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

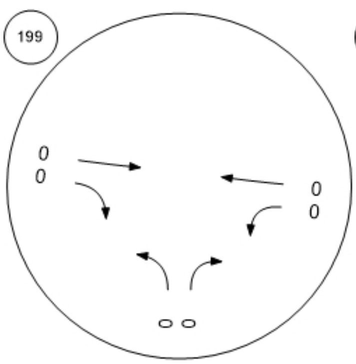


Generated with PTV VISTRO

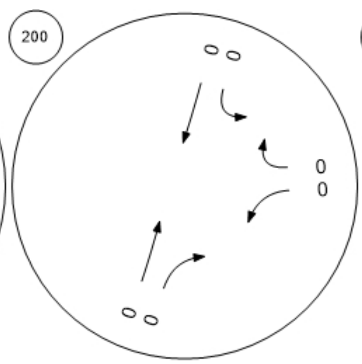
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

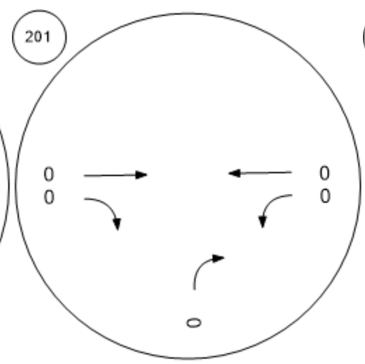

Bayfront Expwy/Bldg 21



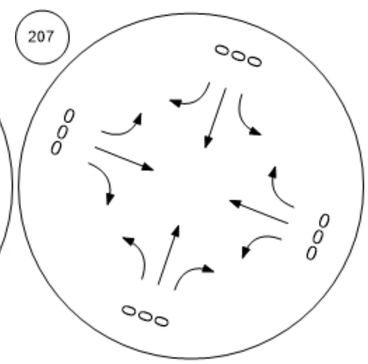

O'Brien Drive/Kavanaugh Dri



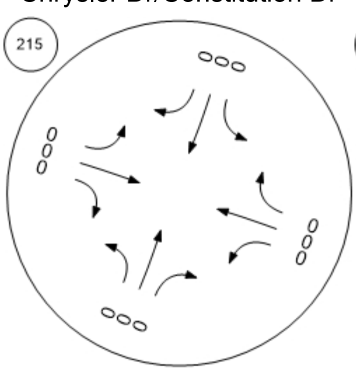

Bayfront Expwy/Bldg 20



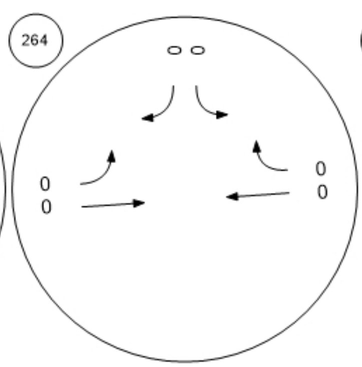

Chilco St/Constitution Dr



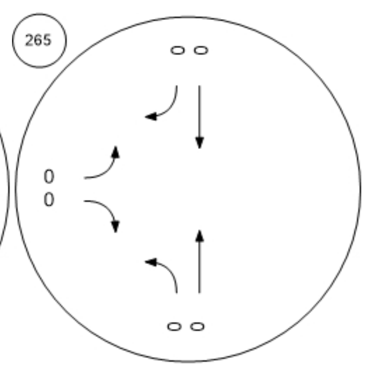

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive

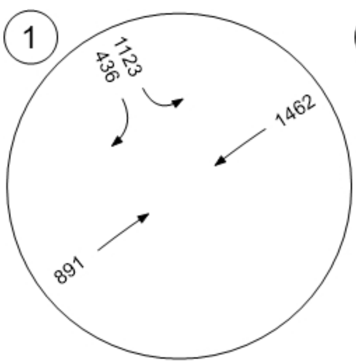



Adam Court/Adams Drive

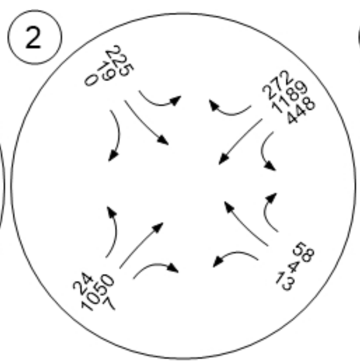


Traffic Volume - Future Total Volume

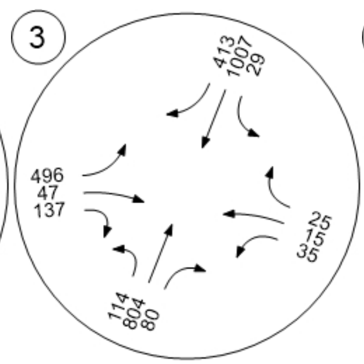

Marsh Rd (SR 84)/US 101 S



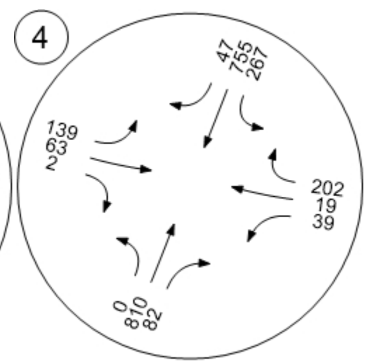

Marsh Rd/Rolison Rd-Scott D



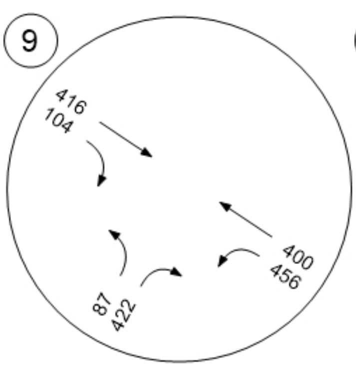

Marsh Rd/Florence St-Bohan



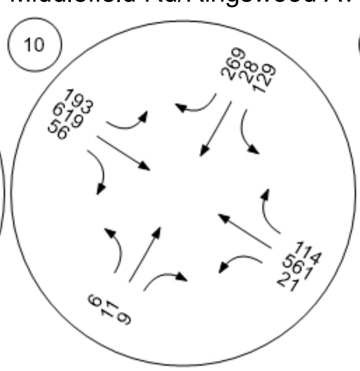

Marsh Rd/Bay Rd



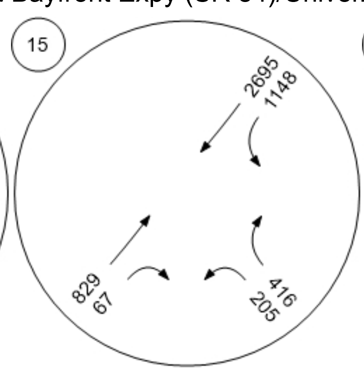

Middlefield Rd/Ravenswood



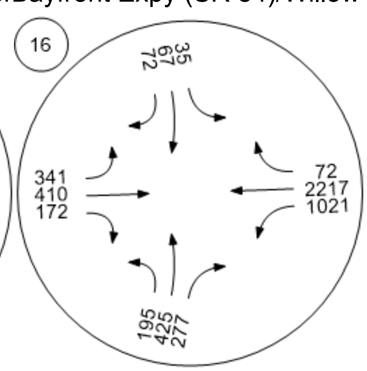

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

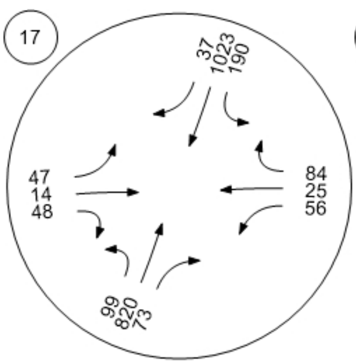


Generated with PTV VISTRO

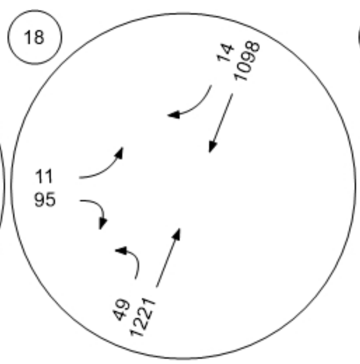
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

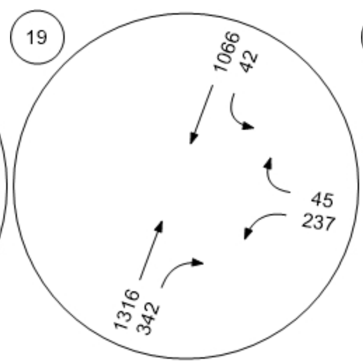

Willow Rd (SR 114)/Hamilton



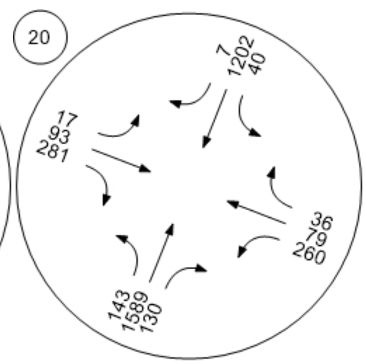

Willow Rd (SR 114)/Ivy Dr



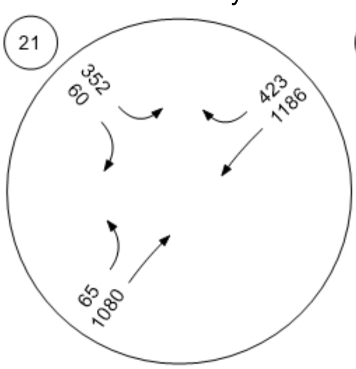

Willow Rd (SR 114)/O'Brien



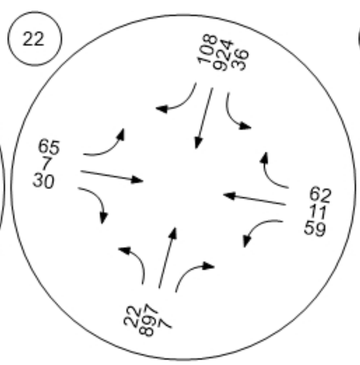

Willow Rd (SR 114)/Newbrid



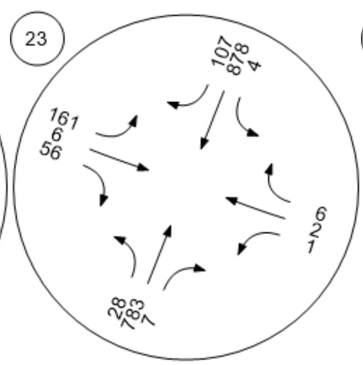

Willow Rd/Bay Rd



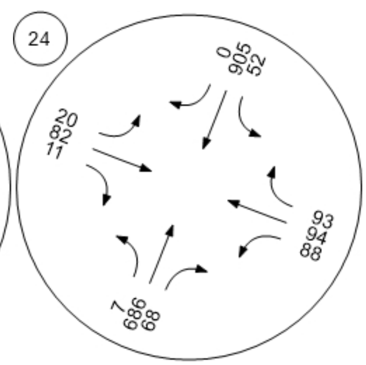

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

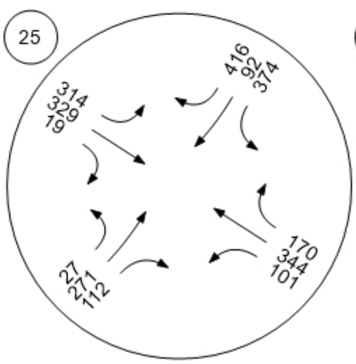


Generated with PTV VISTRO

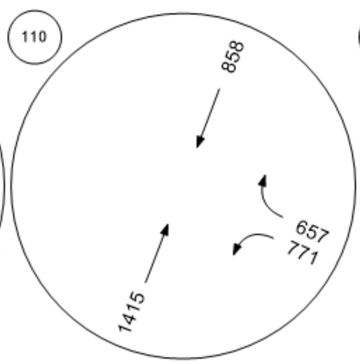
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

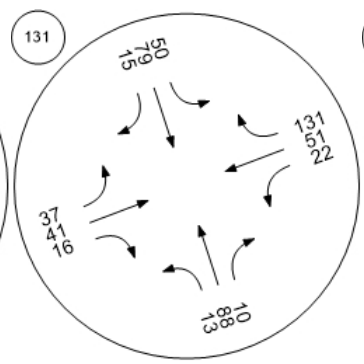

Middlefield Rd-Willow Rd



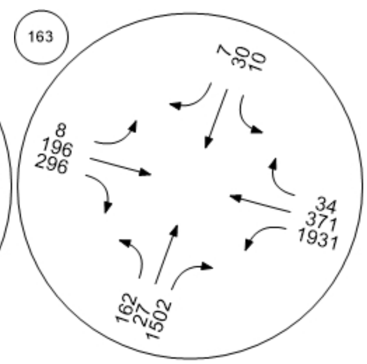

Marsh Road and US 101 NB



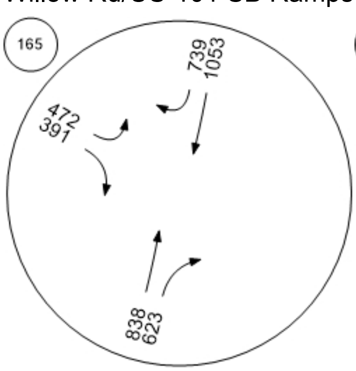

Chilco Street/Hamilton Avenu



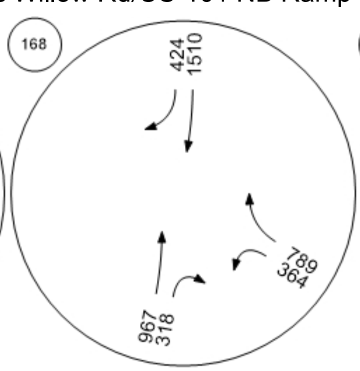

Bayfront Expy/Marsh Rd



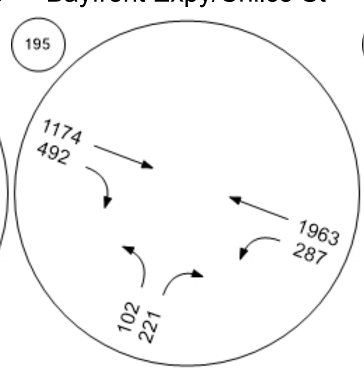

Willow Rd/US-101 SB Ramps



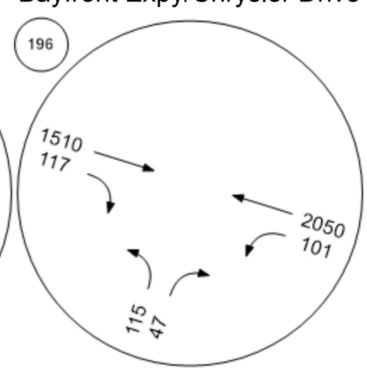

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



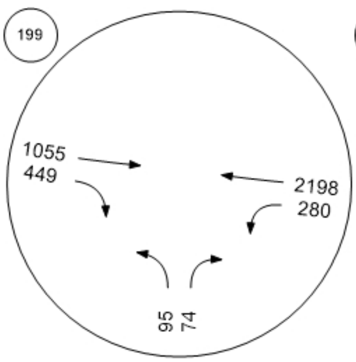
Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

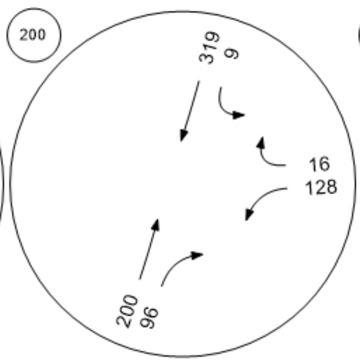

### Bayfront Expwy/Bldg 21

199



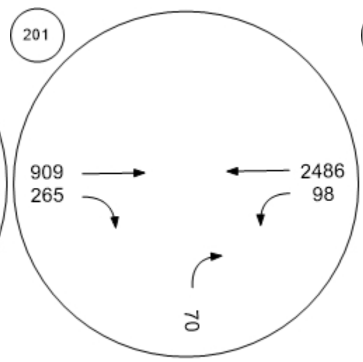

### O'Brien Drive/Kavanaugh Dri

200



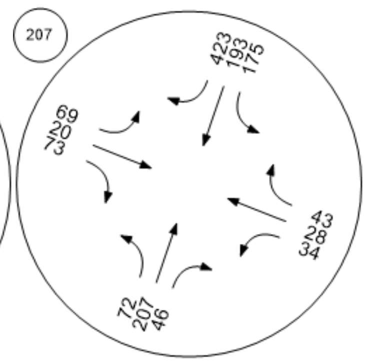

### Bayfront Expwy/Bldg 20

201



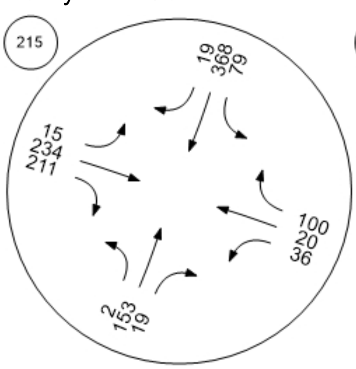

### Chilco St/Constitution Dr

207



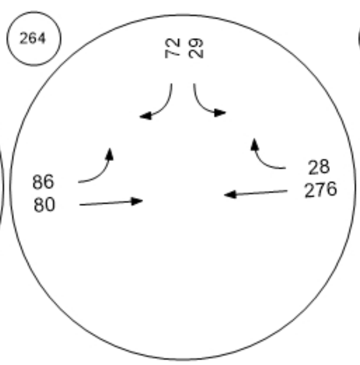

### Chrysler Dr/Constitution Dr

215



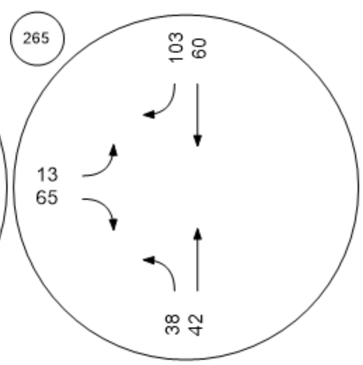

### Adams Drive/O'Brien Drive

264




### Adam Court/Adams Drive

265



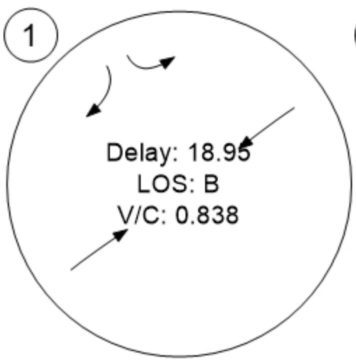
Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Conditions

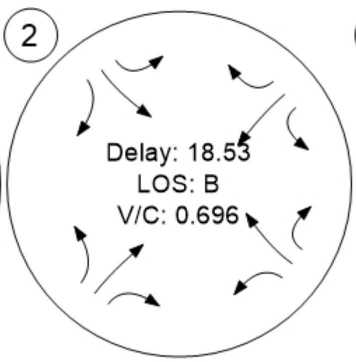

Marsh Rd (SR 84)/US 101 S

1



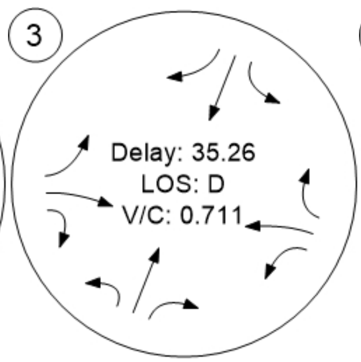

Marsh Rd/Rolison Rd-Scott D

2



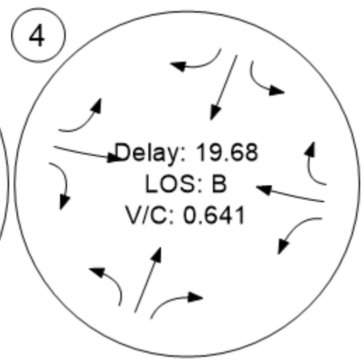

Marsh Rd/Florence St-Bohan

3



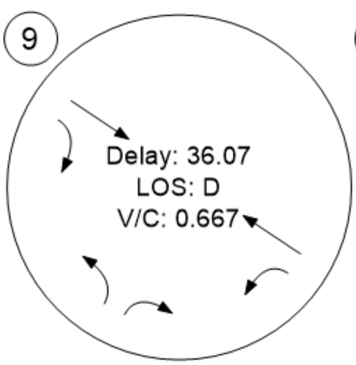

Marsh Rd/Bay Rd

4



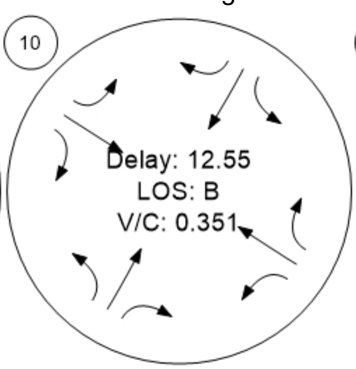

Middlefield Rd/Ravenswood

9



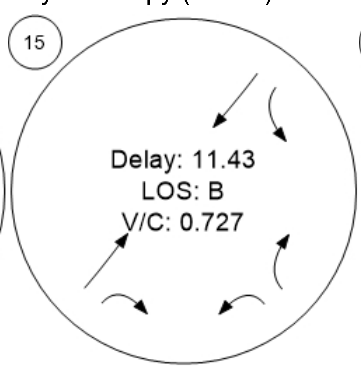

Middlefield Rd/Ringswood Av

10



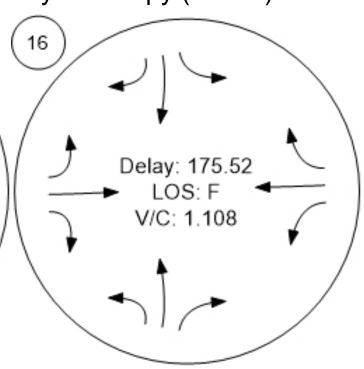

Bayfront Expy (SR 84)/Univer

15



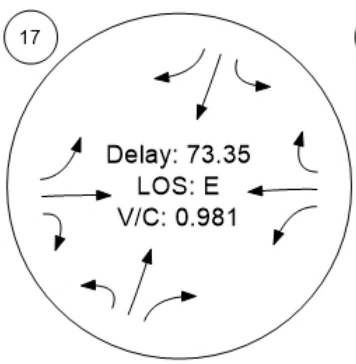

Bayfront Expy (SR 84)/Willow

16

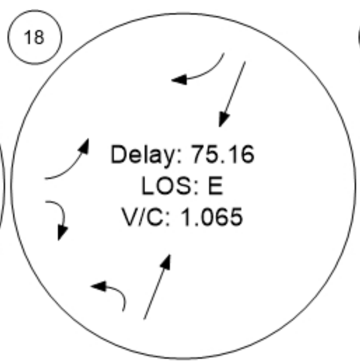


Traffic Conditions

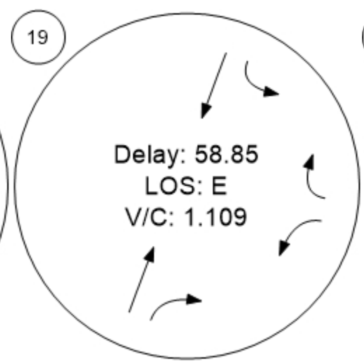

Willow Rd (SR 114)/Hamilton



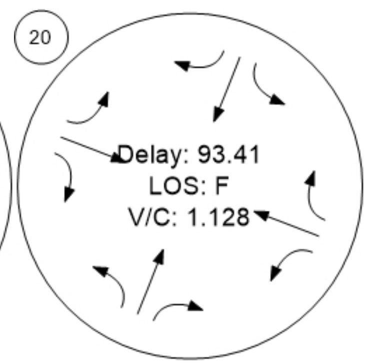

Willow Rd (SR 114)/Ivy Dr



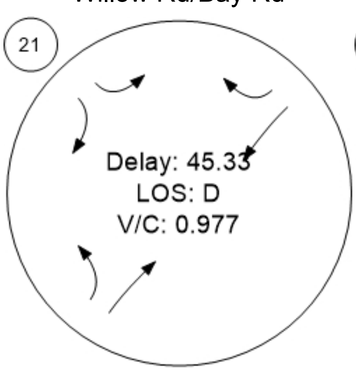

Willow Rd (SR 114)/O'Brien



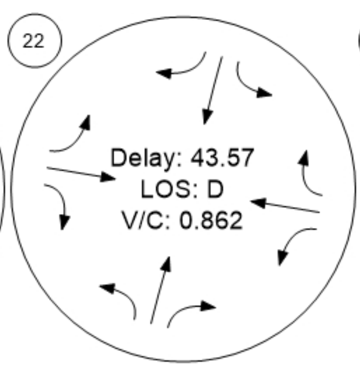

Willow Rd (SR 114)/Newbrid



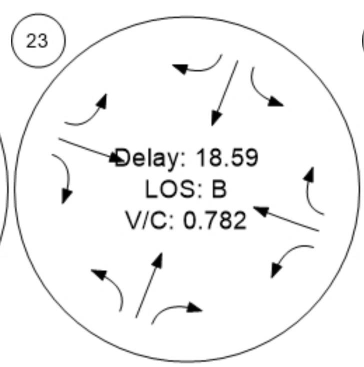

Willow Rd/Bay Rd



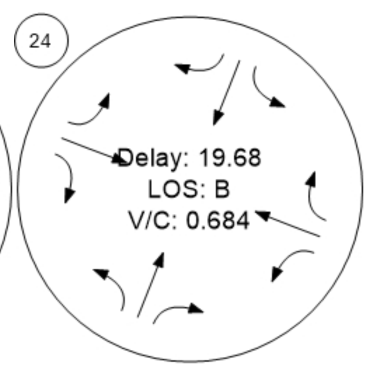

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

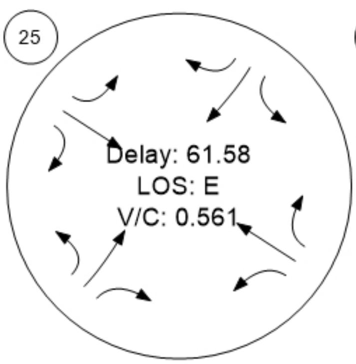



Willow Rd/Gilbert Ave

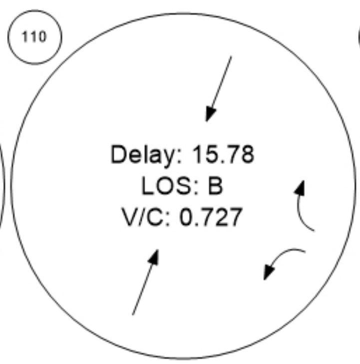


## Traffic Conditions

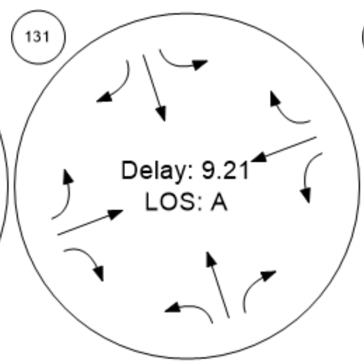

Middlefield Rd-Willow Rd



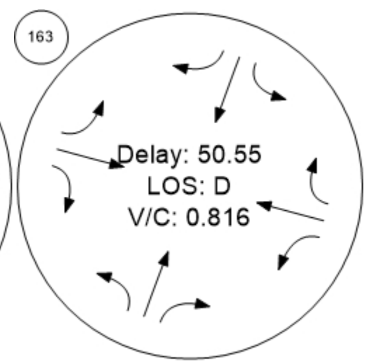

Marsh Road and US 101 NB



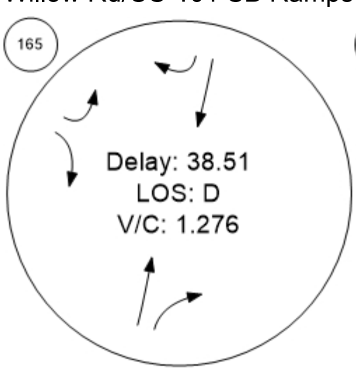

Chilco Street/Hamilton Avenu



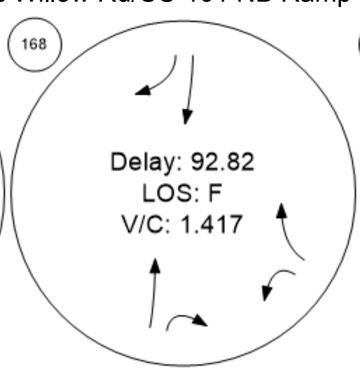

Bayfront Expy/Marsh Rd



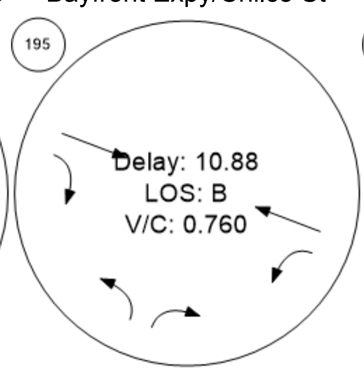

Willow Rd/US-101 SB Ramps



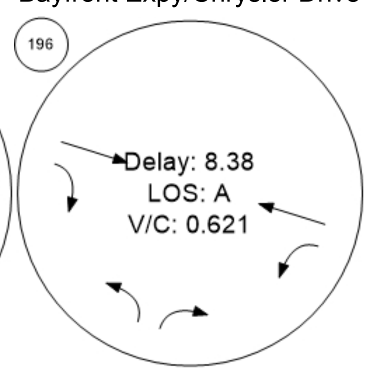

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

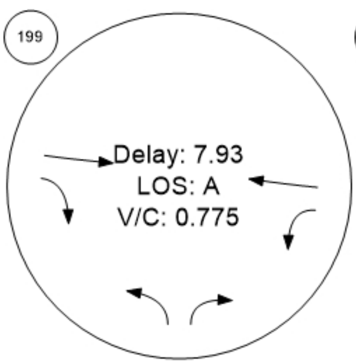



Bayfront Expy/Chrysler Drive

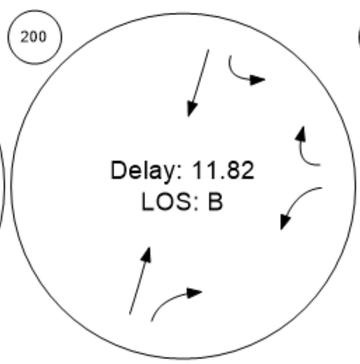


## Traffic Conditions

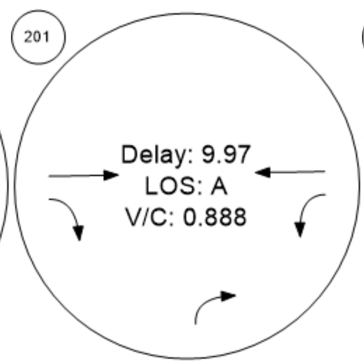

Bayfront Expwy/Bldg 21



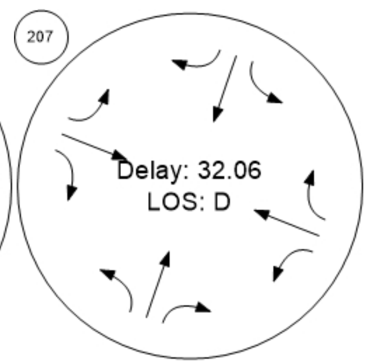

O'Brien Drive/Kavanaugh Dri



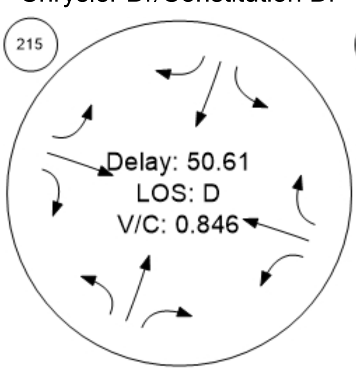

Bayfront Expwy/Bldg 20



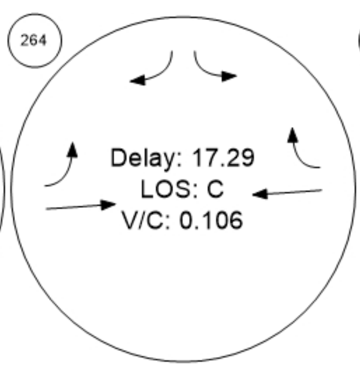

Chilco St/Constitution Dr



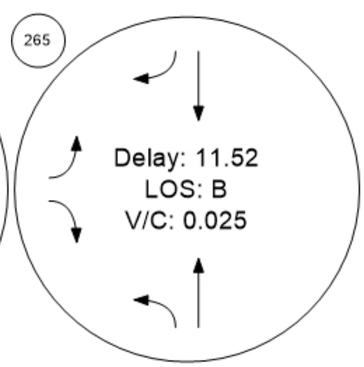

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/Adams Drive

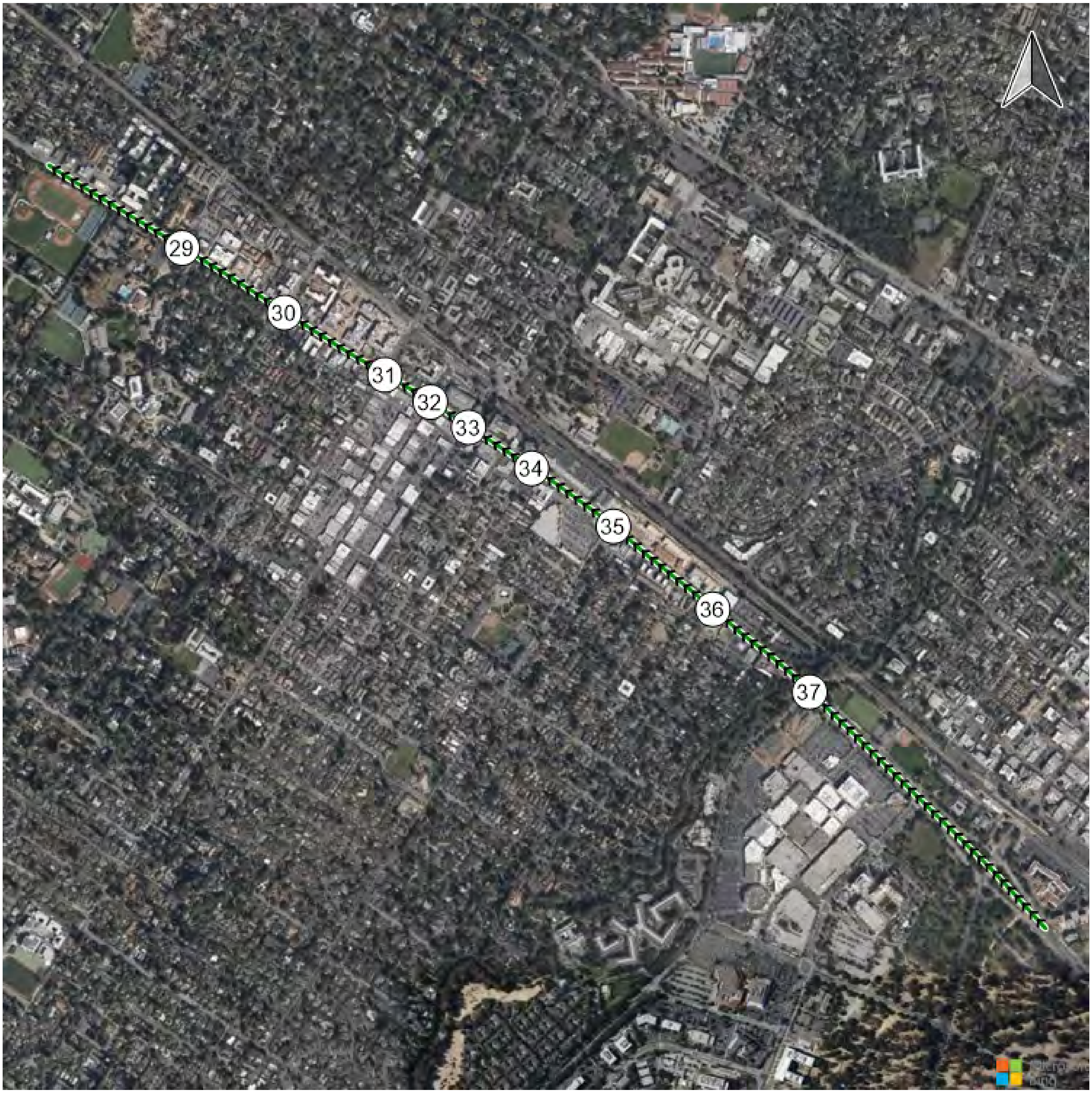


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



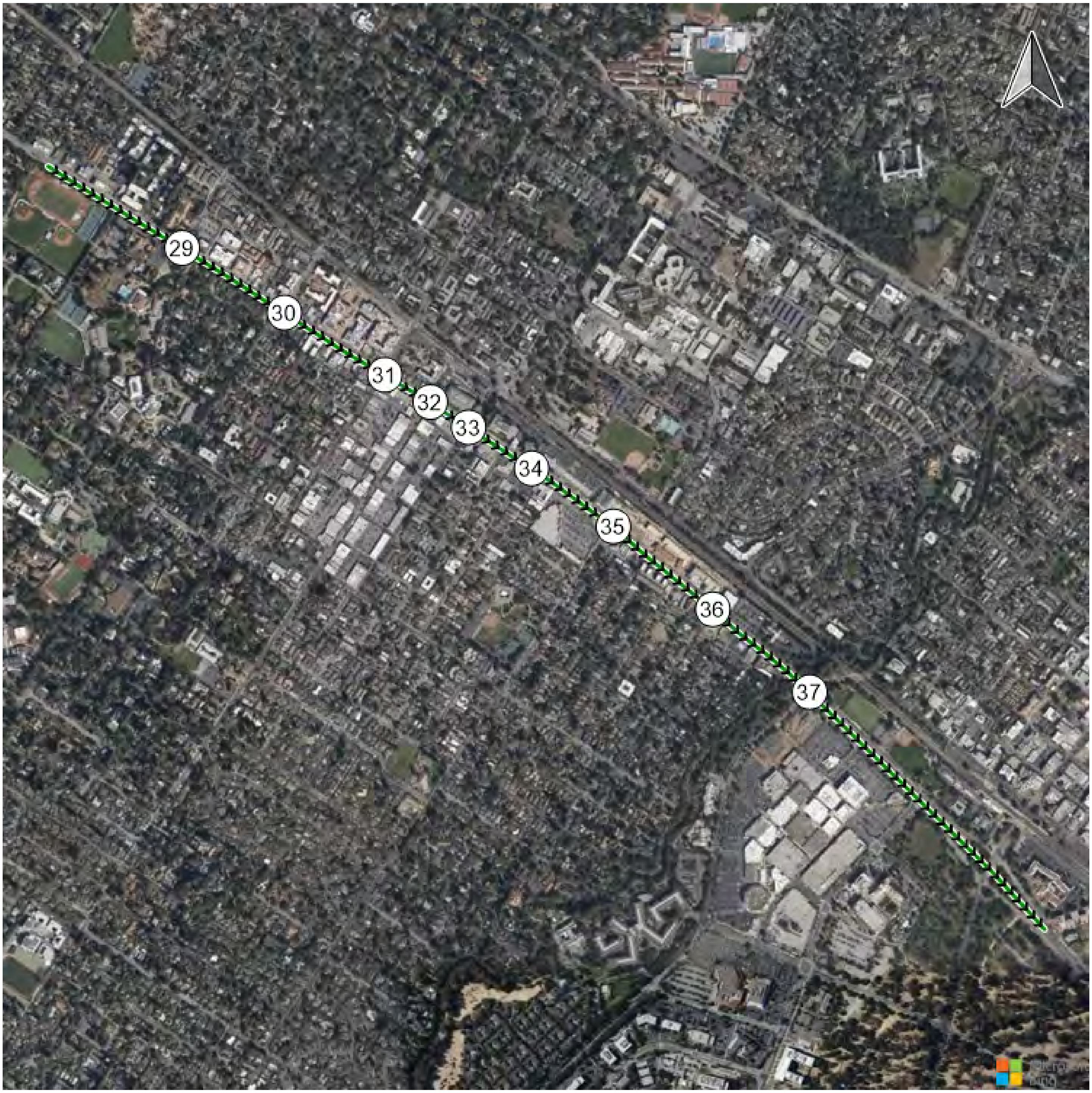
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



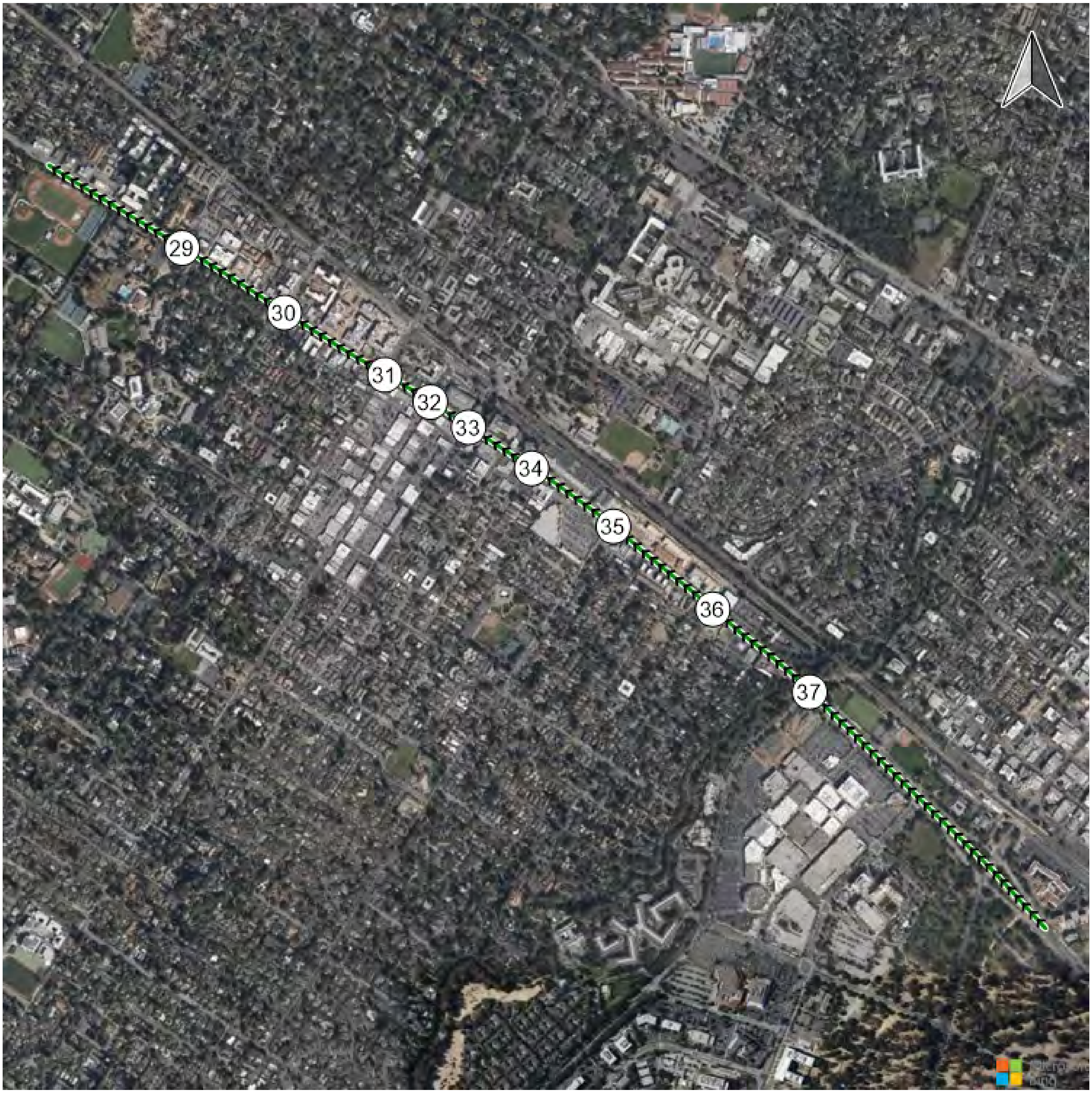
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



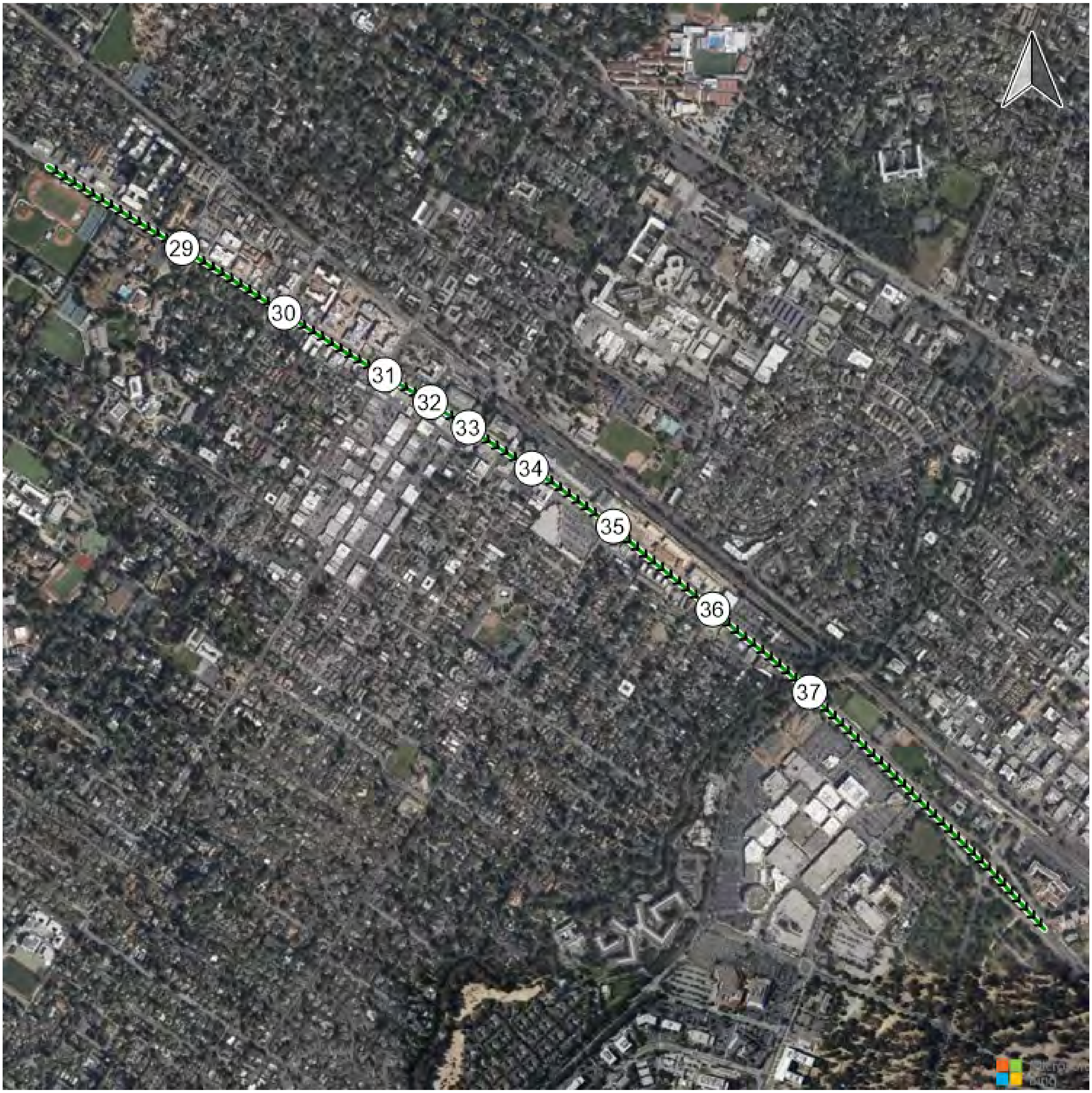
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro
Report File: \...\Existing PM.pdf

Scenario 16 Existing PM (2019 vols)
12/9/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.701 | 17.0 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.460 | 15.3 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.682 | 34.6 | C |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.634 | 18.6 | B |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.394 | 16.1 | B |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.366 | 13.7 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Right | 1.043 | 94.1 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | EB Thru | 0.948 | 142.1 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Left | 1.209 | 155.4 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 0.979 | 39.5 | D |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 1.291 | 147.5 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.222 | 133.7 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.233 | 113.5 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.166 | 167.7 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.610 | 9.2 | A |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | EB Left | 0.514 | 10.3 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NWB Right | 0.569 | 31.5 | C |
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | WB Left | 0.771 | 13.3 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 0.752 | 16.8 | C |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | SB Right | 0.839 | 31.6 | C |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.612 | 98.9 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.073 | 83.9 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.808 | 13.1 | B |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.779 | 13.1 | B |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.732 | 10.2 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 0.727 | 15.2 | C |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.759 | 8.2 | A |
| 207 | Chilco St/Constitution Dr | All-way stop | HCM 6th Edition | SB Thru | 0.916 | 32.5 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 0.666 | 28.0 | C |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.366 | 27.6 | D |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.064 | 11.9 | B |
| 267 | Willow Road (SR 114)/Park Street | Signalized | HCM 6th Edition | | 0.000 | 0.0 | A |
| 269 | O'Brien Drive/Loop Road | Signalized | HCM 6th Edition | | 0.000 | 0.0 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.701 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 959 | 1000 | 279 | 1176 | 296 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 959 | 1000 | 279 | 1176 | 296 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 245 | 255 | 70 | 300 | 76 |
| Total Analysis Volume [veh/h] | 0 | 979 | 1020 | 279 | 1200 | 302 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 45 | 43 | 31 | 31 |
| g / C, Green / Cycle | 0.56 | 0.53 | 0.39 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.29 | 0.35 | 0.19 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2236 | 1886 | 1313 | 619 |
| d1, Uniform Delay [s] | 10.29 | 12.25 | 23.32 | 18.62 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.63 | 1.12 | 1.13 | 0.22 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.54 | 0.91 | 0.49 |
| d, Delay for Lane Group [s/veh] | 10.91 | 13.37 | 24.44 | 18.84 |
| Lane Group LOS | B | B | C | B |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.53 | 5.50 | 10.17 | 4.04 |
| 50th-Percentile Queue Length [ft/ln] | 113.27 | 137.61 | 254.25 | 101.06 |
| 95th-Percentile Queue Length [veh/ln] | 8.02 | 9.35 | 15.40 | 7.28 |
| 95th-Percentile Queue Length [ft/ln] | 200.55 | 233.80 | 385.00 | 181.91 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 10.91 | 13.37 | 0.00 | 24.44 | 18.84 |
| Movement LOS | | B | B | | C | B |
| d_A, Approach Delay [s/veh] | 10.91 | | 13.37 | | 23.32 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 16.95 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.701 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.781 | 0.000 | 2.422 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.81 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.401 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.460 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 1326 | 7 | 55 | 815 | 193 | 15 | 5 | 388 | 256 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 1326 | 7 | 55 | 815 | 193 | 15 | 5 | 62 | 256 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 345 | 2 | 14 | 212 | 50 | 4 | 1 | 16 | 67 | 2 | 1 |
| Total Analysis Volume [veh/h] | 35 | 1381 | 7 | 57 | 849 | 201 | 16 | 5 | 65 | 267 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 6 | 102 | 102 | 102 | 102 | 102 | 8 | 8 | 16 | 16 |
| g / C, Green / Cycle | 0.04 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.06 | 0.06 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.26 | 0.26 | 0.06 | 0.29 | 0.29 | 0.01 | 0.02 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 886 | 1877 | 1738 | 1830 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 70 | 2591 | 1357 | 672 | 1371 | 1270 | 105 | 162 | 206 | 196 |
| d1, Uniform Delay [s] | 65.82 | 6.85 | 6.85 | 6.81 | 7.15 | 7.18 | 62.86 | 63.60 | 59.47 | 59.47 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.08 | 0.38 | 0.72 | 0.02 | 0.86 | 0.94 | 0.68 | 1.19 | 3.03 | 3.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.35 | 0.35 | 0.08 | 0.40 | 0.40 | 0.20 | 0.40 | 0.69 | 0.69 |
| d, Delay for Lane Group [s/veh] | 69.90 | 7.23 | 7.57 | 6.83 | 8.00 | 8.12 | 63.54 | 64.79 | 62.50 | 62.67 |
| Lane Group LOS | E | A | A | A | A | A | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.30 | 4.65 | 5.00 | 0.24 | 5.94 | 5.61 | 0.74 | 1.16 | 5.08 | 4.82 |
| 50th-Percentile Queue Length [ft/ln] | 32.53 | 116.27 | 125.03 | 5.98 | 148.49 | 140.20 | 18.55 | 28.94 | 126.89 | 120.49 |
| 95th-Percentile Queue Length [veh/ln] | 2.34 | 8.19 | 8.67 | 0.43 | 9.94 | 9.49 | 1.34 | 2.08 | 8.77 | 8.42 |
| 95th-Percentile Queue Length [ft/ln] | 58.56 | 204.69 | 216.72 | 10.77 | 248.41 | 237.29 | 33.39 | 52.08 | 219.26 | 210.50 |

**Movement, Approach, & Intersection Results**

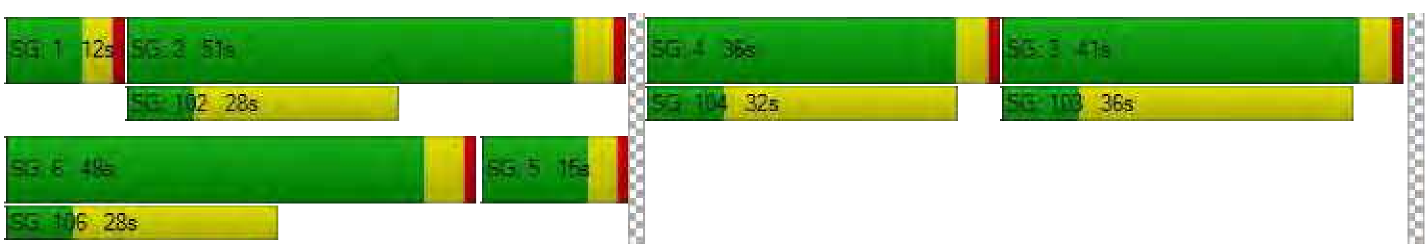
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 69.90 | 7.34 | 7.57 | 6.83 | 8.05 | 8.12 | 63.54 | 63.54 | 64.79 | 62.58 | 62.67 | 62.67 |
| Movement LOS | E | A | A | A | A | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 8.88 | | | 8.00 | | | 64.49 | | | 62.58 | | |
| Approach LOS | A | | | A | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 15.34 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.460 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.908 | 3.126 | 2.919 | 2.102 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.342 | 2.473 | 2.239 | 2.017 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.682 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 180 | 675 | 38 | 13 | 773 | 354 | 436 | 18 | 157 | 109 | 50 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 180 | 675 | 38 | 13 | 773 | 354 | 436 | 18 | 0 | 109 | 50 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 48 | 181 | 10 | 3 | 208 | 95 | 117 | 5 | 0 | 29 | 13 | 11 |
| Total Analysis Volume [veh/h] | 194 | 726 | 41 | 14 | 831 | 381 | 469 | 19 | 0 | 117 | 54 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 19 | 90 | 90 | 4 | 75 | 75 | 24 | 24 | 24 | 14 | 14 |
| g / C, Green / Cycle | 0.13 | 0.64 | 0.64 | 0.03 | 0.53 | 0.53 | 0.17 | 0.17 | 0.17 | 0.10 | 0.10 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.21 | 0.21 | 0.01 | 0.34 | 0.35 | 0.14 | 0.14 | 0.00 | 0.07 | 0.06 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1812 | 1714 | 1867 | 1640 | 1774 | 1816 | 1605 | 1751 | 1745 |
| c, Capacity [veh/h] | 238 | 1191 | 1166 | 45 | 998 | 877 | 303 | 310 | 274 | 180 | 179 |
| d1, Uniform Delay [s] | 58.82 | 11.26 | 11.26 | 66.87 | 22.98 | 23.30 | 55.68 | 55.68 | 0.00 | 60.34 | 59.62 |
| k, delay calibration | 0.36 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 19.45 | 0.73 | 0.74 | 1.45 | 3.12 | 3.81 | 3.60 | 3.51 | 0.00 | 2.93 | 1.88 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.32 | 0.33 | 0.31 | 0.64 | 0.66 | 0.80 | 0.80 | 0.00 | 0.65 | 0.54 |
| d, Delay for Lane Group [s/veh] | 78.27 | 11.98 | 12.01 | 68.31 | 26.10 | 27.11 | 59.27 | 59.19 | 0.00 | 63.26 | 61.50 |
| Lane Group LOS | E | B | B | E | C | C | E | E | A | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.94 | 5.51 | 5.42 | 0.51 | 15.38 | 14.20 | 8.55 | 8.75 | 0.00 | 4.19 | 3.40 |
| 50th-Percentile Queue Length [ft/ln] | 198.43 | 137.86 | 135.51 | 12.71 | 384.50 | 354.92 | 213.85 | 218.79 | 0.00 | 104.63 | 85.05 |
| 95th-Percentile Queue Length [veh/ln] | 12.56 | 9.37 | 9.24 | 0.92 | 21.81 | 20.38 | 13.35 | 13.60 | 0.00 | 7.53 | 6.12 |
| 95th-Percentile Queue Length [ft/ln] | 313.93 | 234.14 | 230.97 | 22.88 | 545.29 | 509.40 | 333.77 | 340.08 | 0.00 | 188.33 | 153.10 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 78.27 | 11.99 | 12.01 | 68.31 | 26.34 | 27.11 | 59.23 | 59.19 | 0.00 | 63.26 | 61.50 | 61.50 |
| Movement LOS | E | B | B | E | C | C | E | E | A | E | E | E |
| d_A, Approach Delay [s/veh] | 25.37 | | | 27.06 | | | 59.23 | | | 62.46 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 34.55 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.682 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.40 | 59.40 | 59.40 | 59.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.869 | 3.015 | 2.662 | 2.039 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 720 | 577 | 457 | 469 |
| d_b, Bicycle Delay [s] | 28.66 | 35.44 | 41.69 | 41.03 |
| I_b,int, Bicycle LOS Score for Intersection | 2.352 | 2.571 | 2.652 | 1.913 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.634 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 50 | 167 | 661 | 56 | 45 | 14 | 2 | 65 | 11 | 267 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 50 | 167 | 661 | 56 | 45 | 14 | 2 | 65 | 11 | 267 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 14 | 47 | 186 | 16 | 13 | 4 | 1 | 18 | 3 | 75 |
| Total Analysis Volume [veh/h] | 2 | 837 | 56 | 188 | 743 | 63 | 51 | 16 | 2 | 73 | 12 | 300 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 35 | 35 | 12 | 50 | 50 | 25 | 25 |
| g / C, Green / Cycle | 0.44 | 0.44 | 0.15 | 0.63 | 0.63 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.25 | 0.10 | 0.22 | 0.22 | 0.09 | 0.24 |
| s, saturation flow rate [veh/h] | 1863 | 1653 | 1795 | 1885 | 1825 | 788 | 1587 |
| c, Capacity [veh/h] | 859 | 722 | 273 | 1181 | 1143 | 327 | 555 |
| d1, Uniform Delay [s] | 17.02 | 17.05 | 32.18 | 7.14 | 7.15 | 20.20 | 24.53 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.23 | 0.31 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.54 | 3.43 | 3.09 | 0.80 | 0.84 | 0.68 | 4.40 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.55 | 0.58 | 0.69 | 0.35 | 0.35 | 0.21 | 0.69 |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 19.56 | 20.47 | 35.27 | 7.94 | 7.98 | 20.88 | 28.93 |
| Lane Group LOS | B | C | D | A | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.56 | 6.00 | 3.54 | 2.97 | 2.90 | 1.01 | 6.91 |
| 50th-Percentile Queue Length [ft/ln] | 164.05 | 149.94 | 88.60 | 74.20 | 72.49 | 25.18 | 172.87 |
| 95th-Percentile Queue Length [veh/ln] | 10.76 | 10.01 | 6.38 | 5.34 | 5.22 | 1.81 | 11.23 |
| 95th-Percentile Queue Length [ft/ln] | 269.07 | 250.35 | 159.48 | 133.56 | 130.48 | 45.33 | 280.68 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.56 | 19.96 | 20.47 | 35.27 | 7.96 | 7.98 | 20.88 | 20.88 | 20.88 | 28.93 | 28.93 | 28.93 |
| Movement LOS | B | B | C | D | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 19.99 | | | 13.13 | | | 20.88 | | | 28.93 | | |
| Approach LOS | B | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 18.58 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.634 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.79 | 29.79 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.862 | 1.770 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.71 | 8.63 | 17.43 | 17.40 |
| I_b,int, Bicycle LOS Score for Intersection | 2.298 | 2.380 | 1.673 | 2.195 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.394 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 460 | 380 | 526 | 369 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 380 | 526 | 369 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 98 | 136 | 95 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 392 | 542 | 380 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 76 | 76 | 76 | 76 | 76 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 21 | 58 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.27 | 0.76 | 0.49 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.22 | 0.29 | 0.27 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1791 |
| c, Capacity [veh/h] | 277 | 247 | 489 | 1433 | 883 |
| d1, Uniform Delay [s] | 29.54 | 0.00 | 25.81 | 3.13 | 13.46 |
| k, delay calibration | 0.08 | 0.08 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.08 | 0.00 | 3.12 | 0.16 | 2.47 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.00 | 0.80 | 0.38 | 0.55 |
| d, Delay for Lane Group [s/veh] | 30.61 | 0.00 | 28.93 | 3.29 | 15.93 |
| Lane Group LOS | C | A | C | A | B |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.38 | 0.00 | 6.58 | 1.58 | 5.68 |
| 50th-Percentile Queue Length [ft/ln] | 59.43 | 0.00 | 164.61 | 39.61 | 142.06 |
| 95th-Percentile Queue Length [veh/ln] | 4.28 | 0.00 | 10.79 | 2.85 | 9.59 |
| 95th-Percentile Queue Length [ft/ln] | 106.97 | 0.00 | 269.82 | 71.30 | 239.79 |

**Movement, Approach, & Intersection Results**

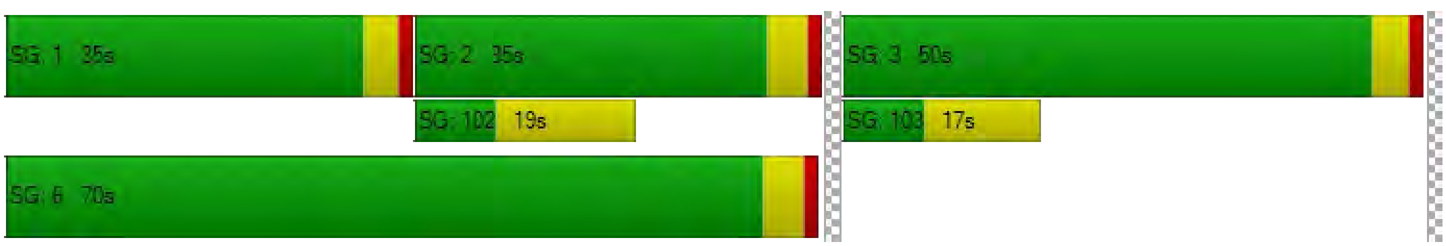
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.61 | 0.00 | 28.93 | 3.29 | 15.93 | 15.93 |
| Movement LOS | C | A | C | A | B | B |
| d_A, Approach Delay [s/veh] | 30.61 | | 14.05 | | 15.93 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 16.13 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 2.394 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 27.85 | 27.85 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.886 | 2.780 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1203 | 1718 | 799 |
| d_b, Bicycle Delay [s] | 6.07 | 0.76 | 13.79 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.101 | 2.363 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.366 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 67 | 0 | 168 | 2 | 662 | 107 | 254 | 561 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 67 | 0 | 160 | 2 | 662 | 50 | 254 | 561 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 18 | 0 | 42 | 1 | 174 | 13 | 67 | 148 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 71 | 0 | 168 | 2 | 697 | 53 | 267 | 591 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 82 | 82 | 92 | 88 | 88 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.18 | 0.79 | 0.69 | 0.69 | 0.77 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.07 | 0.11 | 0.00 | 0.20 | 0.03 | 0.31 | 0.16 | 0.16 |
| s, saturation flow rate [veh/h] | 1419 | 1710 | 975 | 1524 | 860 | 3569 | 1564 | 862 | 1873 | 1870 |
| c, Capacity [veh/h] | 158 | 307 | 235 | 274 | 722 | 2447 | 1072 | 689 | 1367 | 1365 |
| d1, Uniform Delay [s] | 53.38 | 42.04 | 47.82 | 45.15 | 3.48 | 7.37 | 6.13 | 4.49 | 5.21 | 5.21 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.69 | 0.34 | 0.68 | 2.12 | 0.00 | 0.29 | 0.09 | 1.64 | 0.36 | 0.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.22 | 0.30 | 0.61 | 0.00 | 0.28 | 0.05 | 0.39 | 0.22 | 0.22 |
| d, Delay for Lane Group [s/veh] | 54.07 | 42.38 | 48.50 | 47.27 | 3.49 | 7.66 | 6.22 | 6.13 | 5.57 | 5.57 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | No | Yes | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.79 | 2.00 | 4.76 | 0.01 | 3.28 | 0.43 | 1.79 | 2.21 | 2.21 |
| 50th-Percentile Queue Length [ft/ln] | 27.19 | 44.85 | 50.01 | 118.98 | 0.24 | 82.00 | 10.71 | 44.79 | 55.33 | 55.27 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 3.23 | 3.60 | 8.34 | 0.02 | 5.90 | 0.77 | 3.22 | 3.98 | 3.98 |
| 95th-Percentile Queue Length [ft/ln] | 48.93 | 80.73 | 90.02 | 208.42 | 0.44 | 147.60 | 19.28 | 80.62 | 99.59 | 99.49 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.07 | 42.38 | 42.38 | 48.50 | 48.50 | 47.27 | 3.49 | 7.66 | 6.22 | 6.13 | 5.57 | 5.57 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 46.43 | | | 47.64 | | | 7.55 | | | 5.74 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.72 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.366 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.980 | 2.438 | 2.934 | 2.767 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 1.967 | 2.227 | 2.269 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 94.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.043 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3307 | 20 | 359 | 970 | 68 | 1803 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3307 | 20 | 359 | 970 | 68 | 1803 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 844 | 5 | 92 | 247 | 17 | 460 |
| Total Analysis Volume [veh/h] | 3374 | 20 | 366 | 990 | 69 | 1840 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 152 | 152 | 152 | 152 | 152 | 152 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 34 | 125 | 15 | 53 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.22 | 0.82 | 0.10 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.66 | 0.01 | 0.11 | 0.20 | 0.02 | 0.43 |
| s, saturation flow rate [veh/h] | 5077 | 1399 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2999 | 826 | 751 | 4137 | 321 | 1470 |
| d1, Uniform Delay [s] | 31.18 | 12.94 | 51.69 | 2.94 | 63.25 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 57.57 | 0.01 | 0.18 | 0.04 | 0.12 | 113.82 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.12 | 0.02 | 0.49 | 0.24 | 0.21 | 1.25 |
| d, Delay for Lane Group [s/veh] | 88.74 | 12.96 | 51.87 | 2.97 | 63.37 | 163.57 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 48.44 | 0.27 | 5.95 | 1.42 | 1.24 | 33.89 |
| 50th-Percentile Queue Length [ft/ln] | 1211.03 | 6.82 | 148.74 | 35.53 | 31.00 | 847.26 |
| 95th-Percentile Queue Length [veh/ln] | 65.94 | 0.49 | 9.95 | 2.56 | 2.23 | 49.83 |
| 95th-Percentile Queue Length [ft/ln] | 1648.39 | 12.27 | 248.75 | 63.95 | 55.80 | 1245.64 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

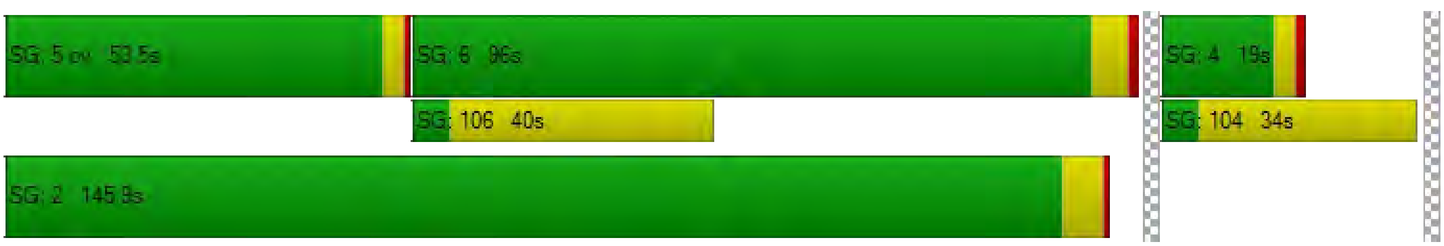
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 88.74 | 12.96 | 51.87 | 2.97 | 63.37 | 163.57 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 88.29 | | 16.17 | | 159.95 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 94.15 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.043 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 67.42 | 0.00 | 67.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.757 | 0.000 | 3.078 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 552 | 578 | 197 |
| d_b, Bicycle Delay [s] | 39.94 | 38.52 | 61.89 |
| I_b,int, Bicycle LOS Score for Intersection | 3.426 | 2.305 | 1.670 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 142.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.948 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 88 | 95 | 1112 | 159 | 204 | 133 | 76 | 1899 | 118 | 559 | 704 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 88 | 95 | 1112 | 159 | 204 | 63 | 76 | 1899 | 73 | 559 | 704 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 24 | 287 | 41 | 53 | 16 | 20 | 489 | 19 | 144 | 181 | 9 |
| Total Analysis Volume [veh/h] | 91 | 98 | 1146 | 164 | 210 | 65 | 78 | 1958 | 75 | 576 | 726 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 7 | 13 | 39 | 9 | 16 | 16 | 67 | 40 | 40 | 67 | 57 | 57 |
| g / C, Green / Cycle | 0.07 | 0.13 | 0.38 | 0.09 | 0.16 | 0.16 | 0.64 | 0.38 | 0.38 | 0.64 | 0.55 | 0.55 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.07 | 0.28 | 0.09 | 0.13 | 0.04 | 0.07 | 0.63 | 0.08 | 0.39 | 0.15 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4142 | 1748 | 1606 | 1503 | 1070 | 3084 | 889 | 1494 | 4959 | 1615 |
| c, Capacity [veh/h] | 119 | 186 | 1566 | 151 | 253 | 237 | 699 | 1186 | 342 | 926 | 2728 | 889 |
| d1, Uniform Delay [s] | 47.76 | 42.65 | 27.74 | 47.62 | 42.55 | 38.56 | 7.53 | 32.08 | 21.57 | 23.80 | 12.36 | 10.77 |
| k, delay calibration | 0.11 | 0.11 | 0.15 | 0.35 | 0.18 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.72 | 2.30 | 0.93 | 86.28 | 10.97 | 0.62 | 0.07 | 293.84 | 0.32 | 0.69 | 0.05 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.76 | 0.53 | 0.73 | 1.09 | 0.83 | 0.27 | 0.11 | 1.65 | 0.22 | 0.62 | 0.27 | 0.04 |
| d, Delay for Lane Group [s/veh] | 57.48 | 44.95 | 28.67 | 133.90 | 53.52 | 39.18 | 7.60 | 325.92 | 21.88 | 24.49 | 12.41 | 10.79 |
| Lane Group LOS | E | D | C | F | D | D | A | F | C | C | B | B |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 2.59 | 1.21 | 7.85 | 7.58 | 3.03 | 1.53 | 0.32 | 41.84 | 1.25 | 2.72 | 2.88 | 0.36 |
| 50th-Percentile Queue Length [ft/ln] | 64.75 | 30.27 | 196.14 | 189.47 | 75.78 | 38.13 | 7.94 | 1046.02 | 31.29 | 68.02 | 71.98 | 8.89 |
| 95th-Percentile Queue Length [veh/ln] | 4.66 | 2.18 | 12.44 | 12.46 | 5.46 | 2.75 | 0.57 | 67.46 | 2.25 | 4.90 | 5.18 | 0.64 |
| 95th-Percentile Queue Length [ft/ln] | 116.56 | 54.48 | 310.98 | 311.43 | 136.41 | 68.63 | 14.30 | 1686.62 | 56.33 | 122.44 | 129.57 | 15.99 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

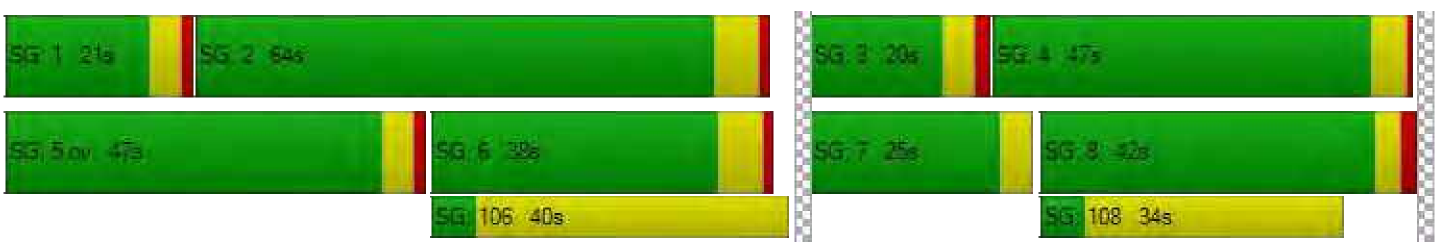
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 57.48 | 44.95 | 28.67 | 133.90 | 53.52 | 39.18 | 7.60 | 325.92 | 21.88 | 24.49 | 12.41 | 10.79 |
| Movement LOS | E | D | C | F | D | D | A | F | C | C | B | B |
| d_A, Approach Delay [s/veh] | 31.83 | | | 81.43 | | | 303.35 | | | 17.57 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 142.14 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 0.948 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 43.44 | 0.00 | 43.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.435 | 0.000 | 3.220 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 818 | 720 | 615 | 1114 |
| d_b, Bicycle Delay [s] | 18.18 | 21.34 | 24.97 | 10.21 |
| I_b,int, Bicycle LOS Score for Intersection | 2.661 | 1.980 | 2.745 | 2.295 |
| Bicycle LOS | B | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 155.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.209 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 43 | 1065 | 7 | 138 | 707 | 54 | 83 | 17 | 35 | 193 | 18 | 99 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 1065 | 7 | 138 | 707 | 54 | 83 | 17 | 35 | 193 | 18 | 99 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 303 | 2 | 39 | 201 | 15 | 24 | 5 | 10 | 55 | 5 | 28 |
| Total Analysis Volume [veh/h] | 49 | 1210 | 8 | 157 | 803 | 61 | 94 | 19 | 40 | 219 | 20 | 113 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 83 | 83 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.64 | 0.64 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.74 | 0.74 | 0.32 | 0.53 | 0.53 | 0.30 | 0.55 |
| s, saturation flow rate [veh/h] | 705 | 826 | 824 | 491 | 826 | 799 | 510 | 643 |
| c, Capacity [veh/h] | 303 | 464 | 463 | 163 | 527 | 509 | 173 | 196 |
| d1, Uniform Delay [s] | 18.65 | 28.44 | 28.44 | 41.33 | 18.16 | 18.34 | 51.38 | 46.93 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.25 | 155.54 | 155.92 | 61.88 | 14.14 | 15.16 | 42.95 | 378.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.16 | 1.31 | 1.31 | 0.96 | 0.83 | 0.84 | 0.88 | 1.80 |
| d, Delay for Lane Group [s/veh] | 18.90 | 183.98 | 184.36 | 103.21 | 32.30 | 33.50 | 94.34 | 425.46 |
| Lane Group LOS | B | F | F | F | C | C | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.41 | 33.28 | 33.24 | 4.42 | 11.55 | 11.49 | 7.18 | 26.87 |
| 50th-Percentile Queue Length [ft/ln] | 10.31 | 832.12 | 831.08 | 110.58 | 288.74 | 287.15 | 179.57 | 671.65 |
| 95th-Percentile Queue Length [veh/ln] | 0.74 | 51.39 | 51.35 | 7.87 | 17.12 | 17.04 | 11.58 | 44.57 |
| 95th-Percentile Queue Length [ft/ln] | 18.55 | 1284.87 | 1283.82 | 196.81 | 428.08 | 426.10 | 289.46 | 1114.25 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 18.90 | 184.17 | 184.36 | 103.21 | 32.84 | 33.50 | 94.34 | 94.34 | 94.34 | 425.46 | 425.46 | 425.46 |
| Movement LOS | B | F | F | F | C | C | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | | 177.78 | | | 43.70 | | | 94.34 | | | 425.46 | |
| Approach LOS | | F | | | D | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 155.41 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.209 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.41 | 54.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.322 | 3.002 | 1.893 | 2.232 |
| Crosswalk LOS | C | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1124 | 1078 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.47 | 13.93 | 36.42 | 36.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.605 | 2.402 | 1.812 | 2.140 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 39.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.979 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 44 | 933 | 1106 | 24 | 32 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 44 | 933 | 1106 | 24 | 32 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 251 | 297 | 6 | 9 | 31 |
| Total Analysis Volume [veh/h] | 47 | 1003 | 1189 | 26 | 34 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 6 | 103 | 95 | 95 | 20 | 20 |
| g / C, Green / Cycle | 0.04 | 0.79 | 0.73 | 0.73 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.64 | 0.73 | 0.74 | 0.03 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 824 | 1021 | 897 |
| c, Capacity [veh/h] | 54 | 1252 | 606 | 600 | 155 | 136 |
| d1, Uniform Delay [s] | 61.78 | 7.55 | 17.62 | 17.62 | 48.30 | 53.91 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.50 | 0.04 | 0.13 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 14.15 | 5.46 | 37.36 | 39.79 | 0.26 | 20.99 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.80 | 1.00 | 1.01 | 0.22 | 0.90 |
| d, Delay for Lane Group [s/veh] | 75.93 | 13.01 | 54.98 | 57.41 | 48.56 | 74.89 |
| Lane Group LOS | E | B | F | F | D | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.74 | 6.60 | 20.71 | 20.93 | 0.99 | 4.73 |
| 50th-Percentile Queue Length [ft/ln] | 43.40 | 164.99 | 517.76 | 523.33 | 24.65 | 118.21 |
| 95th-Percentile Queue Length [veh/ln] | 3.12 | 10.81 | 28.25 | 28.74 | 1.77 | 8.29 |
| 95th-Percentile Queue Length [ft/ln] | 78.12 | 270.32 | 706.35 | 718.56 | 44.36 | 207.37 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 75.93 | 13.01 | 56.17 | 57.41 | 48.56 | 74.89 |
| Movement LOS | E | B | E | E | D | E |
| d_A, Approach Delay [s/veh] | 15.83 | | 56.19 | | 69.19 | |
| Approach LOS | B | | E | | E | |
| d_I, Intersection Delay [s/veh] | 39.54 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.979 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.933 | 2.882 | 2.033 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.426 | 2.562 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 147.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.291 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 352 | 57 | 1065 | 274 | 45 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 352 | 57 | 1065 | 274 | 45 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 95 | 15 | 286 | 74 | 12 |
| Total Analysis Volume [veh/h] | 1075 | 378 | 61 | 1145 | 295 | 48 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 0.70 | 0.09 | 0.89 | 0.27 | 0.28 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 601 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 105 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 70.86 | 43.45 | 82.54 | 291.72 | 296.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 1.08 | 0.97 | 1.16 | 1.56 | 1.57 |
| d, Delay for Lane Group [s/veh] | 158.87 | 92.53 | 101.91 | 97.54 | 345.28 | 349.74 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 15.74 | 2.73 | 22.03 | 12.92 | 12.11 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 393.45 | 68.17 | 550.82 | 322.92 | 302.78 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 23.59 | 4.91 | 33.43 | 22.13 | 20.95 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 589.86 | 122.71 | 835.68 | 553.32 | 523.64 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 92.53 | 101.91 | 97.54 | 347.07 | 349.74 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 141.61 | | 97.76 | | 347.43 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 147.51 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.291 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.212 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 2.758 | 2.555 | 2.126 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 133.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.222 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1310 | 138 | 78 | 1171 | 26 | 27 | 170 | 206 | 160 | 255 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1310 | 138 | 78 | 1171 | 26 | 27 | 170 | 31 | 160 | 255 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 360 | 38 | 21 | 322 | 7 | 7 | 47 | 9 | 44 | 70 | 3 |
| Total Analysis Volume [veh/h] | 295 | 1440 | 152 | 86 | 1287 | 29 | 30 | 187 | 34 | 176 | 280 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 64 | 64 | 8 | 59 | 59 | 27 | 27 | 27 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.49 | 0.49 | 0.06 | 0.45 | 0.45 | 0.21 | 0.21 | 0.21 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.43 | 0.43 | 0.09 | 0.47 | 0.47 | 0.02 | 0.19 | 0.02 | 0.05 | 0.21 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1239 | 952 | 1853 | 959 | 1810 | 965 | 1535 | 3409 | 1303 | 1414 |
| c, Capacity [veh/h] | 127 | 1223 | 611 | 59 | 842 | 436 | 377 | 201 | 320 | 414 | 158 | 172 |
| d1, Uniform Delay [s] | 58.48 | 29.18 | 29.29 | 60.98 | 35.45 | 35.45 | 41.39 | 50.49 | 41.59 | 52.90 | 57.10 | 50.55 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.14 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 615.74 | 8.40 | 15.70 | 221.06 | 38.54 | 51.50 | 0.03 | 20.14 | 0.05 | 0.26 | 370.87 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 2.32 | 0.87 | 0.87 | 1.46 | 1.03 | 1.03 | 0.08 | 0.93 | 0.11 | 0.43 | 1.77 | 0.07 |
| d, Delay for Lane Group [s/veh] | 674.22 | 37.57 | 44.99 | 282.04 | 73.99 | 86.96 | 41.43 | 70.63 | 41.64 | 53.16 | 427.97 | 50.61 |
| Lane Group LOS | F | D | D | F | F | F | D | E | D | D | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 25.92 | 15.30 | 16.65 | 5.57 | 17.68 | 19.88 | 0.79 | 7.08 | 0.90 | 2.69 | 21.49 | 0.35 |
| 50th-Percentile Queue Length [ft/ln] | 648.06 | 382.54 | 416.30 | 139.19 | 441.99 | 496.91 | 19.68 | 177.12 | 22.43 | 67.21 | 537.17 | 8.78 |
| 95th-Percentile Queue Length [veh/ln] | 41.88 | 21.72 | 23.34 | 10.02 | 25.09 | 27.82 | 1.42 | 11.45 | 1.61 | 4.84 | 34.79 | 0.63 |
| 95th-Percentile Queue Length [ft/ln] | 1046.89 | 542.92 | 583.61 | 250.54 | 627.17 | 695.61 | 35.42 | 286.25 | 40.37 | 120.98 | 869.67 | 15.81 |

**Movement, Approach, & Intersection Results**

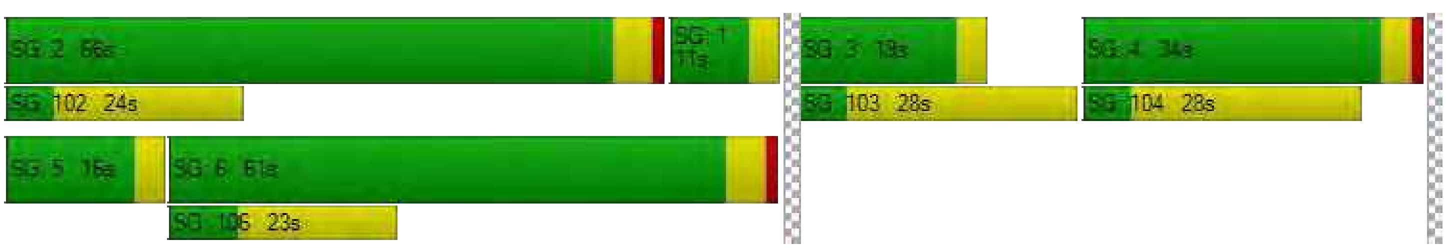
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 674.22 | 39.53 | 44.99 | 282.04 | 78.23 | 86.96 | 41.43 | 70.63 | 41.64 | 53.16 | 427.97 | 50.61 |
| Movement LOS | F | D | D | F | F | F | D | E | D | D | F | D |
| d_A, Approach Delay [s/veh] | 139.20 | | | 90.91 | | | 63.21 | | | 277.34 | | |
| Approach LOS | F | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 133.68 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.222 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.274 | 2.953 | 2.649 | 2.688 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 939 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.53 | 50.13 |
| I_b,int, Bicycle LOS Score for Intersection | 2.597 | 2.331 | 2.263 | 2.406 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 113.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.233 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 1201 | 678 | 100 | 241 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 20 | 1201 | 678 | 0 | 241 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 310 | 175 | 0 | 62 | 0 |
| Total Analysis Volume [veh/h] | 21 | 1238 | 699 | 0 | 248 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 67 | 67 | 67 | 67 | 67 | 67 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 1 | 36 | 31 | 31 | 21 | 21 |
| g / C, Green / Cycle | 0.02 | 0.54 | 0.47 | 0.47 | 0.31 | 0.31 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.74 | 0.42 | 0.00 | 0.29 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1615 | 850 | 1596 |
| c, Capacity [veh/h] | 36 | 906 | 788 | 755 | 268 | 503 |
| d1, Uniform Delay [s] | 32.48 | 15.37 | 16.18 | 0.00 | 22.12 | 0.00 |
| k, delay calibration | 0.04 | 0.24 | 0.15 | 0.15 | 0.05 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.68 | 168.42 | 5.05 | 0.00 | 6.86 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.59 | 1.37 | 0.89 | 0.00 | 0.93 | 0.00 |
| d, Delay for Lane Group [s/veh] | 38.16 | 183.79 | 21.23 | 0.00 | 28.98 | 0.00 |
| Lane Group LOS | D | F | C | A | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.38 | 26.73 | 4.58 | 0.00 | 3.95 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 9.52 | 668.35 | 114.49 | 0.00 | 98.69 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 0.69 | 42.87 | 8.09 | 0.00 | 7.11 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 17.13 | 1071.82 | 202.23 | 0.00 | 177.65 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 38.16 | 183.79 | 21.23 | 0.00 | 28.98 | 0.00 |
| Movement LOS | D | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 181.36 | | 21.23 | | 28.98 | |
| Approach LOS | F | | C | | C | |
| d_I, Intersection Delay [s/veh] | 113.49 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.233 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 23.25 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.166 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1080 | 1080 | 1080 |
| d_b, Bicycle Delay [s] | 7.10 | 7.08 | 7.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.598 | 2.320 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 167.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.166 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1029 | 4 | 29 | 522 | 18 | 132 | 1 | 31 | 21 | 6 | 17 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1029 | 4 | 29 | 522 | 18 | 132 | 1 | 13 | 21 | 6 | 17 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 286 | 1 | 8 | 145 | 5 | 37 | 0 | 4 | 6 | 2 | 5 |
| Total Analysis Volume [veh/h] | 10 | 1143 | 4 | 32 | 580 | 20 | 147 | 1 | 14 | 23 | 7 | 19 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 3 | 102 | 10 | 10 | 10 | 10 | 10 |
| g / C, Green / Cycle | 0.01 | 0.70 | 0.70 | 0.02 | 0.72 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.90 | 0.90 | 0.02 | 1.01 | 0.04 | 0.04 | 0.03 | 0.01 | 0.05 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1811 | 441 | 1810 | 559 |
| c, Capacity [veh/h] | 11 | 484 | 414 | 44 | 426 | 130 | 134 | 33 | 130 | 40 |
| d1, Uniform Delay [s] | 70.29 | 21.08 | 21.08 | 68.92 | 20.09 | 63.56 | 63.56 | 62.74 | 62.05 | 64.24 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 100.20 | 139.57 | 142.06 | 21.12 | 197.86 | 3.75 | 3.62 | 8.58 | 0.65 | 16.25 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.90 | 1.28 | 1.28 | 0.74 | 1.41 | 0.56 | 0.56 | 0.43 | 0.18 | 0.65 |
| d, Delay for Lane Group [s/veh] | 170.49 | 160.65 | 163.14 | 90.04 | 217.95 | 67.31 | 67.18 | 71.32 | 62.69 | 80.49 |
| Lane Group LOS | F | F | F | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.67 | 33.44 | 28.90 | 1.42 | 36.10 | 2.75 | 2.85 | 0.58 | 0.81 | 1.11 |
| 50th-Percentile Queue Length [ft/ln] | 16.87 | 835.93 | 722.48 | 35.56 | 902.39 | 68.85 | 71.18 | 14.40 | 20.36 | 27.67 |
| 95th-Percentile Queue Length [veh/ln] | 1.21 | 51.46 | 45.11 | 2.56 | 58.18 | 4.96 | 5.12 | 1.04 | 1.47 | 1.99 |
| 95th-Percentile Queue Length [ft/ln] | 30.36 | 1286.57 | 1127.69 | 64.01 | 1454.44 | 123.94 | 128.12 | 25.91 | 36.64 | 49.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 170.49 | 161.79 | 163.14 | 90.04 | 217.95 | 217.95 | 67.24 | 67.18 | 71.32 | 62.69 | 80.49 | 80.49 |
| Movement LOS | F | F | F | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 161.87 | | | 211.47 | | | 67.59 | | | 72.14 | | |
| Approach LOS | F | | | F | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 167.71 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.166 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 60.37 | 60.37 | 60.37 | 60.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.517 | 2.737 | 2.196 | 1.985 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 282 | 282 | 423 | 423 |
| d_b, Bicycle Delay [s] | 52.44 | 52.59 | 44.14 | 44.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.514 | 2.602 | 1.857 | 1.640 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# Intersection Level Of Service Report
## Intersection 23: Willow Rd/Coleman Ave

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.610 |

### Intersection Setup

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 693 | 5 | 2 | 685 | 100 | 73 | 2 | 36 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 693 | 5 | 2 | 685 | 100 | 73 | 2 | 36 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 190 | 1 | 1 | 188 | 27 | 20 | 1 | 10 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 14 | 762 | 5 | 2 | 753 | 110 | 80 | 2 | 40 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 78 | 78 | 78 | 78 | 14 | 14 |
| g / C, Green / Cycle | 0.78 | 0.78 | 0.78 | 0.78 | 0.14 | 0.14 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.41 | 0.00 | 0.48 | 0.09 | 0.02 |
| s, saturation flow rate [veh/h] | 651 | 1851 | 712 | 1795 | 1407 | 1464 |
| c, Capacity [veh/h] | 424 | 1437 | 493 | 1394 | 259 | 265 |
| d1, Uniform Delay [s] | 10.75 | 4.27 | 8.40 | 4.82 | 39.90 | 37.39 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.14 | 1.43 | 0.01 | 2.08 | 1.33 | 0.17 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.53 | 0.00 | 0.62 | 0.47 | 0.10 |
| d, Delay for Lane Group [s/veh] | 10.90 | 5.70 | 8.41 | 6.89 | 41.23 | 37.56 |
| Lane Group LOS | B | A | A | A | D | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.16 | 5.20 | 0.02 | 6.31 | 2.88 | 0.59 |
| 50th-Percentile Queue Length [ft/ln] | 4.03 | 130.05 | 0.48 | 157.67 | 72.00 | 14.84 |
| 95th-Percentile Queue Length [veh/ln] | 0.29 | 8.94 | 0.03 | 10.43 | 5.18 | 1.07 |
| 95th-Percentile Queue Length [ft/ln] | 7.25 | 223.56 | 0.86 | 260.63 | 129.59 | 26.71 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.90 | 5.70 | 5.70 | 8.41 | 6.89 | 6.89 | 41.23 | 41.23 | 41.23 | 37.56 | 37.56 | 37.56 |
| Movement LOS | B | A | A | A | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 5.79 | | | 6.90 | | | 41.23 | | | 37.56 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 9.21 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |
| Intersection V/C | 0.610 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.59 | 39.59 | 39.59 | 39.59 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.398 | 2.616 | 1.861 | 1.737 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.85 | 4.84 | 29.77 | 29.77 |
| I_b,int, Bicycle LOS Score for Intersection | 2.848 | 2.987 | 1.761 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.514 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 63 | 54 | 657 | 10 | 14 | 31 | 5 | 75 | 50 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 63 | 54 | 657 | 10 | 14 | 31 | 5 | 75 | 50 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 16 | 14 | 171 | 3 | 4 | 8 | 1 | 20 | 13 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 66 | 56 | 684 | 10 | 15 | 32 | 5 | 78 | 52 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 79 | 79 | 79 | 79 | 13 | 13 | 13 | 13 |
| g / C, Green / Cycle | 0.79 | 0.79 | 0.79 | 0.79 | 0.13 | 0.13 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.41 | 0.08 | 0.37 | 0.01 | 0.02 | 0.06 | 0.07 |
| s, saturation flow rate [veh/h] | 762 | 1821 | 724 | 1854 | 1261 | 1814 | 1384 | 1671 |
| c, Capacity [veh/h] | 568 | 1439 | 528 | 1466 | 125 | 231 | 192 | 213 |
| d1, Uniform Delay [s] | 6.14 | 3.73 | 7.43 | 3.51 | 46.44 | 38.86 | 44.19 | 40.80 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 1.35 | 0.40 | 1.10 | 0.42 | 0.32 | 1.38 | 2.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.52 | 0.11 | 0.47 | 0.12 | 0.16 | 0.41 | 0.53 |
| d, Delay for Lane Group [s/veh] | 6.15 | 5.08 | 7.83 | 4.61 | 46.86 | 39.18 | 45.57 | 42.80 |
| Lane Group LOS | A | A | A | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.02 | 4.56 | 0.52 | 3.96 | 0.38 | 0.84 | 1.95 | 2.71 |
| 50th-Percentile Queue Length [ft/ln] | 0.60 | 114.07 | 13.05 | 98.88 | 9.46 | 20.89 | 48.76 | 67.72 |
| 95th-Percentile Queue Length [veh/ln] | 0.04 | 8.07 | 0.94 | 7.12 | 0.68 | 1.50 | 3.51 | 4.88 |
| 95th-Percentile Queue Length [ft/ln] | 1.08 | 201.65 | 23.50 | 177.98 | 17.02 | 37.60 | 87.77 | 121.89 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 6.15 | 5.08 | 5.08 | 7.83 | 4.61 | 4.61 | 46.86 | 39.18 | 39.18 | 45.57 | 42.80 | 42.80 |
| Movement LOS | A | A | A | A | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 5.08 | | | 4.85 | | | 41.39 | | | 43.94 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 10.30 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.514 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.467 | 2.464 | 1.981 | 2.118 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.800 | 2.797 | 1.645 | 1.873 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.569 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 198 | 203 | 372 | 86 | 277 | 101 | 439 | 184 | 277 | 416 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 198 | 83 | 372 | 86 | 0 | 101 | 439 | 184 | 277 | 416 | 14 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 52 | 22 | 98 | 23 | 0 | 27 | 116 | 48 | 73 | 109 | 4 |
| Total Analysis Volume [veh/h] | 32 | 208 | 87 | 392 | 91 | 0 | 106 | 462 | 194 | 292 | 438 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 15 | 15 | 15 | 15 | 15 | 15 | 14 | 14 | 14 | 14 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.20 | 0.20 | 0.20 | 0.18 | 0.18 | 0.18 | 0.18 | 0.20 | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.11 | 0.06 | 0.13 | 0.13 | 0.00 | 0.06 | 0.12 | 0.12 | 0.13 | 0.14 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1446 | 1785 | 1842 | 1584 | 1794 | 1892 | 1892 | 1541 | 1718 | 1882 | 1701 |
| c, Capacity [veh/h] | 334 | 354 | 271 | 351 | 363 | 312 | 323 | 341 | 341 | 277 | 346 | 379 | 342 |
| d1, Uniform Delay [s] | 26.40 | 29.14 | 27.40 | 29.25 | 29.25 | 0.00 | 28.08 | 30.09 | 30.10 | 30.11 | 29.18 | 29.17 | 29.19 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 1.56 | 0.67 | 2.28 | 2.21 | 0.00 | 0.59 | 2.35 | 2.37 | 3.19 | 2.56 | 2.32 | 2.61 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 0.59 | 0.32 | 0.68 | 0.68 | 0.00 | 0.33 | 0.68 | 0.68 | 0.70 | 0.70 | 0.70 | 0.70 |
| d, Delay for Lane Group [s/veh] | 26.52 | 30.70 | 28.08 | 31.52 | 31.46 | 0.00 | 28.67 | 32.45 | 32.48 | 33.29 | 31.73 | 31.49 | 31.80 |
| Lane Group LOS | C | C | C | C | C | A | C | C | C | C | C | C | C |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.49 | 3.61 | 1.41 | 4.28 | 4.41 | 0.00 | 1.74 | 4.15 | 4.16 | 3.55 | 4.31 | 4.69 | 4.29 |
| 50th-Percentile Queue Length [ft/ln] | 12.33 | 90.23 | 35.25 | 107.11 | 110.35 | 0.00 | 43.43 | 103.7 | 104.1 | 88.76 | 107.87 | 117.27 | 107.32 |
| 95th-Percentile Queue Length [veh/ln] | 0.89 | 6.50 | 2.54 | 7.68 | 7.86 | 0.00 | 3.13 | 7.47 | 7.50 | 6.39 | 7.72 | 8.24 | 7.69 |
| 95th-Percentile Queue Length [ft/ln] | 22.19 | 162.41 | 63.45 | 191.97 | 196.48 | 0.00 | 78.17 | 186.7 | 187.4 | 159.7 | 193.03 | 206.07 | 192.26 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 26.52 | 30.70 | 28.08 | 31.50 | 31.46 | 0.00 | 28.67 | 32.46 | 33.29 | 31.69 | 31.65 | 31.80 |
| Movement LOS | C | C | C | C | C | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 29.59 | | | 31.49 | | | 32.15 | | | 31.67 | | |
| Approach LOS | C | | | C | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 31.50 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.569 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 28.06 | 28.06 | 28.06 | 28.06 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.453 | 4.230 | 4.321 | 2.727 |
| Crosswalk LOS | B | D | E | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 733 | 1055 | 697 | 876 |
| d_b, Bicycle Delay [s] | 16.10 | 8.82 | 16.63 | 12.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.297 | 4.007 | 3.013 | 2.174 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.771 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1842 | 0 | 0 | 824 | 570 | 420 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1842 | 0 | 0 | 824 | 570 | 420 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 465 | 0 | 0 | 208 | 144 | 106 |
| Total Analysis Volume [veh/h] | 1861 | 0 | 0 | 832 | 576 | 424 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 58 | 58 | 17 | 17 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.53 | 0.24 | 0.17 | 0.16 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2549 | 2578 | 721 | 552 |
| d1, Uniform Delay [s] | 6.23 | 3.81 | 29.75 | 29.51 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.88 | 0.33 | 0.79 | 0.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.73 | 0.32 | 0.80 | 0.77 |
| d, Delay for Lane Group [s/veh] | 8.11 | 4.14 | 30.54 | 30.36 |
| Lane Group LOS | A | A | C | C |
| Critical Lane Group | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 6.87 | 1.81 | 5.14 | 3.76 |
| 50th-Percentile Queue Length [ft/ln] | 171.66 | 45.31 | 128.43 | 93.96 |
| 95th-Percentile Queue Length [veh/ln] | 11.16 | 3.26 | 8.85 | 6.77 |
| 95th-Percentile Queue Length [ft/ln] | 279.09 | 81.57 | 221.35 | 169.14 |

**Movement, Approach, & Intersection Results**

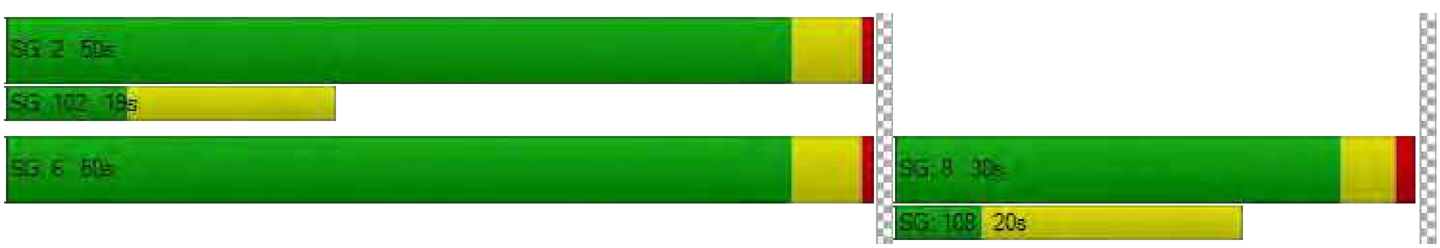
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.11 | 0.00 | 0.00 | 4.14 | 30.54 | 30.36 |
| Movement LOS | A | | | A | C | C |
| d_A, Approach Delay [s/veh] | 8.11 | | 4.14 | | 30.46 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 13.27 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.771 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.886 | 2.368 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.47 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 3.095 | 2.246 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 16.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.752 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 19 | 63 | 18 | 71 | 407 | 36 | 21 | 124 | 21 | 7 | 16 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 19 | 63 | 18 | 71 | 407 | 36 | 21 | 124 | 21 | 7 | 16 | 47 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 17 | 5 | 19 | 110 | 10 | 6 | 35 | 6 | 2 | 4 | 13 |
| Total Analysis Volume [veh/h] | 21 | 68 | 19 | 77 | 440 | 39 | 24 | 140 | 24 | 8 | 17 | 51 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 663 | 739 | 629 | 639 |
| Degree of Utilization, x | 0.16 | 0.75 | 0.30 | 0.12 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.58 | 6.98 | 1.25 | 0.40 |
| 95th-Percentile Queue Length [ft] | 14.48 | 174.47 | 31.29 | 10.07 |
| Approach Delay [s/veh] | 9.49 | 21.09 | 11.15 | 9.39 |
| Approach LOS | A | C | B | A |
| Intersection Delay [s/veh] | 16.77 | | | |
| Intersection LOS | C | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.839 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 179 | 40 | 1834 | 12 | 31 | 5 | 9 | 505 | 208 | 1822 | 119 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 179 | 40 | 1834 | 12 | 31 | 5 | 9 | 505 | 208 | 1822 | 119 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 47 | 10 | 478 | 3 | 8 | 1 | 2 | 132 | 54 | 474 | 31 | 4 |
| Total Analysis Volume [veh/h] | 186 | 42 | 1910 | 13 | 32 | 5 | 9 | 526 | 217 | 1898 | 124 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

### Phasing & Timing

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 38 | 128 | 10 | 10 | 26 | 26 | 26 | 76 | 76 |
| g / C, Green / Cycle | 0.24 | 0.80 | 0.06 | 0.06 | 0.16 | 0.16 | 0.16 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.46 | 0.02 | 0.01 | 0.15 | 0.15 | 0.14 | 0.37 | 0.08 |
| s, saturation flow rate [veh/h] | 1826 | 4190 | 1707 | 1588 | 1891 | 1724 | 1551 | 5150 | 1644 |
| c, Capacity [veh/h] | 436 | 3257 | 137 | 97 | 311 | 284 | 255 | 2450 | 782 |
| d1, Uniform Delay [s] | 52.96 | 7.29 | 71.59 | 71.56 | 65.54 | 65.54 | 64.69 | 34.82 | 24.02 |
| k, delay calibration | 0.10 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.88 | 0.78 | 0.27 | 0.45 | 3.84 | 4.18 | 3.08 | 2.47 | 0.50 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.59 | 0.20 | 0.23 | 0.90 | 0.90 | 0.85 | 0.77 | 0.18 |
| d, Delay for Lane Group [s/veh] | 53.85 | 8.07 | 71.86 | 72.00 | 69.38 | 69.72 | 67.77 | 37.29 | 24.52 |
| Lane Group LOS | D | A | E | E | E | E | E | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.18 | 8.44 | 1.10 | 0.89 | 11.58 | 10.58 | 8.83 | 20.99 | 3.20 |
| 50th-Percentile Queue Length [ft/ln] | 204.39 | 211.03 | 27.52 | 22.30 | 289.56 | 264.57 | 220.67 | 524.82 | 80.12 |
| 95th-Percentile Queue Length [veh/ln] | 12.86 | 13.21 | 1.98 | 1.61 | 17.16 | 15.92 | 13.70 | 28.51 | 5.77 |
| 95th-Percentile Queue Length [ft/ln] | 321.62 | 330.15 | 49.54 | 40.15 | 429.10 | 397.95 | 342.48 | 712.67 | 144.22 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

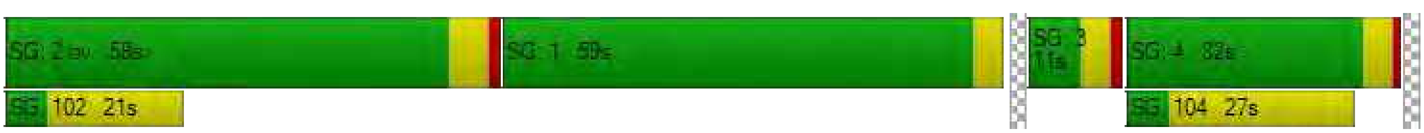
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 53.85 | 53.85 | 8.07 | 71.86 | 71.94 | 72.00 | 69.38 | 69.54 | 67.77 | 37.29 | 24.52 | 24.52 |
| Movement LOS | D | D | A | E | E | E | E | E | E | D | C | C |
| d_A, Approach Delay [s/veh] | 12.95 | | | 71.92 | | | 69.03 | | | 36.42 | | |
| Approach LOS | B | | | E | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 31.62 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.839 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.420 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 5.087 | 1.601 | 2.180 | 4.921 |
| Bicycle LOS | F | A | B | E |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 98.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.612 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 651 | 199 | 0 | 766 | 633 | 0 | 0 | 0 | 285 | 0 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 651 | 199 | 0 | 766 | 633 | 0 | 0 | 0 | 285 | 0 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 175 | 50 | 0 | 206 | 170 | 0 | 0 | 0 | 71 | 0 | 98 |
| Total Analysis Volume [veh/h] | 0 | 700 | 199 | 0 | 824 | 681 | 0 | 0 | 0 | 285 | 0 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 59 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 44 | 44 | 44 | | 27 | 27 |
| g / C, Green / Cycle | 0.56 | 0.56 | 0.56 | | 0.34 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.16 | 0.98 | | 0.08 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 694 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2836 | 2791 | 386 | | 1205 | 436 |
| d1, Uniform Delay [s] | 9.08 | 9.38 | 17.11 | | 18.75 | 24.88 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.21 | 0.27 | 353.91 | | 0.10 | 6.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.25 | 0.30 | 1.76 | | 0.24 | 0.90 |
| d, Delay for Lane Group [s/veh] | 9.29 | 9.65 | 371.02 | | 18.85 | 31.65 |
| Lane Group LOS | A | A | F | | B | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.94 | 2.36 | 43.84 | | 1.83 | 3.71 |
| 50th-Percentile Queue Length [ft/ln] | 48.47 | 58.99 | 1096.08 | | 45.71 | 92.71 |
| 95th-Percentile Queue Length [veh/ln] | 3.49 | 4.25 | 73.81 | | 3.29 | 6.67 |
| 95th-Percentile Queue Length [ft/ln] | 87.25 | 106.18 | 1845.17 | | 82.27 | 166.87 |

**Movement, Approach, & Intersection Results**

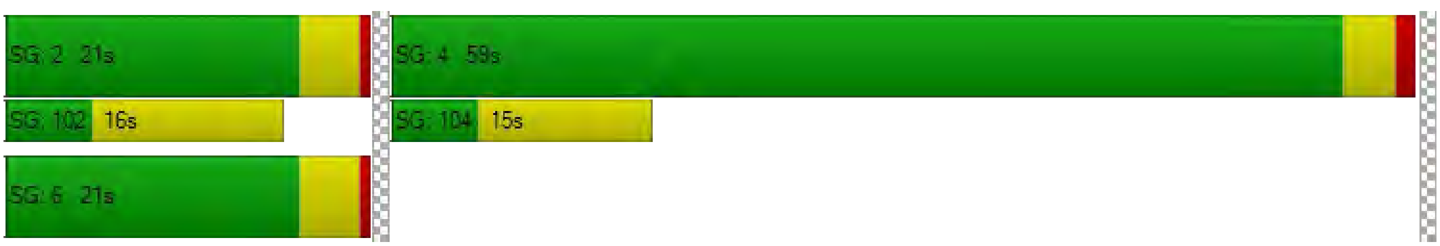
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 9.29 | 0.00 | 0.00 | 9.65 | 371.02 | 0.00 | 0.00 | 0.00 | 18.85 | 0.00 | 31.65 |
| Movement LOS | | A | | | A | F | | | | B | | C |
| d_A, Approach Delay [s/veh] | 9.29 | | | 173.17 | | | 0.00 | | | 26.25 | | |
| Approach LOS | A | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 98.88 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.612 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.856 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 1.945 | 2.387 | 4.132 | 1.560 |
| Bicycle LOS | A | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 83.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.073 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 827 | 122 | 0 | 1194 | 495 | 0 | 0 | 0 | 196 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 827 | 122 | 0 | 1194 | 495 | 0 | 0 | 0 | 196 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 211 | 31 | 0 | 305 | 124 | 0 | 0 | 0 | 49 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 844 | 124 | 0 | 1218 | 495 | 0 | 0 | 0 | 196 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.08 | 0.40 | | 0.06 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 920 | 476 | 920 | | 2102 | 1008 |
| d1, Uniform Delay [s] | 26.93 | 21.10 | 27.90 | | 6.83 | 14.87 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 15.33 | 1.33 | 153.14 | | 0.02 | 5.54 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.92 | 0.26 | 1.32 | | 0.09 | 0.95 |
| d, Delay for Lane Group [s/veh] | 42.26 | 22.43 | 181.03 | | 6.85 | 20.41 |
| Lane Group LOS | D | C | F | | A | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.22 | 1.87 | 18.60 | | 0.63 | 7.41 |
| 50th-Percentile Queue Length [ft/ln] | 155.44 | 46.79 | 464.95 | | 15.79 | 185.23 |
| 95th-Percentile Queue Length [veh/ln] | 10.31 | 3.37 | 29.70 | | 1.14 | 11.87 |
| 95th-Percentile Queue Length [ft/ln] | 257.68 | 84.22 | 742.49 | | 28.43 | 296.84 |

**Movement, Approach, & Intersection Results**

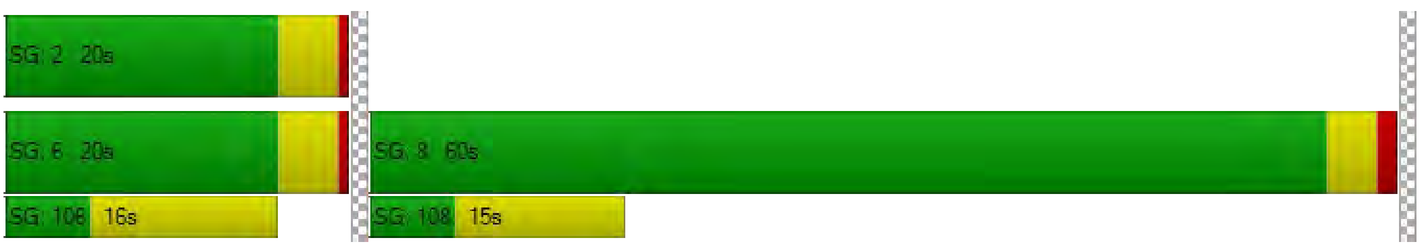
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 42.26 | 22.43 | 0.00 | 181.03 | 0.00 | 0.00 | 0.00 | 0.00 | 6.85 | 0.00 | 20.41 |
| Movement LOS | | D | C | | F | | | | | A | | C |
| d_A, Approach Delay [s/veh] | | 39.72 | | | 181.03 | | | 0.00 | | | 18.10 | |
| Approach LOS | | D | | | F | | | A | | | B | |
| d_I, Intersection Delay [s/veh] | 83.86 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.073 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.010 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.092 | 2.230 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 195: Bayfront Expy/Chilco St

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.808 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 234 | 245 | 2182 | 206 | 129 | 1011 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 234 | 245 | 2182 | 206 | 129 | 1011 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 63 | 66 | 587 | 55 | 35 | 272 |
| Total Analysis Volume [veh/h] | 252 | 263 | 2346 | 222 | 139 | 1087 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 56 | 56 | 56 | 56 | 56 | 56 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 11 | 11 | 27 | 27 | 35 | 35 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.48 | 0.48 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.17 | 0.46 | 0.14 | 0.38 | 0.22 |
| s, saturation flow rate [veh/h] | 3361 | 1542 | 5049 | 1579 | 365 | 4979 |
| c, Capacity [veh/h] | 664 | 305 | 2449 | 766 | 352 | 3124 |
| d1, Uniform Delay [s] | 19.68 | 21.85 | 14.00 | 8.70 | 11.83 | 5.02 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.13 | 2.86 | 1.26 | 0.08 | 0.27 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.38 | 0.86 | 0.96 | 0.29 | 0.40 | 0.35 |
| d, Delay for Lane Group [s/veh] | 19.81 | 24.71 | 15.26 | 8.78 | 12.10 | 5.04 |
| Lane Group LOS | B | C | B | A | B | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.33 | 3.30 | 7.87 | 1.35 | 0.48 | 1.38 |
| 50th-Percentile Queue Length [ft/ln] | 33.32 | 82.56 | 196.66 | 33.86 | 11.97 | 34.43 |
| 95th-Percentile Queue Length [veh/ln] | 2.40 | 5.94 | 12.47 | 2.44 | 0.86 | 2.48 |
| 95th-Percentile Queue Length [ft/ln] | 59.97 | 148.62 | 311.65 | 60.95 | 21.54 | 61.98 |

**Movement, Approach, & Intersection Results**

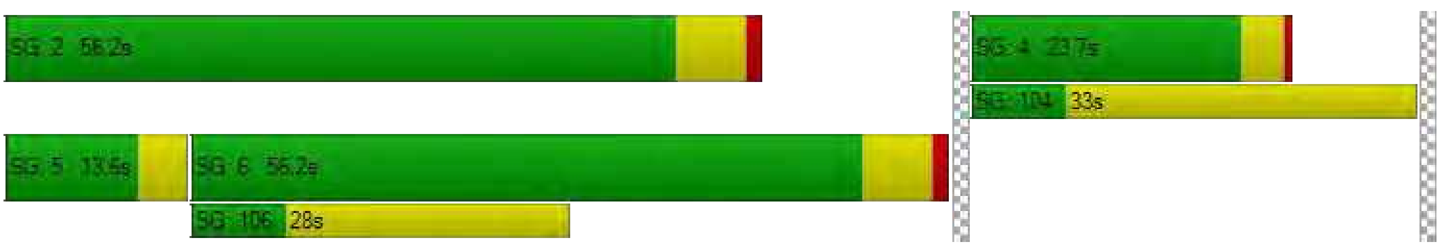
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.81 | 24.71 | 15.26 | 8.78 | 12.10 | 5.04 |
| Movement LOS | B | C | B | A | B | A |
| d_A, Approach Delay [s/veh] | 22.31 | | 14.70 | | 5.84 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 13.09 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.808 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 18.28 | 18.28 | 18.28 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.547 | 3.112 | 3.102 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 709 | 1773 | 1773 |
| d_b, Bicycle Delay [s] | 11.80 | 0.36 | 0.36 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.972 | 2.234 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.779 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 605 | 59 | 2220 | 125 | 38 | 1242 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 605 | 59 | 2220 | 125 | 38 | 1242 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 154 | 15 | 566 | 32 | 10 | 317 |
| Total Analysis Volume [veh/h] | 617 | 60 | 2265 | 128 | 39 | 1267 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 53 | 53 | 53 | 53 | 53 | 53 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 11 | 11 | 25 | 25 | 2 | 31 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.47 | 0.47 | 0.04 | 0.59 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.04 | 0.45 | 0.08 | 0.02 | 0.25 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 728 | 339 | 2377 | 753 | 75 | 2924 |
| d1, Uniform Delay [s] | 20.28 | 17.31 | 13.60 | 8.16 | 25.08 | 6.09 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.09 | 0.09 | 1.16 | 0.04 | 2.07 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.18 | 0.95 | 0.17 | 0.52 | 0.43 |
| d, Delay for Lane Group [s/veh] | 21.37 | 17.40 | 14.76 | 8.20 | 27.15 | 6.13 |
| Lane Group LOS | C | B | B | A | C | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.50 | 0.57 | 6.12 | 0.61 | 0.47 | 1.45 |
| 50th-Percentile Queue Length [ft/ln] | 87.60 | 14.30 | 153.06 | 15.13 | 11.67 | 36.26 |
| 95th-Percentile Queue Length [veh/ln] | 6.31 | 1.03 | 10.18 | 1.09 | 0.84 | 2.61 |
| 95th-Percentile Queue Length [ft/ln] | 157.68 | 25.74 | 254.51 | 27.24 | 21.00 | 65.27 |

**Movement, Approach, & Intersection Results**

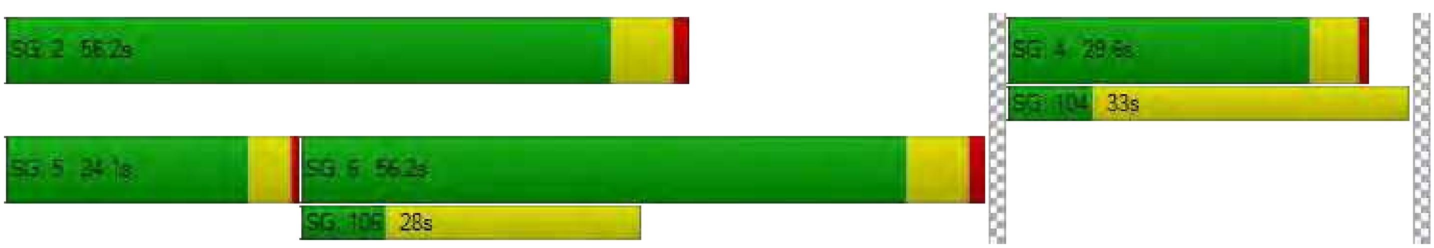
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.37 | 17.40 | 14.76 | 8.20 | 27.15 | 6.13 |
| Movement LOS | C | B | B | A | C | A |
| d_A, Approach Delay [s/veh] | 21.02 | | 14.41 | | 6.75 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 13.15 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.779 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 16.79 | 16.79 | 16.79 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.273 | 3.478 | 3.323 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 1876 | 1876 |
| d_b, Bicycle Delay [s] | 7.52 | 0.10 | 0.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.876 | 2.278 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bafront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.732 |

### Intersection Setup

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 237 | 67 | 2049 | 73 | 59 | 1017 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 237 | 67 | 2049 | 73 | 59 | 1017 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 60 | 17 | 523 | 19 | 15 | 259 |
| Total Analysis Volume [veh/h] | 242 | 68 | 2091 | 74 | 60 | 1038 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 45 | 45 | 45 | 45 | 45 | 45 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 7 | 7 | 22 | 22 | 28 | 28 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.49 | 0.49 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.11 | 0.46 | 0.05 | 0.08 | 0.23 |
| s, saturation flow rate [veh/h] | 1438 | 1364 | 4507 | 1406 | 743 | 4470 |
| c, Capacity [veh/h] | 214 | 203 | 2207 | 689 | 617 | 2814 |
| d1, Uniform Delay [s] | 18.18 | 18.19 | 10.85 | 6.14 | 8.42 | 3.99 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.89 | 2.04 | 1.13 | 0.03 | 0.03 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.74 | 0.75 | 0.95 | 0.11 | 0.10 | 0.37 |
| d, Delay for Lane Group [s/veh] | 20.06 | 20.23 | 11.98 | 6.17 | 8.45 | 4.02 |
| Lane Group LOS | C | C | B | A | A | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.48 | 1.42 | 4.70 | 0.27 | 0.05 | 0.78 |
| 50th-Percentile Queue Length [ft/ln] | 36.90 | 35.46 | 117.50 | 6.83 | 1.36 | 19.42 |
| 95th-Percentile Queue Length [veh/ln] | 2.66 | 2.55 | 8.26 | 0.49 | 0.10 | 1.40 |
| 95th-Percentile Queue Length [ft/ln] | 66.42 | 63.82 | 206.39 | 12.30 | 2.45 | 34.95 |

**Movement, Approach, & Intersection Results**

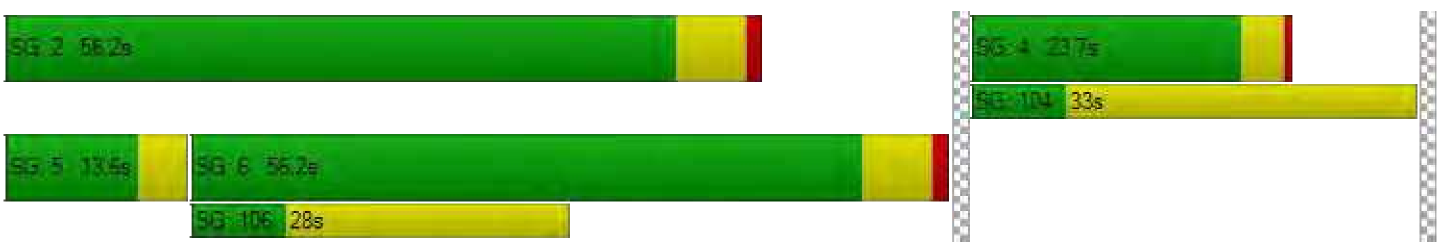
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.12 | 20.23 | 11.98 | 6.17 | 8.45 | 4.02 |
| Movement LOS | C | C | B | A | A | A |
| d_A, Approach Delay [s/veh] | 20.15 | | 11.78 | | 4.27 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 10.20 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.732 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 12.63 | 12.63 | 12.63 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.244 | 3.033 | 3.081 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 898 | 2244 | 2244 |
| d_b, Bicycle Delay [s] | 6.77 | 0.33 | 0.33 |
| I_b,int, Bicycle LOS Score for Intersection | 2.071 | 2.750 | 2.164 |
| Bicycle LOS | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 15.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.727 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 376 | 153 | 18 | 185 | 45 | 17 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 376 | 153 | 18 | 185 | 45 | 17 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 108 | 44 | 5 | 53 | 13 | 5 |
| Total Analysis Volume [veh/h] | 432 | 176 | 21 | 213 | 52 | 20 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 836 | 741 | 620 |
| Degree of Utilization, x | 0.73 | 0.32 | 0.12 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 6.51 | 1.36 | 0.39 |
| 95th-Percentile Queue Length [ft] | 162.87 | 33.89 | 9.80 |
| Approach Delay [s/veh] | 17.89 | 10.08 | 9.57 |
| Approach LOS | C | B | A |
| Intersection Delay [s/veh] | 15.23 | | |
| Intersection LOS | C | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 8.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.759 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 73 | 2101 | 29 | 60 | 1085 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 73 | 2101 | 29 | 60 | 1085 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 20 | 577 | 8 | 16 | 298 |
| Total Analysis Volume [veh/h] | 0 | 80 | 2309 | 32 | 66 | 1192 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| | | | | | | |
|---|---|---|---|---|---|---|
| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 41 | 41 | 41 | 41 | 41 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 22 | 22 | 28 | 28 |
| g / C, Green / Cycle | 0.07 | 0.54 | 0.54 | 0.69 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.51 | 0.02 | 0.19 | 0.27 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 343 | 4342 |
| c, Capacity [veh/h] | 90 | 2424 | 756 | 417 | 2987 |
| d1, Uniform Delay [s] | 19.05 | 9.11 | 4.56 | 8.76 | 2.78 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.29 | 1.13 | 0.01 | 0.06 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 0.95 | 0.04 | 0.16 | 0.40 |
| d, Delay for Lane Group [s/veh] | 29.34 | 10.25 | 4.57 | 8.83 | 2.81 |
| Lane Group LOS | C | B | A | A | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.92 | 4.11 | 0.08 | 0.06 | 0.40 |
| 50th-Percentile Queue Length [ft/ln] | 23.07 | 102.74 | 2.05 | 1.41 | 9.89 |
| 95th-Percentile Queue Length [veh/ln] | 1.66 | 7.40 | 0.15 | 0.10 | 0.71 |
| 95th-Percentile Queue Length [ft/ln] | 41.52 | 184.92 | 3.69 | 2.53 | 17.80 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

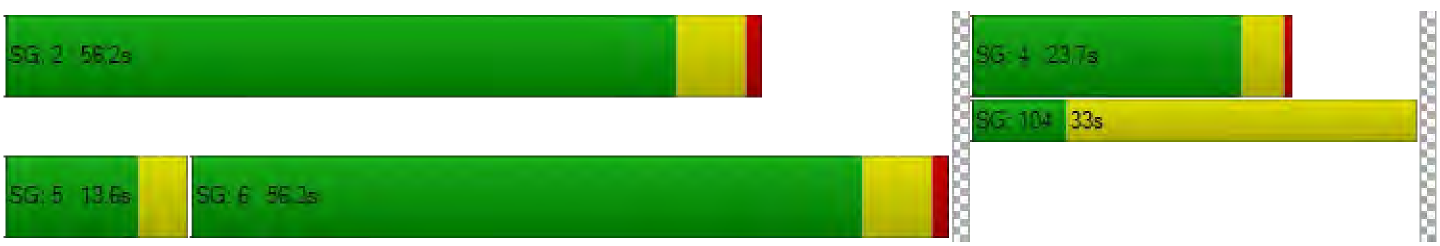
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 29.34 | 10.25 | 4.57 | 8.83 | 2.81 |
| Movement LOS | | C | B | A | A | A |
| d_A, Approach Delay [s/veh] | 29.34 | | 10.17 | | 3.13 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 8.18 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.759 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 27.35 | 11.15 | 11.15 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.846 | 3.040 | 3.056 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 967 | 2417 | 2417 |
| d_b, Bicycle Delay [s] | 5.52 | 0.90 | 0.90 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.847 | 2.252 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 32.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.916 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 237 | 51 | 22 | 327 | 36 | 221 | 37 | 240 | 33 | 18 | 109 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 21.40 | 1.50 | 20.00 | 11.80 | 3.80 | 0.00 | 3.60 | 50.00 | 2.60 | 2.50 | 50.00 | 1.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 237 | 51 | 22 | 327 | 36 | 221 | 37 | 240 | 33 | 18 | 109 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 67 | 14 | 6 | 93 | 10 | 63 | 11 | 68 | 9 | 5 | 31 |
| Total Analysis Volume [veh/h] | 15 | 269 | 58 | 25 | 372 | 41 | 251 | 42 | 273 | 38 | 20 | 124 |
| Pedestrian Volume [ped/h] | 38 | | | 0 | | | 80 | | | 0 | | |

**Intersection Settings**

**Lanes**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 393 | 439 | 413 | 451 | 415 | 488 | 411 |
| Degree of Utilization, x | 0.04 | 0.75 | 0.06 | 0.92 | 0.71 | 0.56 | 0.44 |

**Movement, Approach, & Intersection Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.12 | 6.12 | 0.19 | 10.31 | 5.34 | 3.39 | 2.22 |
| 95th-Percentile Queue Length [ft] | 2.97 | 153.10 | 4.82 | 257.72 | 133.45 | 84.74 | 55.46 |
| Approach Delay [s/veh] | 30.56 | | 49.96 | | 24.57 | | 18.58 |
| Approach LOS | D | | E | | C | | C |
| Intersection Delay [s/veh] | 32.47 | | | | | | |
| Intersection LOS | D | | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 28.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.666 |

**Intersection Setup**

| Name | | | | Chrysler Drive | | | | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | | | | Chrysler Drive | | | | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 490 | 14 | 194 | 84 | 3 | 128 | 205 | 53 | 13 | 6 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 490 | 14 | 194 | 84 | 3 | 128 | 205 | 53 | 13 | 6 | 114 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 123 | 4 | 49 | 21 | 1 | 32 | 51 | 13 | 3 | 2 | 29 |
| Total Analysis Volume [veh/h] | 2 | 490 | 14 | 194 | 84 | 3 | 128 | 205 | 53 | 13 | 6 | 114 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 7 | | | 0 | | | 0 | | | 8 | |
| v_di, Inbound Pedestrian Volume crossing m | | 8 | | | 0 | | | 0 | | | 7 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 0 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 4 | 0 | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | L | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 47 | 17 | 17 | 15 |
| g / C, Green / Cycle | 0.52 | 0.52 | 0.52 | 0.19 | 0.19 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.16 | 0.36 | 0.08 | 0.16 | 0.15 |
| s, saturation flow rate [veh/h] | 1709 | 1539 | 783 | 1609 | 1627 | 895 |
| c, Capacity [veh/h] | 923 | 794 | 472 | 300 | 303 | 147 |
| d1, Uniform Delay [s] | 12.48 | 12.49 | 21.06 | 32.39 | 35.44 | 36.96 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.79 | 0.98 | 5.45 | 0.96 | 6.65 | 17.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.29 | 0.30 | 0.60 | 0.43 | 0.85 | 0.91 |
| d, Delay for Lane Group [s/veh] | 13.27 | 13.47 | 26.51 | 33.35 | 42.09 | 54.81 |
| Lane Group LOS | B | B | C | C | D | D |
| Critical Lane Group | No | No | Yes | No | Yes | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.10 | 2.83 | 5.34 | 2.51 | 5.92 | 3.55 |
| 50th-Percentile Queue Length [ft/ln] | 77.43 | 70.79 | 133.55 | 62.76 | 147.98 | 88.64 |
| 95th-Percentile Queue Length [veh/ln] | 5.58 | 5.10 | 9.13 | 4.52 | 9.91 | 6.38 |
| 95th-Percentile Queue Length [ft/ln] | 139.38 | 127.43 | 228.31 | 112.97 | 247.73 | 159.56 |

**Movement, Approach, & Intersection Results**

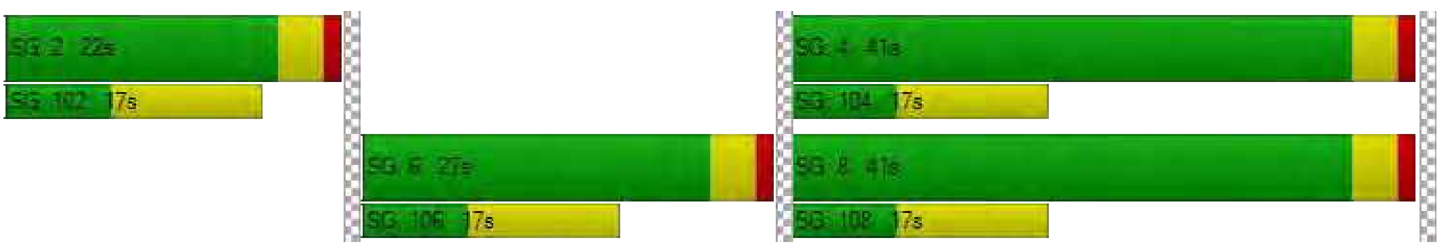
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.27 | 13.36 | 13.47 | 26.51 | 26.51 | 26.51 | 33.35 | 42.09 | 42.09 | 54.81 | 54.81 | 54.81 |
| Movement LOS | B | B | B | C | C | C | C | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 13.37 | | | 26.51 | | | 39.19 | | | 54.81 | | |
| Approach LOS | B | | | C | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 28.05 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.666 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.70 | 34.70 | 34.70 | 34.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.153 | 2.269 | 2.072 | 2.257 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 822 | 822 | 511 | 400 |
| d_b, Bicycle Delay [s] | 15.63 | 15.63 | 24.96 | 28.82 |
| I_b,int, Bicycle LOS Score for Intersection | 1.977 | 2.023 | 2.197 | 1.779 |
| Bicycle LOS | A | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 27.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.366 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 73 | 63 | 226 | 214 | 70 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 73 | 63 | 226 | 214 | 70 | 15 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 19 | 68 | 64 | 21 | 5 |
| Total Analysis Volume [veh/h] | 88 | 76 | 272 | 258 | 84 | 18 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.37 | 0.08 | 0.19 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 27.62 | 16.41 | 8.01 | 0.00 | 0.00 | 0.00 |
| Movement LOS | D | C | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.22 | 2.22 | 0.68 | 0.68 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 55.50 | 55.50 | 16.98 | 16.98 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 22.43 | | 4.11 | | 0.00 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.36 | | | | | |
| Intersection LOS | D | | | | | |

# Intersection Level Of Service Report
## Intersection 265: Adam Court/ Adams Drive

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.064 |

### Intersection Setup

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 209 | 35 | 15 | 30 | 48 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 209 | 35 | 15 | 30 | 48 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 65 | 11 | 5 | 9 | 15 |
| Total Analysis Volume [veh/h] | 37 | 258 | 43 | 19 | 37 | 59 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| d_M, Delay for Movement [s/veh] | 7.45 | 0.00 | 0.00 | 0.00 | 11.86 | 9.36 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.08 | 0.08 | 0.00 | 0.00 | 0.42 | 0.42 |
| 95th-Percentile Queue Length [ft/ln] | 1.89 | 1.89 | 0.00 | 0.00 | 10.60 | 10.60 |
| d_A, Approach Delay [s/veh] | 0.93 | | 0.00 | | 10.33 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 2.80 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 267: Willow Road (SR 114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | | | | | |
| Maximum Recall | | | | | | |
| Pedestrian Recall | | | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

**Lane Group Results**

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | | | | | |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.00 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.000 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 45.00 | 45.00 | 45.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.141 | 2.463 | 2.141 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 | 0 |
| d_b, Bicycle Delay [s] | 45.00 | 45.00 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 | 1.560 |
| Bicycle LOS | A | A | A |

**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 0 | | | 0 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 0 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | | | | | | | | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | | | | | | | | | | | |
| Maximum Recall | | | | | | | | | | | | |
| Pedestrian Recall | | | | | | | | | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

**Lane Group Results**

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | | | | | | | | | | | |
| d_A, Approach Delay [s/veh] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 0.00 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |
| Intersection V/C | 0.000 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 45.00 | 45.00 | 45.00 | 45.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.950 | 1.950 | 1.950 | 1.950 |
| Crosswalk LOS | A | A | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 | 0 | 0 |
| d_b, Bicycle Delay [s] | 45.00 | 45.00 | 45.00 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 | 1.560 | 1.560 |
| Bicycle LOS | A | A | A | A |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro | Scenario 16 Existing PM (2019 vols)
Report File: \...\Existing PM.pdf | 12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 959 | 1000 | 1176 | 296 | 3431 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 34 | 1326 | 7 | 55 | 815 | 193 | 15 | 5 | 388 | 256 | 6 | 4 | 3104 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 180 | 675 | 38 | 13 | 773 | 354 | 436 | 18 | 157 | 109 | 50 | 40 | 2843 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 50 | 167 | 661 | 56 | 45 | 14 | 2 | 65 | 11 | 267 | 2085 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 460 | 380 | 526 | 369 | 104 | 1976 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 67 | 0 | 168 | 2 | 662 | 107 | 254 | 561 | 2 | 1921 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3307 | 20 | 359 | 970 | 68 | 1803 | 6527 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 88 | 95 | 1112 | 159 | 204 | 133 | 76 | 1899 | 118 | 559 | 704 | 34 | 5181 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 43 | 1065 | 7 | 138 | 707 | 54 | 83 | 17 | 35 | 193 | 18 | 99 | 2459 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 44 | 933 | 1106 | 24 | 32 | 114 | 2253 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 352 | 57 | 1065 | 274 | 45 | 2793 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1310 | 138 | 78 | 1171 | 26 | 27 | 170 | 206 | 160 | 255 | 56 | 3865 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 20 | 1201 | 678 | 100 | 241 | 40 | 2280 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1029 | 4 | 29 | 522 | 18 | 132 | 1 | 31 | 21 | 6 | 17 | 1819 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 13 | 693 | 5 | 2 | 685 | 100 | 73 | 2 | 36 | 15 | 4 | 6 | 1634 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 63 | 54 | 657 | 10 | 14 | 31 | 5 | 75 | 50 | 58 | 1676 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 198 | 203 | 372 | 86 | 277 | 101 | 439 | 184 | 277 | 416 | 14 | 2597 |

| ID | Intersection Name | Northbound | Southbound | Westbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1842 | 824 | 570 | 420 | 3656 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 19 | 63 | 18 | 71 | 407 | 36 | 21 | 124 | 21 | 7 | 16 | 47 | 850 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 179 | 40 | 1834 | 12 | 31 | 5 | 9 | 505 | 208 | 1822 | 119 | 14 | 4778 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 651 | 199 | 766 | 633 | 285 | 352 | 2886 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 827 | 122 | 1194 | 495 | 196 | 859 | 3693 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 234 | 245 | 2182 | 206 | 129 | 1011 | 4007 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 605 | 59 | 2220 | 125 | 38 | 1242 | 4289 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 237 | 67 | 2049 | 73 | 59 | 1017 | 3502 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 376 | 153 | 18 | 185 | 45 | 17 | 794 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 73 | 2101 | 29 | 60 | 1085 | 3348 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 13 | 237 | 51 | 22 | 327 | 36 | 221 | 37 | 240 | 33 | 18 | 109 | 1344 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 2 | 490 | 14 | 194 | 84 | 3 | 128 | 205 | 53 | 13 | 6 | 114 | 1306 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 73 | 63 | 226 | 214 | 70 | 15 | 661 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 30 | 209 | 35 | 15 | 30 | 48 | 367 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR 114)/Park Street | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro — Scenario 16 Existing PM (2019 vols)
Report File: \...\Existing PM.pdf — 12/9/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 959 | 1000 | 1176 | 296 | 3431 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **959** | **1000** | **1176** | **296** | **3431** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 34 | 1326 | 7 | 55 | 815 | 193 | 15 | 5 | 388 | 256 | 6 | 4 | 3104 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **1326** | **7** | **55** | **815** | **193** | **15** | **5** | **388** | **256** | **6** | **4** | **3104** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 180 | 675 | 38 | 13 | 773 | 354 | 436 | 18 | 157 | 109 | 50 | 40 | 2843 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **180** | **675** | **38** | **13** | **773** | **354** | **436** | **18** | **157** | **109** | **50** | **40** | **2843** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 50 | 167 | 661 | 56 | 45 | 14 | 2 | 65 | 11 | 267 | 2085 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **50** | **167** | **661** | **56** | **45** | **14** | **2** | **65** | **11** | **267** | **2085** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 460 | 380 | 526 | 369 | 104 | 1976 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **460** | **380** | **526** | **369** | **104** | **1976** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 67 | 0 | 168 | 2 | 662 | 107 | 254 | 561 | 2 | 1921 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **67** | **0** | **168** | **2** | **662** | **107** | **254** | **561** | **2** | **1921** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3307 | 20 | 359 | 970 | 68 | 1803 | 6527 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3307** | **20** | **359** | **970** | **68** | **1803** | **6527** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 88 | 95 | 1112 | 159 | 204 | 133 | 76 | 1899 | 118 | 559 | 704 | 34 | 5181 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **88** | **95** | **1112** | **159** | **204** | **133** | **76** | **1899** | **118** | **559** | **704** | **34** | **5181** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 43 | 1065 | 7 | 138 | 707 | 54 | 83 | 17 | 35 | 193 | 18 | 99 | 2459 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **43** | **1065** | **7** | **138** | **707** | **54** | **83** | **17** | **35** | **193** | **18** | **99** | **2459** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 44 | 933 | 1106 | 24 | 32 | 114 | 2253 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **44** | **933** | **1106** | **24** | **32** | **114** | **2253** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 352 | 57 | 1065 | 274 | 45 | 2793 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **352** | **57** | **1065** | **274** | **45** | **2793** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1310 | 138 | 78 | 1171 | 26 | 27 | 170 | 206 | 160 | 255 | 56 | 3865 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1310** | **138** | **78** | **1171** | **26** | **27** | **170** | **206** | **160** | **255** | **56** | **3865** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 20 | 1201 | 678 | 100 | 241 | 40 | 2280 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **1201** | **678** | **100** | **241** | **40** | **2280** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1029 | 4 | 29 | 522 | 18 | 132 | 1 | 31 | 21 | 6 | 17 | 1819 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1029** | **4** | **29** | **522** | **18** | **132** | **1** | **31** | **21** | **6** | **17** | **1819** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 13 | 693 | 5 | 2 | 685 | 100 | 73 | 2 | 36 | 15 | 4 | 6 | 1634 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **693** | **5** | **2** | **685** | **100** | **73** | **2** | **36** | **15** | **4** | **6** | **1634** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 63 | 54 | 657 | 10 | 14 | 31 | 5 | 75 | 50 | 58 | 1676 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **63** | **54** | **657** | **10** | **14** | **31** | **5** | **75** | **50** | **58** | **1676** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 198 | 203 | 372 | 86 | 277 | 101 | 439 | 184 | 277 | 416 | 14 | 2597 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **198** | **203** | **372** | **86** | **277** | **101** | **439** | **184** | **277** | **416** | **14** | **2597** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1842 | 824 | 570 | 420 | 3656 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1842** | **824** | **570** | **420** | **3656** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 19 | 63 | 18 | 71 | 407 | 36 | 21 | 124 | 21 | 7 | 16 | 47 | 850 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **19** | **63** | **18** | **71** | **407** | **36** | **21** | **124** | **21** | **7** | **16** | **47** | **850** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 179 | 40 | 1834 | 12 | 31 | 5 | 9 | 505 | 208 | 1822 | 119 | 14 | 4778 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **40** | **1834** | **12** | **31** | **5** | **9** | **505** | **208** | **1822** | **119** | **14** | **4778** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 651 | 199 | 766 | 633 | 285 | 352 | 2886 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **651** | **199** | **766** | **633** | **285** | **352** | **2886** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 827 | 122 | 1194 | 495 | 196 | 859 | 3693 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **827** | **122** | **1194** | **495** | **196** | **859** | **3693** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 234 | 245 | 2182 | 206 | 129 | 1011 | 4007 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **234** | **245** | **2182** | **206** | **129** | **1011** | **4007** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 605 | 59 | 2220 | 125 | 38 | 1242 | 4289 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **605** | **59** | **2220** | **125** | **38** | **1242** | **4289** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 237 | 67 | 2049 | 73 | 59 | 1017 | 3502 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **237** | **67** | **2049** | **73** | **59** | **1017** | **3502** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 376 | 153 | 18 | 185 | 45 | 17 | 794 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **376** | **153** | **18** | **185** | **45** | **17** | **794** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 73 | 2101 | 29 | 60 | 1085 | 3348 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **73** | **2101** | **29** | **60** | **1085** | **3348** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 13 | 237 | 51 | 22 | 327 | 36 | 221 | 37 | 240 | 33 | 18 | 109 | 1344 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **237** | **51** | **22** | **327** | **36** | **221** | **37** | **240** | **33** | **18** | **109** | **1344** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 2 | 490 | 14 | 194 | 84 | 3 | 128 | 205 | 53 | 13 | 6 | 114 | 1306 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **490** | **14** | **194** | **84** | **3** | **128** | **205** | **53** | **13** | **6** | **114** | **1306** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 73 | 63 | 226 | 214 | 70 | 15 | 661 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **73** | **63** | **226** | **214** | **70** | **15** | **661** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 30 | 209 | 35 | 15 | 30 | 48 | 367 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **209** | **35** | **15** | **30** | **48** | **367** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR 114)/Park Street | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 100 | 514 | 70 | 166 |
| 2 | 97 | 499 | 68 | 161 |
| 3 | 95 | 488 | 67 | 158 |
| 4 | 89 | 457 | 62 | 148 |
| 5 | 79 | 406 | 55 | 131 |
| 6 | 78 | 401 | 55 | 129 |
| 7 | 77 | 396 | 54 | 128 |
| 8 | 70 | 360 | 49 | 116 |
| 9 | 69 | 355 | 48 | 115 |
| 10 | 68 | 350 | 48 | 113 |
| 11 | 59 | 303 | 41 | 98 |
| 12 | 55 | 283 | 39 | 91 |
| 13 | 54 | 278 | 38 | 90 |
| 14 | 40 | 206 | 28 | 66 |
| 15 | 40 | 206 | 28 | 66 |
| 16 | 28 | 144 | 20 | 46 |
| 17 | 16 | 82 | 11 | 27 |
| 18 | 16 | 82 | 11 | 27 |
| 19 | 9 | 46 | 6 | 15 |
| 20 | 5 | 26 | 4 | 8 |
| 21 | 3 | 15 | 2 | 5 |
| 22 | 1 | 5 | 1 | 2 |
| 23 | 1 | 5 | 1 | 2 |
| 24 | 1 | 5 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 614 | 1 | 166 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 596 | 1 | 161 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 3 | 1 | 583 | 1 | 158 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 4 | 1 | 546 | 1 | 148 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 5 | 1 | 485 | 1 | 131 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 1 | 479 | 1 | 129 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 1 | 473 | 1 | 128 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 1 | 430 | 1 | 116 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 9 | 1 | 424 | 1 | 115 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 10 | 1 | 418 | 1 | 113 | No | No | Yes | Yes | No | No | No | No | No | No |
| 11 | 1 | 362 | 1 | 98 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 1 | 338 | 1 | 91 | No | No | No | Yes | No | No | No | No | No | No |
| 13 | 1 | 332 | 1 | 90 | No | No | No | Yes | No | No | No | No | No | No |
| 14 | 1 | 246 | 1 | 66 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 246 | 1 | 66 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 172 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 98 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 98 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 55 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 31 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 18 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 3 | 7 | 10 | 13 | 0 | 1 | 4 | 9 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.4 | 11.2 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:10 | 0:30 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 70 | 166 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 850 | 850 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 203 | 529 | 62 |
| 2 | 197 | 513 | 60 |
| 3 | 193 | 503 | 59 |
| 4 | 181 | 471 | 55 |
| 5 | 160 | 418 | 49 |
| 6 | 158 | 413 | 48 |
| 7 | 156 | 407 | 48 |
| 8 | 142 | 370 | 43 |
| 9 | 140 | 365 | 43 |
| 10 | 138 | 360 | 42 |
| 11 | 120 | 312 | 37 |
| 12 | 112 | 291 | 34 |
| 13 | 110 | 286 | 33 |
| 14 | 81 | 212 | 25 |
| 15 | 81 | 212 | 25 |
| 16 | 57 | 148 | 17 |
| 17 | 32 | 85 | 10 |
| 18 | 32 | 85 | 10 |
| 19 | 18 | 48 | 6 |
| 20 | 10 | 26 | 3 |
| 21 | 6 | 16 | 2 |
| 22 | 2 | 5 | 1 |
| 23 | 2 | 5 | 1 |
| 24 | 2 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 732 | 1 | 62 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 710 | 1 | 60 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 3 | 1 | 696 | 1 | 59 | No | No | No | No | No | No | Yes | Yes | No | No |
| 4 | 1 | 652 | 1 | 55 | No | No | No | No | No | No | Yes | Yes | No | No |
| 5 | 1 | 578 | 1 | 49 | No | No | No | No | No | No | No | Yes | No | No |
| 6 | 1 | 571 | 1 | 48 | No | No | No | No | No | No | No | Yes | No | No |
| 7 | 1 | 563 | 1 | 48 | No | No | No | No | No | No | No | Yes | No | No |
| 8 | 1 | 512 | 1 | 43 | No | No | No | No | No | No | No | Yes | No | No |
| 9 | 1 | 505 | 1 | 43 | No | No | No | No | No | No | No | Yes | No | No |
| 10 | 1 | 498 | 1 | 42 | No | No | No | No | No | No | No | Yes | No | No |
| 11 | 1 | 432 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 403 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 396 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 293 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 293 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 205 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 117 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 117 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 66 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 36 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 22 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 10 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:09 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 62 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 794 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 207: Chilco St/Constitution Dr

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N, S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | E | W | N | S |
| 1 | 160 | 498 | 385 | 301 |
| 2 | 155 | 483 | 373 | 292 |
| 3 | 152 | 473 | 366 | 286 |
| 4 | 142 | 443 | 343 | 268 |
| 5 | 126 | 393 | 304 | 238 |
| 6 | 125 | 388 | 300 | 235 |
| 7 | 123 | 383 | 296 | 232 |
| 8 | 112 | 349 | 270 | 211 |
| 9 | 110 | 344 | 266 | 208 |
| 10 | 109 | 339 | 262 | 205 |
| 11 | 94 | 294 | 227 | 178 |
| 12 | 88 | 274 | 212 | 166 |
| 13 | 86 | 269 | 208 | 163 |
| 14 | 64 | 199 | 154 | 120 |
| 15 | 64 | 199 | 154 | 120 |
| 16 | 45 | 139 | 108 | 84 |
| 17 | 26 | 80 | 62 | 48 |
| 18 | 26 | 80 | 62 | 48 |
| 19 | 14 | 45 | 35 | 27 |
| 20 | 8 | 25 | 19 | 15 |
| 21 | 5 | 15 | 12 | 9 |
| 22 | 2 | 5 | 4 | 3 |
| 23 | 2 | 5 | 4 | 3 |
| 24 | 2 | 5 | 4 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 658 | 2 | 385 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No |
| 2 | 2 | 638 | 2 | 373 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No |
| 3 | 2 | 625 | 2 | 366 | Yes | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 4 | 2 | 585 | 2 | 343 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 5 | 2 | 519 | 2 | 304 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 2 | 513 | 2 | 300 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 2 | 506 | 2 | 296 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 2 | 461 | 2 | 270 | No | No | Yes | Yes | No | No | No | No | No | No |
| 9 | 2 | 454 | 2 | 266 | No | No | Yes | Yes | No | No | No | No | No | No |
| 10 | 2 | 448 | 2 | 262 | No | No | Yes | Yes | No | No | No | No | No | No |
| 11 | 2 | 388 | 2 | 227 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 2 | 362 | 2 | 212 | No | No | No | Yes | No | No | No | No | No | No |
| 13 | 2 | 355 | 2 | 208 | No | No | No | Yes | No | No | No | No | No | No |
| 14 | 2 | 263 | 2 | 154 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 263 | 2 | 154 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 184 | 2 | 108 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 106 | 2 | 62 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 106 | 2 | 62 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 59 | 2 | 35 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 33 | 2 | 19 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 20 | 2 | 12 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 7 | 2 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 7 | 2 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 7 | 2 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 3 | 7 | 10 | 13 | 0 | 0 | 2 | 7 | 2 | 0 |

## Warrant 3 Condition A

| Orientation | N | S |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 50 | 30.6 |
| Number of Lanes on Minor Street Approach | 2 | 2 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 5:20 | 2:33 |
| Delay Condition Met | Yes | No |
| Volume on Minor Street Approach During Same Hour | 385 | 301 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1344 | 1344 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | Yes | No |
| **Warrant Met for Intersection** | **Yes** | |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 85 | 440 | 136 |
| 2 | 82 | 427 | 132 |
| 3 | 81 | 418 | 129 |
| 4 | 76 | 392 | 121 |
| 5 | 67 | 348 | 107 |
| 6 | 66 | 343 | 106 |
| 7 | 65 | 339 | 105 |
| 8 | 59 | 308 | 95 |
| 9 | 59 | 304 | 94 |
| 10 | 58 | 299 | 92 |
| 11 | 50 | 260 | 80 |
| 12 | 47 | 242 | 75 |
| 13 | 46 | 238 | 73 |
| 14 | 34 | 176 | 54 |
| 15 | 34 | 176 | 54 |
| 16 | 24 | 123 | 38 |
| 17 | 14 | 70 | 22 |
| 18 | 14 | 70 | 22 |
| 19 | 8 | 40 | 12 |
| 20 | 4 | 22 | 7 |
| 21 | 3 | 13 | 4 |
| 22 | 1 | 4 | 1 |
| 23 | 1 | 4 | 1 |
| 24 | 1 | 4 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 525 | 1 | 136 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 2 | 1 | 509 | 1 | 132 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 3 | 1 | 499 | 1 | 129 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 4 | 1 | 468 | 1 | 121 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 5 | 1 | 415 | 1 | 107 | No | No | Yes | Yes | No | No | No | No | No | No |
| 6 | 1 | 409 | 1 | 106 | No | No | Yes | Yes | No | No | No | No | No | No |
| 7 | 1 | 404 | 1 | 105 | No | No | Yes | Yes | No | No | No | No | No | No |
| 8 | 1 | 367 | 1 | 95 | No | No | No | Yes | No | No | No | No | No | No |
| 9 | 1 | 363 | 1 | 94 | No | No | No | Yes | No | No | No | No | No | No |
| 10 | 1 | 357 | 1 | 92 | No | No | No | Yes | No | No | No | No | No | No |
| 11 | 1 | 310 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 289 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 284 | 1 | 73 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 210 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 210 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 147 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 84 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 84 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 48 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 26 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 16 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 10 | 0 | 0 | 1 | 4 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 22.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:50 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 136 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 661 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 239 | 50 | 78 |
| 2 | 232 | 49 | 76 |
| 3 | 227 | 48 | 74 |
| 4 | 213 | 45 | 69 |
| 5 | 189 | 40 | 62 |
| 6 | 186 | 39 | 61 |
| 7 | 184 | 39 | 60 |
| 8 | 167 | 35 | 55 |
| 9 | 165 | 35 | 54 |
| 10 | 163 | 34 | 53 |
| 11 | 141 | 30 | 46 |
| 12 | 131 | 28 | 43 |
| 13 | 129 | 27 | 42 |
| 14 | 96 | 20 | 31 |
| 15 | 96 | 20 | 31 |
| 16 | 67 | 14 | 22 |
| 17 | 38 | 8 | 12 |
| 18 | 38 | 8 | 12 |
| 19 | 22 | 5 | 7 |
| 20 | 12 | 3 | 4 |
| 21 | 7 | 2 | 2 |
| 22 | 2 | 1 | 1 |
| 23 | 2 | 1 | 1 |
| 24 | 2 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 289 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 281 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 275 | 1 | 74 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 258 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 229 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 225 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 223 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 202 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 200 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 197 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 171 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 159 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 156 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 116 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 116 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 81 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 46 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 46 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 27 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 15 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 78 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 367 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

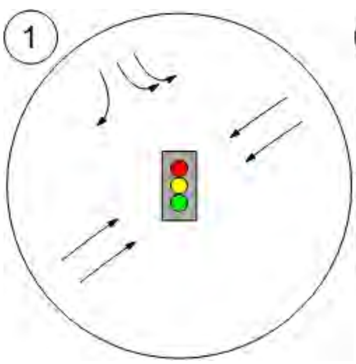
Generated with PTV VISTRO

Version 2021 (SP 0-4)

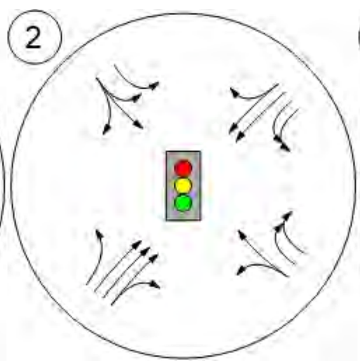
Study Intersections

Lane Configuration and Traffic Control

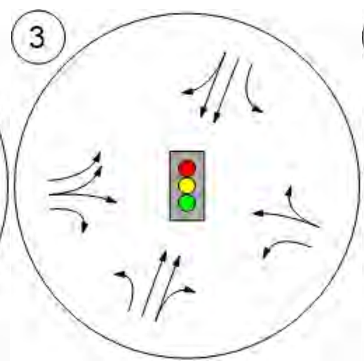

Marsh Rd (SR 84)/US 101 S



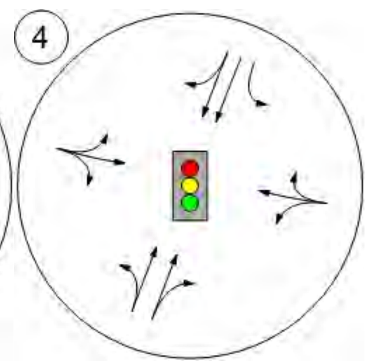

Marsh Rd/Rolison Rd-Scott D



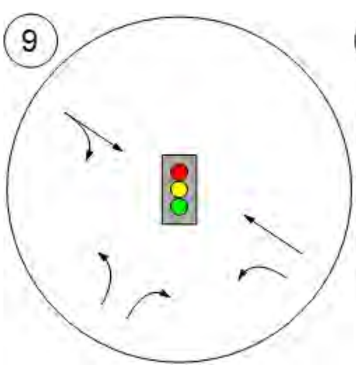

Marsh Rd/Florence St-Bohan



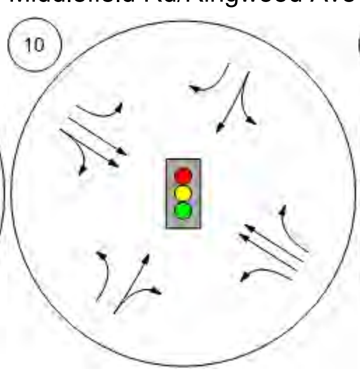

Marsh Rd/Bay Rd



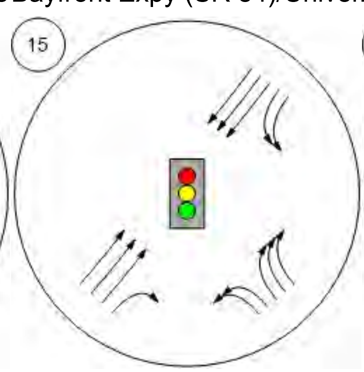

Middlefield Rd/Ravenswood



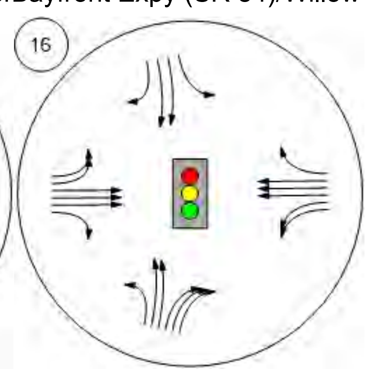

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer



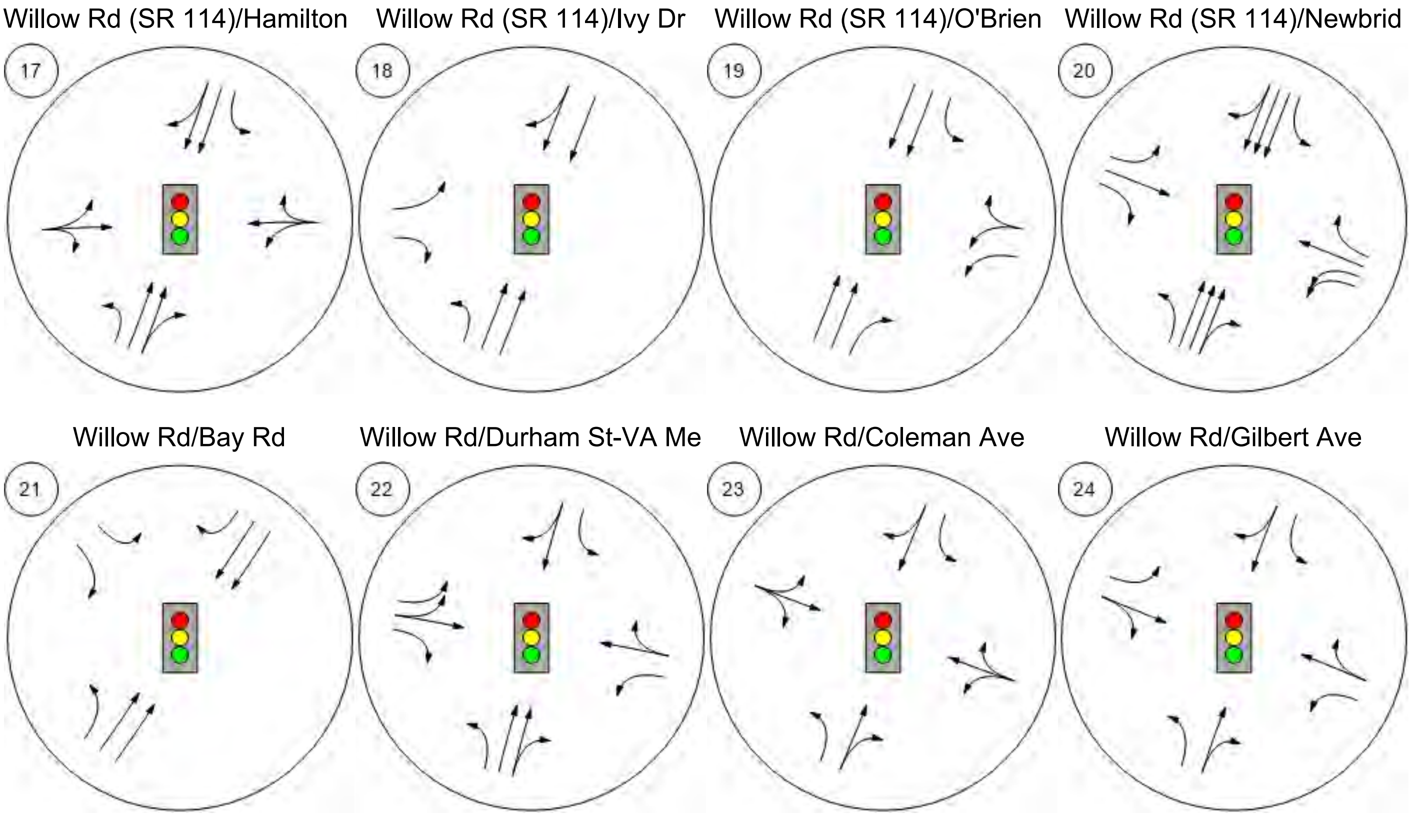

Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-4)

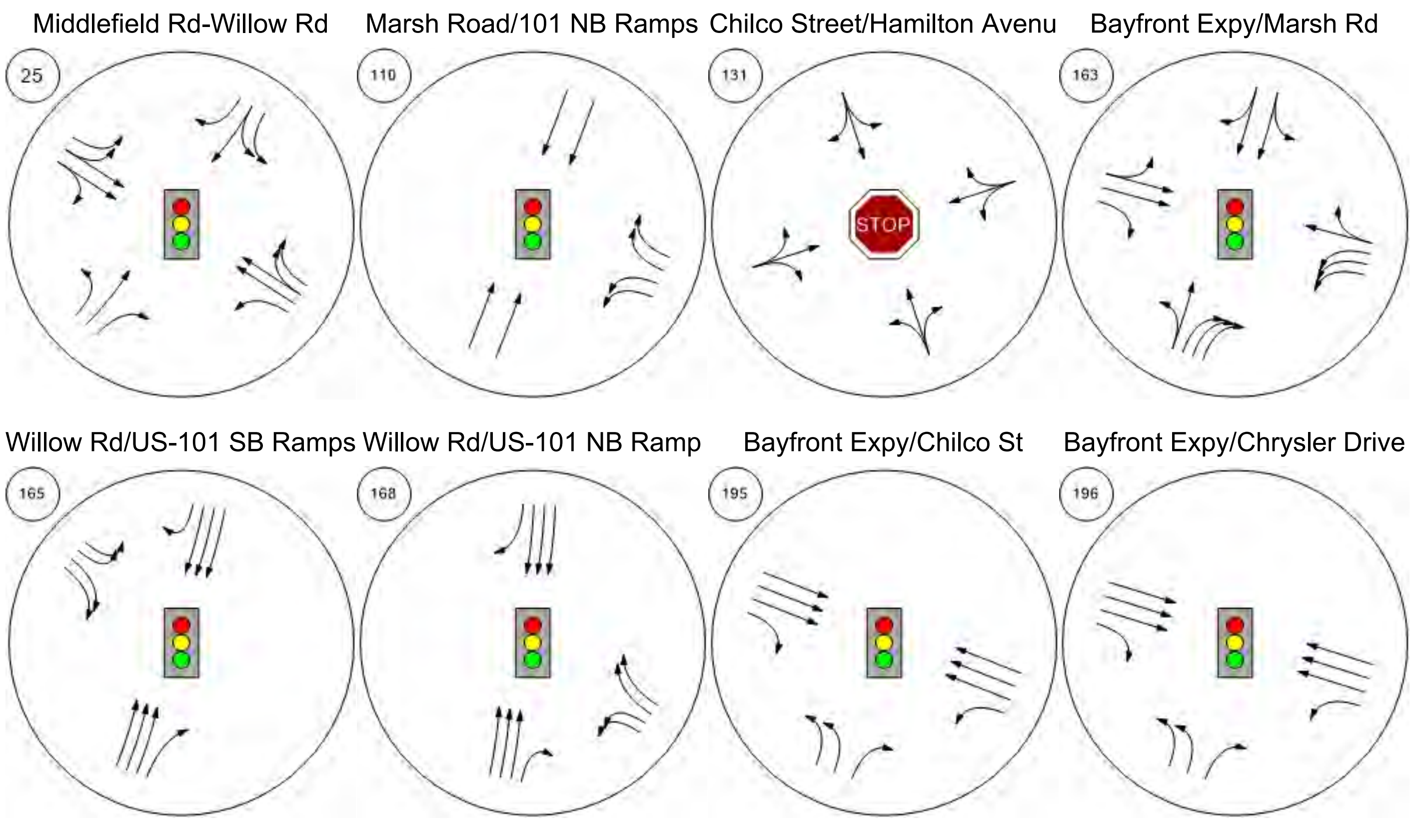
Lane Configuration and Traffic Control

Generated with PTV VISTRO

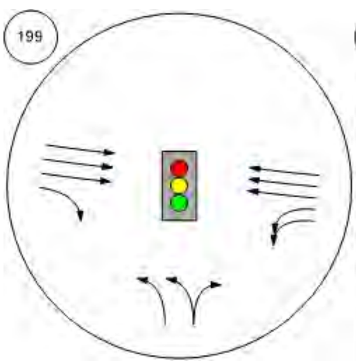
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

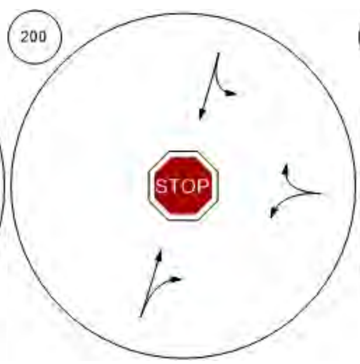



## Lane Configuration and Traffic Control

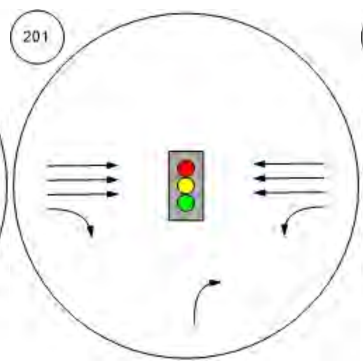

Bafront Expwy/Bldg 21



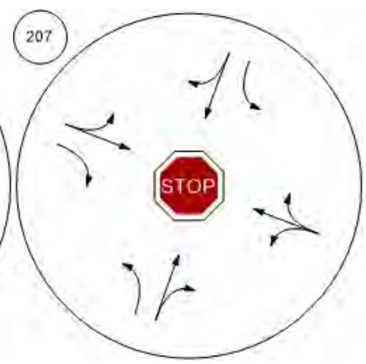

O'Brien Drive/Kavanaugh Dri



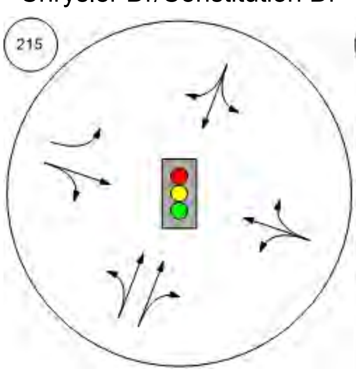

Bayfront Expwy/Bldg 20



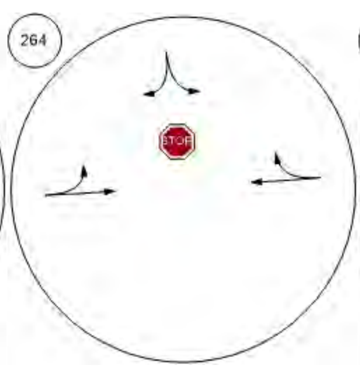

Chilco St/Constitution Dr



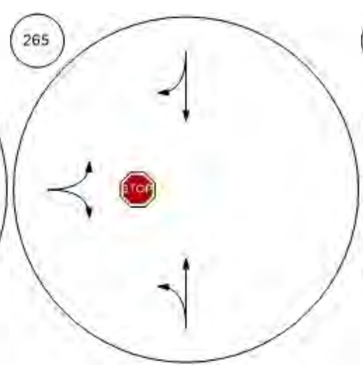

Chrysler Dr/Constitution Dr



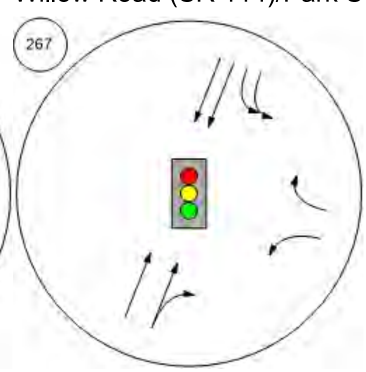

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive




Willow Road (SR 114)/Park S

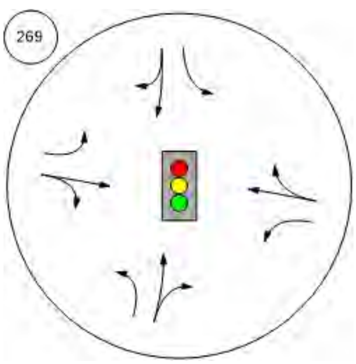


Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control


### O'Brien Drive/Loop Road

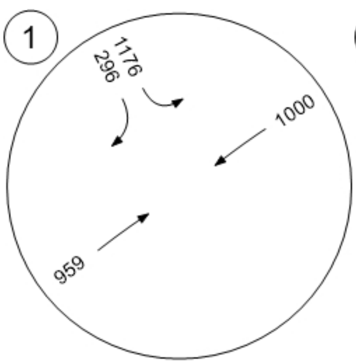


Generated with PTV VISTRO

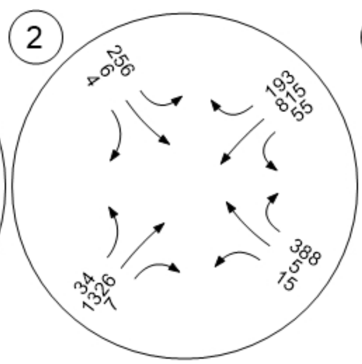
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

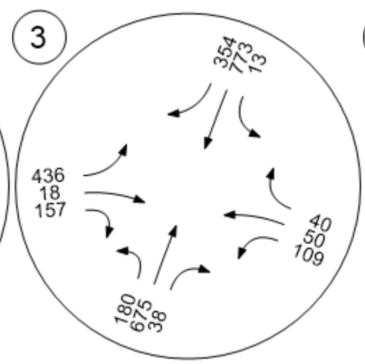

Marsh Rd (SR 84)/US 101 S



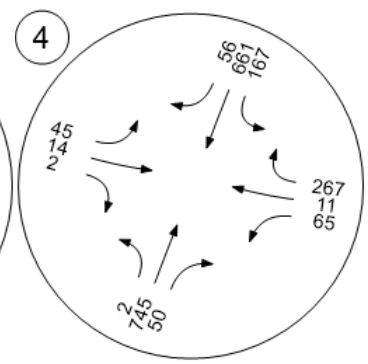

Marsh Rd/Rolison Rd-Scott D



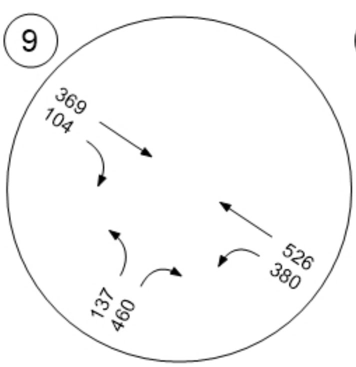

Marsh Rd/Florence St-Bohan



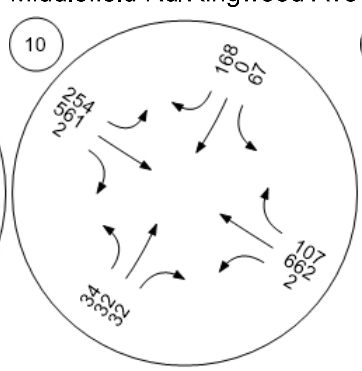

Marsh Rd/Bay Rd



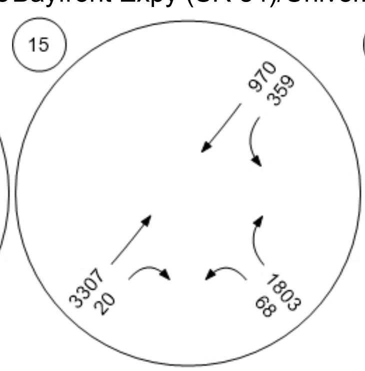

Middlefield Rd/Ravenswood



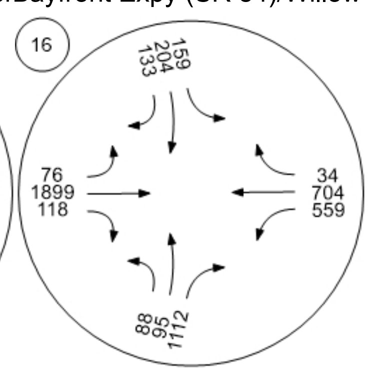

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

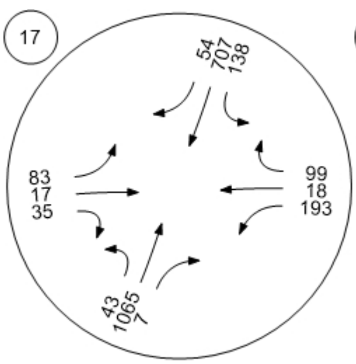


Generated with PTV VISTRO

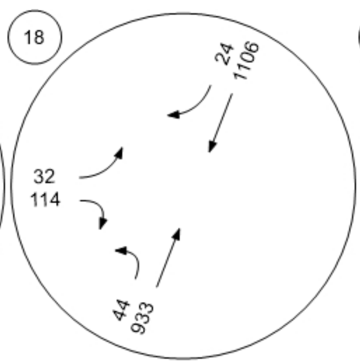
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

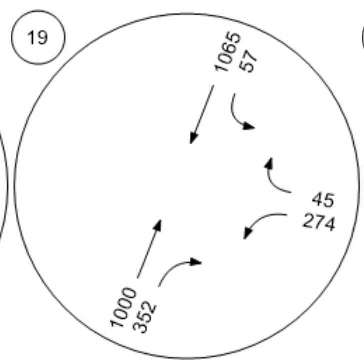

Willow Rd (SR 114)/Hamilton



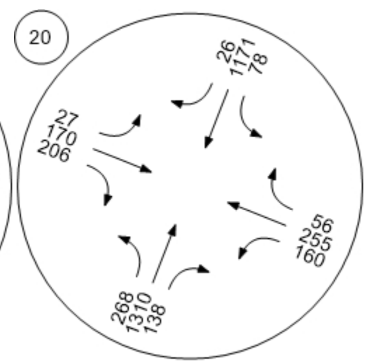

Willow Rd (SR 114)/Ivy Dr



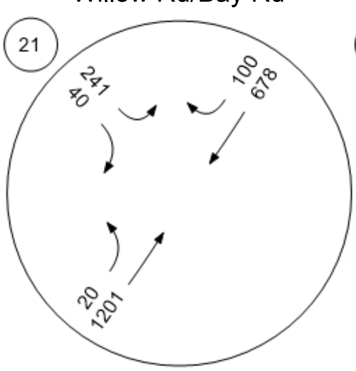

Willow Rd (SR 114)/O'Brien



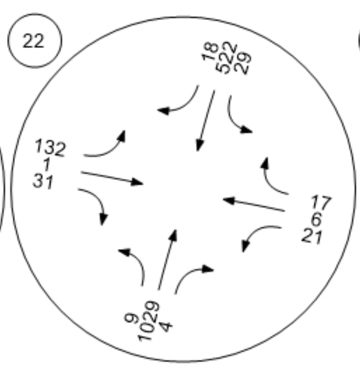

Willow Rd (SR 114)/Newbrid



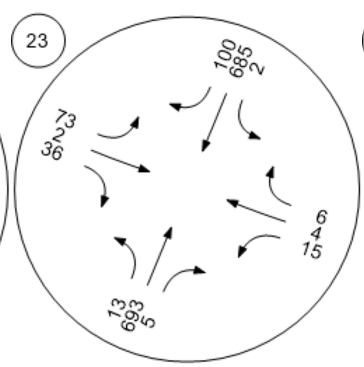

Willow Rd/Bay Rd



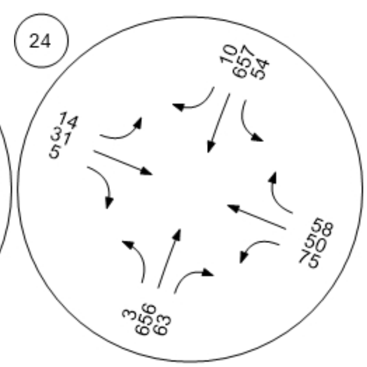

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

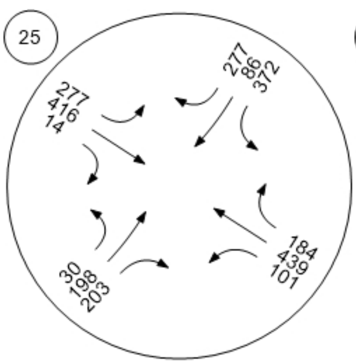


Generated with PTV VISTRO

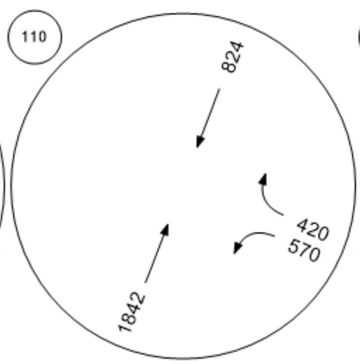
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

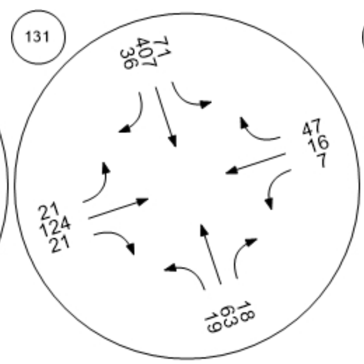

Middlefield Rd-Willow Rd



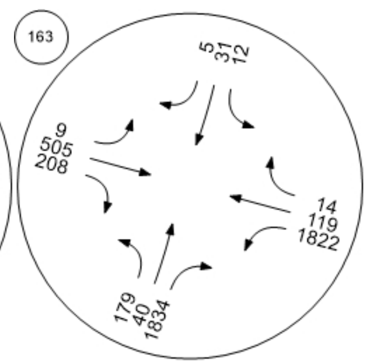

Marsh Road/101 NB Ramps



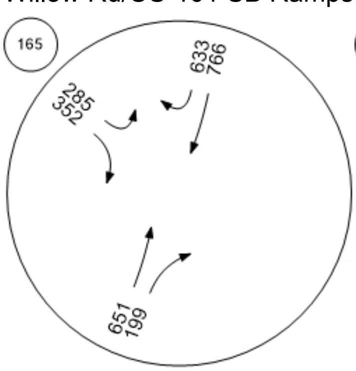

Chilco Street/Hamilton Avenu



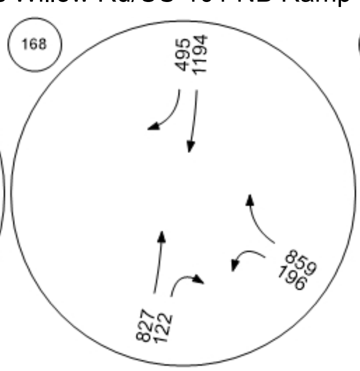

Bayfront Expy/Marsh Rd



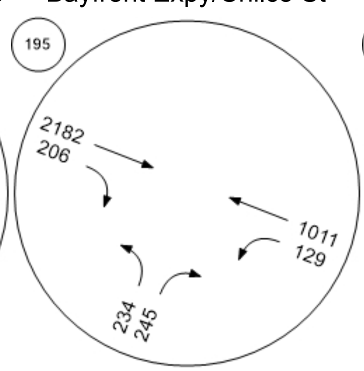

Willow Rd/US-101 SB Ramps



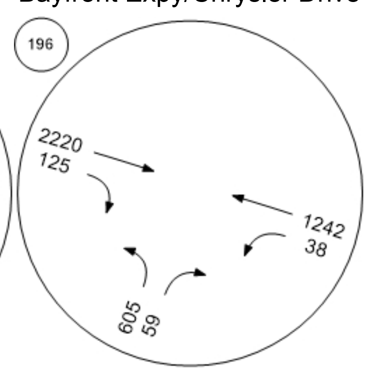

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

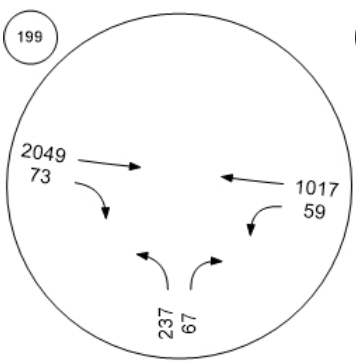



Bayfront Expy/Chrysler Drive

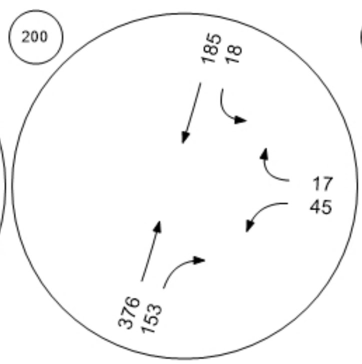


## Traffic Volume - Base Volume

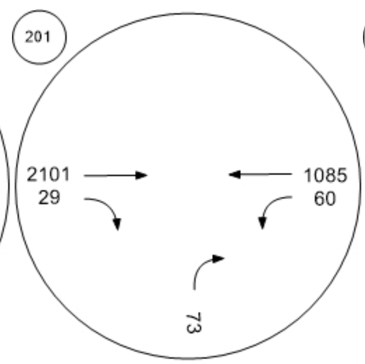

Bafront Expwy/Bldg 21



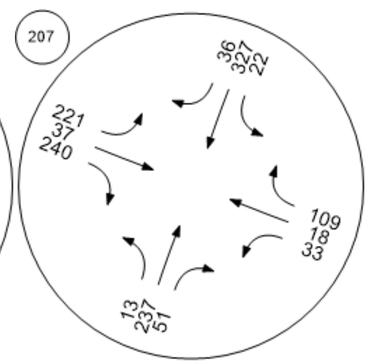

O'Brien Drive/Kavanaugh Dri



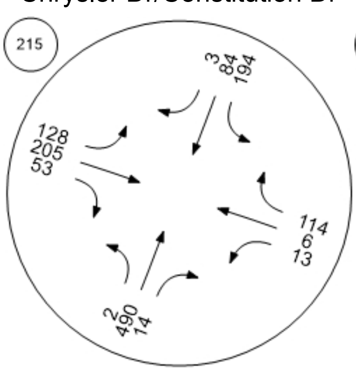

Bayfront Expwy/Bldg 20



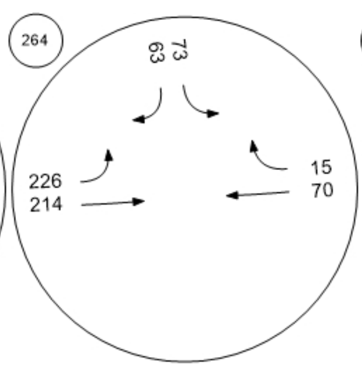

Chilco St/Constitution Dr



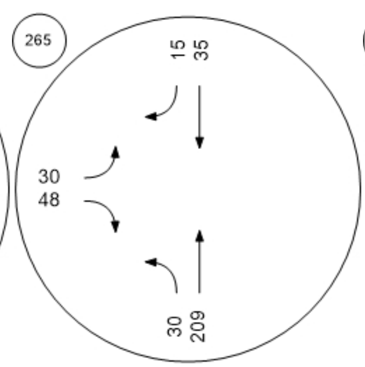

Chrysler Dr/Constitution Dr



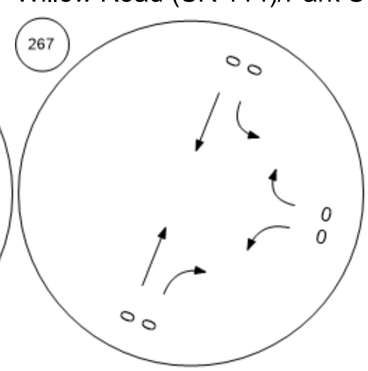

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

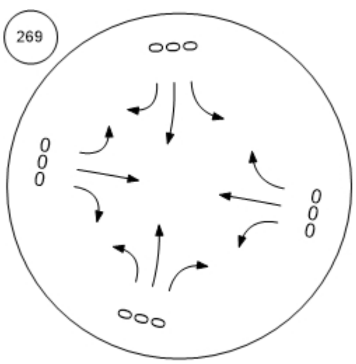



Willow Road (SR 114)/Park S



Traffic Volume - Base Volume

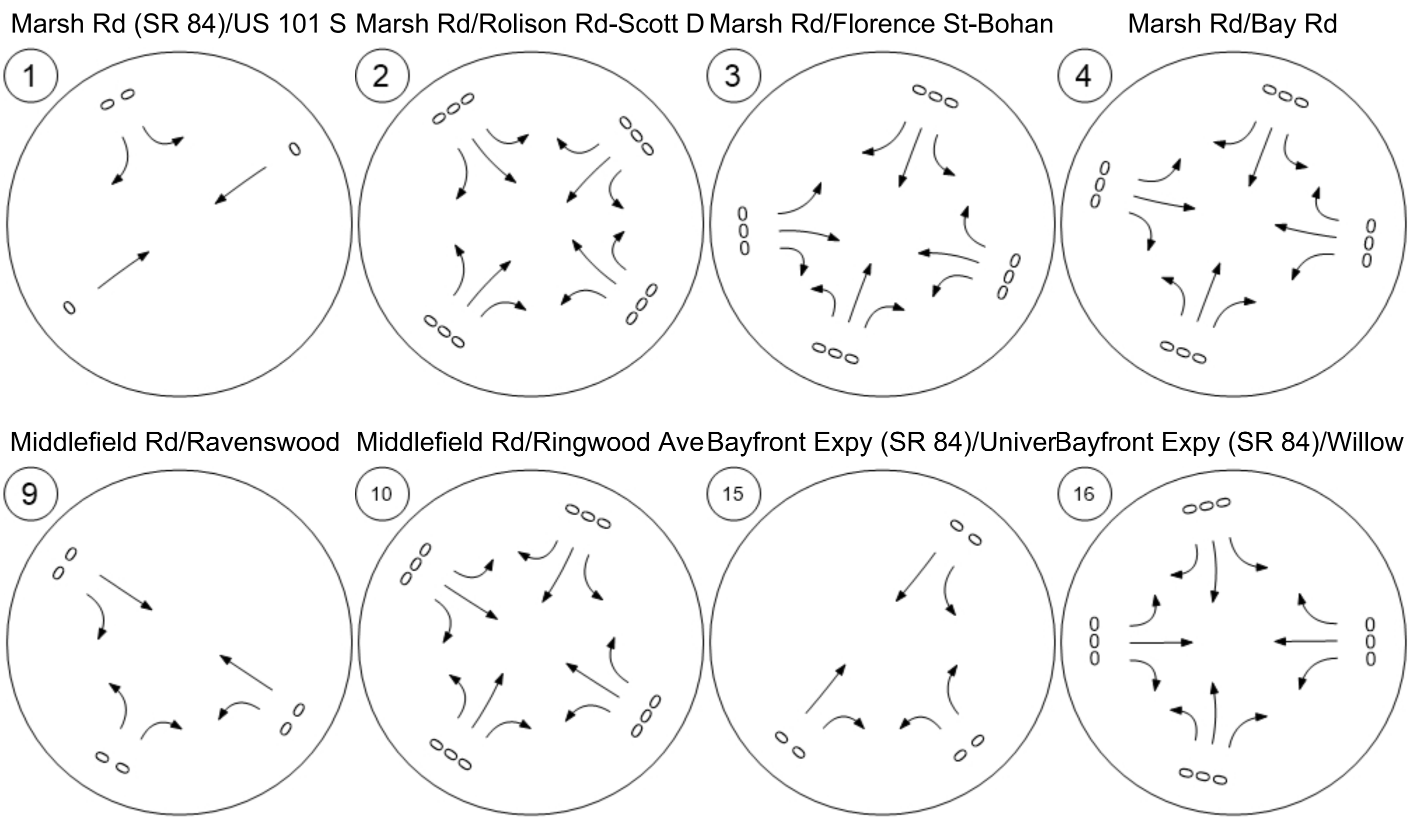

O'Brien Drive/Loop Road



Generated with PTV VISTRO

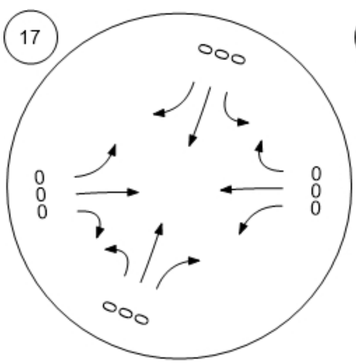
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

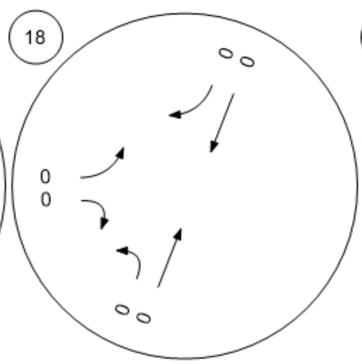



Traffic Volume - In-Process Volume

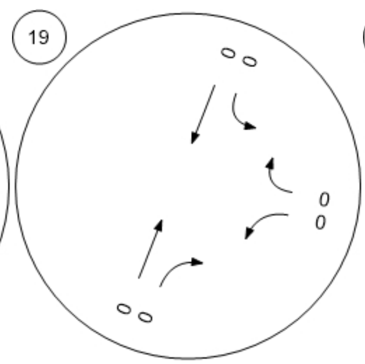

Willow Rd (SR 114)/Hamilton



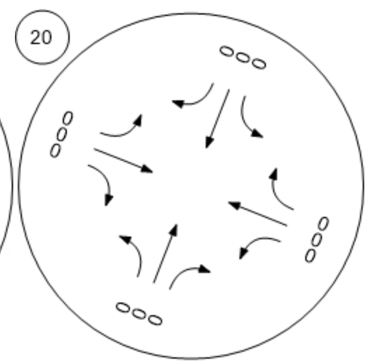

Willow Rd (SR 114)/Ivy Dr



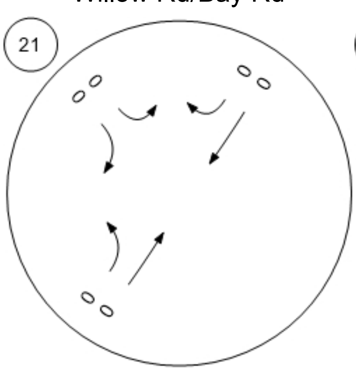

Willow Rd (SR 114)/O'Brien



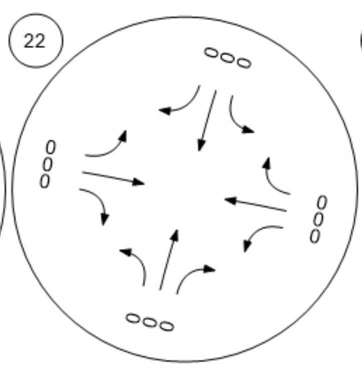

Willow Rd (SR 114)/Newbrid



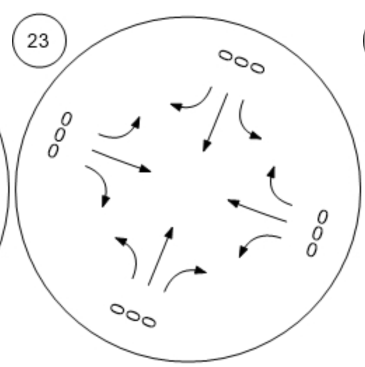

Willow Rd/Bay Rd



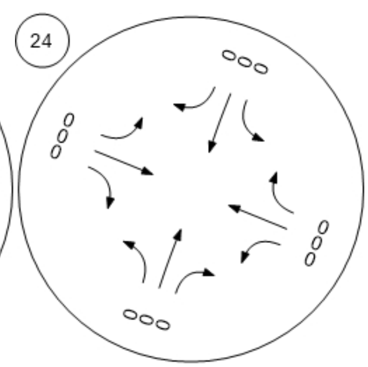

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

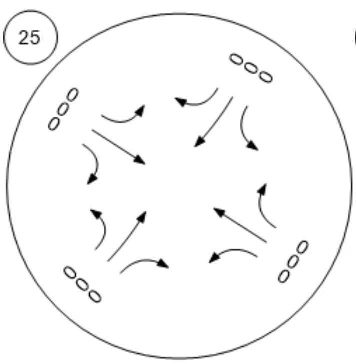



Willow Rd/Gilbert Ave

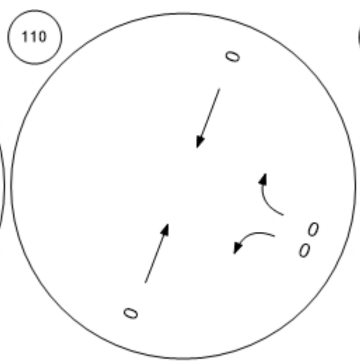


Traffic Volume - In-Process Volume

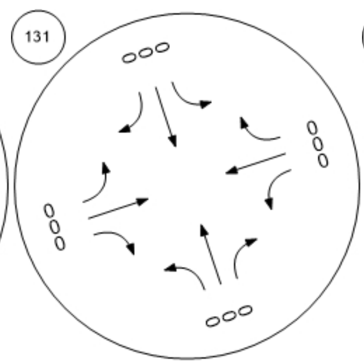

Middlefield Rd-Willow Rd



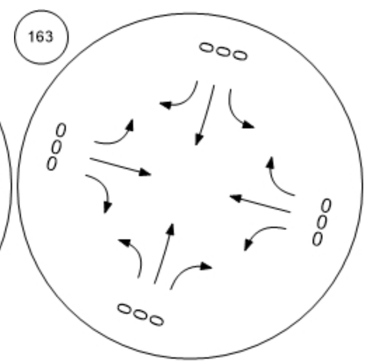

Marsh Road/101 NB Ramps



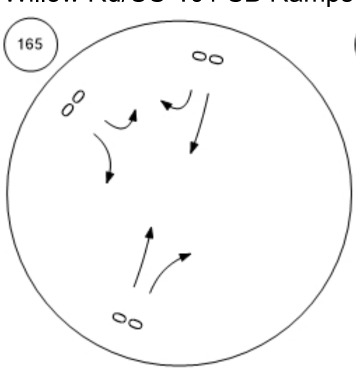

Chilco Street/Hamilton Avenu



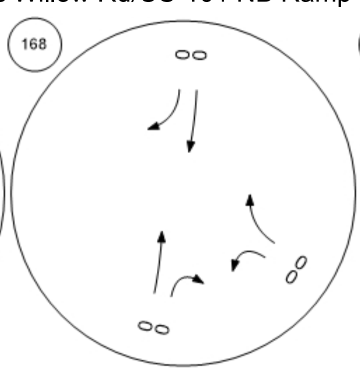

Bayfront Expy/Marsh Rd



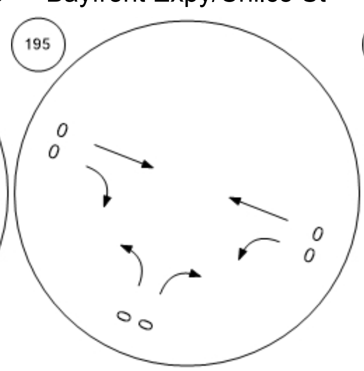

Willow Rd/US-101 SB Ramps



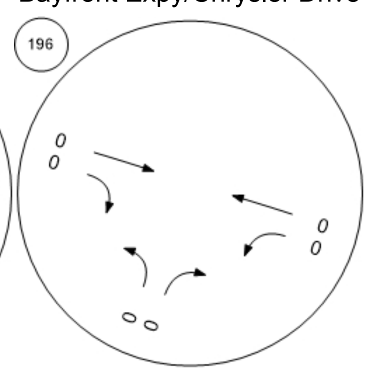

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

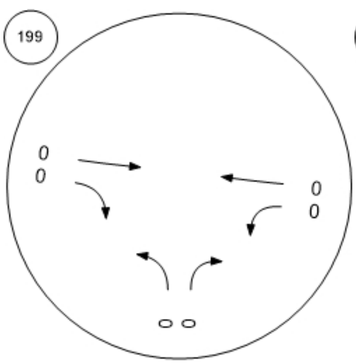


Generated with PTV VISTRO

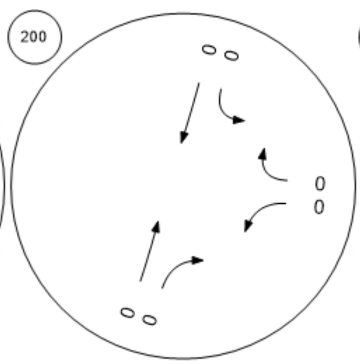
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

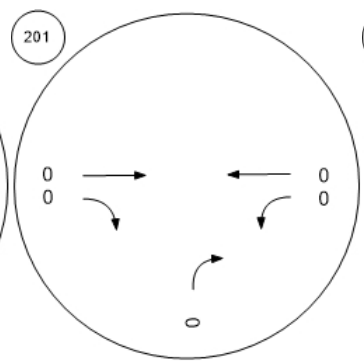

Bafront Expwy/Bldg 21



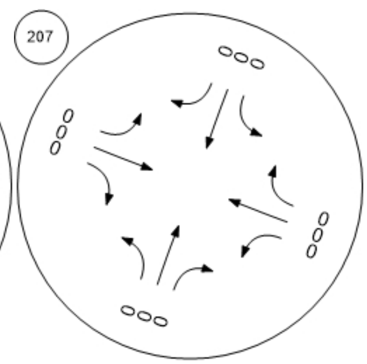

O'Brien Drive/Kavanaugh Dri



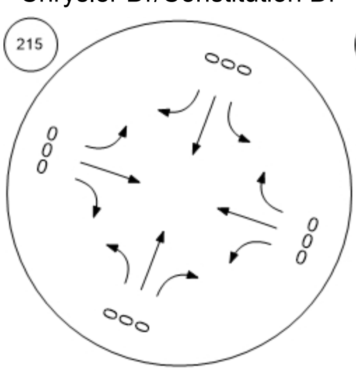

Bayfront Expwy/Bldg 20



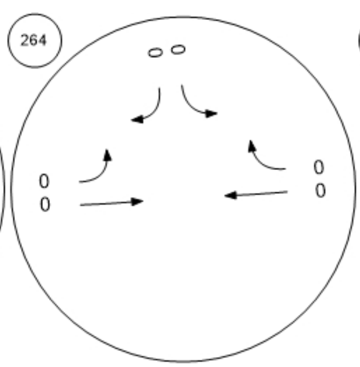

Chilco St/Constitution Dr



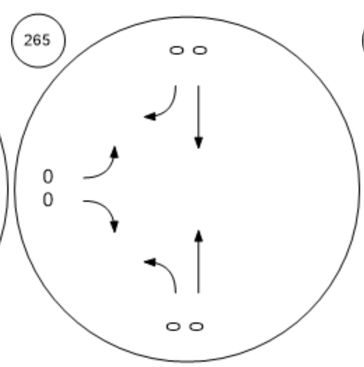

Chrysler Dr/Constitution Dr



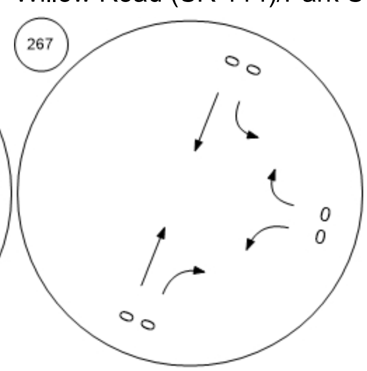

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive




Willow Road (SR 114)/Park S

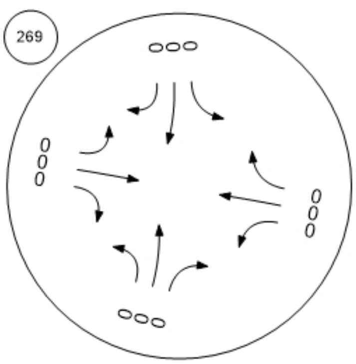


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road

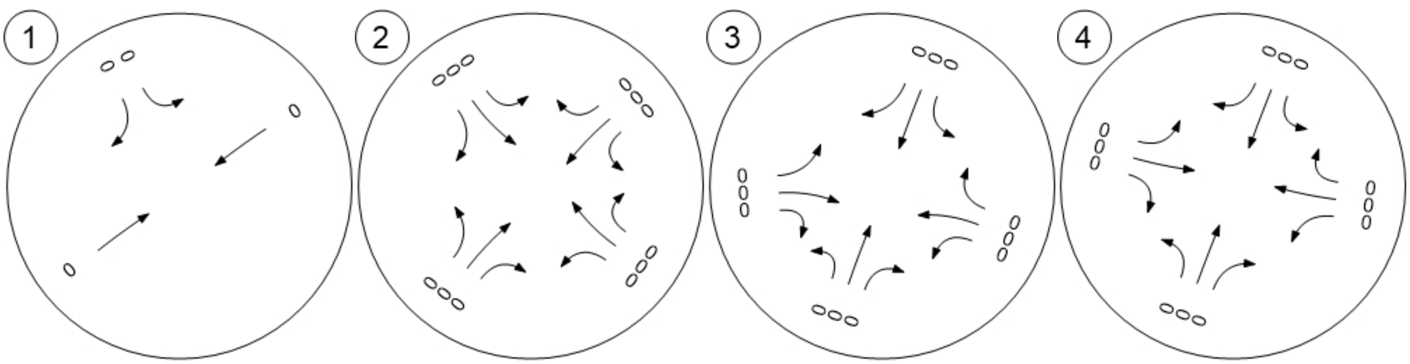


Generated with PTV VISTRO

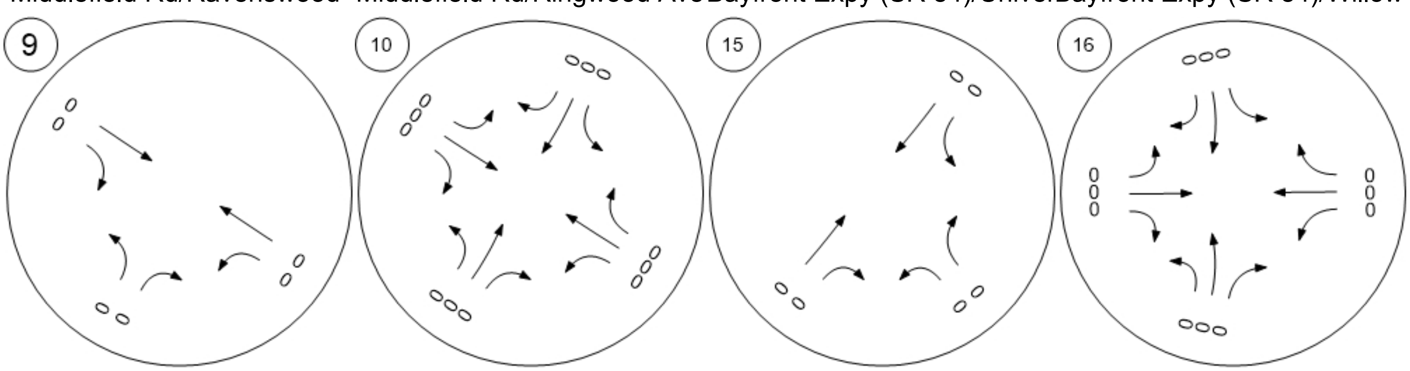
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

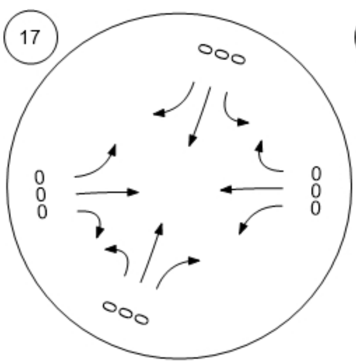


Generated with PTV VISTRO

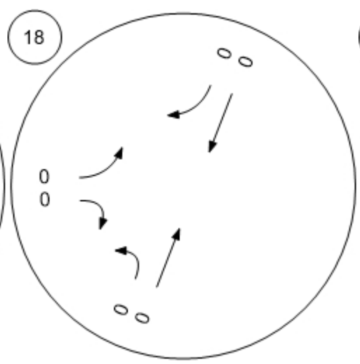
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

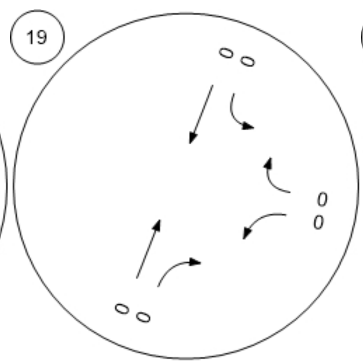

Willow Rd (SR 114)/Hamilton



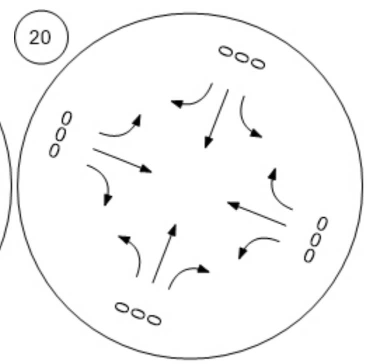

Willow Rd (SR 114)/Ivy Dr



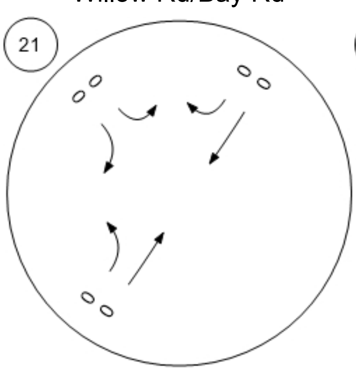

Willow Rd (SR 114)/O'Brien



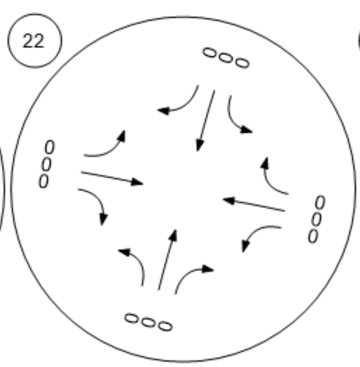

Willow Rd (SR 114)/Newbrid



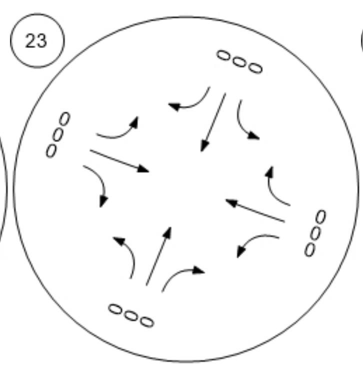

Willow Rd/Bay Rd



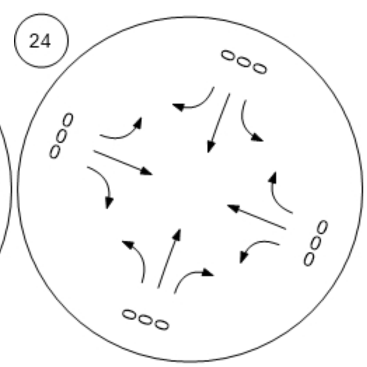

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

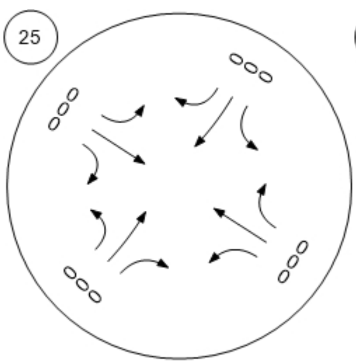


Generated with PTV VISTRO

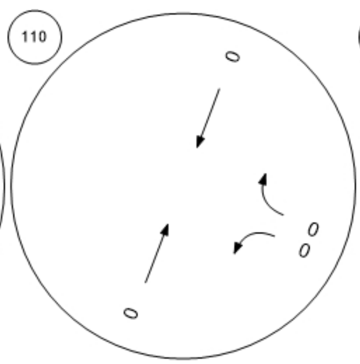
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

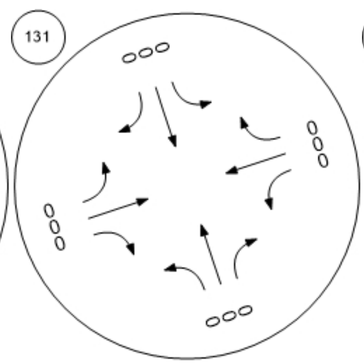

Middlefield Rd-Willow Rd



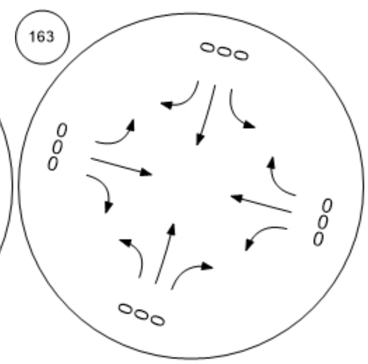

Marsh Road/101 NB Ramps



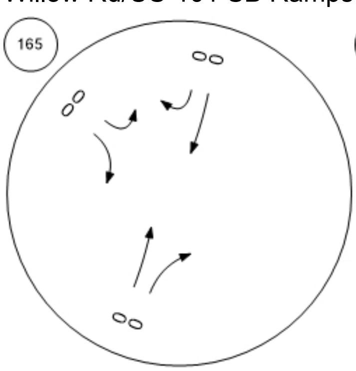

Chilco Street/Hamilton Avenu



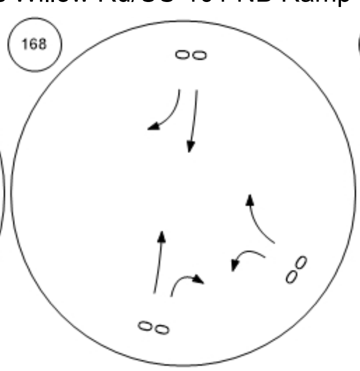

Bayfront Expy/Marsh Rd



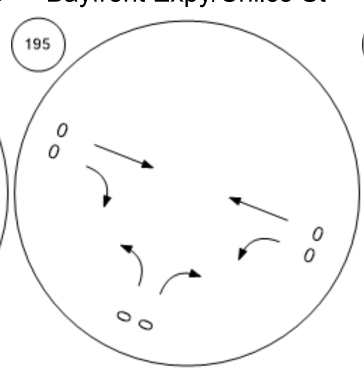

Willow Rd/US-101 SB Ramps



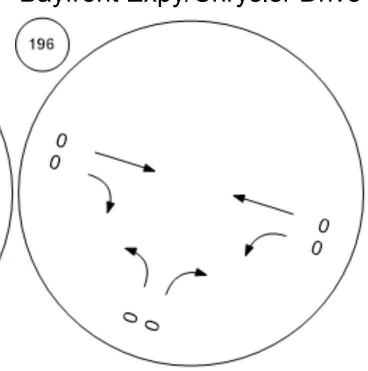

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

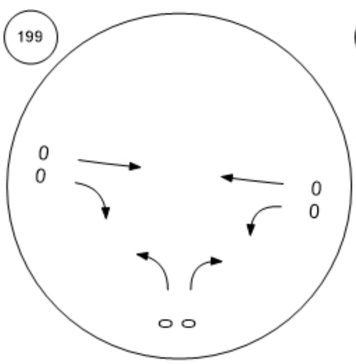



Bayfront Expy/Chrysler Drive

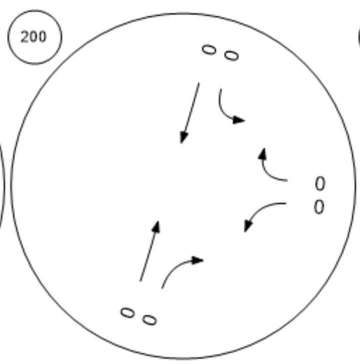


Traffic Volume - Net New Site Trips

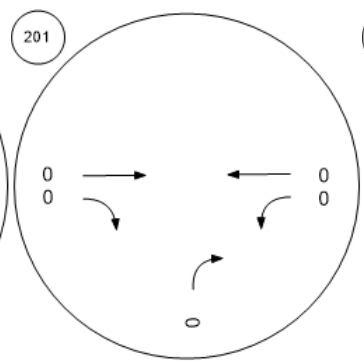

Bafront Expwy/Bldg 21



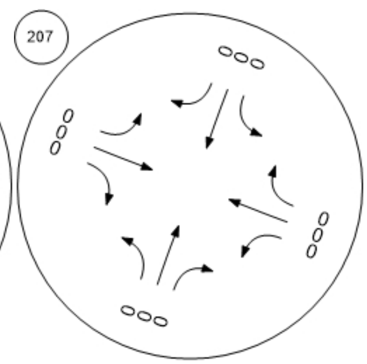

O'Brien Drive/Kavanaugh Dri



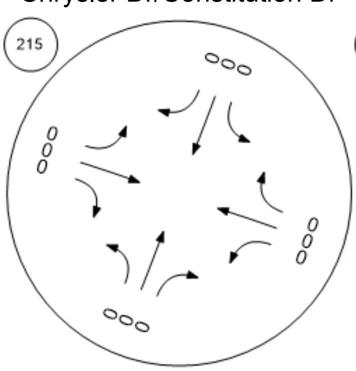

Bayfront Expwy/Bldg 20



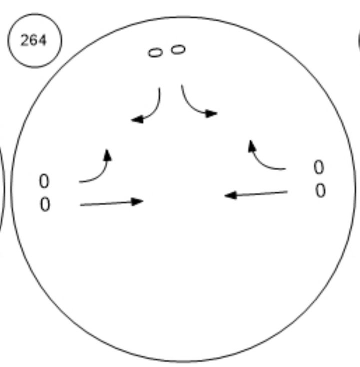

Chilco St/Constitution Dr



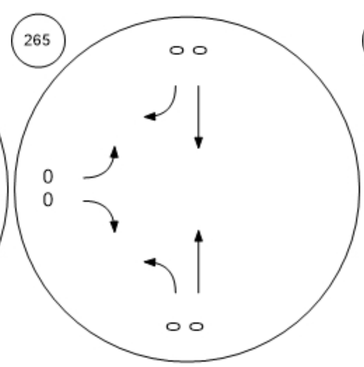

Chrysler Dr/Constitution Dr



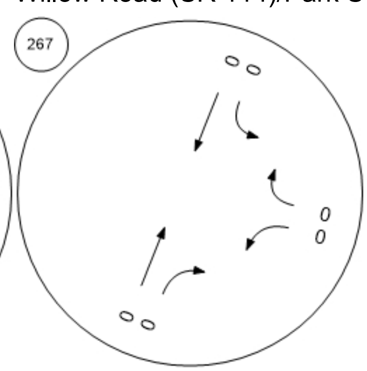

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive




Willow Road (SR 114)/Park S

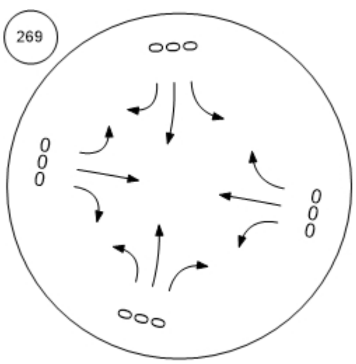


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips


O'Brien Drive/Loop Road

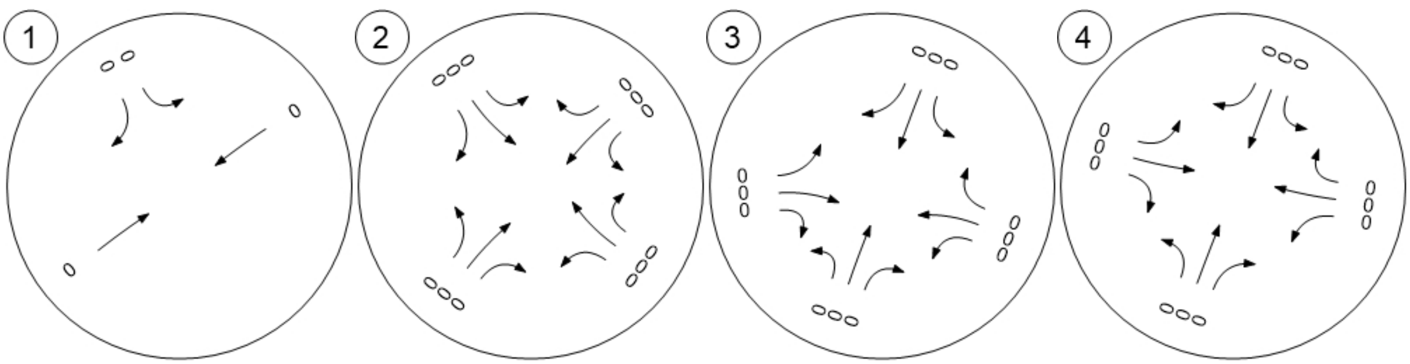


Generated with PTV VISTRO

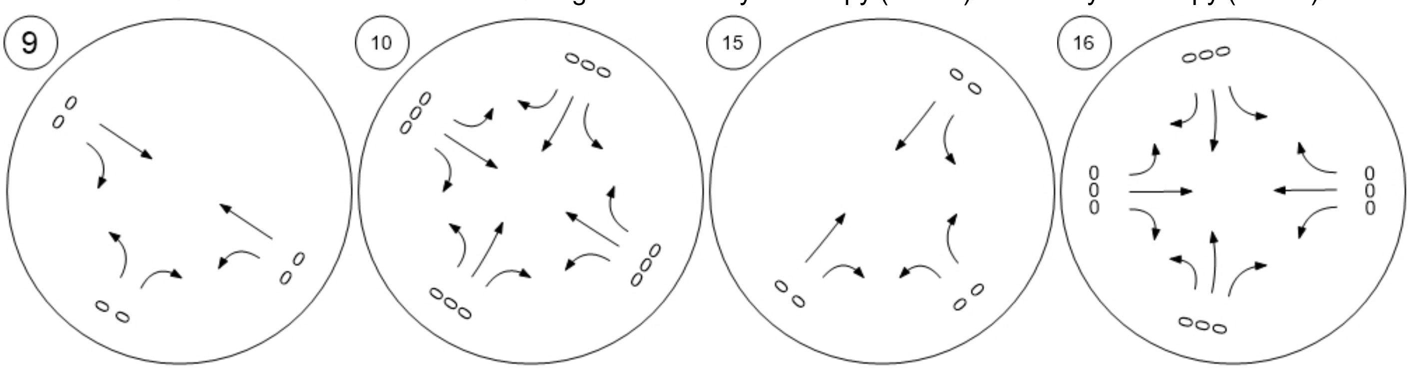
Version 2021 (SP 0-4)

Traffic Volume - Other Volume


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringwood Ave Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow



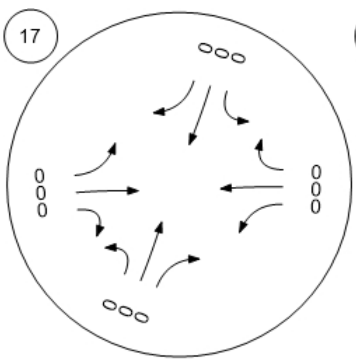
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

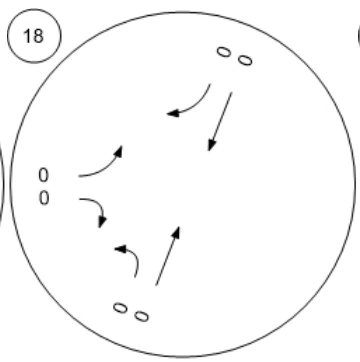

Willow Rd (SR 114)/Hamilton

17



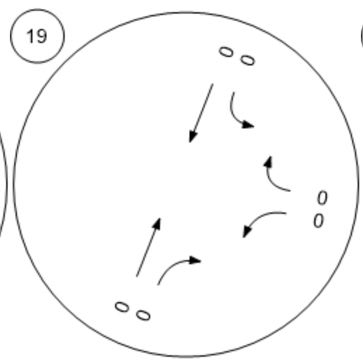

Willow Rd (SR 114)/Ivy Dr

18



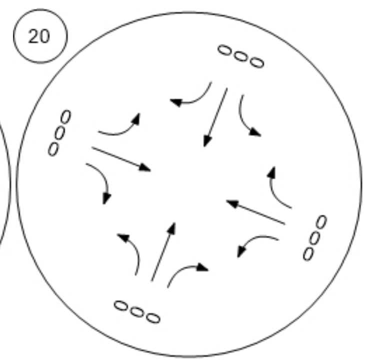

Willow Rd (SR 114)/O'Brien

19



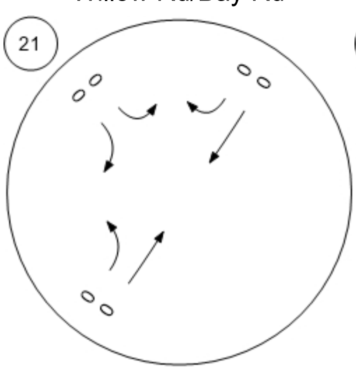

Willow Rd (SR 114)/Newbrid

20



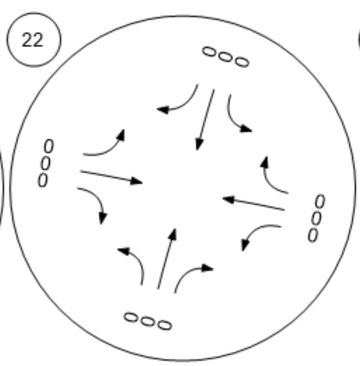

Willow Rd/Bay Rd

21



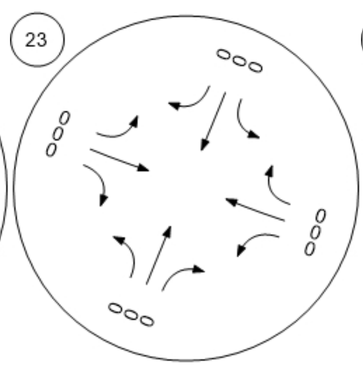

Willow Rd/Durham St-VA Me

22



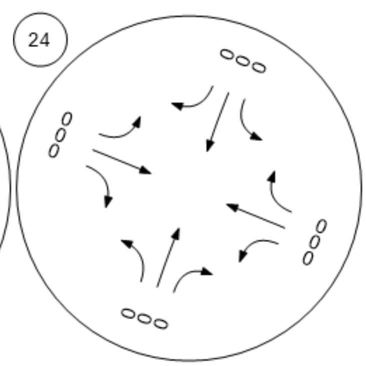

Willow Rd/Coleman Ave

23




Willow Rd/Gilbert Ave

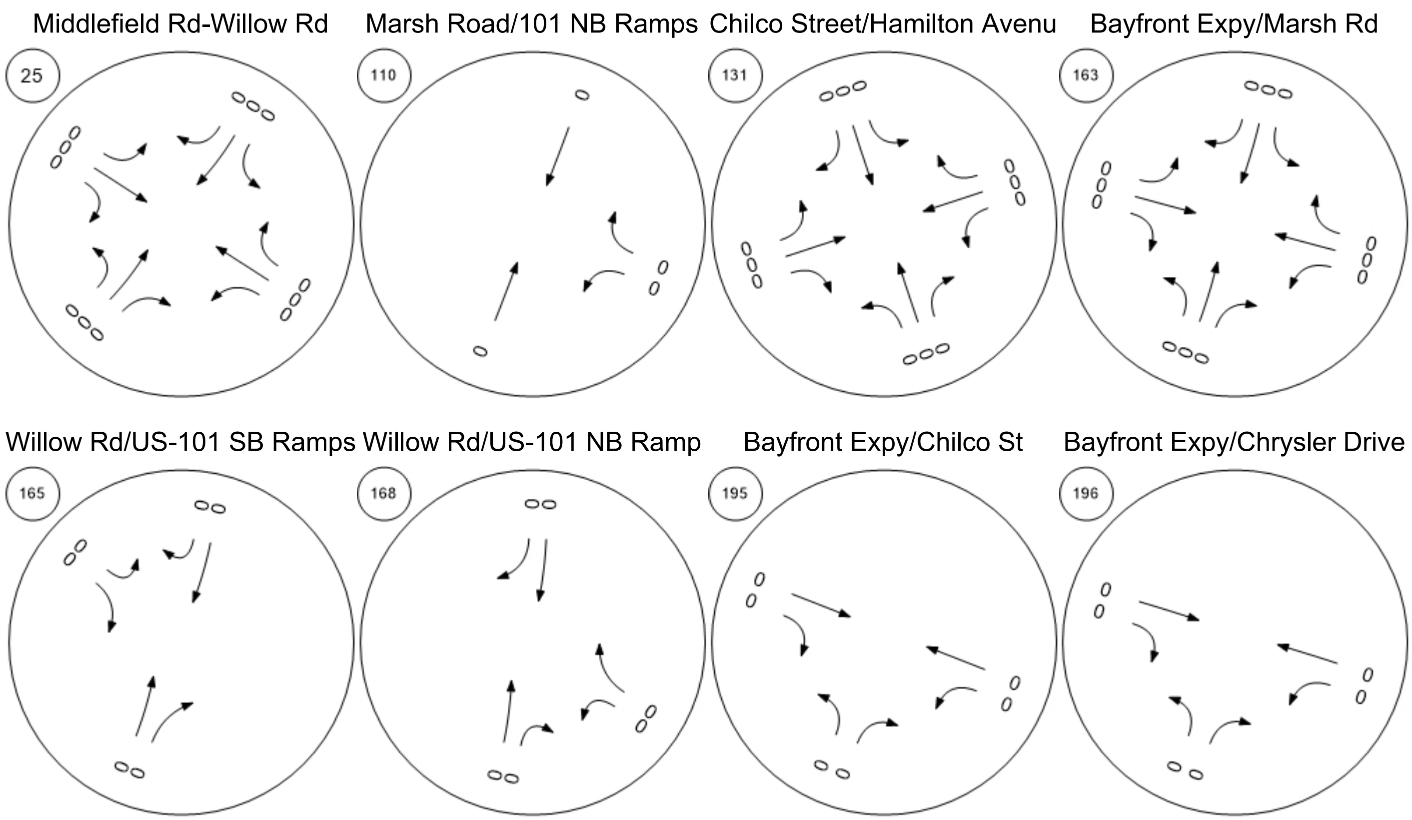
24



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

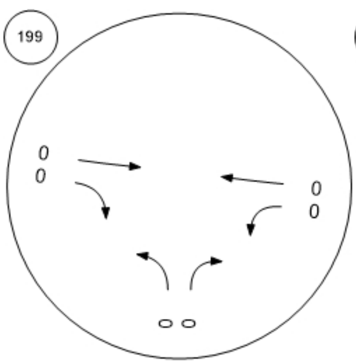



Generated with PTV VISTRO

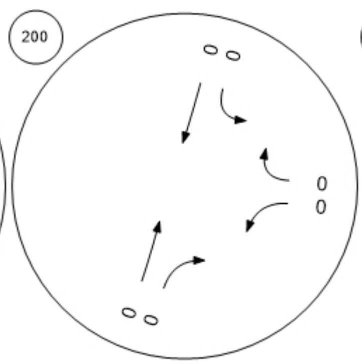
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

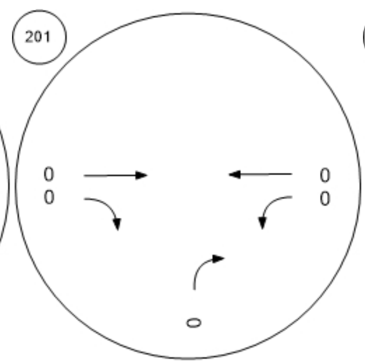

Bafront Expwy/Bldg 21



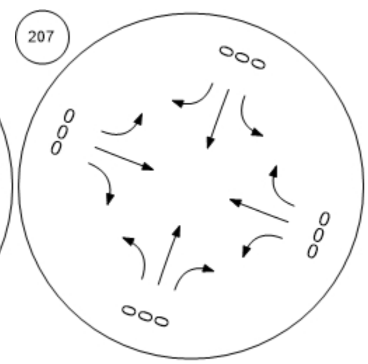

O'Brien Drive/Kavanaugh Dri



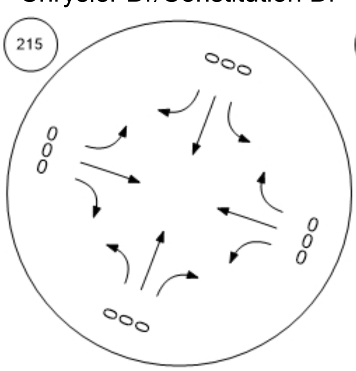

Bayfront Expwy/Bldg 20



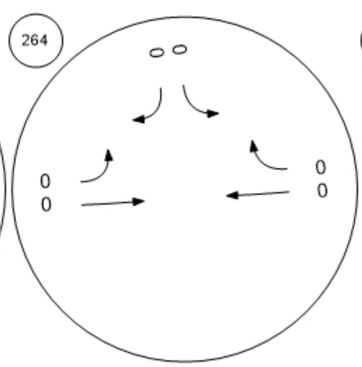

Chilco St/Constitution Dr



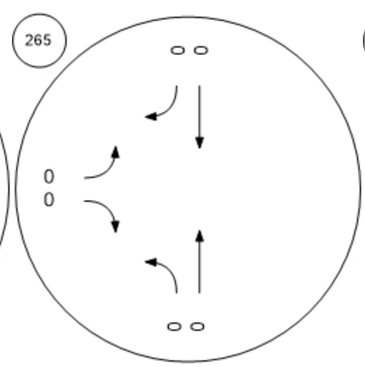

Chrysler Dr/Constitution Dr



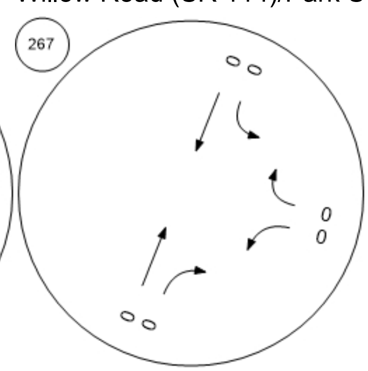

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive




Willow Road (SR 114)/Park S

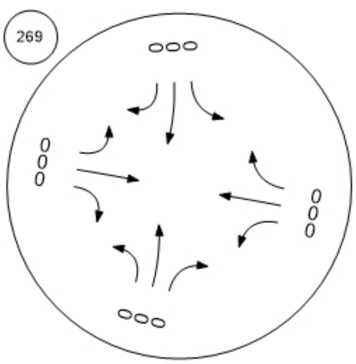


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume


O'Brien Drive/Loop Road

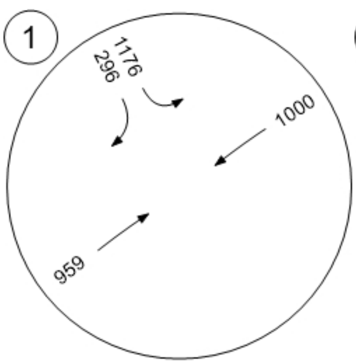


Generated with PTV VISTRO

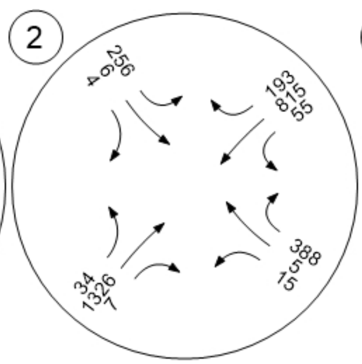
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

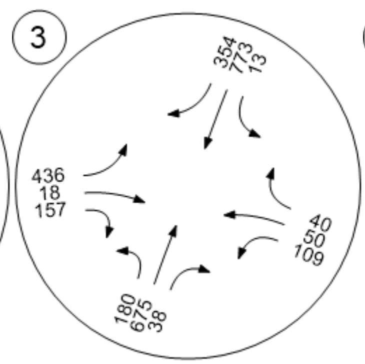

Marsh Rd (SR 84)/US 101 S



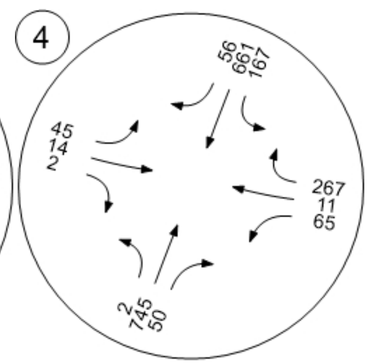

Marsh Rd/Rolison Rd-Scott D



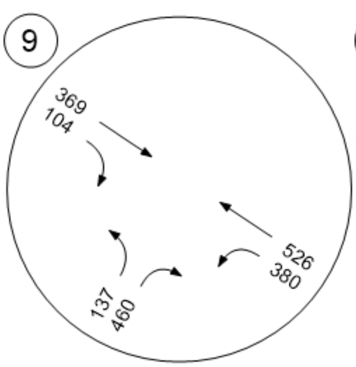

Marsh Rd/Florence St-Bohan



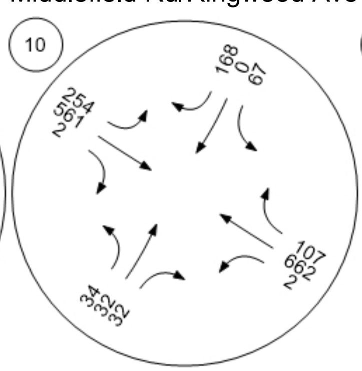

Marsh Rd/Bay Rd



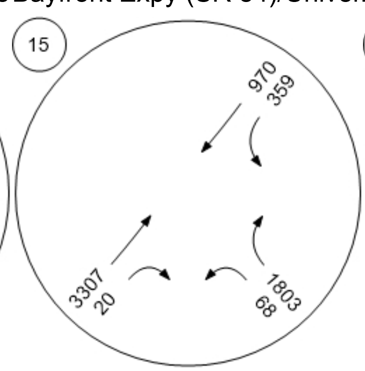

Middlefield Rd/Ravenswood



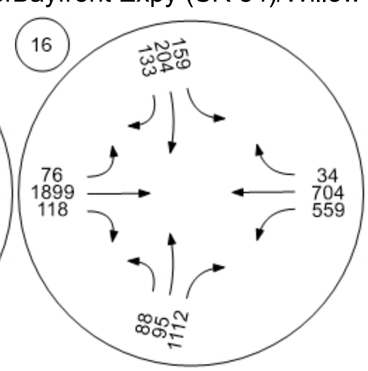

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

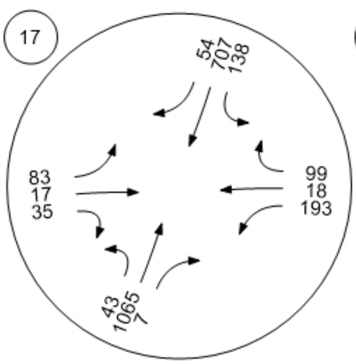


Generated with PTV VISTRO

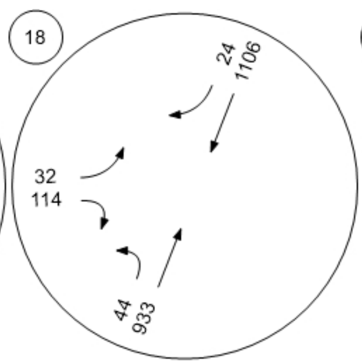
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

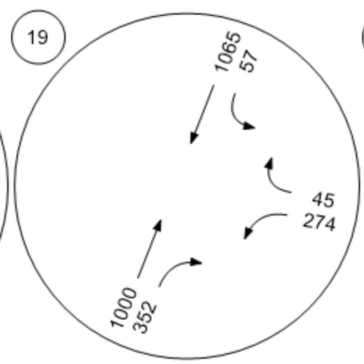

Willow Rd (SR 114)/Hamilton



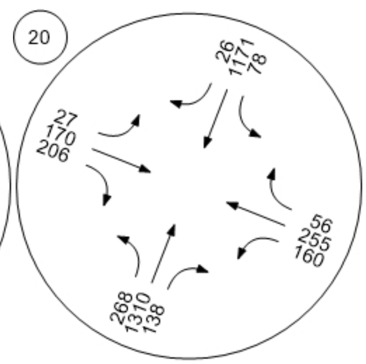

Willow Rd (SR 114)/Ivy Dr



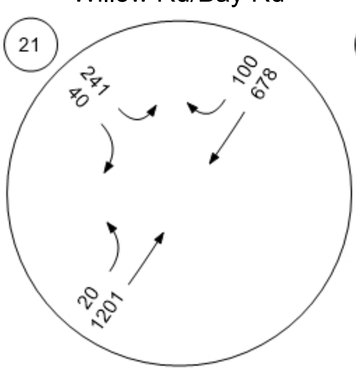

Willow Rd (SR 114)/O'Brien



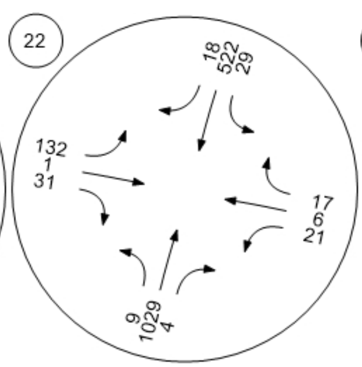

Willow Rd (SR 114)/Newbrid



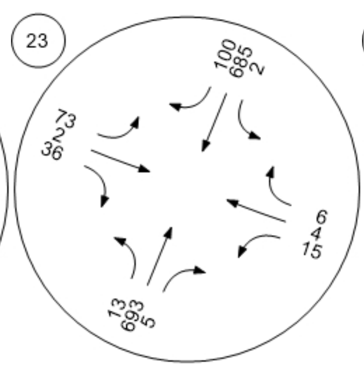

Willow Rd/Bay Rd



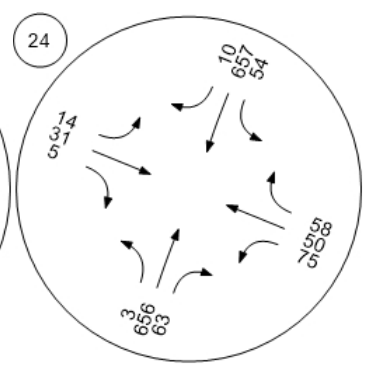

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



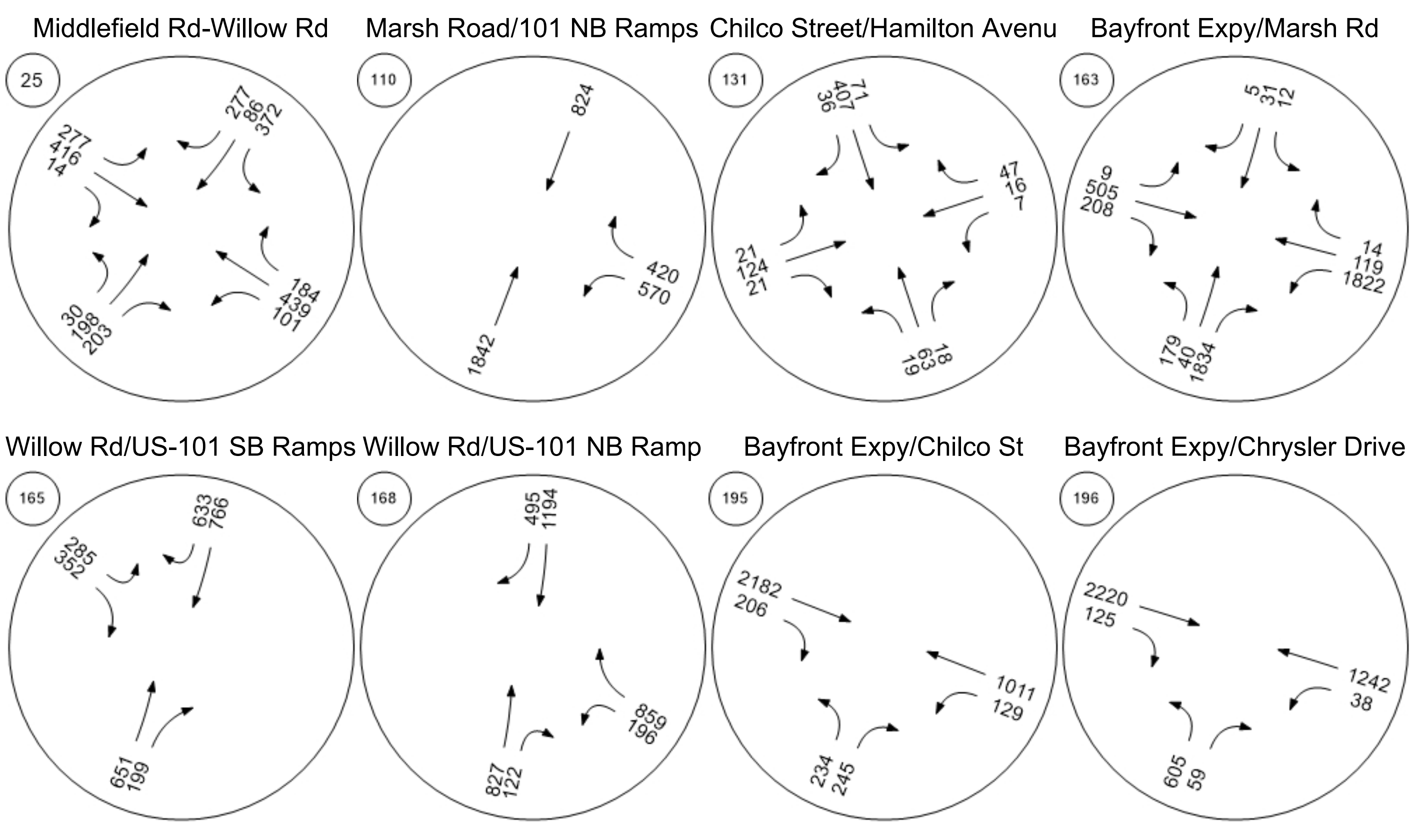

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

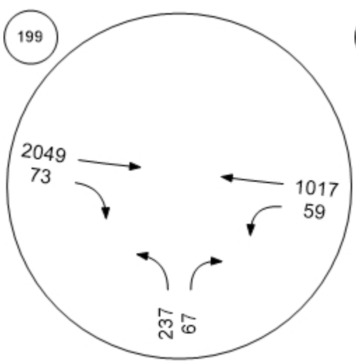
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

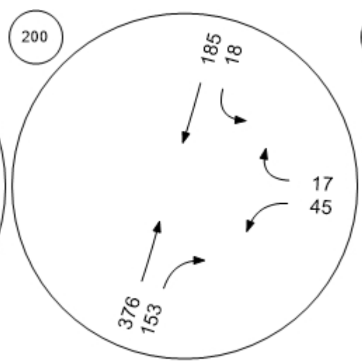



## Traffic Volume - Future Total Volume

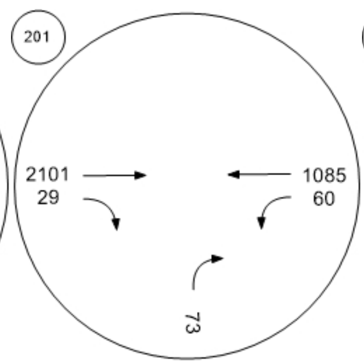

Bafront Expwy/Bldg 21



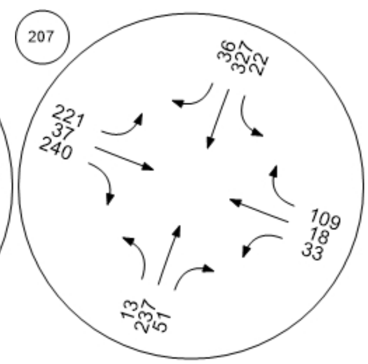

O'Brien Drive/Kavanaugh Dri



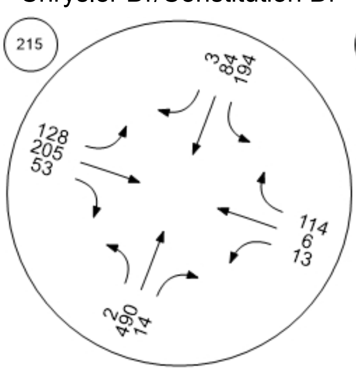

Bayfront Expwy/Bldg 20



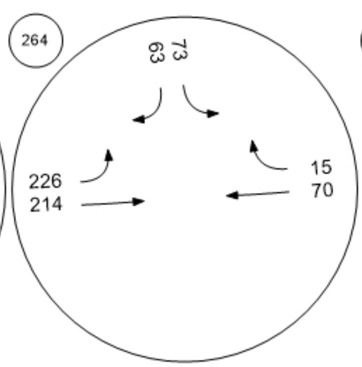

Chilco St/Constitution Dr



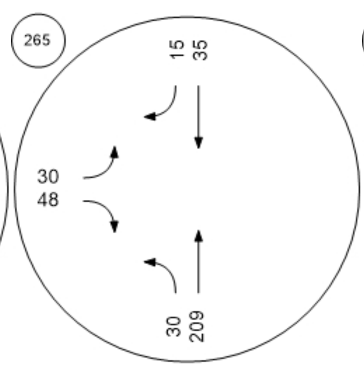

Chrysler Dr/Constitution Dr



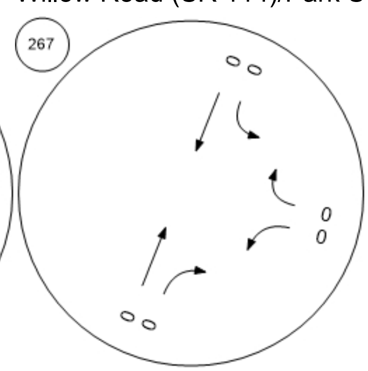

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

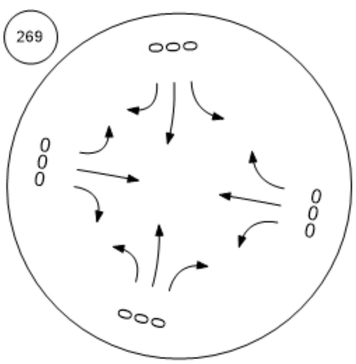



Willow Road (SR 114)/Park S



Traffic Volume - Future Total Volume


O'Brien Drive/Loop Road

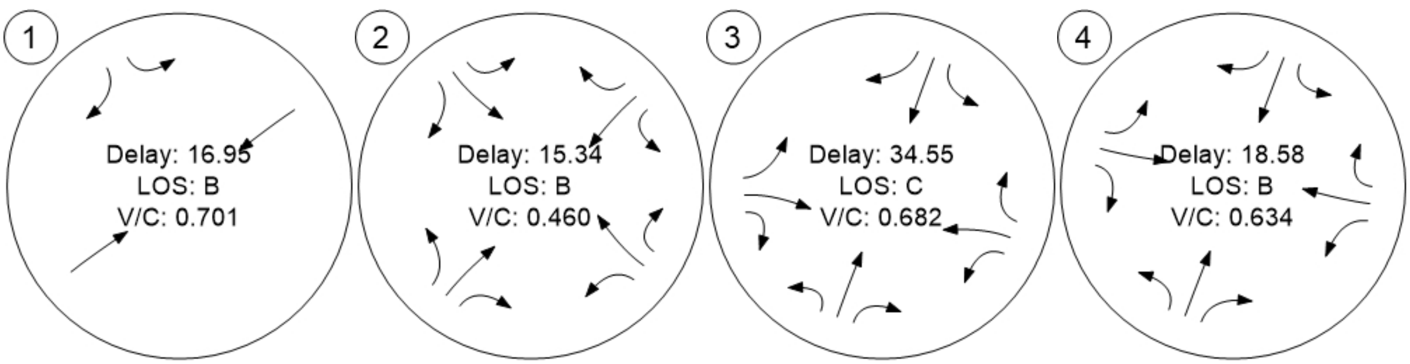


Generated with PTV VISTRO

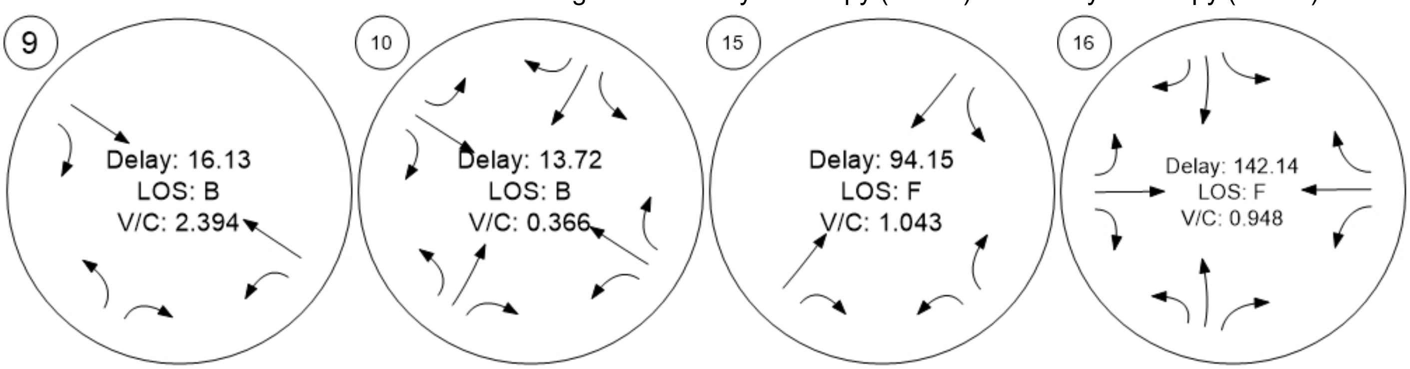
Version 2021 (SP 0-4)

Traffic Conditions


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

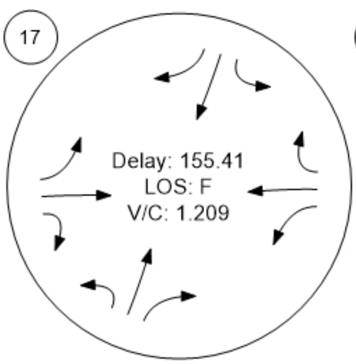


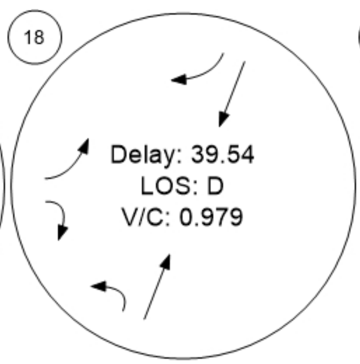
Generated with PTV VISTRO

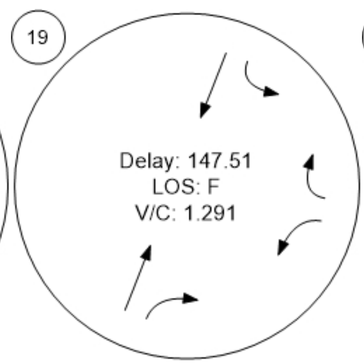
Version 2021 (SP 0-4)

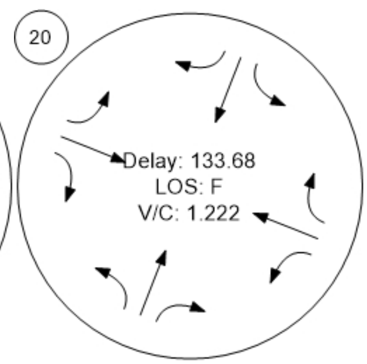
## Traffic Conditions


| Willow Rd (SR 114)/Hamilton | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/O'Brien | Willow Rd (SR 114)/Newbrid |
|---|---|---|---|

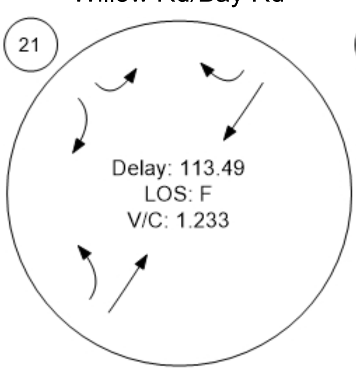


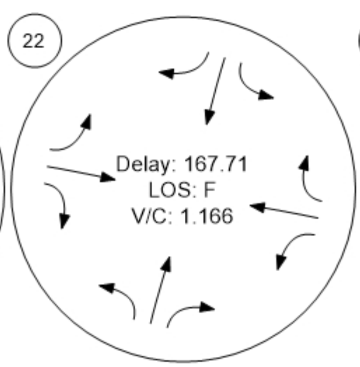



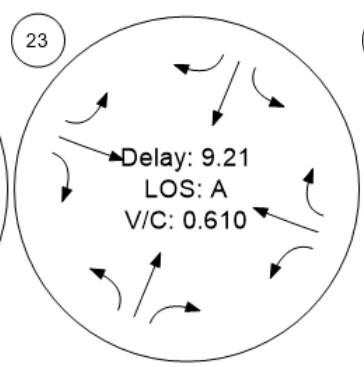



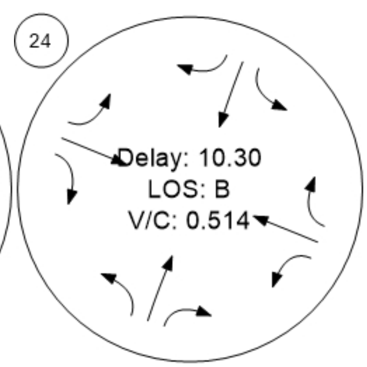




| Willow Rd/Bay Rd | Willow Rd/Durham St-VA Me | Willow Rd/Coleman Ave | Willow Rd/Gilbert Ave |
|---|---|---|---|



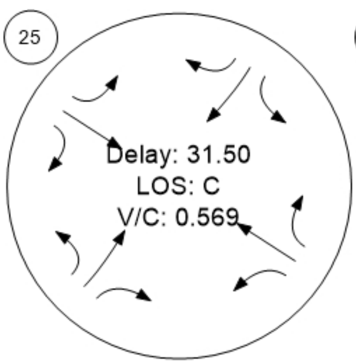



Generated with PTV VISTRO

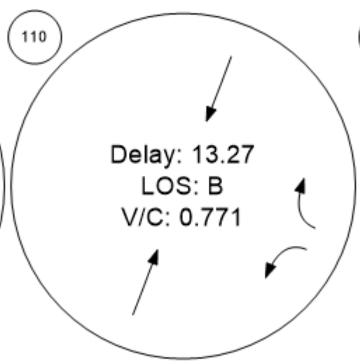
Version 2021 (SP 0-4)

## Traffic Conditions

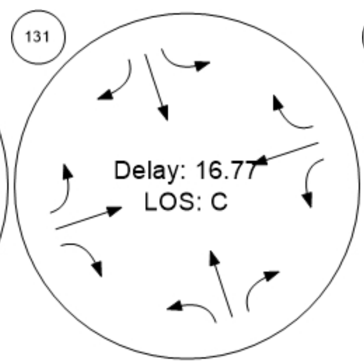

Middlefield Rd-Willow Rd



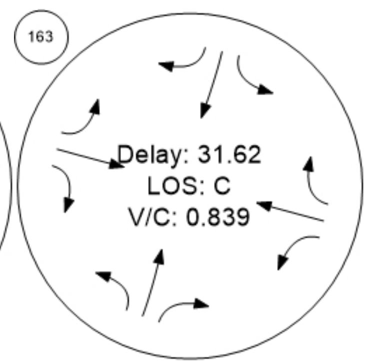

Marsh Road/101 NB Ramps



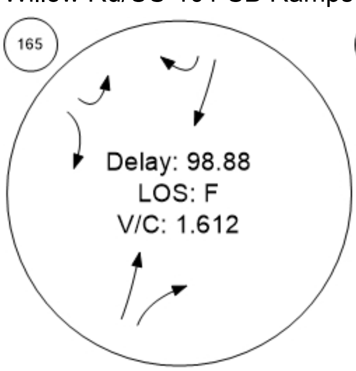

Chilco Street/Hamilton Avenu



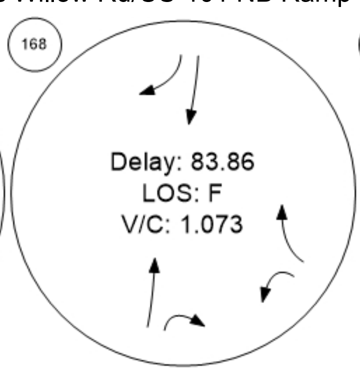

Bayfront Expy/Marsh Rd



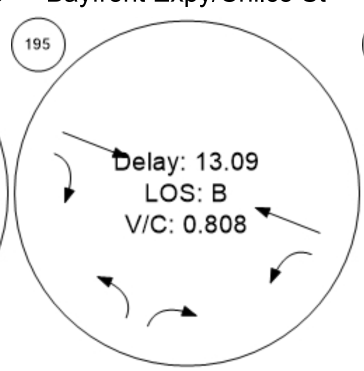

Willow Rd/US-101 SB Ramps



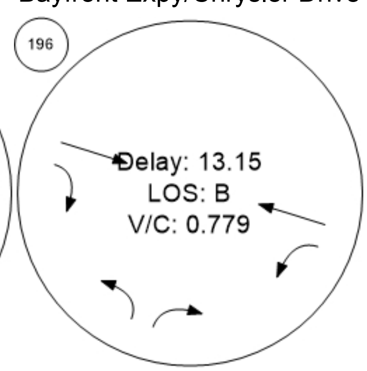

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

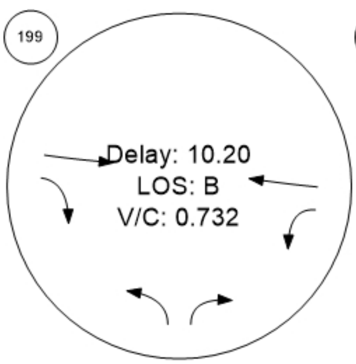



Bayfront Expy/Chrysler Drive

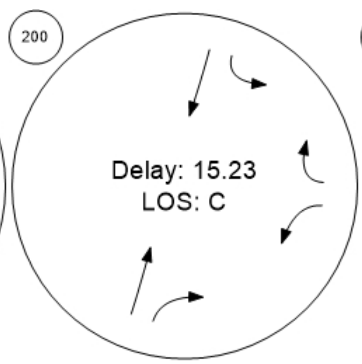


## Traffic Conditions

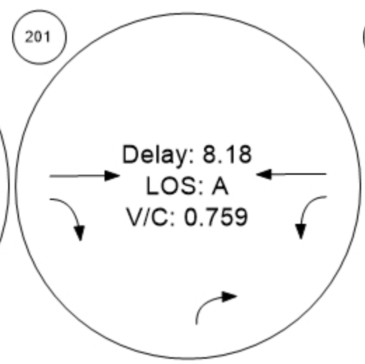

Bafront Expwy/Bldg 21



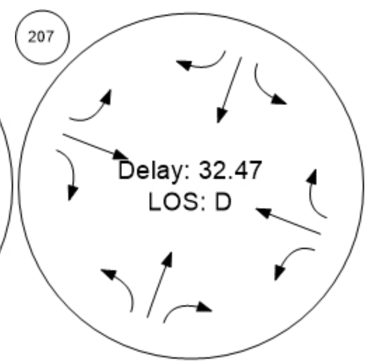

O'Brien Drive/Kavanaugh Dri



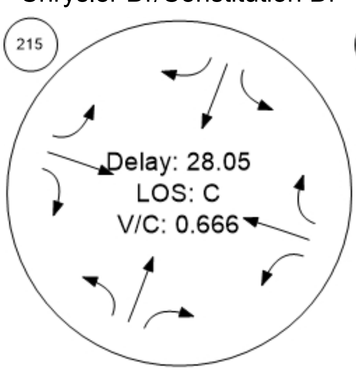

Bayfront Expwy/Bldg 20



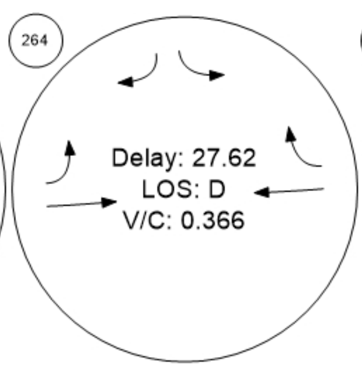

Chilco St/Constitution Dr



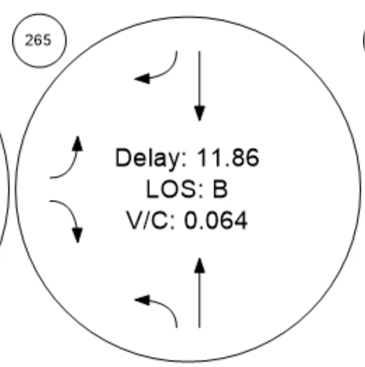

Chrysler Dr/Constitution Dr



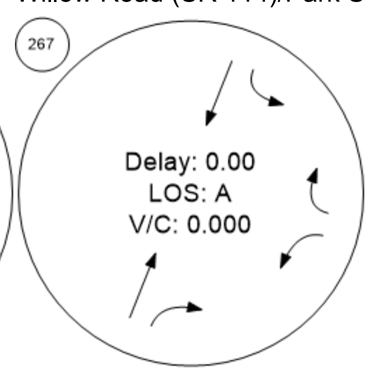

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

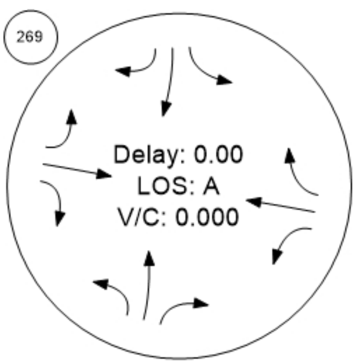



Willow Road (SR 114)/Park S



Traffic Conditions


O'Brien Drive/Loop Road

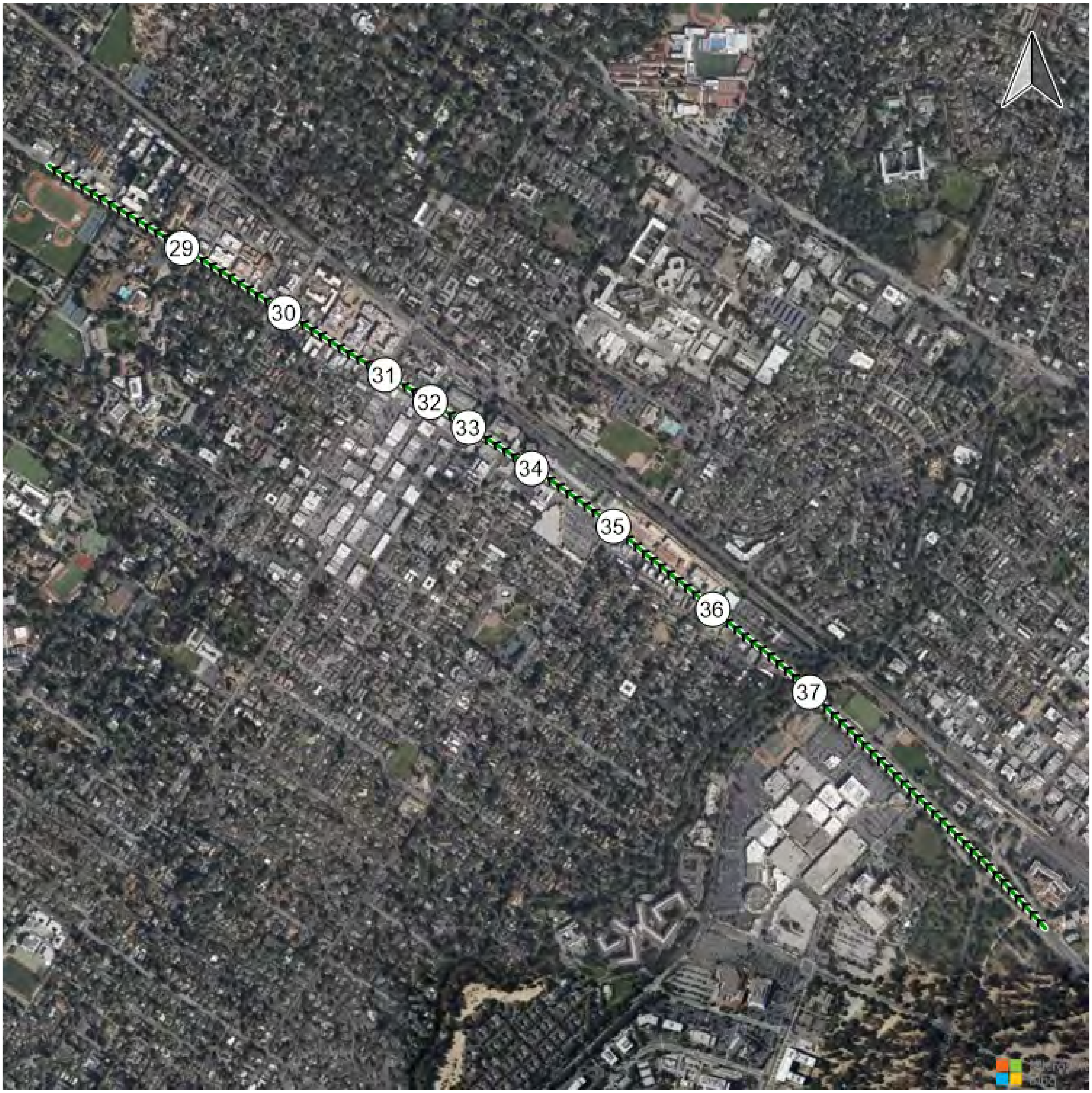


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



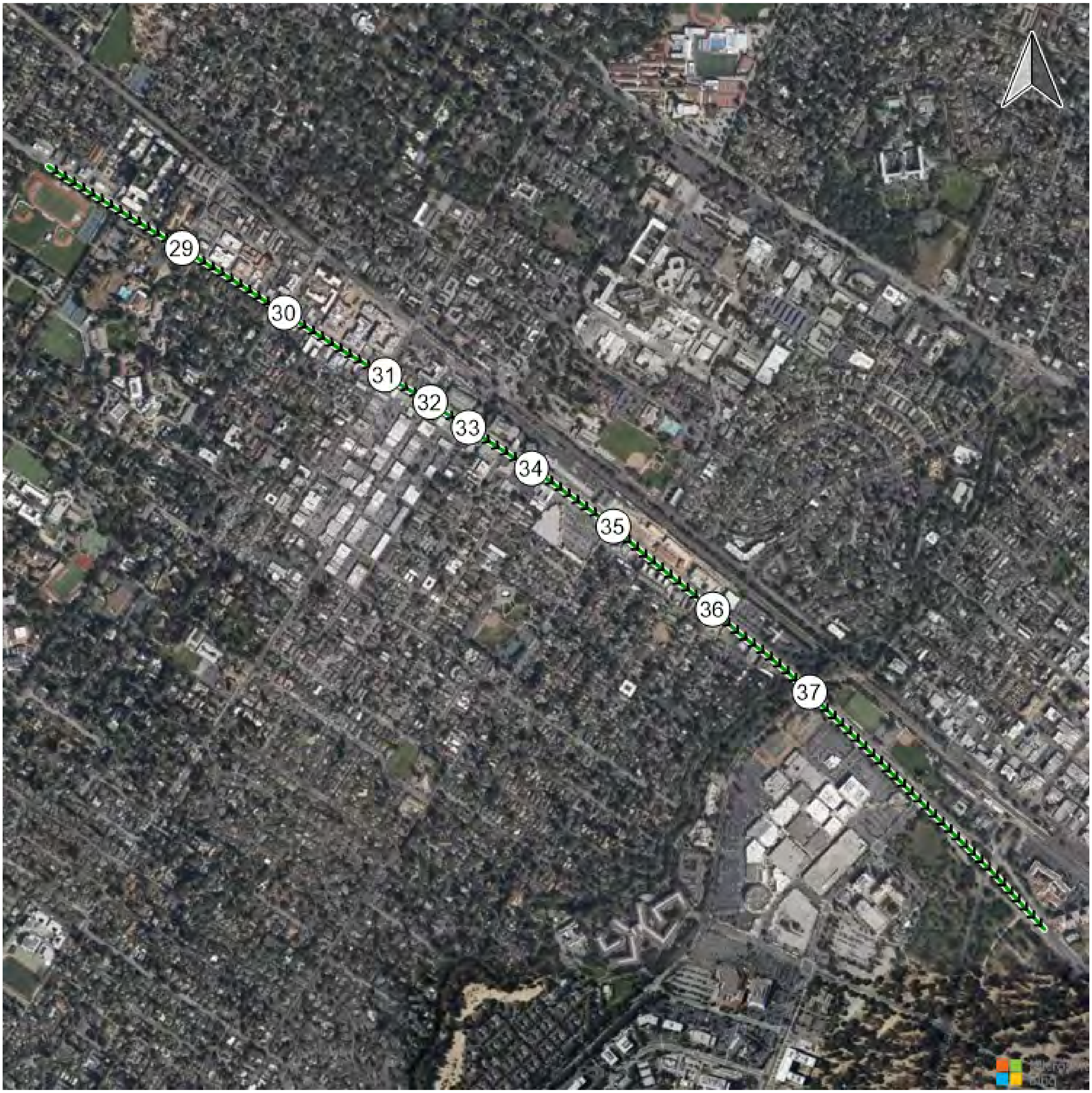
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



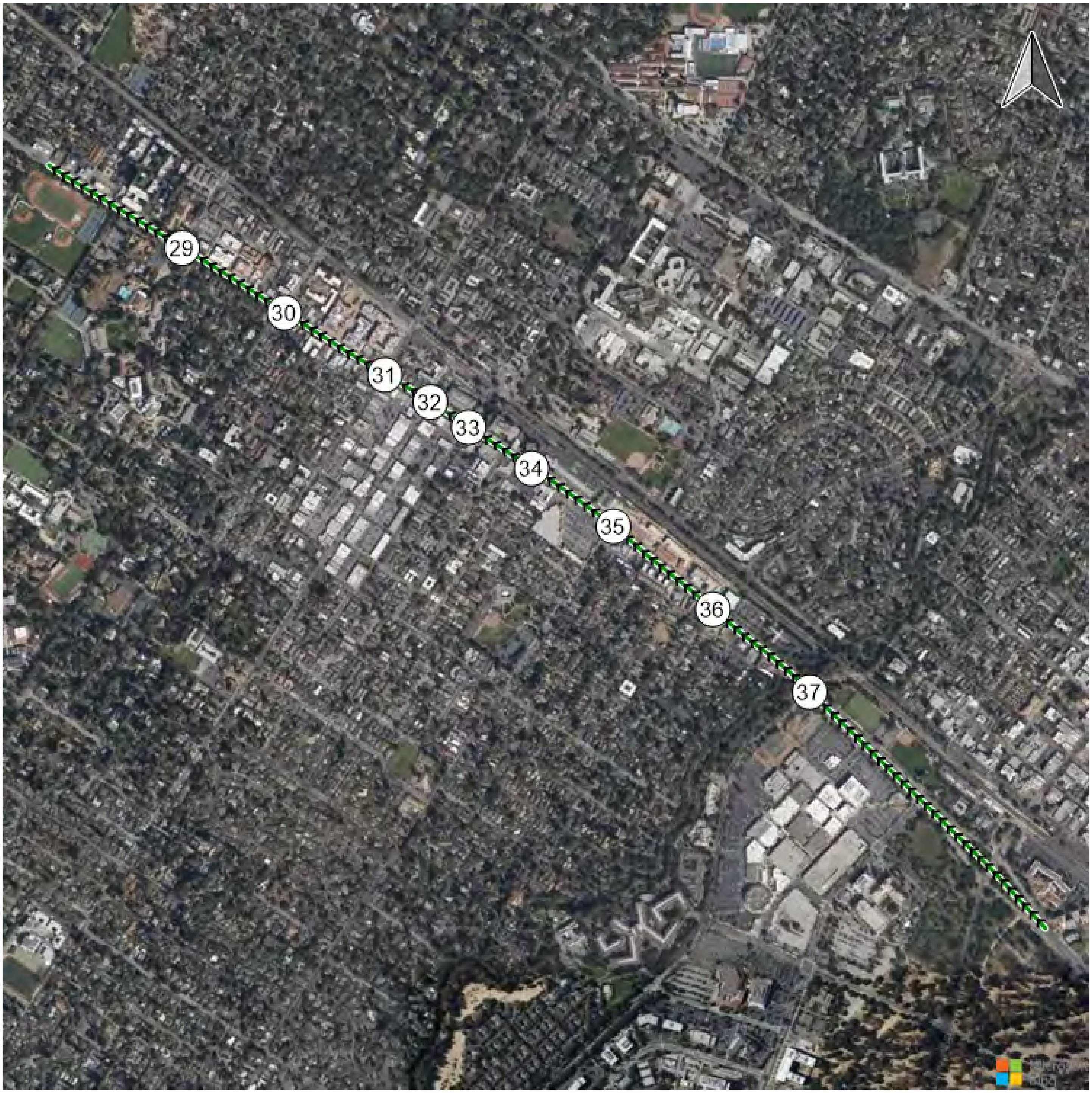
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



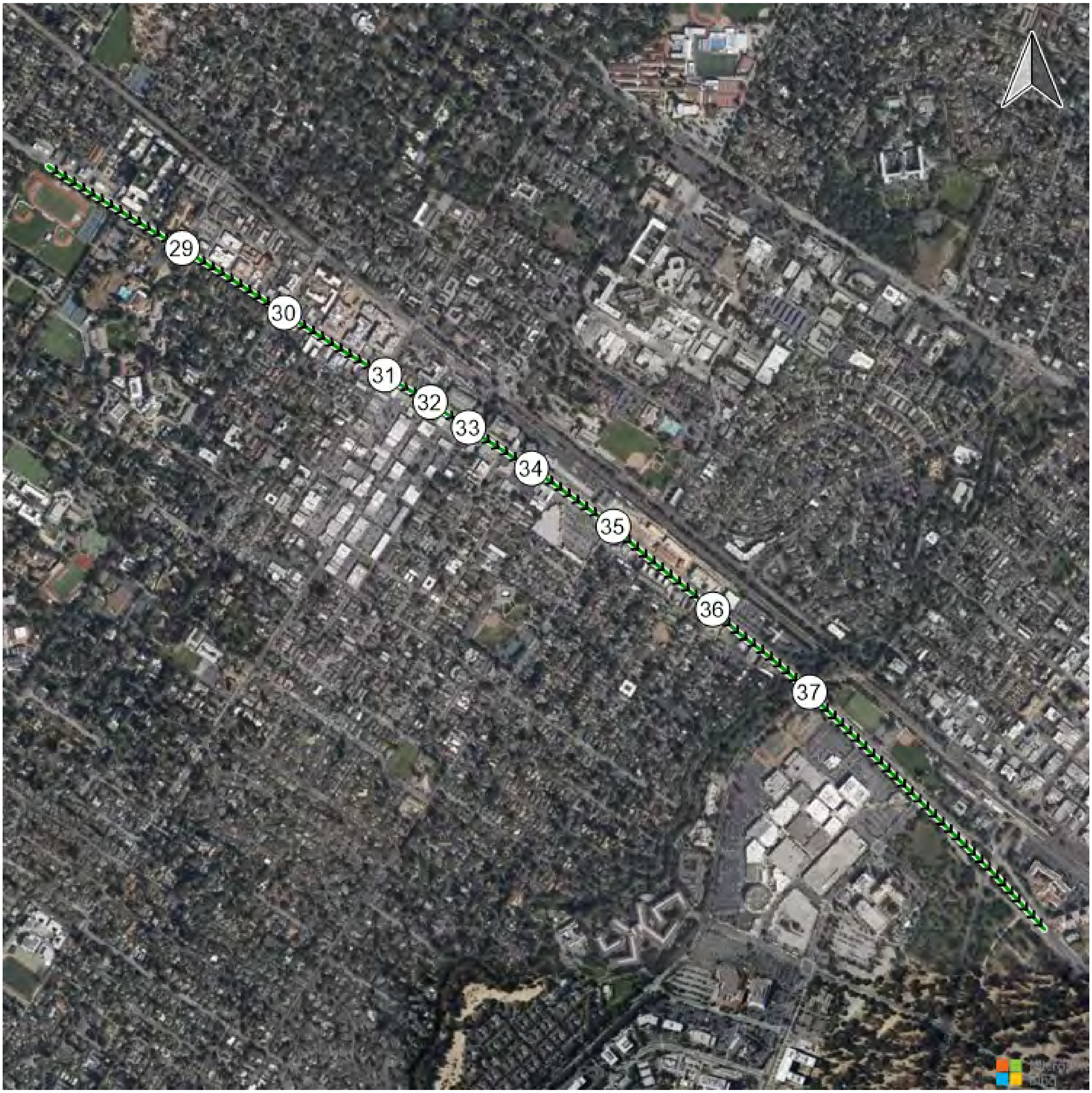
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term AM.pdf

Scenario 17 Near-Term AM (2025 vols)
12/30/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.875 | 20.7 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.745 | 20.3 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.760 | 40.0 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.752 | 23.6 | C |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.722 | 43.1 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.375 | 13.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.772 | 13.9 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.166 | 212.5 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Left | 1.060 | 106.4 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.228 | 130.5 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.162 | 77.4 | E |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | SB Right | 1.249 | 134.5 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.049 | 57.0 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | NB Left | 0.958 | 71.7 | E |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.841 | 25.1 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | EB Left | 0.692 | 20.0 | C |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.581 | 62.3 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.907 | 23.1 | C |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.351 | 10.5 | B |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.814 | 52.0 | D |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.511 | 63.8 | E |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.535 | 120.6 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.830 | 23.7 | C |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.641 | 9.1 | A |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.778 | 7.3 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | SB Thru | 0.528 | 12.7 | B |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.805 | 7.3 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Left | 0.527 | 24.8 | C |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | EB Right | 0.837 | 59.8 | E |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.108 | 17.6 | C |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.025 | 11.5 | B |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | | 0.000 | 0.0 | A |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Left | | 2.7 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.875 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 942 | 1474 | 217 | 1224 | 503 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 942 | 1474 | 217 | 1224 | 503 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 240 | 376 | 54 | 312 | 128 |
| Total Analysis Volume [veh/h] | 0 | 961 | 1504 | 217 | 1249 | 513 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 43 | 41 | 32 | 32 |
| g / C, Green / Cycle | 0.54 | 0.52 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.43 | 0.37 | 0.33 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2167 | 1812 | 1355 | 632 |
| d1, Uniform Delay [s] | 11.04 | 16.39 | 22.70 | 21.22 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.33 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.66 | 4.58 | 1.21 | 7.47 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.83 | 0.92 | 0.81 |
| d, Delay for Lane Group [s/veh] | 11.70 | 20.96 | 23.91 | 28.69 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.67 | 11.21 | 10.53 | 9.22 |
| 50th-Percentile Queue Length [ft/ln] | 116.77 | 280.35 | 263.31 | 230.60 |
| 95th-Percentile Queue Length [veh/ln] | 8.22 | 16.71 | 15.85 | 14.20 |
| 95th-Percentile Queue Length [ft/ln] | 205.38 | 417.64 | 396.37 | 355.12 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.70 | 20.96 | 0.00 | 23.91 | 28.69 |
| Movement LOS | | B | C | | C | C |
| d_A, Approach Delay [s/veh] | 11.70 | | 20.96 | | 25.30 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 20.66 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.875 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.974 | 0.000 | 2.550 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.352 | 2.800 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.745 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 1159 | 7 | 448 | 1224 | 331 | 13 | 4 | 58 | 241 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 1159 | 7 | 448 | 1224 | 331 | 13 | 4 | 0 | 241 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 322 | 2 | 124 | 340 | 92 | 4 | 1 | 0 | 67 | 5 | 0 |
| Total Analysis Volume [veh/h] | 27 | 1288 | 8 | 498 | 1360 | 368 | 14 | 4 | 0 | 268 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 5 | 105 | 105 | 120 | 112 | 112 | 6 | 6 | 28 | 28 |
| g / C, Green / Cycle | 0.03 | 0.66 | 0.66 | 0.75 | 0.70 | 0.70 | 0.04 | 0.04 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.24 | 0.24 | 0.46 | 0.47 | 0.50 | 0.01 | 0.00 | 0.15 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1081 | 1840 | 1711 | 1829 | 2572 | 1785 | 1900 |
| c, Capacity [veh/h] | 56 | 2324 | 1217 | 803 | 1294 | 1204 | 72 | 101 | 313 | 333 |
| d1, Uniform Delay [s] | 76.05 | 12.30 | 12.30 | 9.59 | 13.26 | 14.20 | 74.49 | 0.00 | 63.94 | 54.95 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.27 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.66 | 0.45 | 0.85 | 3.59 | 2.74 | 3.70 | 1.34 | 0.00 | 15.21 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.48 | 0.37 | 0.37 | 0.62 | 0.67 | 0.72 | 0.25 | 0.00 | 0.86 | 0.06 |
| d, Delay for Lane Group [s/veh] | 80.71 | 12.75 | 13.16 | 13.18 | 16.00 | 17.90 | 75.83 | 0.00 | 79.15 | 55.01 |
| Lane Group LOS | F | B | B | B | B | B | E | A | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.17 | 6.91 | 7.37 | 3.00 | 17.39 | 18.80 | 0.75 | 0.00 | 12.03 | 0.73 |
| 50th-Percentile Queue Length [ft/ln] | 29.17 | 172.74 | 184.33 | 75.12 | 434.63 | 470.10 | 18.86 | 0.00 | 300.76 | 18.16 |
| 95th-Percentile Queue Length [veh/ln] | 2.10 | 11.22 | 11.83 | 5.41 | 24.22 | 25.92 | 1.36 | 0.00 | 17.72 | 1.31 |
| 95th-Percentile Queue Length [ft/ln] | 52.50 | 280.52 | 295.66 | 135.21 | 605.59 | 647.89 | 33.94 | 0.00 | 442.97 | 32.69 |

**Movement, Approach, & Intersection Results**

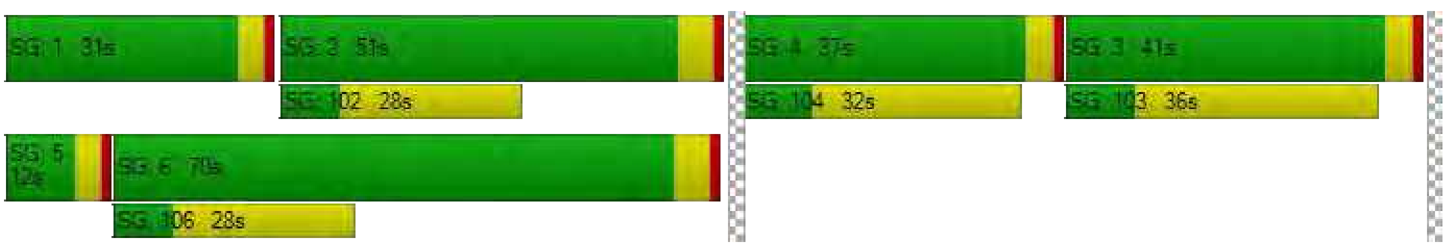
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 80.71 | 12.89 | 13.16 | 13.18 | 16.69 | 17.90 | 75.83 | 75.83 | 0.00 | 79.15 | 55.01 | 55.01 |
| Movement LOS | F | B | B | B | B | B | E | E | A | E | E | E |
| d_A, Approach Delay [s/veh] | 14.27 | | | 16.11 | | | 75.83 | | | 77.39 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 20.35 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.745 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.40 | 68.40 | 69.33 | 69.33 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.059 | 3.245 | 2.984 | 2.154 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.59 | 28.16 | 47.39 | 50.52 |
| I_b,int, Bicycle LOS Score for Intersection | 2.287 | 3.396 | 1.687 | 2.036 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 40.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.760 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 133 | 841 | 83 | 29 | 1012 | 431 | 576 | 56 | 166 | 35 | 16 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 133 | 841 | 83 | 29 | 1012 | 431 | 576 | 56 | 151 | 35 | 16 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 217 | 21 | 7 | 261 | 111 | 148 | 14 | 39 | 9 | 4 | 6 |
| Total Analysis Volume [veh/h] | 137 | 867 | 86 | 30 | 1043 | 444 | 594 | 58 | 156 | 36 | 16 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 100 | 100 | 5 | 92 | 92 | 35 | 35 | 35 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.62 | 0.62 | 0.03 | 0.58 | 0.58 | 0.22 | 0.22 | 0.22 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.26 | 0.26 | 0.02 | 0.42 | 0.44 | 0.19 | 0.19 | 0.10 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1809 | 1704 | 1823 | 1643 | 1717 | 1703 | 1525 | 1439 | 1196 |
| c, Capacity [veh/h] | 142 | 1169 | 1127 | 58 | 1051 | 947 | 378 | 375 | 336 | 104 | 86 |
| d1, Uniform Delay [s] | 73.20 | 15.30 | 15.32 | 75.88 | 24.85 | 25.46 | 60.04 | 59.99 | 53.98 | 70.60 | 71.34 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.12 | 0.12 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 66.06 | 1.08 | 1.13 | 2.58 | 4.54 | 5.63 | 6.78 | 6.60 | 0.74 | 1.47 | 3.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.96 | 0.41 | 0.42 | 0.51 | 0.73 | 0.76 | 0.87 | 0.86 | 0.46 | 0.35 | 0.49 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 139.26 | 16.38 | 16.46 | 78.45 | 29.39 | 31.09 | 66.83 | 66.59 | 54.72 | 72.07 | 74.48 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.22 | 9.26 | 9.00 | 1.26 | 22.31 | 21.48 | 13.67 | 13.48 | 5.61 | 1.47 | 1.75 |
| 50th-Percentile Queue Length [ft/ln] | 205.39 | 231.40 | 224.97 | 31.42 | 557.85 | 536.93 | 341.69 | 336.97 | 140.23 | 36.66 | 43.85 |
| 95th-Percentile Queue Length [veh/ln] | 12.92 | 14.25 | 13.92 | 2.26 | 30.06 | 29.08 | 19.73 | 19.50 | 9.49 | 2.64 | 3.16 |
| 95th-Percentile Queue Length [ft/ln] | 322.91 | 356.13 | 347.96 | 56.56 | 751.52 | 726.94 | 493.27 | 487.49 | 237.33 | 65.99 | 78.93 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

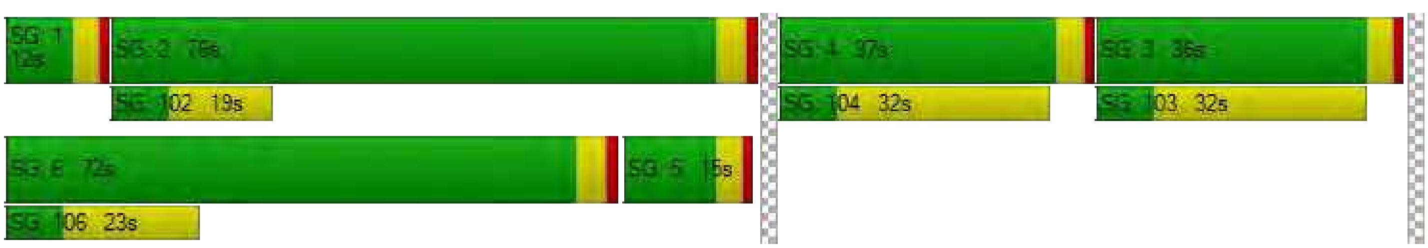
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 139.26 | 16.41 | 16.46 | 78.45 | 29.84 | 31.09 | 66.72 | 66.59 | 54.72 | 72.07 | 74.48 | 74.48 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 31.86 | | | 31.16 | | | 64.39 | | | 73.37 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 40.01 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.760 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.924 | 3.050 | 2.468 | 2.036 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.459 | 2.811 | 2.918 | 1.688 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.752 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 810 | 85 | 310 | 755 | 66 | 218 | 66 | 2 | 40 | 22 | 202 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 810 | 85 | 310 | 755 | 66 | 218 | 66 | 2 | 40 | 22 | 202 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 207 | 22 | 79 | 193 | 17 | 56 | 17 | 1 | 10 | 6 | 52 |
| Total Analysis Volume [veh/h] | 0 | 827 | 87 | 316 | 770 | 67 | 222 | 67 | 2 | 41 | 22 | 206 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 29 | 29 | 16 | 48 | 48 | 28 | 28 |
| g / C, Green / Cycle | 0.36 | 0.36 | 0.20 | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.19 | 0.23 | 0.24 | 0.27 | 0.16 |
| s, saturation flow rate [veh/h] | 1882 | 1652 | 1708 | 1807 | 1747 | 1074 | 1637 |
| c, Capacity [veh/h] | 714 | 587 | 342 | 1072 | 1036 | 454 | 624 |
| d1, Uniform Delay [s] | 22.46 | 22.47 | 31.43 | 8.67 | 8.68 | 24.56 | 20.45 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.35 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.21 | 7.73 | 10.46 | 1.10 | 1.15 | 4.80 | 1.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.68 | 0.73 | 0.92 | 0.40 | 0.40 | 0.64 | 0.43 |
| d, Delay for Lane Group [s/veh] | 27.67 | 30.19 | 41.89 | 9.76 | 9.83 | 29.35 | 21.46 |
| Lane Group LOS | C | C | D | A | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.39 | 7.72 | 6.69 | 3.61 | 3.53 | 5.51 | 3.94 |
| 50th-Percentile Queue Length [ft/ln] | 209.72 | 193.08 | 167.14 | 90.23 | 88.27 | 137.79 | 98.45 |
| 95th-Percentile Queue Length [veh/ln] | 13.14 | 12.28 | 10.93 | 6.50 | 6.36 | 9.36 | 7.09 |
| 95th-Percentile Queue Length [ft/ln] | 328.46 | 307.03 | 273.15 | 162.41 | 158.88 | 234.04 | 177.20 |

**Movement, Approach, & Intersection Results**

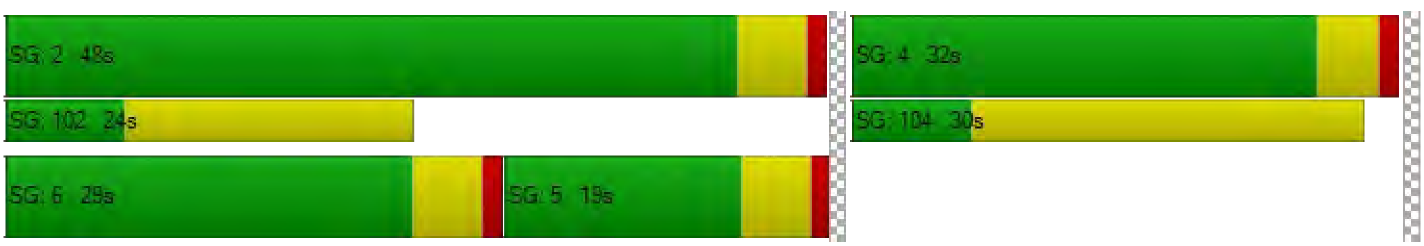
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.67 | 28.71 | 30.19 | 41.89 | 9.79 | 9.83 | 29.35 | 29.35 | 29.35 | 21.46 | 21.46 | 21.46 |
| Movement LOS | C | C | C | D | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 28.85 | | | 18.59 | | | 29.35 | | | 21.46 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 23.65 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.752 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.79 | 29.79 | 29.79 | 19.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.674 | 3.157 | 1.863 | 2.052 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.70 | 8.68 | 17.47 | 17.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.314 | 2.511 | 2.040 | 2.003 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 43.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.722 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 479 | 488 | 425 | 476 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 488 | 425 | 476 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 130 | 113 | 127 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 519 | 452 | 506 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.29 | 0.24 | 0.35 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1776 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1004 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.15 | 17.39 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 60.55 | 0.47 | 2.82 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.07 | 0.29 | 0.61 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 104.07 | 2.63 | 20.21 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 22.27 | 1.62 | 11.53 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 556.69 | 40.44 | 288.37 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 31.27 | 2.91 | 17.10 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 781.87 | 72.79 | 427.61 |

**Movement, Approach, & Intersection Results**

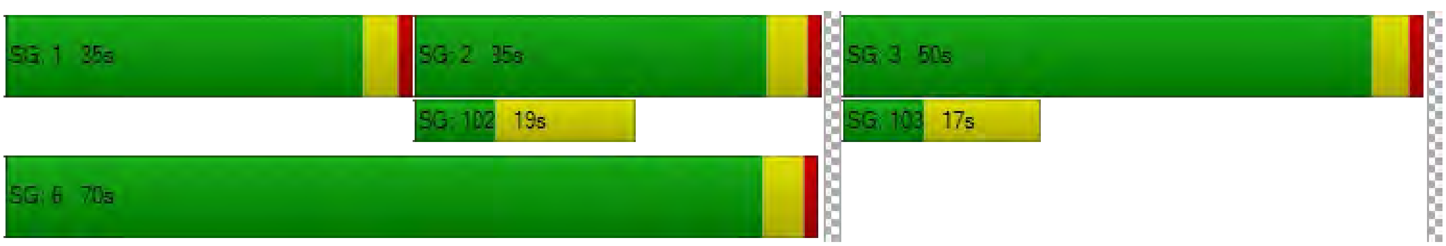
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 104.07 | 2.63 | 20.21 | 20.21 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 56.85 | | 20.21 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 43.14 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.722 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.936 | 2.849 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.162 | 2.578 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.375 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 310 | 21 | 600 | 114 | 243 | 683 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 88 | 21 | 600 | 18 | 243 | 683 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 23 | 6 | 160 | 5 | 65 | 182 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 94 | 22 | 638 | 19 | 259 | 727 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | 24 | 92 | 79 | 79 | 89 | 83 | 83 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.20 | 0.77 | 0.66 | 0.66 | 0.74 | 0.69 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.06 | 0.03 | 0.18 | 0.01 | 0.29 | 0.22 | 0.22 |
| s, saturation flow rate [veh/h] | 1401 | 1737 | 1278 | 1481 | 748 | 3526 | 1473 | 888 | 1840 | 1774 |
| c, Capacity [veh/h] | 122 | 348 | 311 | 297 | 607 | 2334 | 975 | 698 | 1276 | 1231 |
| d1, Uniform Delay [s] | 55.06 | 38.85 | 46.06 | 40.81 | 4.36 | 8.37 | 6.93 | 5.01 | 7.18 | 7.20 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 0.07 | 1.38 | 0.58 | 0.02 | 0.29 | 0.04 | 1.51 | 0.64 | 0.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.06 | 0.54 | 0.32 | 0.04 | 0.27 | 0.02 | 0.37 | 0.31 | 0.32 |
| d, Delay for Lane Group [s/veh] | 55.22 | 38.92 | 47.44 | 41.39 | 4.39 | 8.66 | 6.97 | 6.52 | 7.82 | 7.88 |
| Lane Group LOS | E | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.55 | 4.76 | 2.42 | 0.12 | 3.28 | 0.17 | 1.94 | 3.84 | 3.76 |
| 50th-Percentile Queue Length [ft/ln] | 4.57 | 13.66 | 119.06 | 60.61 | 3.11 | 82.01 | 4.18 | 48.45 | 96.01 | 93.94 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 0.98 | 8.34 | 4.36 | 0.22 | 5.91 | 0.30 | 3.49 | 6.91 | 6.76 |
| 95th-Percentile Queue Length [ft/ln] | 8.22 | 24.60 | 208.53 | 109.10 | 5.60 | 147.63 | 7.53 | 87.21 | 172.81 | 169.10 |

**Movement, Approach, & Intersection Results**

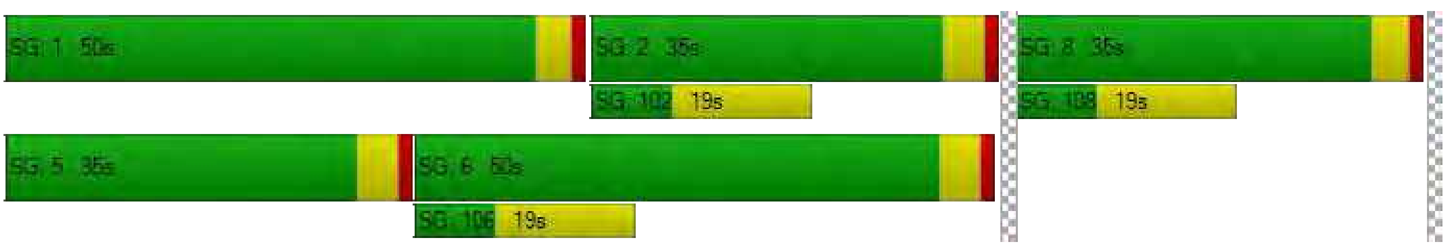
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.22 | 38.92 | 38.92 | 47.44 | 47.44 | 41.39 | 4.39 | 8.66 | 6.97 | 6.52 | 7.85 | 7.88 |
| Movement LOS | E | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 42.42 | | | 45.26 | | | 8.47 | | | 7.52 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.22 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.375 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.007 | 2.794 | 3.111 | 2.779 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.357 | 2.199 | 2.423 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.772 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 829 | 84 | 1215 | 2780 | 329 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 829 | 84 | 1215 | 2780 | 329 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 214 | 22 | 313 | 716 | 85 | 107 |
| Total Analysis Volume [veh/h] | 855 | 87 | 1253 | 2866 | 339 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 73 | 73 | 73 | 73 | 73 | 73 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 20 | 30 | 53 | 10 | 44 |
| g / C, Green / Cycle | 0.27 | 0.27 | 0.41 | 0.73 | 0.14 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.06 | 0.36 | 0.57 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1548 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1350 | 422 | 1410 | 3676 | 471 | 2489 |
| d1, Uniform Delay [s] | 23.35 | 20.46 | 20.14 | 6.24 | 30.20 | 6.59 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.60 | 0.29 | 0.81 | 0.45 | 0.78 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.21 | 0.89 | 0.78 | 0.72 | 0.17 |
| d, Delay for Lane Group [s/veh] | 23.95 | 20.75 | 20.94 | 6.69 | 30.98 | 6.61 |
| Lane Group LOS | C | C | C | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.77 | 1.02 | 8.01 | 3.44 | 2.75 | 0.81 |
| 50th-Percentile Queue Length [ft/ln] | 94.15 | 25.52 | 200.24 | 86.12 | 68.87 | 20.18 |
| 95th-Percentile Queue Length [veh/ln] | 6.78 | 1.84 | 12.65 | 6.20 | 4.96 | 1.45 |
| 95th-Percentile Queue Length [ft/ln] | 169.48 | 45.94 | 316.27 | 155.02 | 123.96 | 36.32 |

**Movement, Approach, & Intersection Results**

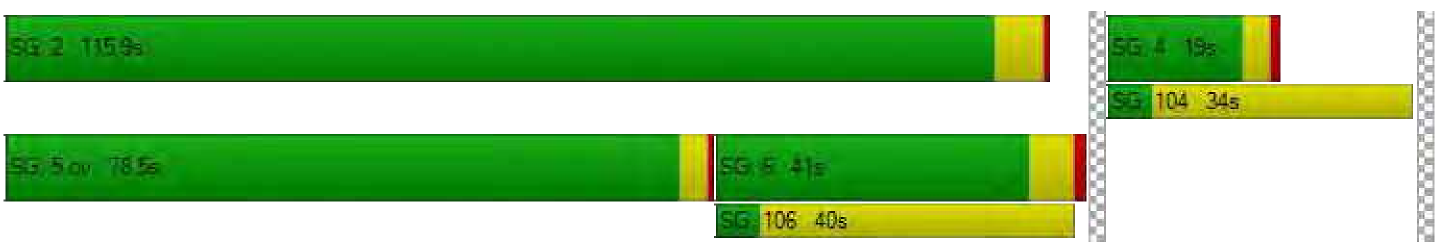
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.95 | 20.75 | 20.94 | 6.69 | 30.98 | 6.61 |
| Movement LOS | C | C | C | A | C | A |
| d_A, Approach Delay [s/veh] | 23.66 | | 11.03 | | 17.37 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 13.90 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.772 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 28.01 | 0.00 | 28.01 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.644 | 0.000 | 2.927 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 960 | 384 | 411 |
| d_b, Bicycle Delay [s] | 9.86 | 23.81 | 23.00 |
| I_b,int, Bicycle LOS Score for Intersection | 2.078 | 3.825 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 212.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.166 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 210 | 464 | 277 | 42 | 93 | 78 | 376 | 453 | 172 | 1142 | 2234 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 210 | 464 | 277 | 42 | 93 | 62 | 376 | 453 | 66 | 1142 | 2234 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 54 | 118 | 71 | 11 | 24 | 16 | 96 | 116 | 17 | 291 | 570 | 18 |
| Total Analysis Volume [veh/h] | 214 | 473 | 283 | 43 | 95 | 63 | 384 | 462 | 67 | 1165 | 2280 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 3 | | | 2 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 0 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 0 | | | 4 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.29 | 0.21 | 0.07 | 0.06 | 0.03 | 0.06 | 0.25 | 0.09 | 0.05 | 0.43 | 0.45 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 58.13 | 56.33 | 57.69 | 50.09 | 24.72 | 23.48 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.32 | 0.11 | 0.24 | 0.11 | 0.19 | 0.15 | 0.11 | 0.11 | 0.48 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 332.70 | 139.67 | 0.05 | 65.89 | 1.84 | 30.27 | 112.73 | 0.06 | 0.08 | 530.36 | 67.17 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.67 | 1.28 | 0.18 | 0.90 | 0.48 | 0.82 | 1.23 | 0.23 | 0.11 | 2.17 | 1.15 | 0.11 |
| d, Delay for Lane Group [s/veh] | 384.84 | 192.21 | 24.51 | 124.02 | 58.18 | 87.96 | 162.82 | 24.78 | 23.57 | 580.94 | 105.24 | 24.15 |
| Lane Group LOS | F | F | C | F | E | F | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 15.83 | 12.89 | 1.81 | 2.26 | 1.53 | 2.66 | 9.79 | 3.07 | 1.28 | 48.10 | 32.47 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 395.66 | 322.25 | 45.13 | 56.49 | 38.32 | 66.49 | 244.65 | 76.82 | 31.98 | 1202.44 | 811.72 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 26.78 | 20.86 | 3.25 | 4.07 | 2.76 | 4.79 | 16.37 | 5.53 | 2.30 | 76.66 | 45.90 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 669.43 | 521.41 | 81.24 | 101.68 | 68.97 | 119.68 | 409.22 | 138.27 | 57.56 | 1916.61 | 1147.60 | 63.55 |

**Movement, Approach, & Intersection Results**

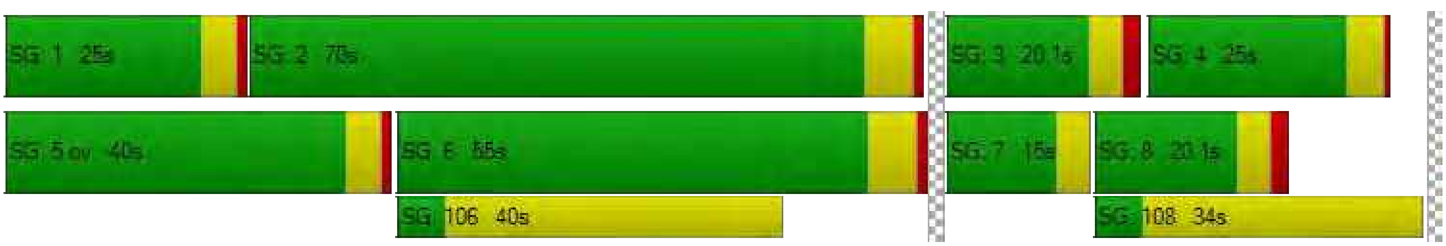
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 384.84 | 192.21 | 24.51 | 124.02 | 58.18 | 87.96 | 162.82 | 24.78 | 23.57 | 580.94 | 105.24 | 24.15 |
| Movement LOS | F | F | C | F | E | F | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | 185.78 | | | 81.60 | | | 82.75 | | | 261.09 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 212.55 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.166 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.125 | 0.000 | 3.332 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.62 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.360 | 1.739 | 2.120 | 3.495 |
| Bicycle LOS | B | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 106.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.060 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 110 | 833 | 73 | 190 | 1189 | 37 | 47 | 14 | 48 | 56 | 25 | 87 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 110 | 833 | 73 | 190 | 1189 | 37 | 47 | 14 | 48 | 56 | 25 | 87 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 30 | 224 | 20 | 51 | 320 | 10 | 13 | 4 | 13 | 15 | 7 | 23 |
| Total Analysis Volume [veh/h] | 118 | 896 | 78 | 204 | 1278 | 40 | 51 | 15 | 52 | 60 | 27 | 94 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 92 | 75 | 75 | 92 | 78 | 78 | 30 | 31 |
| g / C, Green / Cycle | 0.71 | 0.58 | 0.58 | 0.71 | 0.60 | 0.60 | 0.23 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.61 | 0.61 | 0.34 | 0.71 | 0.71 | 0.22 | 0.24 |
| s, saturation flow rate [veh/h] | 467 | 808 | 782 | 599 | 934 | 919 | 548 | 762 |
| c, Capacity [veh/h] | 146 | 468 | 453 | 179 | 563 | 554 | 168 | 202 |
| d1, Uniform Delay [s] | 36.23 | 27.32 | 27.32 | 47.95 | 25.77 | 25.77 | 49.64 | 46.68 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.34 | 0.43 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 36.99 | 56.85 | 59.11 | 110.51 | 95.94 | 100.31 | 15.26 | 36.65 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 1.05 | 1.06 | 1.14 | 1.17 | 1.18 | 0.70 | 0.90 |
| d, Delay for Lane Group [s/veh] | 73.22 | 84.17 | 86.43 | 158.46 | 121.71 | 126.08 | 64.90 | 83.33 |
| Lane Group LOS | E | F | F | F | F | F | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.48 | 20.55 | 20.17 | 7.18 | 31.23 | 31.41 | 4.55 | 7.66 |
| 50th-Percentile Queue Length [ft/ln] | 61.95 | 513.78 | 504.36 | 179.45 | 780.85 | 785.13 | 113.77 | 191.46 |
| 95th-Percentile Queue Length [veh/ln] | 4.46 | 29.19 | 28.83 | 12.64 | 45.65 | 46.14 | 8.05 | 12.20 |
| 95th-Percentile Queue Length [ft/ln] | 111.52 | 729.84 | 720.75 | 316.00 | 1141.32 | 1153.52 | 201.23 | 304.92 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 73.22 | 85.18 | 86.43 | 158.46 | 123.82 | 126.08 | 64.90 | 64.90 | 64.90 | 83.33 | 83.33 | 83.33 |
| Movement LOS | E | F | F | F | F | F | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | | 83.98 | | | 128.52 | | | 64.90 | | | 83.33 | |
| Approach LOS | | F | | | F | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | 106.44 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.060 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.30 | 56.30 | 54.45 | 54.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.327 | 2.961 | 1.959 | 2.260 |
| Crosswalk LOS | C | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1123 | 1077 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.58 | 14.10 | 36.42 | 36.38 |
| I_b,int, Bicycle LOS Score for Intersection | 2.461 | 2.815 | 1.754 | 1.858 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 130.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.228 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 81 | 1273 | 1273 | 14 | 11 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 81 | 1273 | 1273 | 14 | 11 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 346 | 346 | 4 | 3 | 26 |
| Total Analysis Volume [veh/h] | 88 | 1384 | 1384 | 15 | 12 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 104 | 88 | 88 | 19 | 19 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.90 | 0.90 | 0.90 | 0.01 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 777 | 1744 | 779 |
| c, Capacity [veh/h] | 80 | 1233 | 526 | 524 | 259 | 116 |
| d1, Uniform Delay [s] | 58.39 | 13.13 | 21.15 | 21.15 | 47.40 | 54.02 |
| k, delay calibration | 0.18 | 0.50 | 0.50 | 0.50 | 0.04 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 91.14 | 66.31 | 160.64 | 163.18 | 0.03 | 41.16 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.10 | 1.12 | 1.33 | 1.33 | 0.05 | 0.89 |
| d, Delay for Lane Group [s/veh] | 149.53 | 79.45 | 181.79 | 184.32 | 47.42 | 95.18 |
| Lane Group LOS | F | F | F | F | D | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 4.60 | 23.46 | 37.10 | 37.31 | 0.34 | 4.61 |
| 50th-Percentile Queue Length [ft/ln] | 115.03 | 586.57 | 927.56 | 932.74 | 8.46 | 115.30 |
| 95th-Percentile Queue Length [veh/ln] | 8.28 | 34.61 | 57.70 | 58.12 | 0.61 | 8.13 |
| 95th-Percentile Queue Length [ft/ln] | 207.05 | 865.17 | 1442.40 | 1453.08 | 15.22 | 203.34 |

### Movement, Approach, & Intersection Results

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 149.53 | 79.45 | 183.04 | 184.32 | 47.42 | 95.18 |
| Movement LOS | F | F | F | F | D | F |
| d_A, Approach Delay [s/veh] | 83.64 | | 183.06 | | 90.19 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 130.47 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.228 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.088 | 3.058 | 2.029 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.774 | 2.714 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 77.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.162 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1366 | 363 | 42 | 1134 | 237 | 83 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1366 | 363 | 42 | 1134 | 237 | 83 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 363 | 97 | 11 | 302 | 63 | 22 |
| Total Analysis Volume [veh/h] | 1453 | 386 | 45 | 1206 | 252 | 88 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 98 | 98 | 4 | 106 | 17 | 17 |
| g / C, Green / Cycle | 0.76 | 0.76 | 0.03 | 0.81 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.94 | 0.26 | 0.03 | 0.81 | 0.12 | 0.12 |
| s, saturation flow rate [veh/h] | 1549 | 1479 | 1704 | 1494 | 1312 | 1596 |
| c, Capacity [veh/h] | 1170 | 1117 | 57 | 1214 | 174 | 211 |
| d1, Uniform Delay [s] | 15.87 | 5.17 | 62.26 | 11.85 | 55.33 | 55.37 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.16 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 116.01 | 0.85 | 8.38 | 24.33 | 18.42 | 16.36 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.24 | 0.35 | 0.78 | 0.99 | 0.88 | 0.89 |
| d, Delay for Lane Group [s/veh] | 131.89 | 6.02 | 70.64 | 36.18 | 73.75 | 71.73 |
| Lane Group LOS | F | A | E | D | E | E |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 32.00 | 3.09 | 1.59 | 14.87 | 5.81 | 6.98 |
| 50th-Percentile Queue Length [ft/ln] | 800.00 | 77.17 | 39.79 | 371.63 | 145.28 | 174.47 |
| 95th-Percentile Queue Length [veh/ln] | 48.82 | 5.56 | 2.86 | 21.19 | 9.76 | 11.31 |
| 95th-Percentile Queue Length [ft/ln] | 1220.58 | 138.90 | 71.61 | 529.71 | 244.11 | 282.78 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 131.89 | 6.02 | 70.64 | 36.18 | 73.00 | 71.73 |
| Movement LOS | F | A | E | D | E | E |
| d_A, Approach Delay [s/veh] | 105.47 | | 37.42 | | 72.64 | |
| Approach LOS | F | | D | | E | |
| d_I, Intersection Delay [s/veh] | 77.40 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.162 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.208 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.17 | 3.45 | 44.18 |
| I_b,int, Bicycle LOS Score for Intersection | 3.077 | 2.592 | 2.121 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 134.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.249 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1593 | 333 | 40 | 1302 | 7 | 23 | 109 | 332 | 293 | 89 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1593 | 333 | 40 | 1302 | 7 | 23 | 109 | 288 | 293 | 89 | 70 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 424 | 89 | 11 | 346 | 2 | 6 | 29 | 77 | 78 | 24 | 19 |
| Total Analysis Volume [veh/h] | 152 | 1695 | 354 | 43 | 1385 | 7 | 24 | 116 | 306 | 312 | 95 | 74 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 60 | 60 | 4 | 51 | 51 | 31 | 31 | 31 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.46 | 0.46 | 0.03 | 0.40 | 0.40 | 0.24 | 0.24 | 0.24 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.40 | 0.41 | 0.02 | 0.61 | 0.61 | 0.02 | 0.07 | 0.23 | 0.20 | 0.12 | 0.11 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1635 | 1781 | 1491 | 780 | 1420 | 1577 | 1318 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 176 | 1605 | 760 | 55 | 591 | 309 | 334 | 371 | 310 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 57.69 | 30.94 | 31.74 | 62.54 | 39.22 | 39.22 | 38.65 | 41.01 | 48.97 | 55.02 | 52.85 | 51.88 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.26 | 0.13 | 0.23 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.17 | 6.09 | 14.65 | 8.43 | 253.81 | 261.28 | 0.03 | 0.18 | 33.48 | 152.98 | 19.05 | 14.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.86 | 0.89 | 0.78 | 1.55 | 1.55 | 0.07 | 0.31 | 0.99 | 1.32 | 0.77 | 0.72 |
| d, Delay for Lane Group [s/veh] | 62.85 | 37.03 | 46.39 | 70.97 | 293.03 | 300.51 | 38.68 | 41.19 | 82.44 | 208.00 | 71.90 | 66.61 |
| Lane Group LOS | E | D | D | E | F | F | D | D | F | F | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.11 | 19.62 | 21.51 | 1.55 | 30.21 | 32.28 | 0.61 | 3.11 | 12.63 | 8.87 | 3.63 | 2.70 |
| 50th-Percentile Queue Length [ft/ln] | 127.63 | 490.50 | 537.67 | 38.85 | 755.34 | 807.07 | 15.16 | 77.80 | 315.72 | 221.75 | 90.86 | 67.55 |
| 95th-Percentile Queue Length [veh/ln] | 8.81 | 26.88 | 29.11 | 2.80 | 49.21 | 52.28 | 1.09 | 5.60 | 18.46 | 15.29 | 6.54 | 4.86 |
| 95th-Percentile Queue Length [ft/ln] | 220.27 | 672.11 | 727.81 | 69.93 | 1230.37 | 1306.99 | 27.28 | 140.04 | 461.43 | 382.24 | 163.54 | 121.60 |

**Movement, Approach, & Intersection Results**

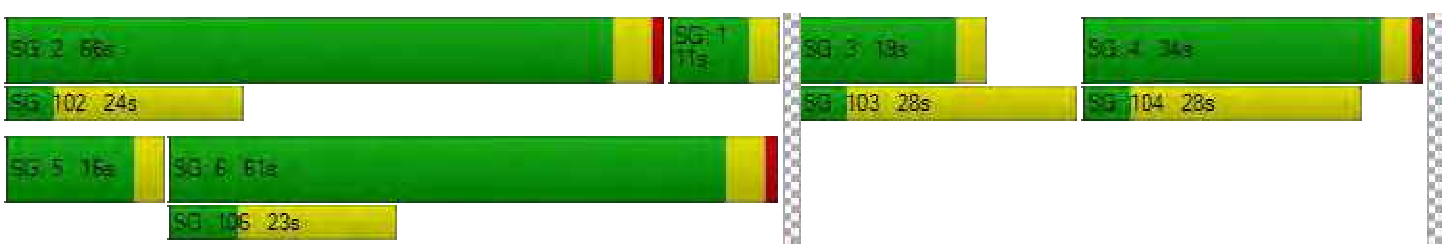
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.85 | 38.81 | 46.39 | 70.97 | 295.58 | 300.51 | 38.68 | 41.19 | 82.44 | 208.00 | 71.90 | 66.61 |
| Movement LOS | E | D | D | E | F | F | D | D | F | F | E | E |
| d_A, Approach Delay [s/veh] | 41.69 | | | 288.87 | | | 69.36 | | | 159.37 | | |
| Approach LOS | D | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 134.53 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.249 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.402 | 2.991 | 2.393 | 2.568 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 2.349 | 2.368 | 2.409 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 57.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.049 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1266 | 1203 | 594 | 406 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1266 | 1203 | 295 | 406 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 317 | 301 | 74 | 102 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1266 | 1203 | 295 | 406 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

### Phasing & Timing

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.48 | 0.43 | 0.24 | 0.44 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 22.35 | 27.29 | 21.49 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.19 | 0.15 | 0.19 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 11.00 | 47.06 | 2.09 | 77.03 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 0.98 | 1.09 | 0.60 | 1.10 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 33.35 | 74.35 | 23.58 | 104.32 | 0.00 |
| Lane Group LOS | D | C | F | C | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 14.02 | 18.18 | 4.92 | 15.38 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 350.43 | 454.44 | 122.99 | 384.57 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 20.16 | 26.71 | 8.56 | 23.22 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 503.94 | 667.65 | 213.93 | 580.55 | 0.00 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 33.35 | 74.35 | 23.58 | 104.32 | 0.00 |
| Movement LOS | D | C | F | C | F | A |
| d_A, Approach Delay [s/veh] | 34.18 | | 64.35 | | 104.32 | |
| Approach LOS | C | | E | | F | |
| d_I, Intersection Delay [s/veh] | 56.95 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.049 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.421 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.658 | 3.042 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 71.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.958 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 899 | 7 | 36 | 924 | 108 | 67 | 7 | 32 | 59 | 11 | 174 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 899 | 7 | 36 | 924 | 108 | 67 | 7 | 26 | 59 | 11 | 174 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 234 | 2 | 9 | 241 | 28 | 17 | 2 | 7 | 15 | 3 | 45 |
| Total Analysis Volume [veh/h] | 23 | 936 | 7 | 38 | 963 | 113 | 70 | 7 | 27 | 61 | 11 | 181 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 163 | 163 | 163 | 163 | 163 | 163 | 163 | 163 | 163 | 163 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 13 | 13 | 13 | 28 | 28 |
| g / C, Green / Cycle | 0.02 | 0.59 | 0.59 | 0.04 | 0.61 | 0.08 | 0.08 | 0.08 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.28 | 0.28 | 0.04 | 0.70 | 0.03 | 0.03 | 0.02 | 0.06 | 0.16 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1386 | 1330 | 952 | 1206 |
| c, Capacity [veh/h] | 23 | 858 | 1125 | 41 | 942 | 77 | 112 | 108 | 163 | 207 |
| d1, Uniform Delay [s] | 79.59 | 18.76 | 18.77 | 77.72 | 31.56 | 71.22 | 71.21 | 70.04 | 59.84 | 66.61 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.34 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 87.14 | 0.88 | 0.67 | 46.23 | 76.81 | 3.41 | 2.34 | 1.20 | 1.42 | 36.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.00 | 0.48 | 0.48 | 0.92 | 1.14 | 0.41 | 0.41 | 0.25 | 0.37 | 0.93 |
| d, Delay for Lane Group [s/veh] | 166.73 | 19.64 | 19.44 | 123.95 | 108.37 | 74.63 | 73.54 | 71.24 | 61.25 | 103.19 |
| Lane Group LOS | F | B | B | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.54 | 9.14 | 11.92 | 2.14 | 56.21 | 1.36 | 1.94 | 1.12 | 2.34 | 10.06 |
| 50th-Percentile Queue Length [ft/ln] | 38.39 | 228.43 | 298.11 | 53.53 | 1405.22 | 34.04 | 48.49 | 28.10 | 58.41 | 251.53 |
| 95th-Percentile Queue Length [veh/ln] | 2.76 | 14.09 | 17.59 | 3.85 | 76.51 | 2.45 | 3.49 | 2.02 | 4.21 | 15.26 |
| 95th-Percentile Queue Length [ft/ln] | 69.11 | 352.36 | 439.69 | 96.36 | 1912.71 | 61.26 | 87.28 | 50.58 | 105.15 | 381.58 |

### Movement, Approach, & Intersection Results

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 166.73 | 19.52 | 19.44 | 123.95 | 108.37 | 108.37 | 74.04 | 73.54 | 71.24 | 61.25 | 103.19 | 103.19 |
| Movement LOS | F | B | B | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 23.03 | | | 108.90 | | | 73.27 | | | 93.08 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 71.70 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.958 | | | | | | | | | | | |

### Other Modes

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 70.86 | 70.86 | 70.86 | 70.86 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.570 | 2.793 | 2.189 | 2.051 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 245 | 245 | 368 | 368 |
| d_b, Bicycle Delay [s] | 62.78 | 62.74 | 54.41 | 54.30 |
| I_b,int, Bicycle LOS Score for Intersection | 2.357 | 3.398 | 1.741 | 1.977 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 25.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.841 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 783 | 7 | 4 | 878 | 120 | 222 | 6 | 59 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 783 | 7 | 4 | 878 | 120 | 222 | 6 | 59 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 206 | 2 | 1 | 231 | 32 | 58 | 2 | 16 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 31 | 824 | 7 | 4 | 924 | 126 | 234 | 6 | 62 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 108 | 108 | 108 | 108 | 34 | 34 |
| g / C, Green / Cycle | 0.72 | 0.72 | 0.72 | 0.72 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.46 | 0.01 | 0.58 | 0.22 | 0.01 |
| s, saturation flow rate [veh/h] | 526 | 1826 | 671 | 1797 | 1391 | 1729 |
| c, Capacity [veh/h] | 212 | 1310 | 364 | 1290 | 360 | 420 |
| d1, Uniform Delay [s] | 37.74 | 10.98 | 21.11 | 14.39 | 56.75 | 44.96 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.37 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.45 | 2.35 | 0.05 | 5.73 | 15.94 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.15 | 0.63 | 0.01 | 0.81 | 0.84 | 0.02 |
| d, Delay for Lane Group [s/veh] | 39.18 | 13.33 | 21.16 | 20.11 | 72.69 | 44.98 |
| Lane Group LOS | D | B | C | C | E | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.94 | 14.77 | 0.08 | 24.53 | 12.87 | 0.27 |
| 50th-Percentile Queue Length [ft/ln] | 23.57 | 369.33 | 2.07 | 613.29 | 321.74 | 6.73 |
| 95th-Percentile Queue Length [veh/ln] | 1.70 | 21.08 | 0.15 | 32.65 | 18.75 | 0.48 |
| 95th-Percentile Queue Length [ft/ln] | 42.42 | 526.92 | 3.72 | 816.36 | 468.82 | 12.12 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 39.18 | 13.33 | 13.33 | 21.16 | 20.11 | 20.11 | 72.69 | 72.69 | 72.69 | 44.98 | 44.98 | 44.98 |
| Movement LOS | D | B | B | C | C | C | E | E | E | D | D | D |
| d_A, Approach Delay [s/veh] | 14.26 | | | 20.12 | | | 72.69 | | | 44.98 | | |
| Approach LOS | B | | | C | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 25.08 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.841 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.39 | 64.39 | 64.39 | 64.39 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.467 | 2.986 | 2.008 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.78 | 42.90 | 42.65 |
| I_b,int, Bicycle LOS Score for Intersection | 2.982 | 3.299 | 2.058 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.692 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 692 | 93 | 52 | 919 | 0 | 20 | 82 | 11 | 97 | 94 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 692 | 93 | 52 | 919 | 0 | 20 | 82 | 11 | 97 | 94 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 188 | 25 | 14 | 250 | 0 | 5 | 22 | 3 | 26 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 752 | 101 | 57 | 999 | 0 | 22 | 89 | 12 | 105 | 102 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 117 | 117 | 117 | 117 | 25 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.78 | 0.78 | 0.78 | 0.78 | 0.17 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.48 | 0.09 | 0.54 | 0.02 | 0.05 | 0.08 | 0.12 |
| s, saturation flow rate [veh/h] | 573 | 1778 | 619 | 1846 | 1169 | 1839 | 1258 | 1709 |
| c, Capacity [veh/h] | 341 | 1386 | 399 | 1439 | 92 | 305 | 176 | 283 |
| d1, Uniform Delay [s] | 18.08 | 7.00 | 15.42 | 7.94 | 70.77 | 55.18 | 66.03 | 59.18 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.13 | 2.05 | 0.75 | 2.78 | 1.33 | 0.63 | 3.24 | 4.71 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.02 | 0.62 | 0.14 | 0.69 | 0.24 | 0.33 | 0.60 | 0.72 |
| d, Delay for Lane Group [s/veh] | 18.21 | 9.05 | 16.17 | 10.73 | 72.10 | 55.82 | 69.27 | 63.89 |
| Lane Group LOS | B | A | B | B | E | E | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.16 | 11.47 | 1.05 | 15.29 | 0.87 | 3.48 | 4.14 | 7.76 |
| 50th-Percentile Queue Length [ft/ln] | 3.88 | 286.63 | 26.14 | 382.30 | 21.84 | 87.10 | 103.56 | 194.12 |
| 95th-Percentile Queue Length [veh/ln] | 0.28 | 17.02 | 1.88 | 21.71 | 1.57 | 6.27 | 7.46 | 12.33 |
| 95th-Percentile Queue Length [ft/ln] | 6.98 | 425.45 | 47.05 | 542.63 | 39.31 | 156.77 | 186.41 | 308.37 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 18.21 | 9.05 | 9.05 | 16.17 | 10.73 | 10.73 | 72.10 | 55.82 | 55.82 | 69.27 | 63.89 | 63.89 |
| Movement LOS | B | A | A | B | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | | 9.14 | | | 11.02 | | | 58.73 | | | 65.72 | |
| Approach LOS | | A | | | B | | | E | | | E | |
| d_I, Intersection Delay [s/veh] | 20.00 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.692 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.649 | 2.579 | 2.039 | 2.196 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.85 | 4.86 | 48.32 | 48.32 |
| I_b,int, Bicycle LOS Score for Intersection | 2.980 | 3.302 | 1.763 | 2.068 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 62.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.581 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 271 | 133 | 374 | 122 | 446 | 125 | 344 | 170 | 352 | 347 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 271 | 14 | 374 | 122 | 0 | 125 | 344 | 170 | 352 | 347 | 20 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 71 | 4 | 97 | 32 | 0 | 33 | 90 | 44 | 92 | 90 | 5 |
| Total Analysis Volume [veh/h] | 28 | 282 | 15 | 390 | 127 | 0 | 130 | 358 | 177 | 367 | 361 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 26 | 26 | 26 | 61 | 61 | 61 | 19 | 19 | 19 | 19 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.17 | 0.41 | 0.41 | 0.41 | 0.13 | 0.13 | 0.13 | 0.13 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.15 | 0.01 | 0.14 | 0.14 | 0.00 | 0.07 | 0.10 | 0.10 | 0.11 | 0.14 | 0.14 | 0.15 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1442 | 1772 | 1813 | 1567 | 1774 | 1892 | 1850 | 1487 | 1734 | 1804 | 1636 |
| c, Capacity [veh/h] | 313 | 316 | 250 | 726 | 743 | 642 | 223 | 237 | 232 | 187 | 293 | 305 | 276 |
| d1, Uniform Delay [s] | 52.04 | 60.60 | 51.73 | 30.51 | 30.51 | 0.00 | 61.84 | 63.71 | 63.76 | 63.82 | 60.50 | 60.48 | 60.58 |
| k, delay calibration | 0.11 | 0.30 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.13 | 0.14 | 0.14 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 20.17 | 0.10 | 1.34 | 1.31 | 0.00 | 2.42 | 6.26 | 6.72 | 11.82 | 9.03 | 8.62 | 10.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.89 | 0.06 | 0.35 | 0.35 | 0.00 | 0.58 | 0.80 | 0.81 | 0.85 | 0.86 | 0.85 | 0.86 |
| d, Delay for Lane Group [s/veh] | 52.17 | 80.78 | 51.83 | 31.85 | 31.82 | 0.00 | 64.26 | 69.97 | 70.48 | 75.64 | 69.53 | 69.10 | 70.78 |
| Lane Group LOS | D | F | D | C | C | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.91 | 12.29 | 0.48 | 6.83 | 6.98 | 0.00 | 4.85 | 7.50 | 7.41 | 6.50 | 10.02 | 10.38 | 9.63 |
| 50th-Percentile Queue Length [ft/ln] | 22.69 | 307.27 | 12.12 | 170.70 | 174.43 | 0.00 | 121.3 | 187.5 | 185.3 | 162.4 | 250.49 | 259.39 | 240.78 |
| 95th-Percentile Queue Length [veh/ln] | 1.63 | 18.04 | 0.87 | 11.11 | 11.31 | 0.00 | 8.47 | 12.00 | 11.88 | 10.68 | 15.21 | 15.66 | 14.72 |
| 95th-Percentile Queue Length [ft/ln] | 40.84 | 451.01 | 21.81 | 277.84 | 282.73 | 0.00 | 211.6 | 299.8 | 296.9 | 266.9 | 380.27 | 391.45 | 368.02 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.17 | 80.78 | 51.83 | 31.84 | 31.82 | 0.00 | 64.26 | 70.21 | 75.64 | 69.39 | 70.11 | 70.78 |
| Movement LOS | D | F | D | C | C | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 76.97 | | | 31.83 | | | 70.34 | | | 69.78 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 62.29 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.581 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.45 | 63.45 | 63.45 | 63.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.500 | 4.289 | 4.313 | 2.740 |
| Crosswalk LOS | B | E | E | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 458 |
| d_b, Bicycle Delay [s] | 49.74 | 39.79 | 50.30 | 45.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.292 | 4.063 | 2.933 | 2.178 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.907 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1573 | 0 | 0 | 858 | 771 | 971 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1573 | 0 | 0 | 858 | 771 | 971 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 405 | 0 | 0 | 221 | 199 | 250 |
| Total Analysis Volume [veh/h] | 1622 | 0 | 0 | 885 | 795 | 1001 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.46 | 0.26 | 0.23 | 0.36 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 12.35 | 8.87 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.09 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.06 | 0.66 | 0.23 | 22.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.78 | 0.43 | 0.66 | 1.03 |
| d, Delay for Lane Group [s/veh] | 15.41 | 9.53 | 22.10 | 48.48 |
| Lane Group LOS | B | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.19 | 3.84 | 6.00 | 11.63 |
| 50th-Percentile Queue Length [ft/ln] | 254.74 | 95.95 | 149.89 | 290.76 |
| 95th-Percentile Queue Length [veh/ln] | 15.42 | 6.91 | 10.01 | 17.59 |
| 95th-Percentile Queue Length [ft/ln] | 385.62 | 172.71 | 250.29 | 439.80 |

**Movement, Approach, & Intersection Results**

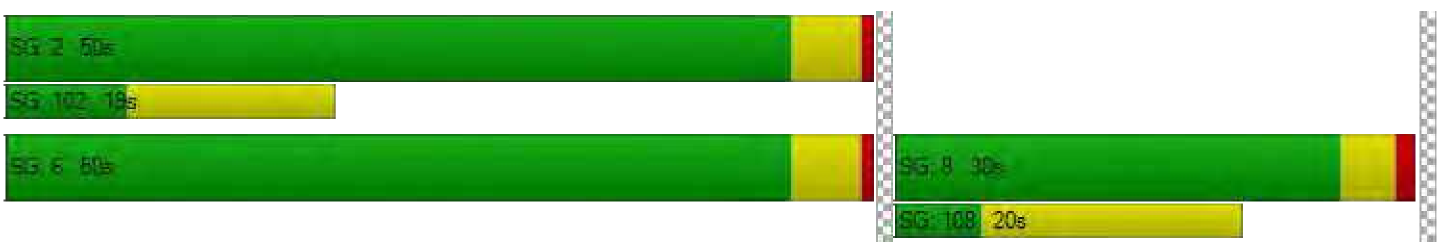
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.41 | 0.00 | 0.00 | 9.53 | 22.10 | 48.48 |
| Movement LOS | B | | | A | C | F |
| d_A, Approach Delay [s/veh] | 15.41 | | 9.53 | | 36.81 | |
| Approach LOS | B | | A | | D | |
| d_I, Intersection Delay [s/veh] | 23.13 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.907 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.982 | 2.562 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.898 | 2.290 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 10.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.351 |

### Intersection Setup

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

### Volumes

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 210 | 10 | 50 | 98 | 24 | 37 | 41 | 23 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 210 | 10 | 50 | 98 | 24 | 37 | 41 | 23 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 55 | 3 | 16 | 31 | 8 | 12 | 13 | 7 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 219 | 10 | 63 | 123 | 30 | 47 | 52 | 29 | 24 | 56 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 692 | 689 | 659 | 719 |
| Degree of Utilization, x | 0.35 | 0.31 | 0.19 | 0.31 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 1.58 | 1.34 | 0.72 | 1.33 |
| 95th-Percentile Queue Length [ft] | 39.48 | 33.55 | 17.88 | 33.28 |
| Approach Delay [s/veh] | 10.99 | 10.61 | 9.77 | 10.27 |
| Approach LOS | B | B | A | B |
| Intersection Delay [s/veh] | 10.50 | | | |
| Intersection LOS | B | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 52.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.814 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 978 | 10 | 30 | 7 | 8 | 323 | 296 | 1931 | 460 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 978 | 10 | 30 | 7 | 8 | 323 | 296 | 1931 | 460 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 255 | 3 | 8 | 2 | 2 | 84 | 77 | 503 | 120 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1019 | 10 | 31 | 7 | 8 | 336 | 308 | 2011 | 479 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 19 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.12 | 0.55 | 0.18 | 0.18 | 0.22 | 0.22 | 0.22 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.25 | 0.01 | 0.01 | 0.11 | 0.11 | 0.21 | 0.40 | 0.29 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1623 | 1480 | 1444 | 5075 | 1794 |
| c, Capacity [veh/h] | 212 | 2153 | 339 | 293 | 363 | 331 | 323 | 2121 | 750 |
| d1, Uniform Delay [s] | 70.05 | 24.10 | 54.28 | 54.32 | 54.19 | 54.19 | 60.65 | 44.89 | 37.99 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.11 | 0.11 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 45.94 | 0.75 | 0.03 | 0.04 | 1.04 | 1.14 | 28.56 | 10.63 | 5.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.93 | 0.47 | 0.07 | 0.08 | 0.50 | 0.49 | 0.95 | 0.95 | 0.69 |
| d, Delay for Lane Group [s/veh] | 115.99 | 24.85 | 54.31 | 54.36 | 55.24 | 55.34 | 89.21 | 55.52 | 43.04 |
| Lane Group LOS | F | C | D | D | E | E | F | E | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.75 | 8.40 | 0.86 | 0.78 | 6.50 | 5.94 | 14.82 | 27.59 | 17.60 |
| 50th-Percentile Queue Length [ft/ln] | 268.63 | 209.88 | 21.43 | 19.47 | 162.55 | 148.44 | 370.44 | 689.70 | 440.00 |
| 95th-Percentile Queue Length [veh/ln] | 16.12 | 13.15 | 1.54 | 1.40 | 10.68 | 9.93 | 21.13 | 36.20 | 24.48 |
| 95th-Percentile Queue Length [ft/ln] | 403.03 | 328.68 | 38.58 | 35.04 | 267.09 | 248.34 | 528.27 | 905.05 | 612.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 115.99 | 115.99 | 24.85 | 54.31 | 54.34 | 54.36 | 55.24 | 55.29 | 89.21 | 55.52 | 43.04 | 43.04 |
| Movement LOS | F | F | C | D | D | D | E | E | F | E | D | D |
| d_A, Approach Delay [s/veh] | 39.61 | | | 54.33 | | | 71.31 | | | 52.98 | | |
| Approach LOS | D | | | D | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 52.03 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.814 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.478 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 3.566 | 1.599 | 2.098 | 5.726 |
| Bicycle LOS | D | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 63.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.511 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1149 | 623 | 0 | 1325 | 861 | 0 | 0 | 0 | 689 | 0 | 391 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1149 | 623 | 0 | 1325 | 861 | 0 | 0 | 0 | 689 | 0 | 391 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 296 | 156 | 0 | 341 | 222 | 0 | 0 | 0 | 172 | 0 | 109 |
| Total Analysis Volume [veh/h] | 0 | 1185 | 623 | 0 | 1366 | 888 | 0 | 0 | 0 | 689 | 0 | 434 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 52 | 52 | 52 | | 20 | 20 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.27 | 1.01 | | 0.20 | 0.15 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 3289 | 3289 | 571 | | 874 | 711 |
| d1, Uniform Delay [s] | 6.35 | 6.66 | 13.41 | | 28.00 | 26.54 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.31 | 0.39 | 258.24 | | 1.62 | 0.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.36 | 0.42 | 1.55 | | 0.79 | 0.61 |
| d, Delay for Lane Group [s/veh] | 6.66 | 7.05 | 271.66 | | 29.63 | 27.39 |
| Lane Group LOS | A | A | F | | C | C |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.61 | 3.16 | 48.65 | | 6.10 | 3.61 |
| 50th-Percentile Queue Length [ft/ln] | 65.21 | 78.98 | 1216.13 | | 152.50 | 90.21 |
| 95th-Percentile Queue Length [veh/ln] | 4.70 | 5.69 | 79.20 | | 10.15 | 6.49 |
| 95th-Percentile Queue Length [ft/ln] | 117.38 | 142.17 | 1980.03 | | 253.76 | 162.37 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

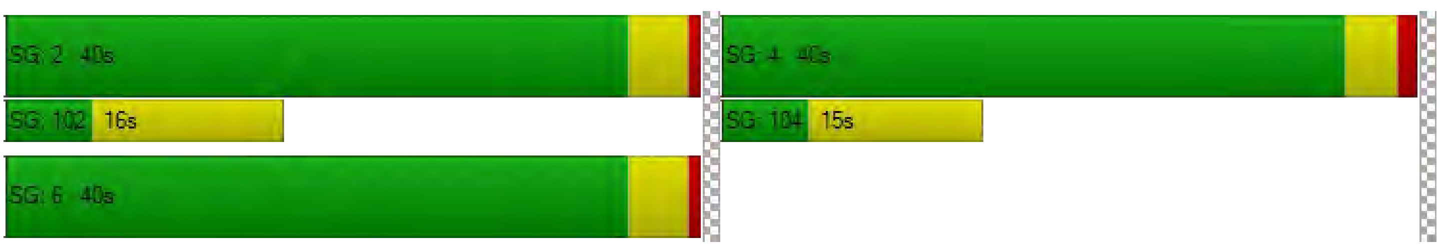
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 6.66 | 0.00 | 0.00 | 7.05 | 271.66 | 0.00 | 0.00 | 0.00 | 29.63 | 0.00 | 27.39 |
| Movement LOS | | A | | | A | F | | | | C | | C |
| d_A, Approach Delay [s/veh] | 6.66 | | | 111.30 | | | 0.00 | | | 28.76 | | |
| Approach LOS | A | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 63.80 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.511 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.005 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.211 | 2.799 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 120.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.535 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1252 | 574 | 0 | 1760 | 424 | 0 | 0 | 0 | 501 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1252 | 574 | 0 | 1760 | 424 | 0 | 0 | 0 | 501 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 323 | 148 | 0 | 454 | 106 | 0 | 0 | 0 | 125 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1291 | 592 | 0 | 1814 | 424 | 0 | 0 | 0 | 501 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.38 | 0.67 | | 0.14 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 16.29 | 19.27 | 21.97 | | 14.06 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.07 | 12.31 | 223.45 | | 0.11 | 113.55 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.85 | 1.49 | | 0.32 | 1.24 |
| d, Delay for Lane Group [s/veh] | 17.36 | 31.58 | 245.42 | | 14.17 | 135.26 |
| Lane Group LOS | B | C | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.63 | 11.18 | 32.14 | | 2.75 | 17.05 |
| 50th-Percentile Queue Length [ft/ln] | 140.75 | 279.60 | 803.38 | | 68.69 | 426.36 |
| 95th-Percentile Queue Length [veh/ln] | 9.52 | 16.67 | 51.81 | | 4.95 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 238.03 | 416.72 | 1295.25 | | 123.64 | 680.73 |

### Movement, Approach, & Intersection Results

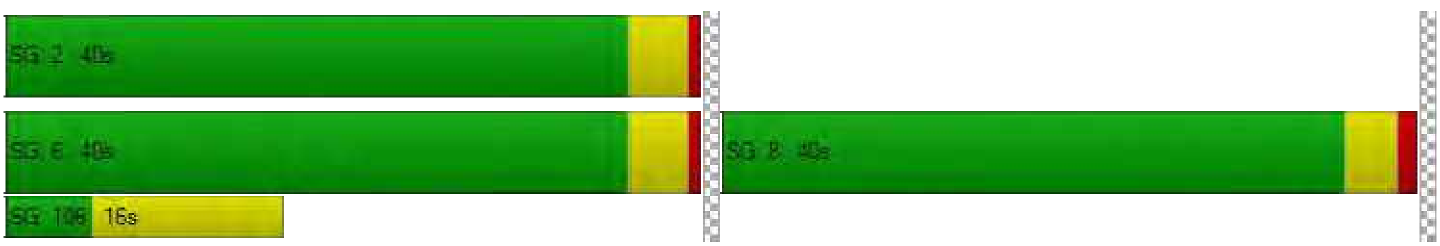
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 17.36 | 31.58 | 0.00 | 245.42 | 0.00 | 0.00 | 0.00 | 0.00 | 14.17 | 0.00 | 135.26 |
| Movement LOS | | B | C | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 21.83 | | | 245.42 | | | 0.00 | | | 91.23 | | |
| Approach LOS | C | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 120.59 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.535 | | | | | | | | | | | |

### Other Modes

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.595 | 2.557 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.830 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 208 | 258 | 1569 | 537 | 481 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 208 | 258 | 1569 | 537 | 481 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 68 | 413 | 141 | 127 | 517 |
| Total Analysis Volume [veh/h] | 219 | 272 | 1652 | 565 | 506 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 34 | 34 | 60 | 60 |
| g / C, Green / Cycle | 0.22 | 0.22 | 0.38 | 0.38 | 0.67 | 0.67 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.21 | 0.33 | 0.37 | 0.59 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 858 | 5020 |
| c, Capacity [veh/h] | 762 | 294 | 1887 | 588 | 601 | 3347 |
| d1, Uniform Delay [s] | 28.94 | 34.11 | 25.84 | 27.16 | 22.80 | 8.47 |
| k, delay calibration | 0.04 | 0.36 | 0.04 | 0.14 | 0.48 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.08 | 29.19 | 0.53 | 12.12 | 12.96 | 0.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.29 | 0.92 | 0.88 | 0.96 | 0.84 | 0.62 |
| d, Delay for Lane Group [s/veh] | 29.01 | 63.30 | 26.37 | 39.28 | 35.76 | 8.54 |
| Lane Group LOS | C | E | C | D | D | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.93 | 8.02 | 9.70 | 12.35 | 5.56 | 5.57 |
| 50th-Percentile Queue Length [ft/ln] | 48.34 | 200.61 | 242.60 | 308.66 | 139.02 | 139.23 |
| 95th-Percentile Queue Length [veh/ln] | 3.48 | 12.67 | 14.81 | 18.11 | 9.43 | 9.44 |
| 95th-Percentile Queue Length [ft/ln] | 87.01 | 316.76 | 370.32 | 452.72 | 235.70 | 235.98 |

**Movement, Approach, & Intersection Results**

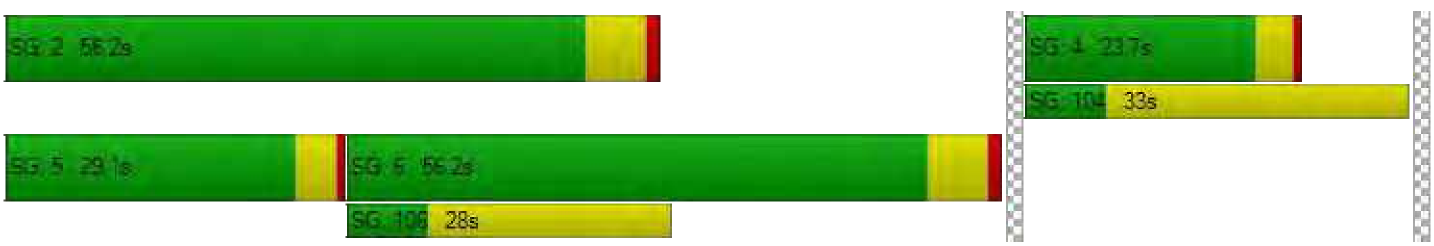
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.01 | 63.30 | 26.37 | 39.28 | 35.76 | 8.54 |
| Movement LOS | C | E | C | D | D | A |
| d_A, Approach Delay [s/veh] | 48.01 | | 29.66 | | 13.89 | |
| Approach LOS | D | | C | | B | |
| d_I, Intersection Delay [s/veh] | 23.68 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.830 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.49 | 34.49 | 34.49 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.995 | 3.639 | 3.533 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 446 | 1116 | 1116 |
| d_b, Bicycle Delay [s] | 27.05 | 8.76 | 8.76 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.779 | 2.974 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.641 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 186 | 70 | 1569 | 137 | 143 | 2068 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 186 | 70 | 1569 | 137 | 143 | 2068 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 48 | 18 | 404 | 35 | 37 | 533 |
| Total Analysis Volume [veh/h] | 192 | 72 | 1618 | 141 | 147 | 2132 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 37 | 37 | 37 | 37 | 37 | 37 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 13 | 13 | 4 | 21 |
| g / C, Green / Cycle | 0.13 | 0.13 | 0.36 | 0.36 | 0.11 | 0.58 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.05 | 0.33 | 0.09 | 0.08 | 0.42 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1492 | 1810 | 5024 |
| c, Capacity [veh/h] | 401 | 191 | 1810 | 545 | 193 | 2924 |
| d1, Uniform Delay [s] | 15.04 | 14.84 | 11.09 | 8.23 | 16.10 | 5.62 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.33 | 0.46 | 0.66 | 0.09 | 2.36 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.48 | 0.38 | 0.89 | 0.26 | 0.76 | 0.73 |
| d, Delay for Lane Group [s/veh] | 15.37 | 15.30 | 11.75 | 8.33 | 18.46 | 5.76 |
| Lane Group LOS | B | B | B | A | B | A |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.66 | 0.50 | 2.48 | 0.47 | 1.02 | 0.94 |
| 50th-Percentile Queue Length [ft/ln] | 16.57 | 12.53 | 62.06 | 11.86 | 25.60 | 23.57 |
| 95th-Percentile Queue Length [veh/ln] | 1.19 | 0.90 | 4.47 | 0.85 | 1.84 | 1.70 |
| 95th-Percentile Queue Length [ft/ln] | 29.83 | 22.55 | 111.71 | 21.34 | 46.09 | 42.42 |

**Movement, Approach, & Intersection Results**

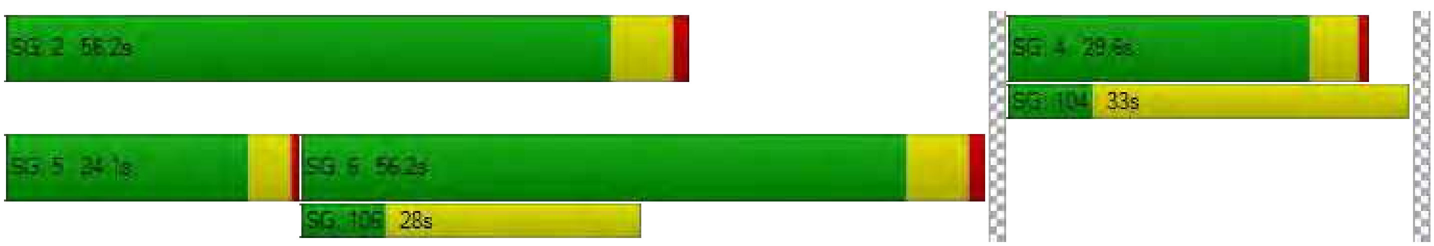
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.37 | 15.30 | 11.75 | 8.33 | 18.46 | 5.76 |
| Movement LOS | B | B | B | A | B | A |
| d_A, Approach Delay [s/veh] | 15.35 | | 11.48 | | 6.58 | |
| Approach LOS | B | | B | | A | |
| d_I, Intersection Delay [s/veh] | 9.12 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.641 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 9.12 | 9.12 | 9.12 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.189 | 3.418 | 3.369 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1353 | 2706 | 2706 |
| d_b, Bicycle Delay [s] | 1.93 | 2.30 | 2.30 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.527 | 2.813 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 7.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.778 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 48 | 37 | 1068 | 288 | 179 | 2198 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 48 | 37 | 1068 | 288 | 179 | 2198 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 10 | 278 | 75 | 47 | 572 |
| Total Analysis Volume [veh/h] | 50 | 39 | 1113 | 300 | 186 | 2290 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 31 | 31 | 31 | 31 | 31 | 31 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 3 | 10 | 10 | 18 | 18 |
| g / C, Green / Cycle | 0.09 | 0.09 | 0.33 | 0.33 | 0.59 | 0.59 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.04 | 0.26 | 0.23 | 0.12 | 0.51 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1605 | 4496 |
| c, Capacity [veh/h] | 105 | 95 | 1384 | 432 | 1175 | 2657 |
| d1, Uniform Delay [s] | 13.36 | 13.40 | 9.52 | 9.08 | 3.84 | 5.28 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.04 | 1.29 | 0.43 | 0.75 | 0.02 | 0.34 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.43 | 0.46 | 0.80 | 0.69 | 0.16 | 0.86 |
| d, Delay for Lane Group [s/veh] | 14.40 | 14.69 | 9.95 | 9.84 | 3.86 | 5.62 |
| Lane Group LOS | B | B | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.26 | 0.26 | 1.16 | 0.95 | 0.00 | 0.08 |
| 50th-Percentile Queue Length [ft/ln] | 6.56 | 6.46 | 29.08 | 23.64 | 0.09 | 2.07 |
| 95th-Percentile Queue Length [veh/ln] | 0.47 | 0.47 | 2.09 | 1.70 | 0.01 | 0.15 |
| 95th-Percentile Queue Length [ft/ln] | 11.80 | 11.63 | 52.35 | 42.55 | 0.17 | 3.72 |

**Movement, Approach, & Intersection Results**

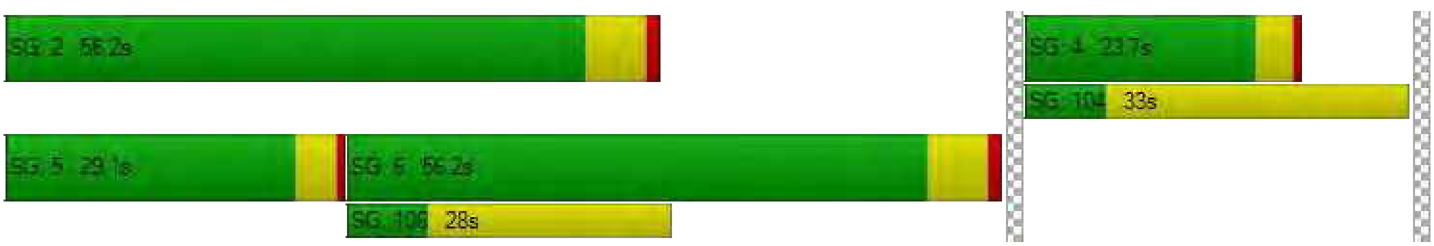
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.43 | 14.69 | 9.95 | 9.84 | 3.86 | 5.62 |
| Movement LOS | B | B | A | A | A | A |
| d_A, Approach Delay [s/veh] | 14.54 | | 9.92 | | 5.49 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.27 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.778 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 6.38 | 6.38 | 6.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.306 | 3.310 | 3.320 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1297 | 3243 | 3243 |
| d_b, Bicycle Delay [s] | 1.90 | 5.96 | 5.96 |
| I_b,int, Bicycle LOS Score for Intersection | 1.706 | 2.337 | 2.921 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 12.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.528 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 201 | 114 | 9 | 321 | 159 | 18 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 201 | 114 | 9 | 321 | 159 | 18 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 32 | 3 | 91 | 45 | 5 |
| Total Analysis Volume [veh/h] | 228 | 130 | 10 | 365 | 181 | 20 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 738 | 711 | 615 |
| Degree of Utilization, x | 0.49 | 0.53 | 0.33 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 2.68 | 3.12 | 1.42 |
| 95th-Percentile Queue Length [ft] | 66.93 | 77.96 | 35.43 |
| Approach Delay [s/veh] | 12.39 | 13.58 | 11.67 |
| Approach LOS | B | B | B |
| Intersection Delay [s/veh] | 12.71 | | |
| Intersection LOS | B | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 7.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.805 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 35 | 922 | 170 | 63 | 2486 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 35 | 922 | 170 | 63 | 2486 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 9 | 245 | 45 | 17 | 661 |
| Total Analysis Volume [veh/h] | 0 | 37 | 981 | 181 | 67 | 2645 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 59 | 59 | 59 | 59 | 59 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 38 | 38 | 46 | 46 |
| g / C, Green / Cycle | 0.05 | 0.65 | 0.65 | 0.78 | 0.78 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.23 | 0.14 | 0.11 | 0.60 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 633 | 4426 |
| c, Capacity [veh/h] | 22 | 2742 | 856 | 617 | 3467 |
| d1, Uniform Delay [s] | 28.12 | 4.76 | 4.23 | 1.84 | 3.45 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 337.17 | 0.03 | 0.05 | 0.03 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.72 | 0.36 | 0.21 | 0.11 | 0.76 |
| d, Delay for Lane Group [s/veh] | 365.28 | 4.79 | 4.28 | 1.87 | 3.59 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.32 | 0.94 | 0.47 | 0.00 | 0.04 |
| 50th-Percentile Queue Length [ft/ln] | 58.11 | 23.45 | 11.73 | 0.12 | 1.07 |
| 95th-Percentile Queue Length [veh/ln] | 4.18 | 1.69 | 0.84 | 0.01 | 0.08 |
| 95th-Percentile Queue Length [ft/ln] | 104.59 | 42.21 | 21.11 | 0.22 | 1.93 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 365.28 | 4.79 | 4.28 | 1.87 | 3.59 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 365.28 | | 4.71 | | 3.55 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.31 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.805 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 19.54 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.366 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 678 | 1694 | 1694 |
| d_b, Bicycle Delay [s] | 12.90 | 0.69 | 0.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.199 | 3.051 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.527 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 86 | 289 | 143 | 556 | 215 | 423 | 70 | 7 | 73 | 30 | 17 | 61 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 86 | 289 | 143 | 556 | 215 | 423 | 70 | 7 | 73 | 30 | 17 | 61 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 74 | 36 | 142 | 55 | 108 | 18 | 2 | 19 | 8 | 4 | 16 |
| Total Analysis Volume [veh/h] | 88 | 295 | 146 | 567 | 219 | 432 | 71 | 7 | 74 | 31 | 17 | 62 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 37 | 35 | 0 | 33 | 31 | 0 | 0 | 31 | 31 | 0 | 31 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 5 | 25 | 15 | 35 | 9 | 9 | 4 | 4 |
| g / C, Green / Cycle | 0.07 | 0.36 | 0.21 | 0.51 | 0.13 | 0.13 | 0.06 | 0.06 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.26 | 0.17 | 0.39 | 0.04 | 0.05 | 0.03 | 0.03 |
| s, saturation flow rate [veh/h] | 1767 | 1665 | 3431 | 1661 | 1774 | 1452 | 1761 | 1577 |
| c, Capacity [veh/h] | 117 | 605 | 720 | 842 | 236 | 193 | 112 | 100 |
| d1, Uniform Delay [s] | 31.91 | 19.17 | 26.00 | 13.89 | 27.36 | 27.45 | 31.50 | 31.57 |
| k, delay calibration | 0.11 | 0.17 | 0.11 | 0.38 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.28 | 2.62 | 1.95 | 5.31 | 0.81 | 1.25 | 3.45 | 4.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 0.73 | 0.79 | 0.77 | 0.33 | 0.38 | 0.50 | 0.54 |
| d, Delay for Lane Group [s/veh] | 41.19 | 21.78 | 27.96 | 19.20 | 28.18 | 28.70 | 34.96 | 35.94 |
| Lane Group LOS | D | C | C | B | C | C | C | D |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.70 | 6.07 | 4.39 | 8.32 | 1.18 | 1.14 | 0.99 | 0.97 |
| 50th-Percentile Queue Length [ft/ln] | 42.56 | 151.71 | 109.77 | 208.07 | 29.56 | 28.54 | 24.74 | 24.13 |
| 95th-Percentile Queue Length [veh/ln] | 3.06 | 10.11 | 7.83 | 13.05 | 2.13 | 2.05 | 1.78 | 1.74 |
| 95th-Percentile Queue Length [ft/ln] | 76.60 | 252.71 | 195.69 | 326.35 | 53.21 | 51.37 | 44.53 | 43.43 |

**Movement, Approach, & Intersection Results**

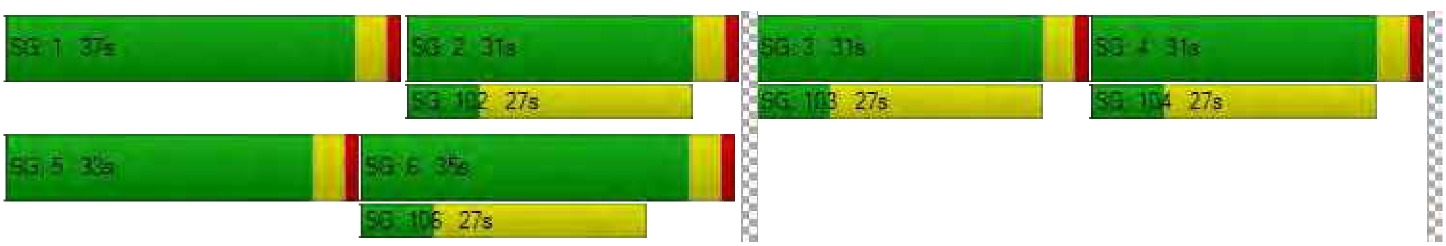
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 41.19 | 21.78 | 21.78 | 27.96 | 19.20 | 19.20 | 28.18 | 28.18 | 28.70 | 34.96 | 34.96 | 35.83 |
| Movement LOS | D | C | C | C | B | B | C | C | C | C | C | D |
| d_A, Approach Delay [s/veh] | 25.01 | | | 23.28 | | | 28.43 | | | 35.44 | | |
| Approach LOS | C | | | C | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 24.79 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.527 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 24.57 | 24.57 | 24.57 | 24.57 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.203 | 2.607 | 2.150 | 2.319 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 778 | 778 | 778 |
| d_b, Bicycle Delay [s] | 10.62 | 12.95 | 12.95 | 12.95 |
| I_b,int, Bicycle LOS Score for Intersection | 2.432 | 3.569 | 1.810 | 1.741 |
| Bicycle LOS | B | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 59.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.837 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 206 | 57 | 119 | 291 | 321 | 47 | 26 | 101 | 0 | 153 | 19 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 206 | 57 | 119 | 291 | 321 | 47 | 26 | 101 | 0 | 153 | 19 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 57 | 16 | 33 | 81 | 89 | 13 | 7 | 28 | 0 | 43 | 5 |
| Total Analysis Volume [veh/h] | 27 | 229 | 63 | 132 | 323 | 357 | 52 | 29 | 112 | 0 | 170 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 76 | 76 | 76 | 76 | 76 | 76 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 19 | 30 | 30 | 16 | 19 | 19 |
| g / C, Green / Cycle | 0.24 | 0.39 | 0.39 | 0.21 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.10 | 0.44 | 0.18 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 1483 | 1357 | 1553 | 1048 | 1404 | 1278 |
| c, Capacity [veh/h] | 411 | 531 | 607 | 219 | 388 | 310 |
| d1, Uniform Delay [s] | 27.84 | 15.72 | 23.31 | 29.35 | 23.52 | 23.65 |
| k, delay calibration | 0.12 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.50 | 0.24 | 73.93 | 10.88 | 0.34 | 0.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.78 | 0.25 | 1.12 | 0.88 | 0.25 | 0.30 |
| d, Delay for Lane Group [s/veh] | 31.34 | 15.96 | 97.23 | 40.23 | 23.86 | 24.18 |
| Lane Group LOS | C | B | F | D | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.75 | 1.50 | 22.46 | 3.95 | 1.43 | 1.36 |
| 50th-Percentile Queue Length [ft/ln] | 143.75 | 37.49 | 561.59 | 98.87 | 35.76 | 34.03 |
| 95th-Percentile Queue Length [veh/ln] | 9.68 | 2.70 | 32.60 | 7.12 | 2.57 | 2.45 |
| 95th-Percentile Queue Length [ft/ln] | 242.06 | 67.48 | 815.11 | 177.97 | 64.37 | 61.25 |

**Movement, Approach, & Intersection Results**

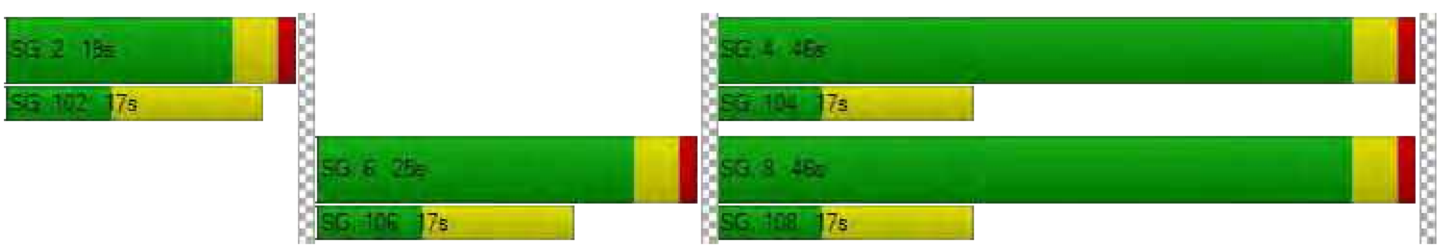
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.34 | 31.34 | 31.34 | 15.96 | 97.23 | 97.23 | 40.23 | 40.23 | 40.23 | 23.86 | 23.99 | 24.18 |
| Movement LOS | C | C | C | B | F | F | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 31.34 | | | 84.02 | | | 40.23 | | | 24.01 | | |
| Approach LOS | C | | | F | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 59.78 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.837 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 27.99 | 27.99 | 27.99 | 27.99 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.169 | 2.225 | 2.019 | 2.201 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1099 | 550 | 393 | 1099 |
| d_b, Bicycle Delay [s] | 7.74 | 20.09 | 24.67 | 7.74 |
| I_b,int, Bicycle LOS Score for Intersection | 2.086 | 2.899 | 1.878 | 1.717 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.108 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 74 | 89 | 81 | 277 | 28 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 74 | 89 | 81 | 277 | 28 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 24 | 29 | 26 | 90 | 9 |
| Total Analysis Volume [veh/h] | 38 | 96 | 116 | 105 | 360 | 36 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.11 | 0.15 | 0.10 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 17.57 | 12.73 | 8.50 | 0.00 | 0.00 | 0.00 |
| Movement LOS | C | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 1.00 | 1.00 | 0.34 | 0.34 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 24.96 | 24.96 | 8.43 | 8.43 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 14.10 | | 4.46 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.83 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.025 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 39 | 42 | 60 | 103 | 13 | 65 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 39 | 42 | 60 | 103 | 13 | 65 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 12 | 18 | 30 | 4 | 19 |
| Total Analysis Volume [veh/h] | 46 | 49 | 71 | 121 | 15 | 76 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.00 | 0.02 | 0.09 |
| d_M, Delay for Movement [s/veh] | 7.82 | 0.00 | 0.00 | 0.00 | 11.55 | 10.07 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.00 | 0.00 | 0.40 | 0.40 |
| 95th-Percentile Queue Length [ft/ln] | 2.70 | 2.70 | 0.00 | 0.00 | 10.02 | 10.02 |
| d_A, Approach Delay [s/veh] | 3.79 | | 0.00 | | 10.31 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 3.43 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | | | | | |
| Maximum Recall | | | | | | |
| Pedestrian Recall | | | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

### Lane Group Calculations

### Lane Group Results

### Movement, Approach, & Intersection Results

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | | | | | |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.00 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.000 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 45.00 | 45.00 | 45.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.141 | 2.463 | 2.141 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 | 0 |
| d_b, Bicycle Delay [s] | 45.00 | 45.00 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 | 1.560 |
| Bicycle LOS | A | A | A |

**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 2.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Exiting Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjusted Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 0 | 0 | 0 | 0 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1380 | 1380 | 1380 | 1380 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1353 | 1353 | 1353 | 1353 |
| X, volume / capacity | 0.00 | 0.00 | 0.00 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | A | A | A |
| 95th-Percentile Queue Length [veh] | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 |
| Approach Delay [s/veh] | 2.66 | 2.66 | 2.66 | 2.66 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 2.66 | | | |
| Intersection LOS | A | | | |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term AM.pdf

Scenario 17 Near-Term AM (2025 vols)
12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 942 | 1474 | 1224 | 503 | 4143 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 24 | 1159 | 7 | 448 | 1224 | 331 | 13 | 4 | 58 | 241 | 19 | 0 | 3528 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 133 | 841 | 83 | 29 | 1012 | 431 | 576 | 56 | 166 | 35 | 16 | 25 | 3403 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 810 | 85 | 310 | 755 | 66 | 218 | 66 | 2 | 40 | 22 | 202 | 2576 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 479 | 488 | 425 | 476 | 104 | 2059 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 310 | 21 | 600 | 114 | 243 | 683 | 56 | 2210 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 829 | 84 | 1215 | 2780 | 329 | 416 | 5653 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 210 | 464 | 277 | 42 | 93 | 78 | 376 | 453 | 172 | 1142 | 2234 | 72 | 5613 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 110 | 833 | 73 | 190 | 1189 | 37 | 47 | 14 | 48 | 56 | 25 | 87 | 2709 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 81 | 1273 | 1273 | 14 | 11 | 95 | 2747 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1366 | 363 | 42 | 1134 | 237 | 83 | 3225 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1593 | 333 | 40 | 1302 | 7 | 23 | 109 | 332 | 293 | 89 | 104 | 4368 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1266 | 1203 | 594 | 406 | 60 | 3594 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 899 | 7 | 36 | 924 | 108 | 67 | 7 | 32 | 59 | 11 | 174 | 2346 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 29 | 783 | 7 | 4 | 878 | 120 | 222 | 6 | 59 | 1 | 2 | 6 | 2117 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 692 | 93 | 52 | 919 | 0 | 20 | 82 | 11 | 97 | 94 | 93 | 2160 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 271 | 133 | 374 | 122 | 446 | 125 | 344 | 170 | 352 | 347 | 20 | 2731 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1573 | 858 | 771 | 971 | 4173 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 210 | 10 | 50 | 98 | 24 | 37 | 41 | 23 | 22 | 51 | 131 | 710 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 978 | 10 | 30 | 7 | 8 | 323 | 296 | 1931 | 460 | 34 | 4266 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1149 | 623 | 1325 | 861 | 689 | 391 | 5038 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1252 | 574 | 1760 | 424 | 501 | 789 | 5300 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 208 | 258 | 1569 | 537 | 481 | 1963 | 5016 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 186 | 70 | 1569 | 137 | 143 | 2068 | 4173 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 48 | 37 | 1068 | 288 | 179 | 2198 | 3818 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 201 | 114 | 9 | 321 | 159 | 18 | 822 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 35 | 922 | 170 | 63 | 2486 | 3676 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 86 | 289 | 143 | 556 | 215 | 423 | 70 | 7 | 73 | 30 | 17 | 61 | 1970 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 24 | 206 | 57 | 119 | 291 | 321 | 47 | 26 | 101 | 0 | 153 | 19 | 1364 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 29 | 74 | 89 | 81 | 277 | 28 | 578 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 39 | 42 | 60 | 103 | 13 | 65 | 322 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term AM.pdf

Scenario 17 Near-Term AM (2025 vols)
12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 942 | 1474 | 1224 | 503 | 4143 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **942** | **1474** | **1224** | **503** | **4143** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 24 | 1159 | 7 | 448 | 1224 | 331 | 13 | 4 | 58 | 241 | 19 | 0 | 3528 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **1159** | **7** | **448** | **1224** | **331** | **13** | **4** | **58** | **241** | **19** | **0** | **3528** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 133 | 841 | 83 | 29 | 1012 | 431 | 576 | 56 | 166 | 35 | 16 | 25 | 3403 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **133** | **841** | **83** | **29** | **1012** | **431** | **576** | **56** | **166** | **35** | **16** | **25** | **3403** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 810 | 85 | 310 | 755 | 66 | 218 | 66 | 2 | 40 | 22 | 202 | 2576 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **810** | **85** | **310** | **755** | **66** | **218** | **66** | **2** | **40** | **22** | **202** | **2576** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 479 | 488 | 425 | 476 | 104 | 2059 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **479** | **488** | **425** | **476** | **104** | **2059** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 310 | 21 | 600 | 114 | 243 | 683 | 56 | 2210 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **310** | **21** | **600** | **114** | **243** | **683** | **56** | **2210** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 829 | 84 | 1215 | 2780 | 329 | 416 | 5653 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **829** | **84** | **1215** | **2780** | **329** | **416** | **5653** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 210 | 464 | 277 | 42 | 93 | 78 | 376 | 453 | 172 | 1142 | 2234 | 72 | 5613 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **210** | **464** | **277** | **42** | **93** | **78** | **376** | **453** | **172** | **1142** | **2234** | **72** | **5613** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 110 | 833 | 73 | 190 | 1189 | 37 | 47 | 14 | 48 | 56 | 25 | 87 | 2709 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **110** | **833** | **73** | **190** | **1189** | **37** | **47** | **14** | **48** | **56** | **25** | **87** | **2709** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 81 | 1273 | 1273 | 14 | 11 | 95 | 2747 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **81** | **1273** | **1273** | **14** | **11** | **95** | **2747** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1366 | 363 | 42 | 1134 | 237 | 83 | 3225 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1366** | **363** | **42** | **1134** | **237** | **83** | **3225** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1593 | 333 | 40 | 1302 | 7 | 23 | 109 | 332 | 293 | 89 | 104 | 4368 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1593** | **333** | **40** | **1302** | **7** | **23** | **109** | **332** | **293** | **89** | **104** | **4368** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1266 | 1203 | 594 | 406 | 60 | 3594 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1266** | **1203** | **594** | **406** | **60** | **3594** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 899 | 7 | 36 | 924 | 108 | 67 | 7 | 32 | 59 | 11 | 174 | 2346 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **899** | **7** | **36** | **924** | **108** | **67** | **7** | **32** | **59** | **11** | **174** | **2346** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 29 | 783 | 7 | 4 | 878 | 120 | 222 | 6 | 59 | 1 | 2 | 6 | 2117 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **783** | **7** | **4** | **878** | **120** | **222** | **6** | **59** | **1** | **2** | **6** | **2117** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 692 | 93 | 52 | 919 | 0 | 20 | 82 | 11 | 97 | 94 | 93 | 2160 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **692** | **93** | **52** | **919** | **0** | **20** | **82** | **11** | **97** | **94** | **93** | **2160** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 271 | 133 | 374 | 122 | 446 | 125 | 344 | 170 | 352 | 347 | 20 | 2731 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **271** | **133** | **374** | **122** | **446** | **125** | **344** | **170** | **352** | **347** | **20** | **2731** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1573 | 858 | 771 | 971 | 4173 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1573** | **858** | **771** | **971** | **4173** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 210 | 10 | 50 | 98 | 24 | 37 | 41 | 23 | 22 | 51 | 131 | 710 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **210** | **10** | **50** | **98** | **24** | **37** | **41** | **23** | **22** | **51** | **131** | **710** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 978 | 10 | 30 | 7 | 8 | 323 | 296 | 1931 | 460 | 34 | 4266 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **978** | **10** | **30** | **7** | **8** | **323** | **296** | **1931** | **460** | **34** | **4266** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1149 | 623 | 1325 | 861 | 689 | 391 | 5038 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1149** | **623** | **1325** | **861** | **689** | **391** | **5038** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1252 | 574 | 1760 | 424 | 501 | 789 | 5300 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1252** | **574** | **1760** | **424** | **501** | **789** | **5300** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 208 | 258 | 1569 | 537 | 481 | 1963 | 5016 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **208** | **258** | **1569** | **537** | **481** | **1963** | **5016** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 186 | 70 | 1569 | 137 | 143 | 2068 | 4173 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **186** | **70** | **1569** | **137** | **143** | **2068** | **4173** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 48 | 37 | 1068 | 288 | 179 | 2198 | 3818 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **37** | **1068** | **288** | **179** | **2198** | **3818** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 201 | 114 | 9 | 321 | 159 | 18 | 822 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **201** | **114** | **9** | **321** | **159** | **18** | **822** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 35 | 922 | 170 | 63 | 2486 | 3676 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **35** | **922** | **170** | **63** | **2486** | **3676** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 86 | 289 | 143 | 556 | 215 | 423 | 70 | 7 | 73 | 30 | 17 | 61 | 1970 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **86** | **289** | **143** | **556** | **215** | **423** | **70** | **7** | **73** | **30** | **17** | **61** | **1970** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 24 | 206 | 57 | 119 | 291 | 321 | 47 | 26 | 101 | 0 | 153 | 19 | 1364 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **206** | **57** | **119** | **291** | **321** | **47** | **26** | **101** | **0** | **153** | **19** | **1364** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 29 | 74 | 89 | 81 | 277 | 28 | 578 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **74** | **89** | **81** | **277** | **28** | **578** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 39 | 42 | 60 | 103 | 13 | 65 | 322 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **39** | **42** | **60** | **103** | **13** | **65** | **322** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 233 | 172 | 204 | 101 |
| 2 | 226 | 167 | 198 | 98 |
| 3 | 221 | 163 | 194 | 96 |
| 4 | 207 | 153 | 182 | 90 |
| 5 | 184 | 136 | 161 | 80 |
| 6 | 182 | 134 | 159 | 79 |
| 7 | 179 | 132 | 157 | 78 |
| 8 | 163 | 120 | 143 | 71 |
| 9 | 161 | 119 | 141 | 70 |
| 10 | 158 | 117 | 139 | 69 |
| 11 | 137 | 101 | 120 | 60 |
| 12 | 128 | 95 | 112 | 56 |
| 13 | 126 | 93 | 110 | 55 |
| 14 | 93 | 69 | 82 | 40 |
| 15 | 93 | 69 | 82 | 40 |
| 16 | 65 | 48 | 57 | 28 |
| 17 | 37 | 28 | 33 | 16 |
| 18 | 37 | 28 | 33 | 16 |
| 19 | 21 | 15 | 18 | 9 |
| 20 | 12 | 9 | 10 | 5 |
| 21 | 7 | 5 | 6 | 3 |
| 22 | 2 | 2 | 2 | 1 |
| 23 | 2 | 2 | 2 | 1 |
| 24 | 2 | 2 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 405 | 1 | 204 | No | Yes | Yes | Yes | No | No | No | No | No | No |
| 2 | 1 | 393 | 1 | 198 | No | No | Yes | Yes | No | No | No | No | No | No |
| 3 | 1 | 384 | 1 | 194 | No | No | Yes | Yes | No | No | No | No | No | No |
| 4 | 1 | 360 | 1 | 182 | No | No | Yes | Yes | No | No | No | No | No | No |
| 5 | 1 | 320 | 1 | 161 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 316 | 1 | 159 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 311 | 1 | 157 | No | No | No | Yes | No | No | No | No | No | No |
| 8 | 1 | 283 | 1 | 143 | No | No | No | Yes | No | No | No | No | No | No |
| 9 | 1 | 280 | 1 | 141 | No | No | No | Yes | No | No | No | No | No | No |
| 10 | 1 | 275 | 1 | 139 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 238 | 1 | 120 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 223 | 1 | 112 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 219 | 1 | 110 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 162 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 162 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 113 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 65 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 65 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 36 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 21 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 12 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 1 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.3 | 9.8 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:34 | 0:16 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 204 | 101 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 710 | 710 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 330 | 315 | 177 |
| 2 | 320 | 306 | 172 |
| 3 | 314 | 299 | 168 |
| 4 | 294 | 280 | 158 |
| 5 | 261 | 249 | 140 |
| 6 | 257 | 246 | 138 |
| 7 | 254 | 243 | 136 |
| 8 | 231 | 221 | 124 |
| 9 | 228 | 217 | 122 |
| 10 | 224 | 214 | 120 |
| 11 | 195 | 186 | 104 |
| 12 | 182 | 173 | 97 |
| 13 | 178 | 170 | 96 |
| 14 | 132 | 126 | 71 |
| 15 | 132 | 126 | 71 |
| 16 | 92 | 88 | 50 |
| 17 | 53 | 50 | 28 |
| 18 | 53 | 50 | 28 |
| 19 | 30 | 28 | 16 |
| 20 | 17 | 16 | 9 |
| 21 | 10 | 9 | 5 |
| 22 | 3 | 3 | 2 |
| 23 | 3 | 3 | 2 |
| 24 | 3 | 3 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 645 | 1 | 177 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 626 | 1 | 172 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 3 | 1 | 613 | 1 | 168 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 4 | 1 | 574 | 1 | 158 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 5 | 1 | 510 | 1 | 140 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 1 | 503 | 1 | 138 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 1 | 497 | 1 | 136 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 1 | 452 | 1 | 124 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 9 | 1 | 445 | 1 | 122 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 10 | 1 | 438 | 1 | 120 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 11 | 1 | 381 | 1 | 104 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 1 | 355 | 1 | 97 | No | No | No | Yes | No | No | No | No | No | No |
| 13 | 1 | 348 | 1 | 96 | No | No | No | Yes | No | No | No | No | No | No |
| 14 | 1 | 258 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 258 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 180 | 1 | 50 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 103 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 103 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 58 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 33 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 19 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 10 | 10 | 13 | 0 | 3 | 4 | 10 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:34 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 177 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 822 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 305 | 170 | 103 |
| 2 | 296 | 165 | 100 |
| 3 | 290 | 162 | 98 |
| 4 | 271 | 151 | 92 |
| 5 | 241 | 134 | 81 |
| 6 | 238 | 133 | 80 |
| 7 | 235 | 131 | 79 |
| 8 | 214 | 119 | 72 |
| 9 | 210 | 117 | 71 |
| 10 | 207 | 116 | 70 |
| 11 | 180 | 100 | 61 |
| 12 | 168 | 94 | 57 |
| 13 | 165 | 92 | 56 |
| 14 | 122 | 68 | 41 |
| 15 | 122 | 68 | 41 |
| 16 | 85 | 48 | 29 |
| 17 | 49 | 27 | 16 |
| 18 | 49 | 27 | 16 |
| 19 | 27 | 15 | 9 |
| 20 | 15 | 9 | 5 |
| 21 | 9 | 5 | 3 |
| 22 | 3 | 2 | 1 |
| 23 | 3 | 2 | 1 |
| 24 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 475 | 1 | 103 | No | No | No | Yes | No | No | No | Yes | No | No |
| 2 | 1 | 461 | 1 | 100 | No | No | No | Yes | No | No | No | Yes | No | No |
| 3 | 1 | 452 | 1 | 98 | No | No | No | Yes | No | No | No | Yes | No | No |
| 4 | 1 | 422 | 1 | 92 | No | No | No | Yes | No | No | No | Yes | No | No |
| 5 | 1 | 375 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 371 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 366 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 333 | 1 | 72 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 327 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 323 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 280 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 262 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 257 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 190 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 190 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 133 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 76 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 76 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 42 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 24 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 14 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 14.1 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:24 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 103 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 578 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 81 | 163 | 78 |
| 2 | 79 | 158 | 76 |
| 3 | 77 | 155 | 74 |
| 4 | 72 | 145 | 69 |
| 5 | 64 | 129 | 62 |
| 6 | 63 | 127 | 61 |
| 7 | 62 | 126 | 60 |
| 8 | 57 | 114 | 55 |
| 9 | 56 | 112 | 54 |
| 10 | 55 | 111 | 53 |
| 11 | 48 | 96 | 46 |
| 12 | 45 | 90 | 43 |
| 13 | 44 | 88 | 42 |
| 14 | 32 | 65 | 31 |
| 15 | 32 | 65 | 31 |
| 16 | 23 | 46 | 22 |
| 17 | 13 | 26 | 12 |
| 18 | 13 | 26 | 12 |
| 19 | 7 | 15 | 7 |
| 20 | 4 | 8 | 4 |
| 21 | 2 | 5 | 2 |
| 22 | 1 | 2 | 1 |
| 23 | 1 | 2 | 1 |
| 24 | 1 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 244 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 237 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 232 | 1 | 74 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 217 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 193 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 190 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 188 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 171 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 168 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 166 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 144 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 135 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 132 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 97 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 97 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 69 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 39 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 39 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 22 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

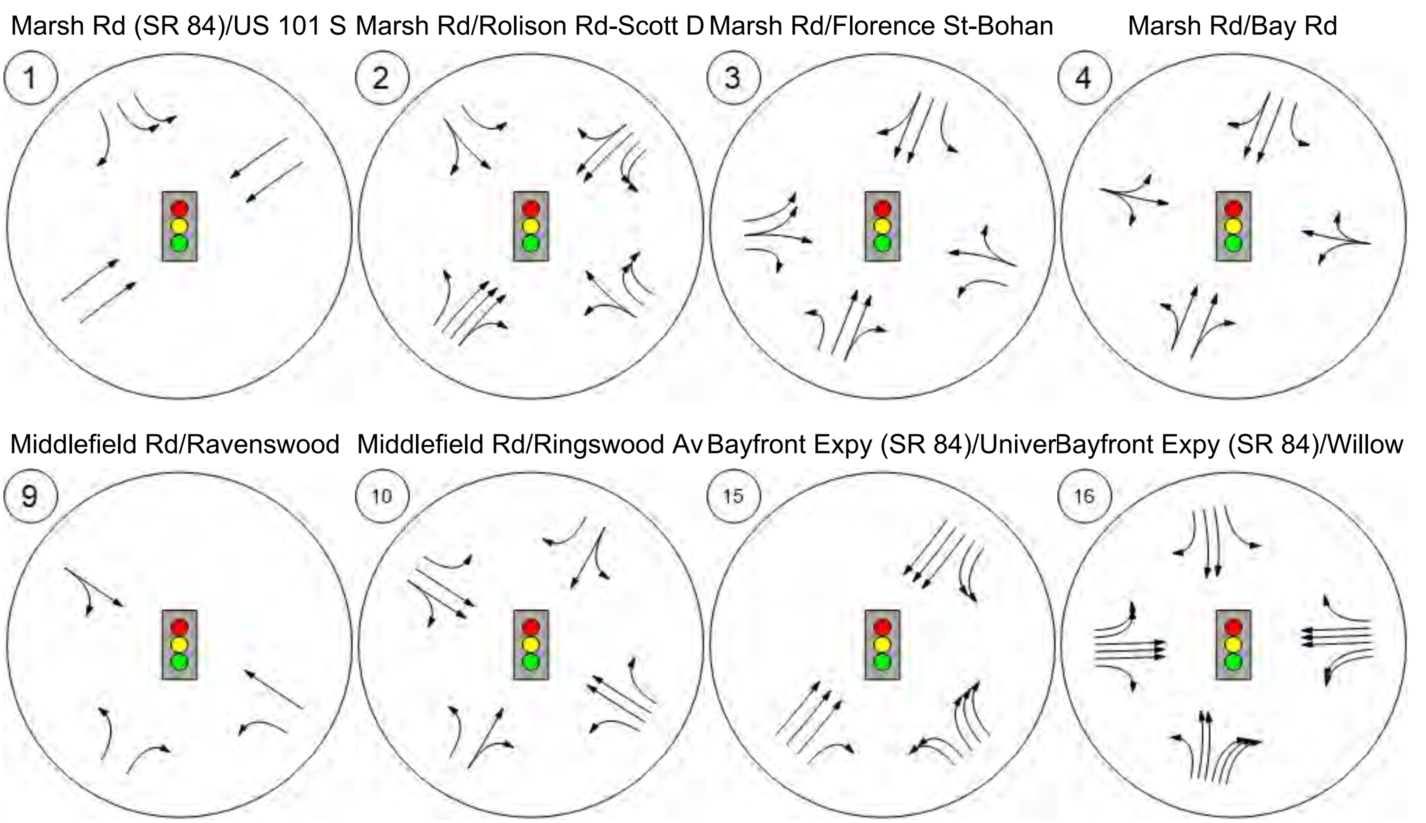
| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 78 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 322 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Study Intersections

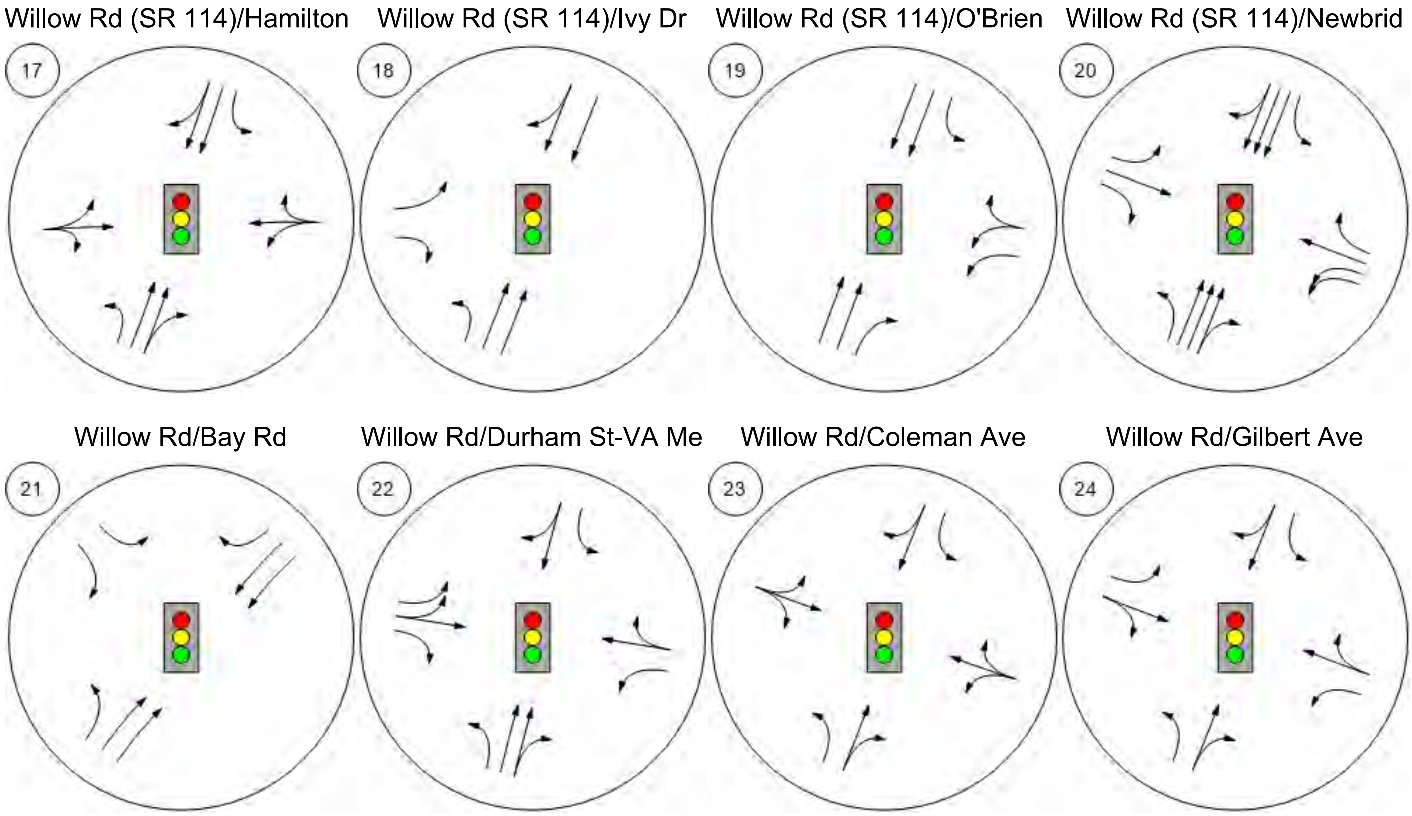
Lane Configuration and Traffic Control

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

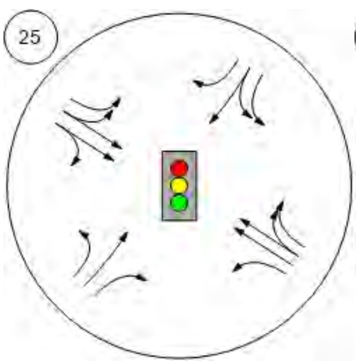



Generated with PTV VISTRO

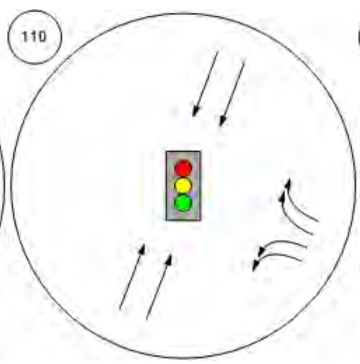
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

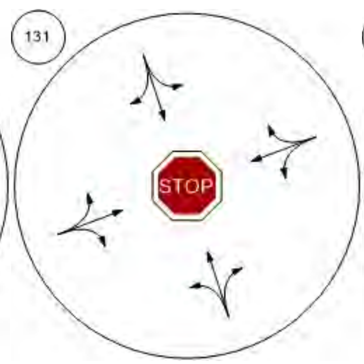

Middlefield Rd-Willow Rd



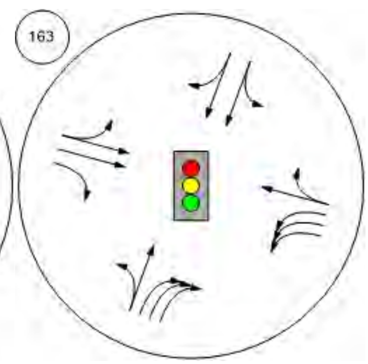

Marsh Road and US 101 NB



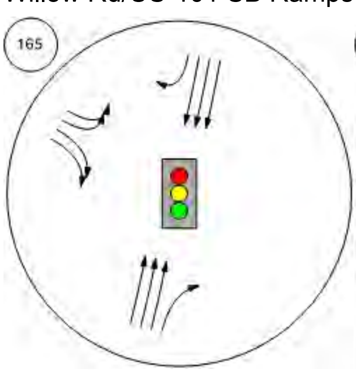

Chilco Street/Hamilton Avenu



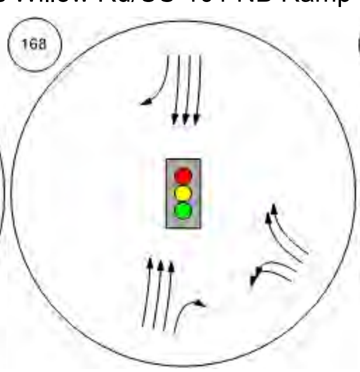

Bayfront Expy/Marsh Rd



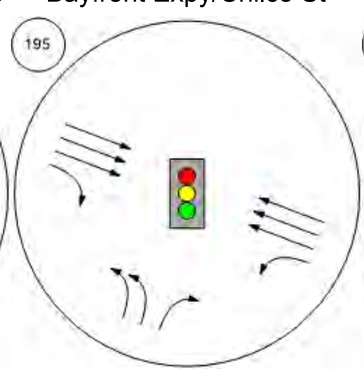

Willow Rd/US-101 SB Ramps



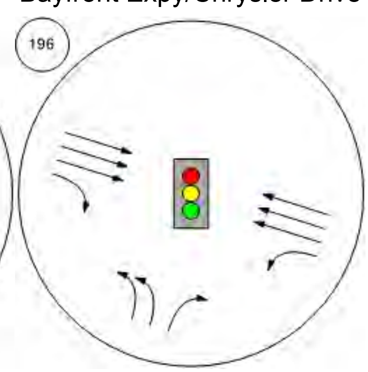

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

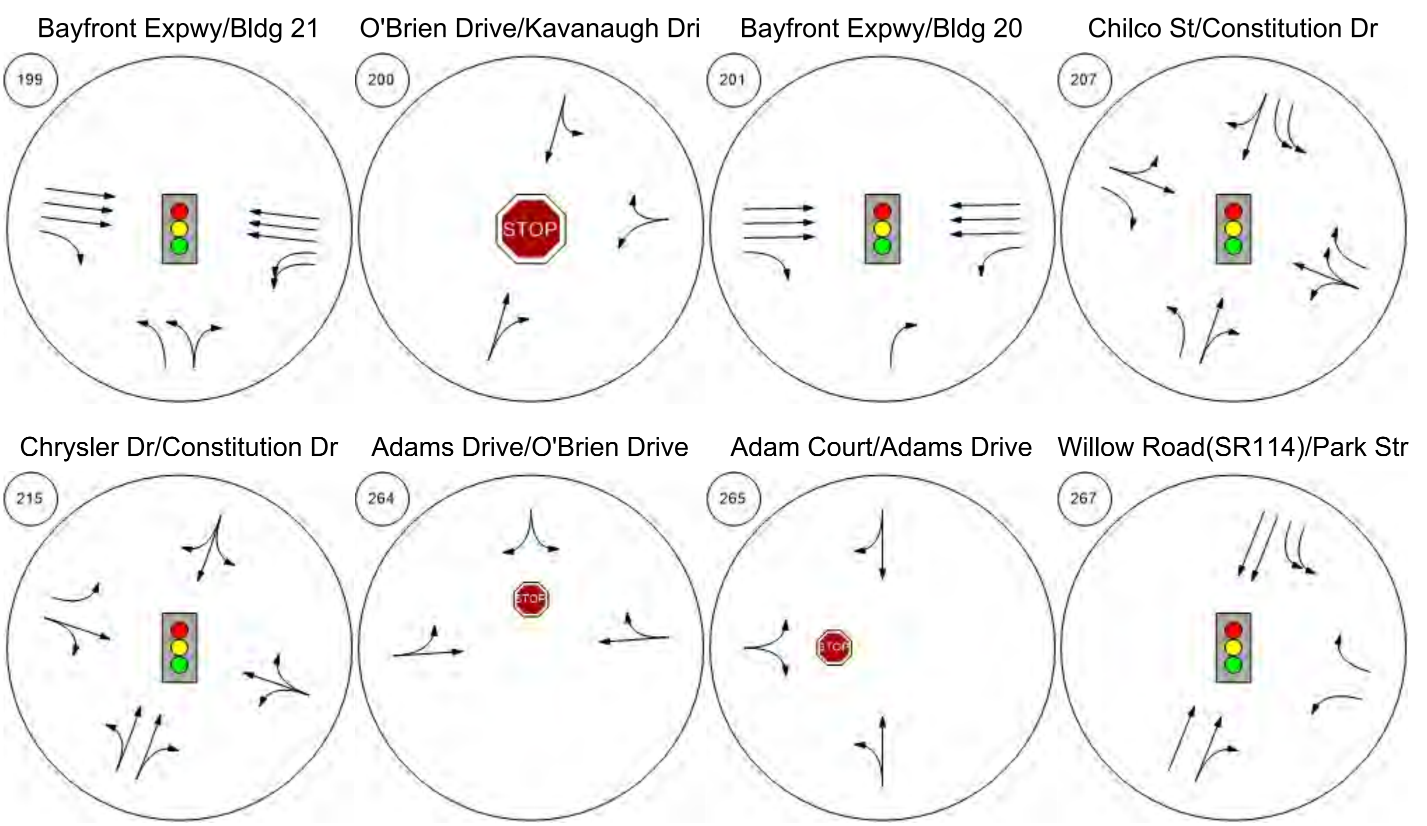



Bayfront Expy/Chrysler Drive



Generated with PTV VISTRO
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

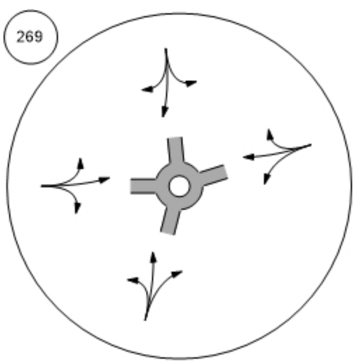



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

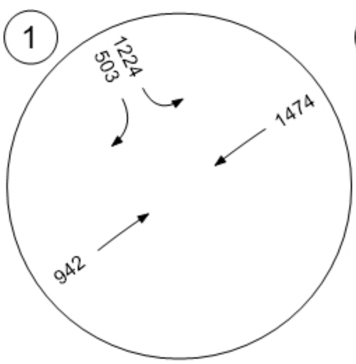


Generated with PTV VISTRO

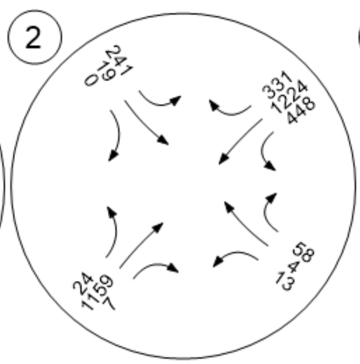
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

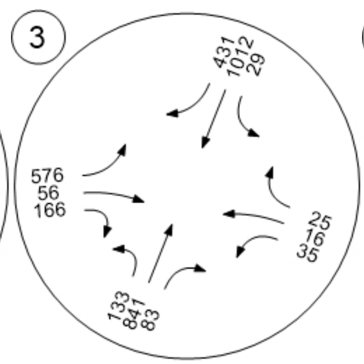

Marsh Rd (SR 84)/US 101 S



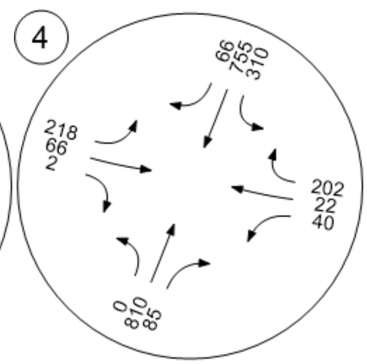

Marsh Rd/Rolison Rd-Scott D



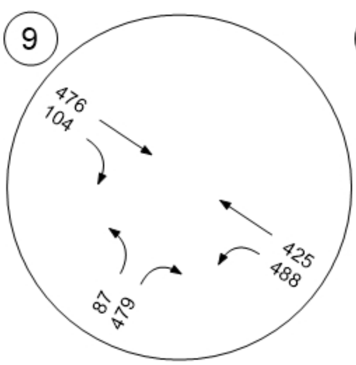

Marsh Rd/Florence St-Bohan



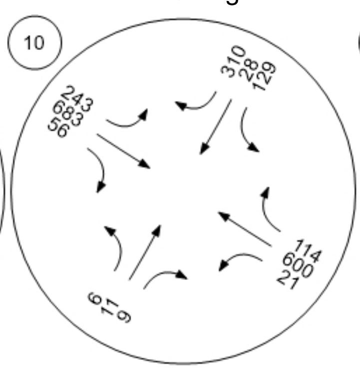

Marsh Rd/Bay Rd



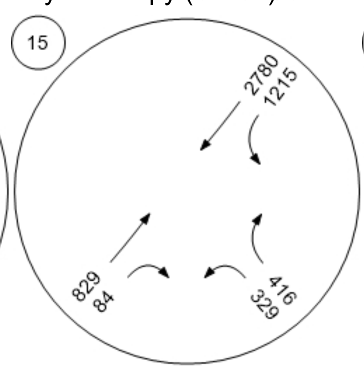

Middlefield Rd/Ravenswood



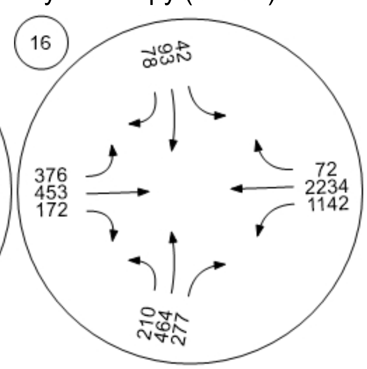

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

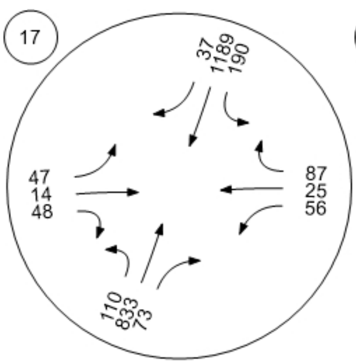


Generated with PTV VISTRO

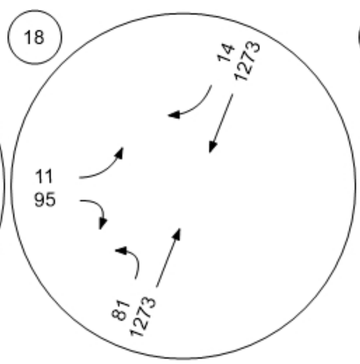
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

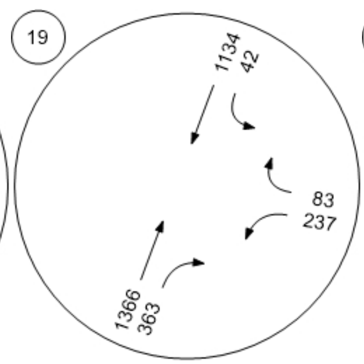

Willow Rd (SR 114)/Hamilton



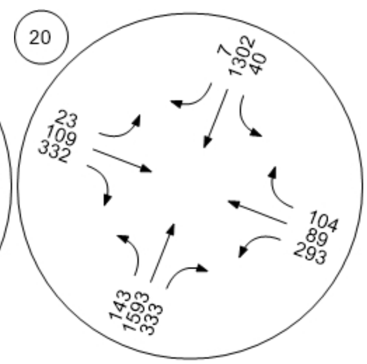

Willow Rd (SR 114)/Ivy Dr



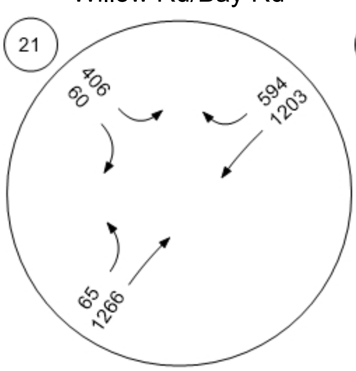

Willow Rd (SR 114)/O'Brien



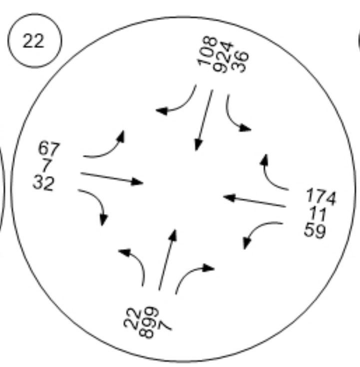

Willow Rd (SR 114)/Newbrid



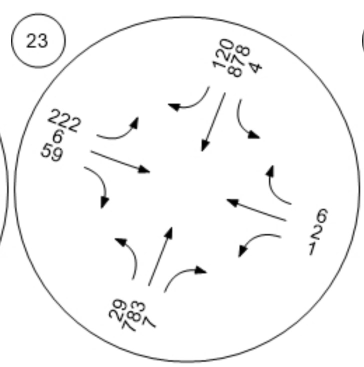

Willow Rd/Bay Rd



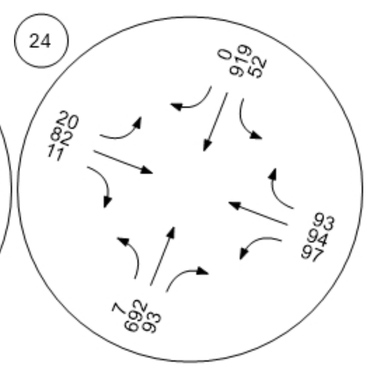

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

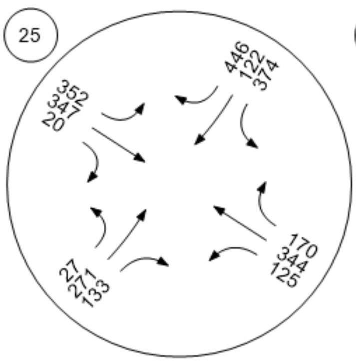


Generated with PTV VISTRO

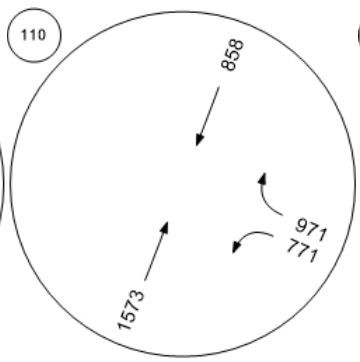
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

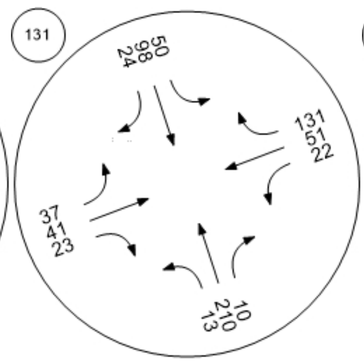

Middlefield Rd-Willow Rd



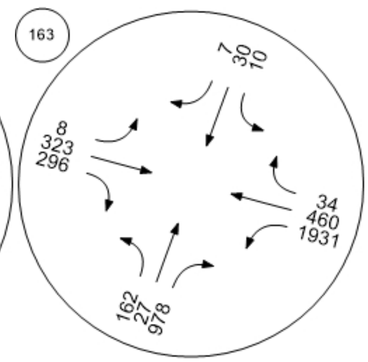

Marsh Road and US 101 NB



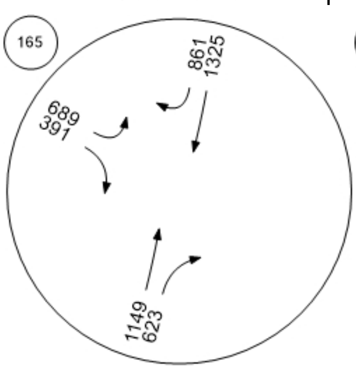

Chilco Street/Hamilton Avenu



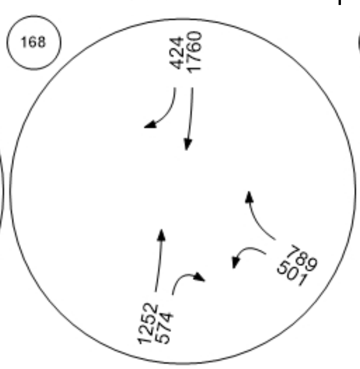

Bayfront Expy/Marsh Rd



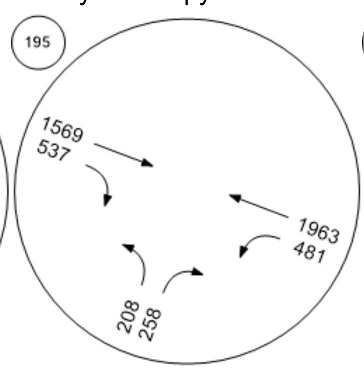

Willow Rd/US-101 SB Ramps



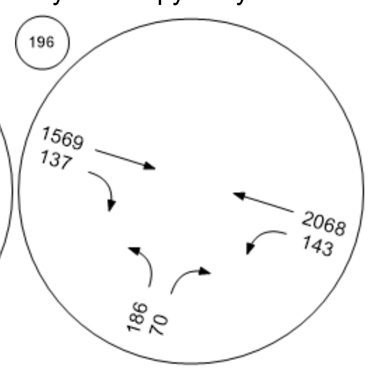

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

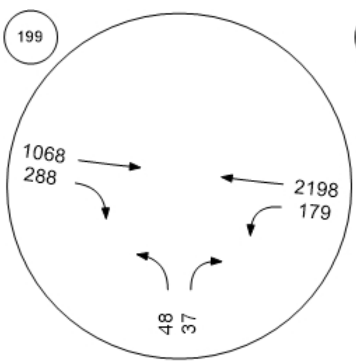


Generated with PTV VISTRO

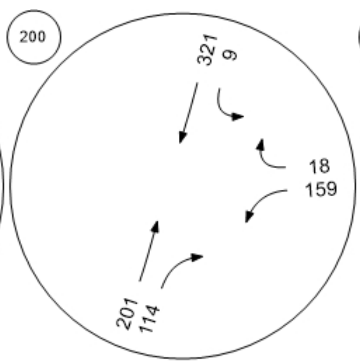
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

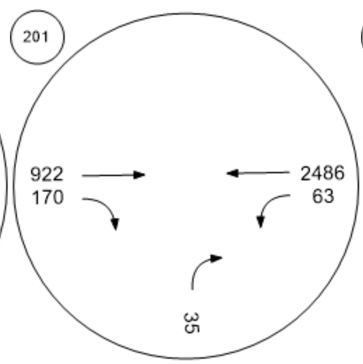

### Bayfront Expwy/Bldg 21



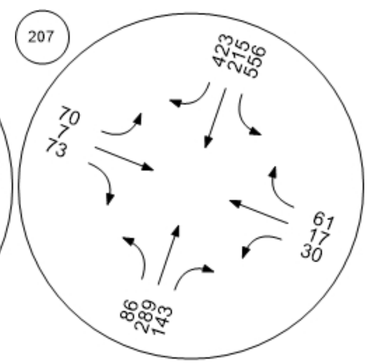

### O'Brien Drive/Kavanaugh Dri



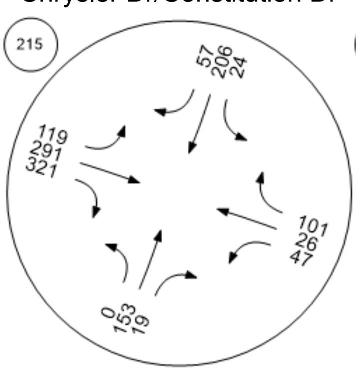

### Bayfront Expwy/Bldg 20



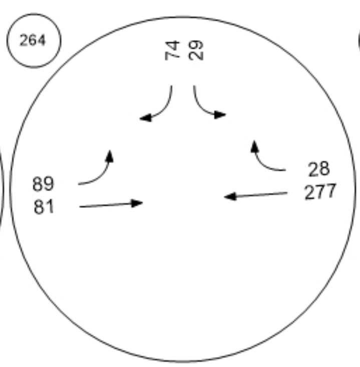

### Chilco St/Constitution Dr



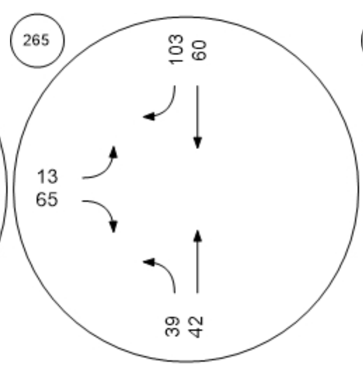

### Chrysler Dr/Constitution Dr



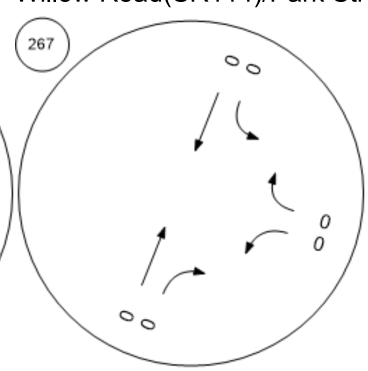

### Adams Drive/O'Brien Drive




### Adam Court/Adams Drive




### Willow Road(SR114)/Park Str

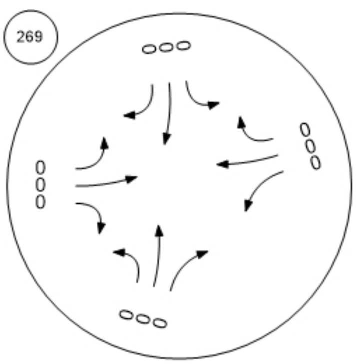


Generated with PTV VISTRO

Version 2021 (SP 0-6)

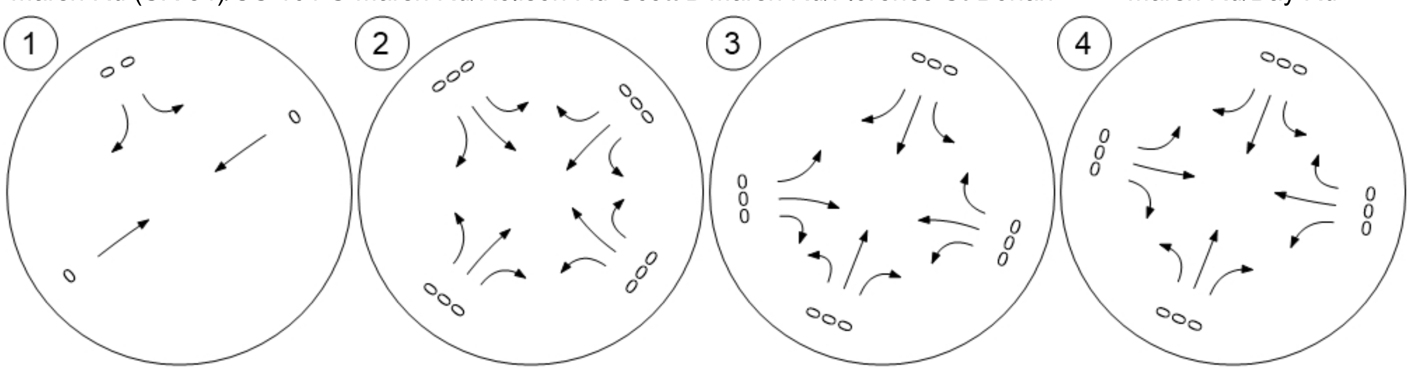
## Traffic Volume - Base Volume


### O'Brien Drive/Loop Road

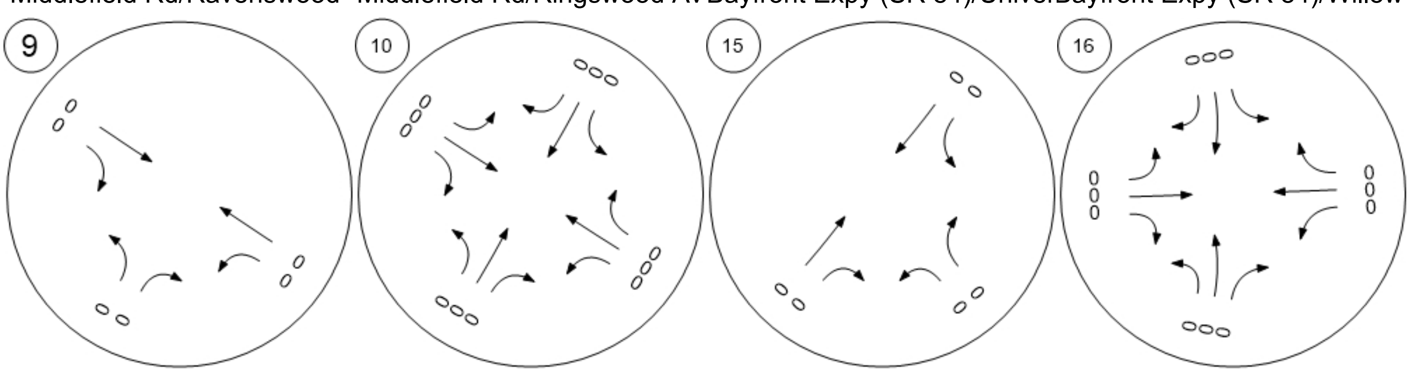


Traffic Volume - In-Process Volume


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

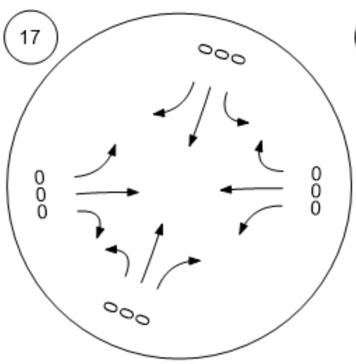


Generated with PTV VISTRO

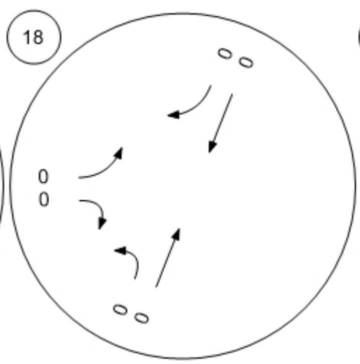
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

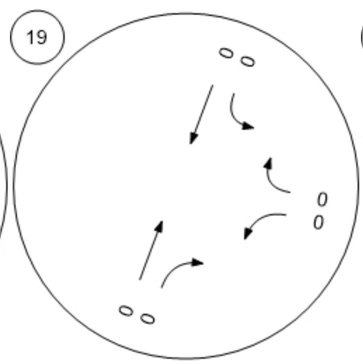

Willow Rd (SR 114)/Hamilton



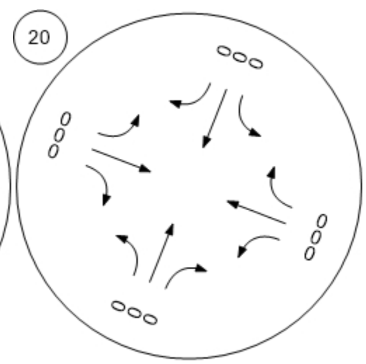

Willow Rd (SR 114)/Ivy Dr



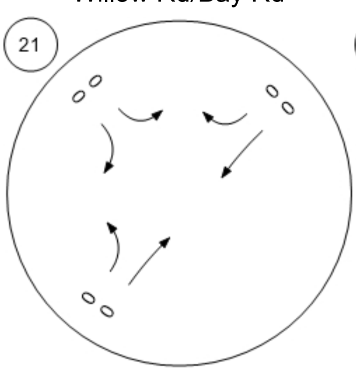

Willow Rd (SR 114)/O'Brien



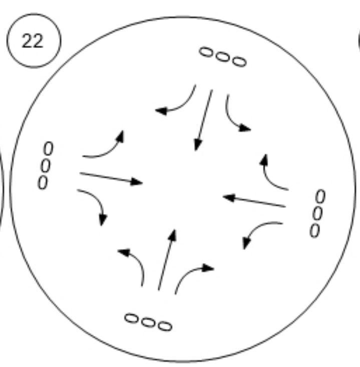

Willow Rd (SR 114)/Newbrid



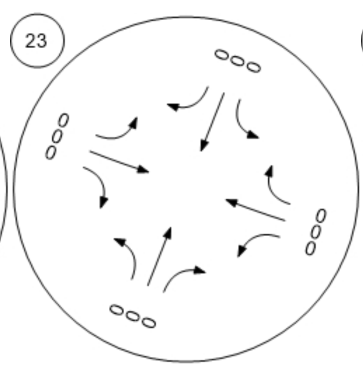

Willow Rd/Bay Rd



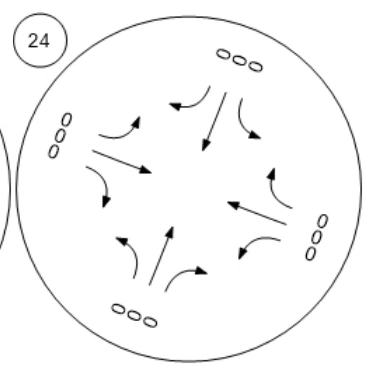

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



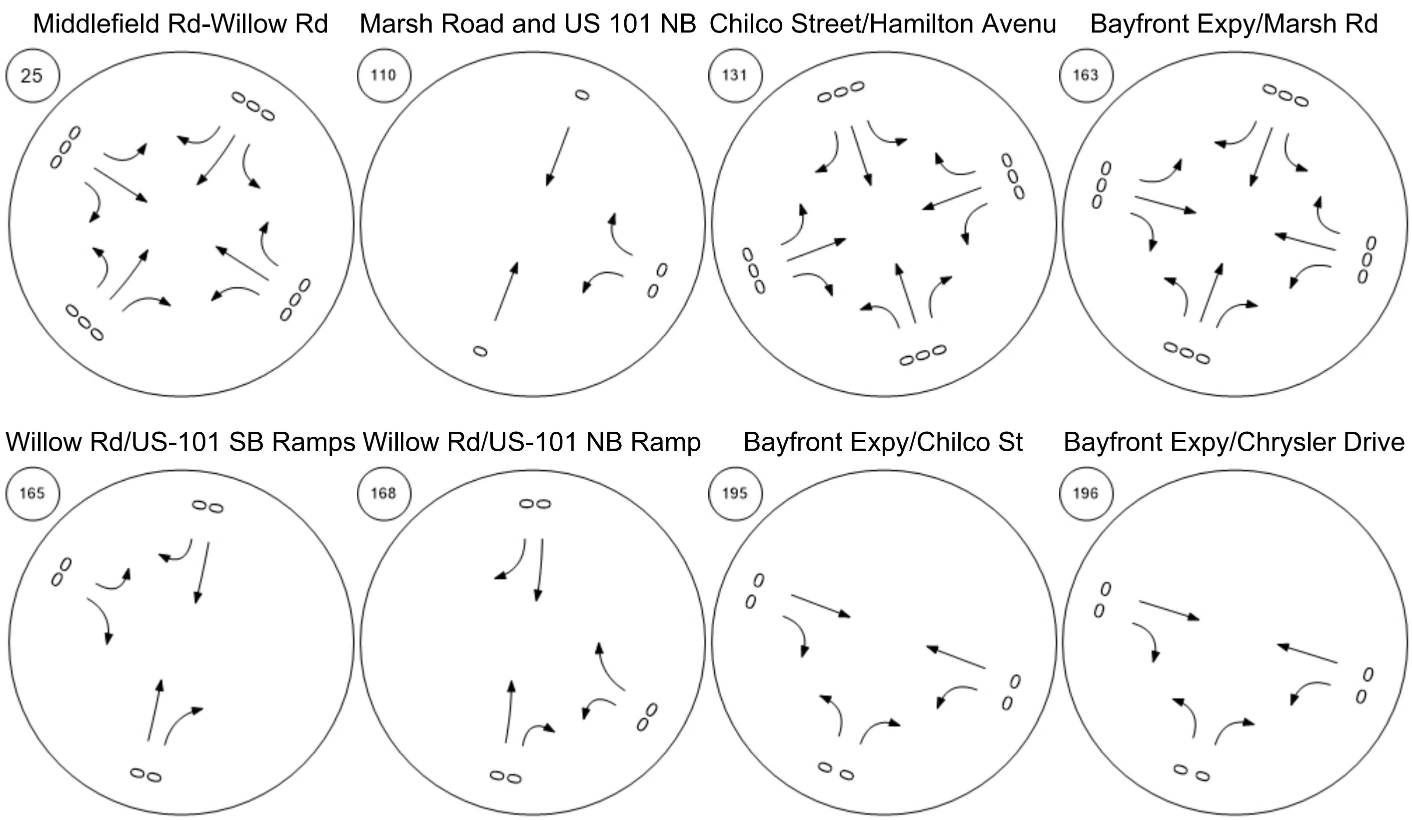

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

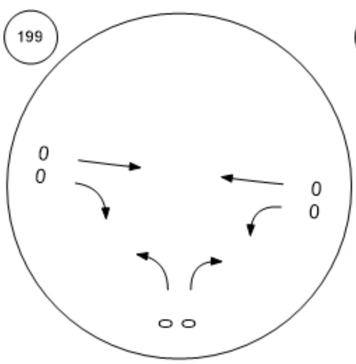



Generated with PTV VISTRO

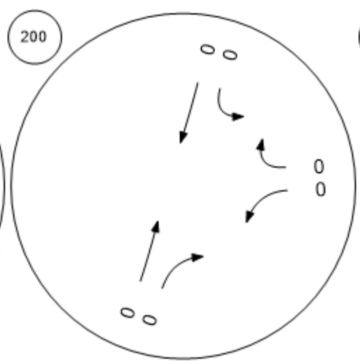
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

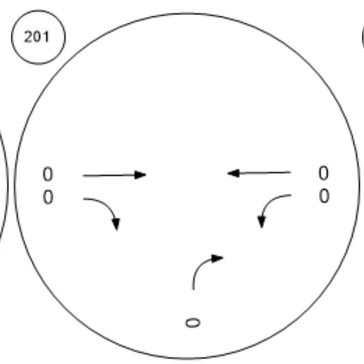

Bayfront Expwy/Bldg 21



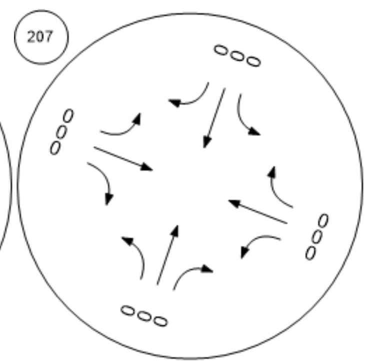

O'Brien Drive/Kavanaugh Dri



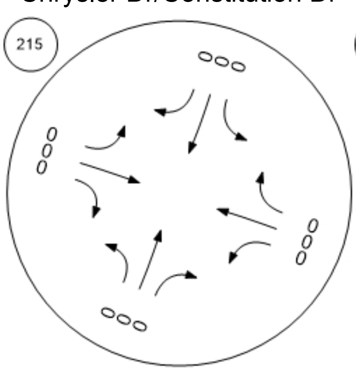

Bayfront Expwy/Bldg 20



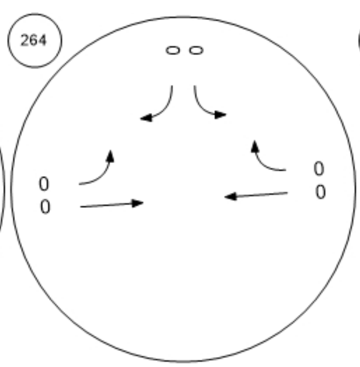

Chilco St/Constitution Dr



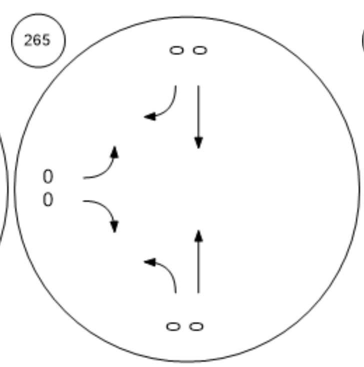

Chrysler Dr/Constitution Dr



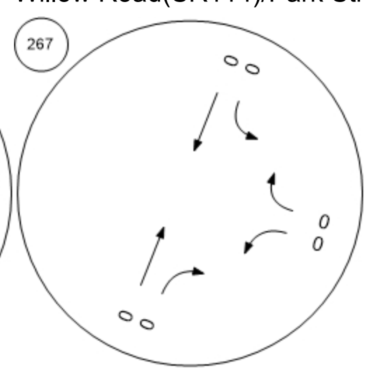

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

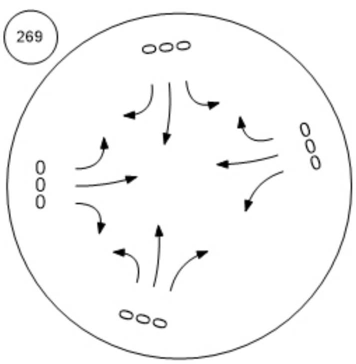


Generated with PTV VISTRO

Version 2021 (SP 0-6)

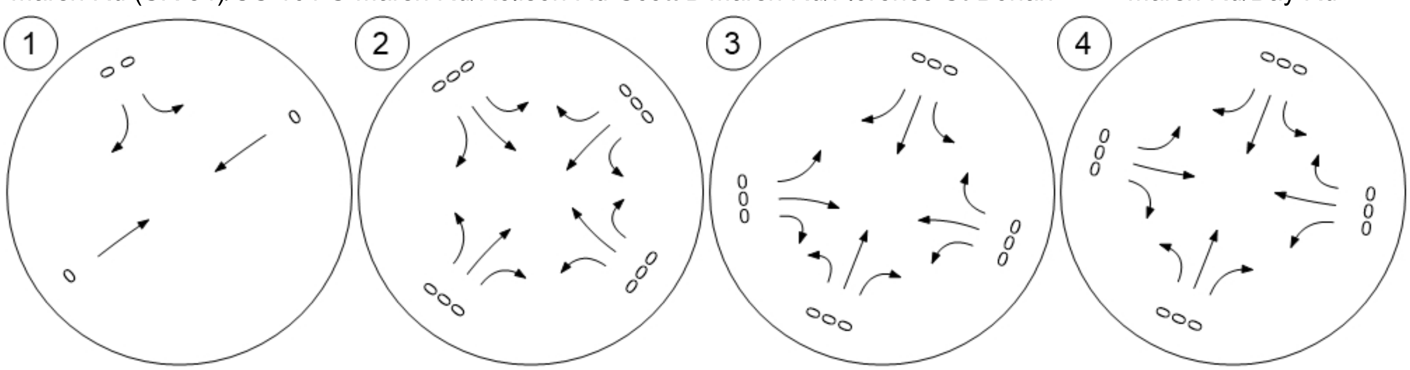
Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road

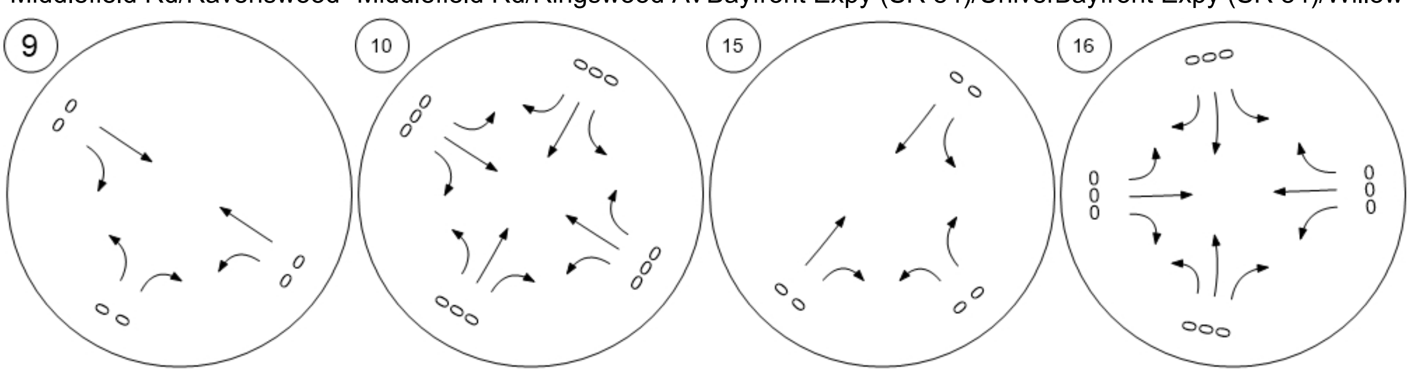


Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

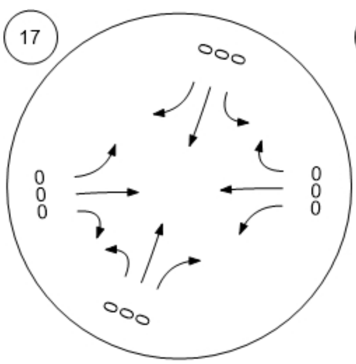


Generated with PTV VISTRO

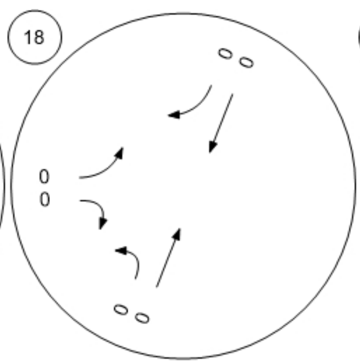
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

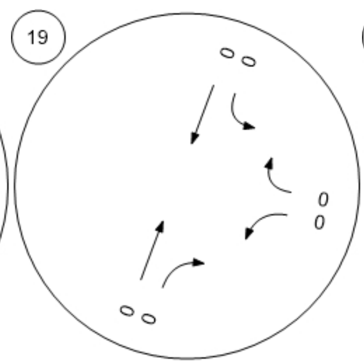

Willow Rd (SR 114)/Hamilton



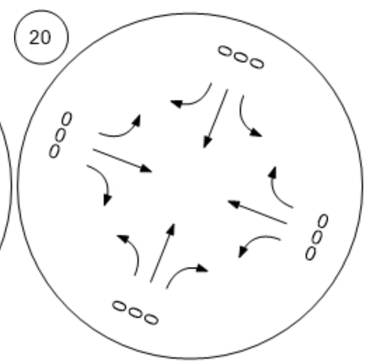

Willow Rd (SR 114)/Ivy Dr



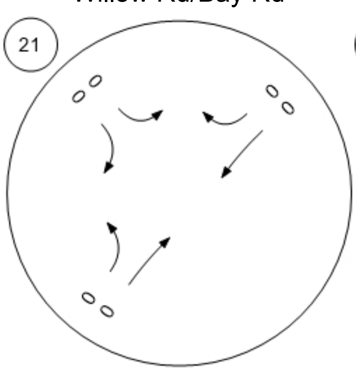

Willow Rd (SR 114)/O'Brien



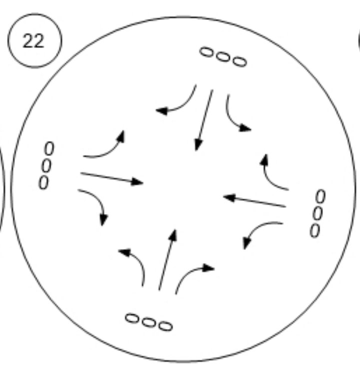

Willow Rd (SR 114)/Newbrid



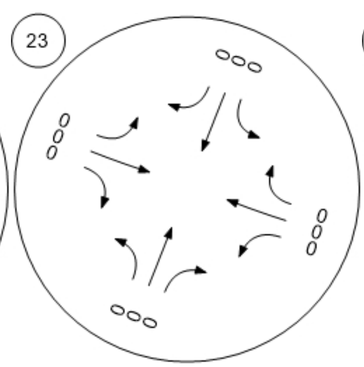

Willow Rd/Bay Rd



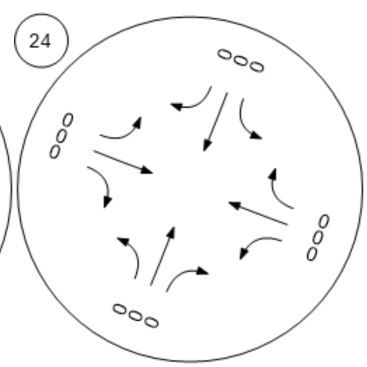

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

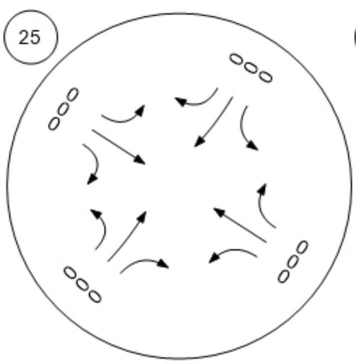


Generated with PTV VISTRO

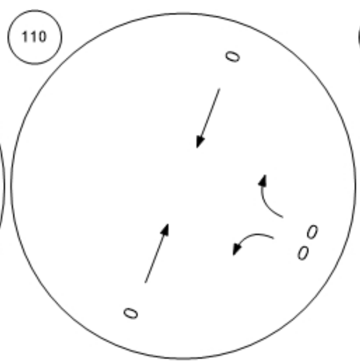
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

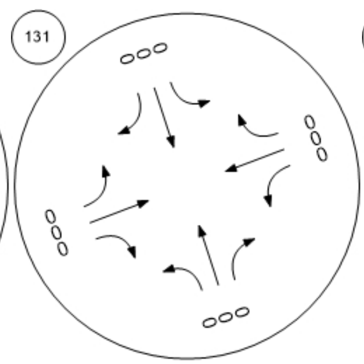

Middlefield Rd-Willow Rd



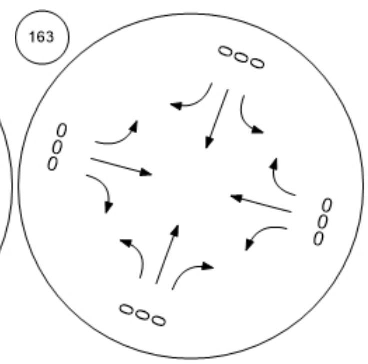

Marsh Road and US 101 NB



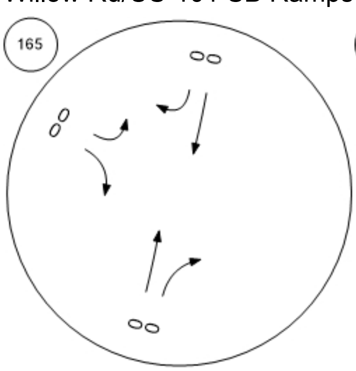

Chilco Street/Hamilton Avenu



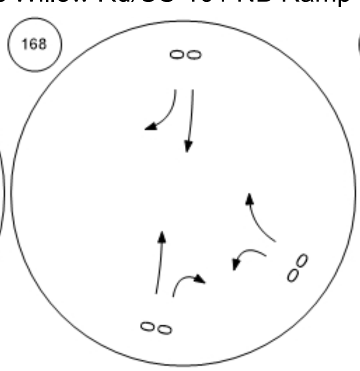

Bayfront Expy/Marsh Rd



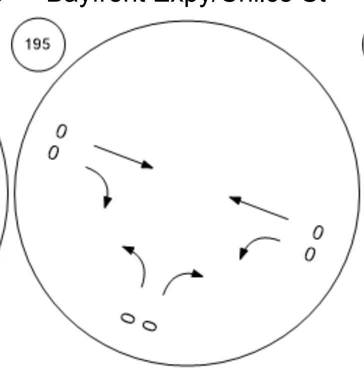

Willow Rd/US-101 SB Ramps



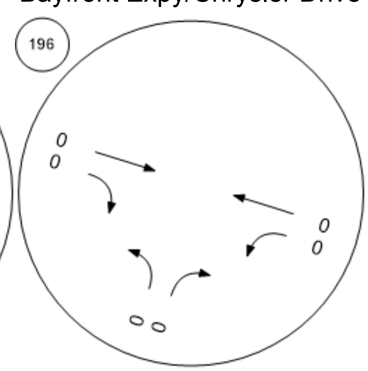

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

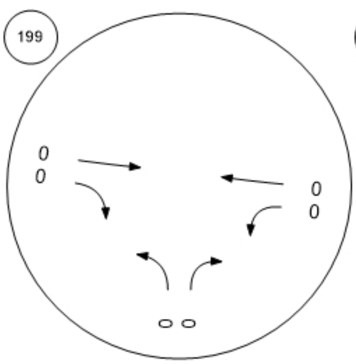


Generated with PTV VISTRO

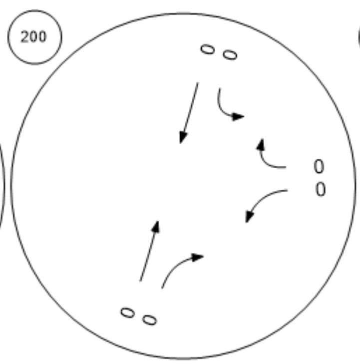
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

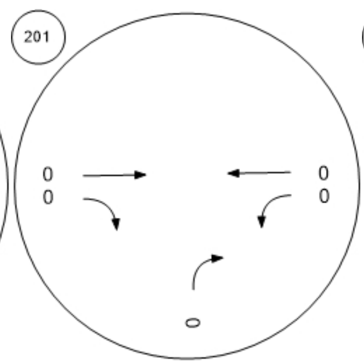

Bayfront Expwy/Bldg 21



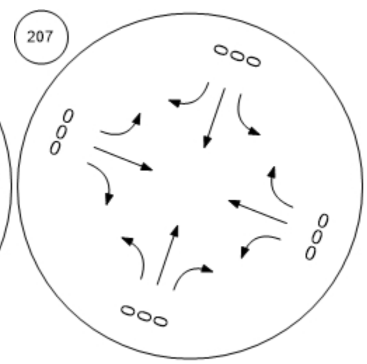

O'Brien Drive/Kavanaugh Dri



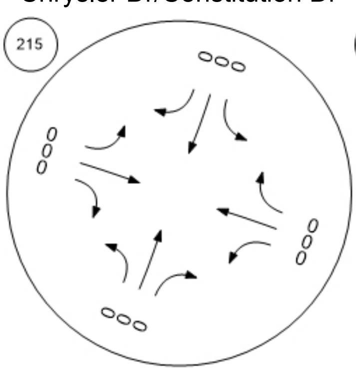

Bayfront Expwy/Bldg 20



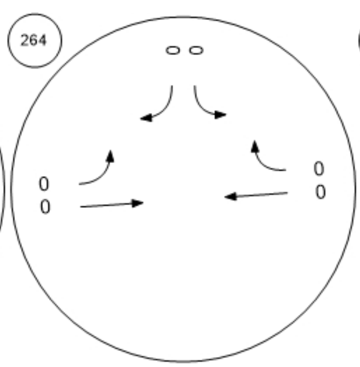

Chilco St/Constitution Dr



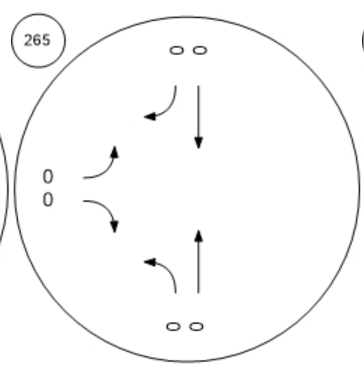

Chrysler Dr/Constitution Dr



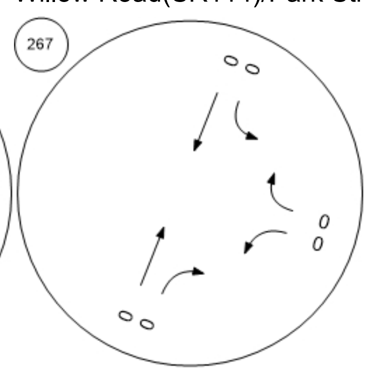

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

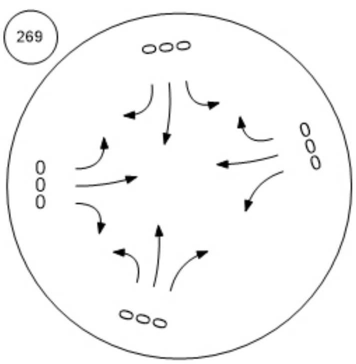


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

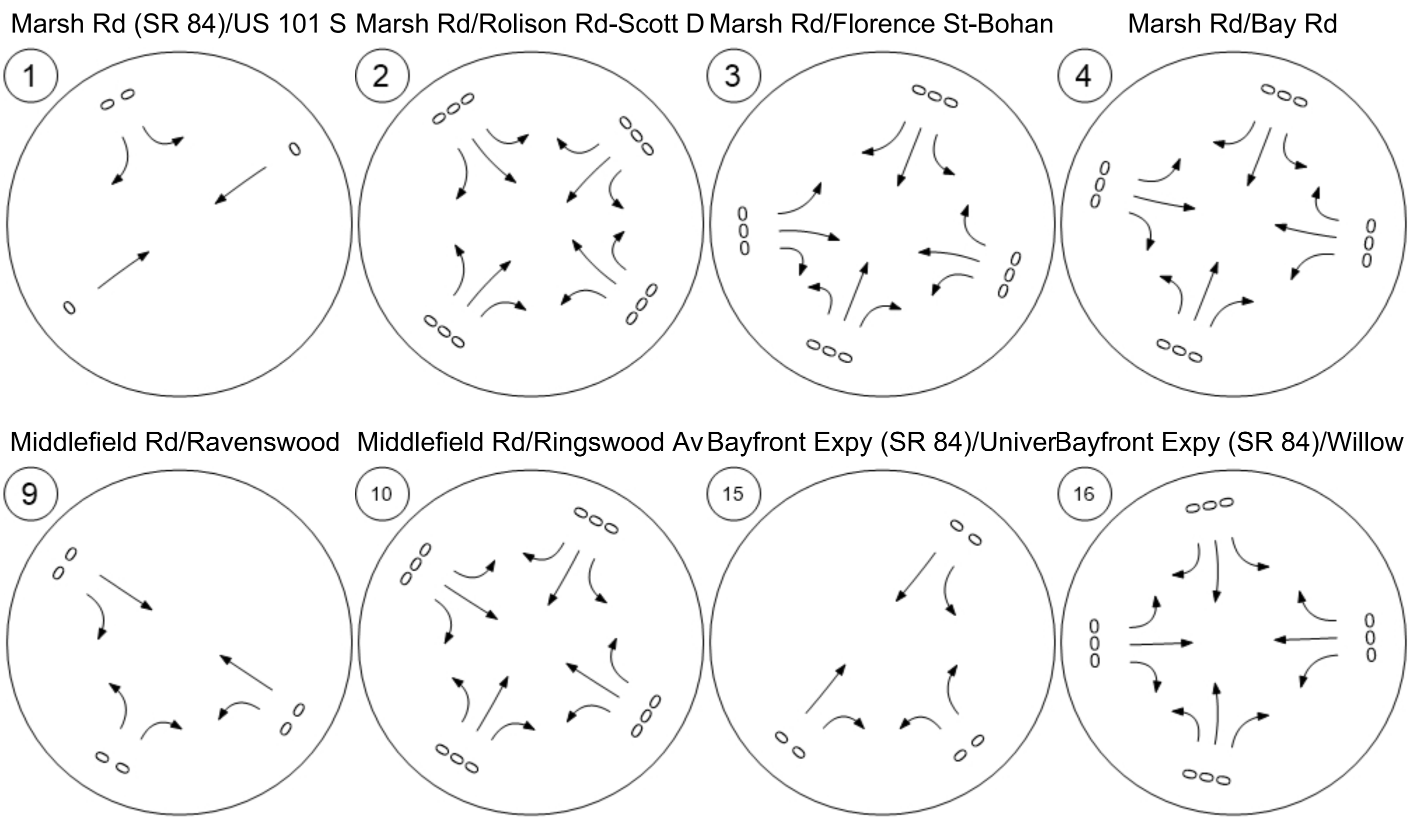

O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume

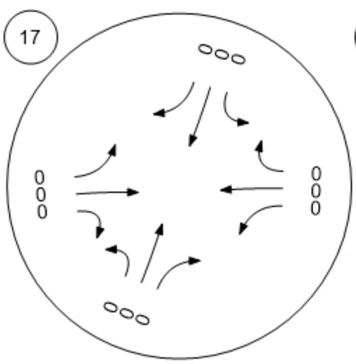



Generated with PTV VISTRO

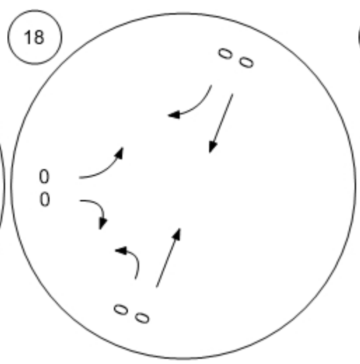
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

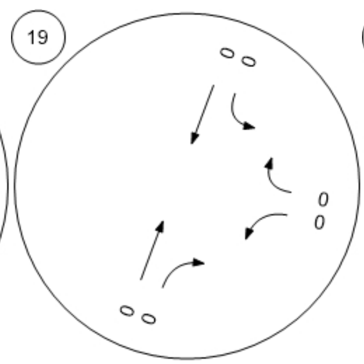

Willow Rd (SR 114)/Hamilton



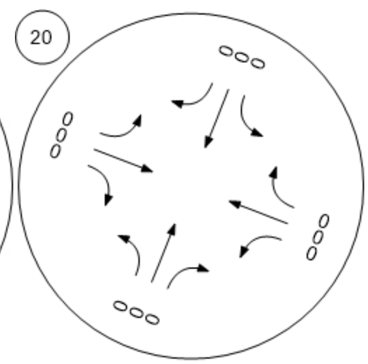

Willow Rd (SR 114)/Ivy Dr



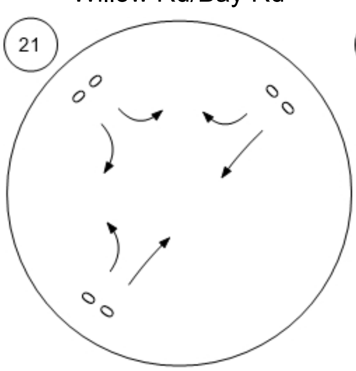

Willow Rd (SR 114)/O'Brien



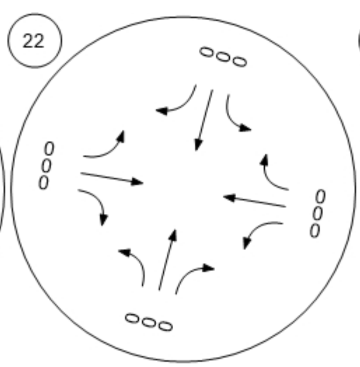

Willow Rd (SR 114)/Newbrid



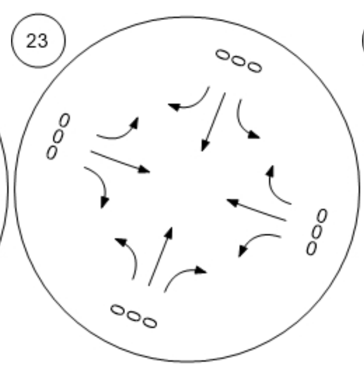

Willow Rd/Bay Rd



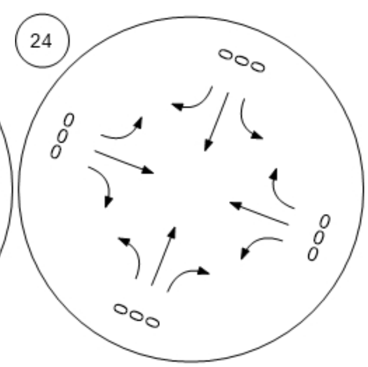

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

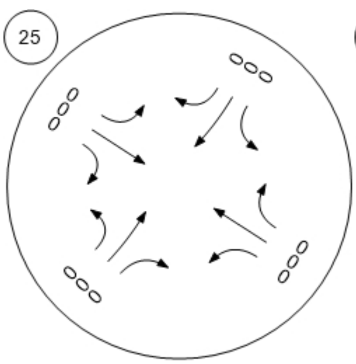



Willow Rd/Gilbert Ave

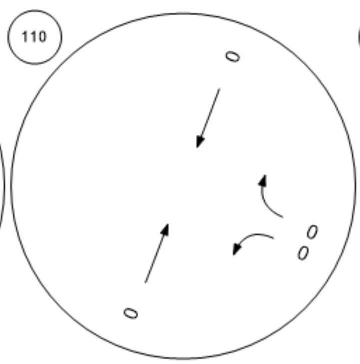


Traffic Volume - Other Volume

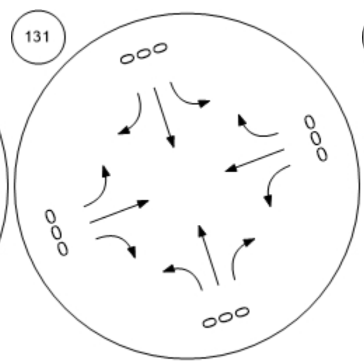

Middlefield Rd-Willow Rd



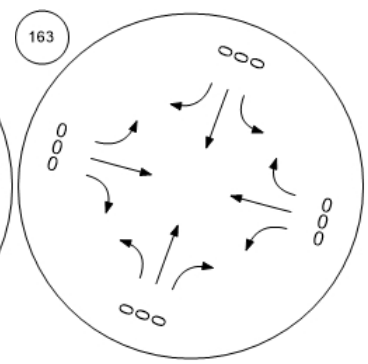

Marsh Road and US 101 NB



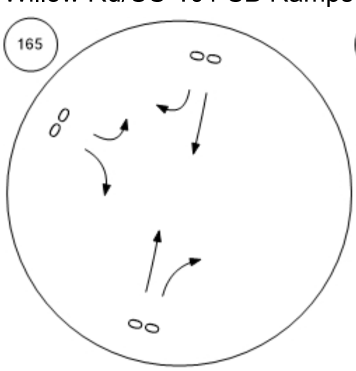

Chilco Street/Hamilton Avenu



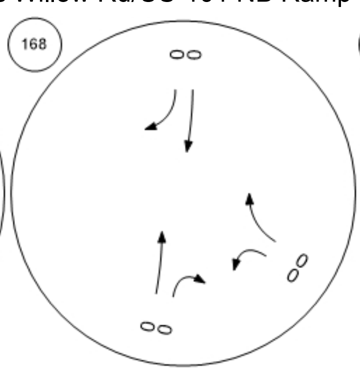

Bayfront Expy/Marsh Rd



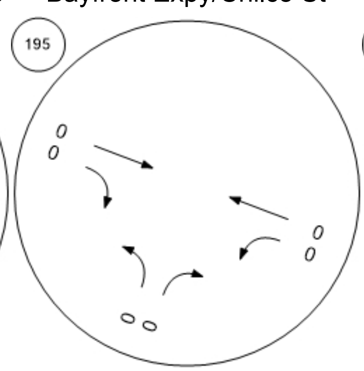

Willow Rd/US-101 SB Ramps



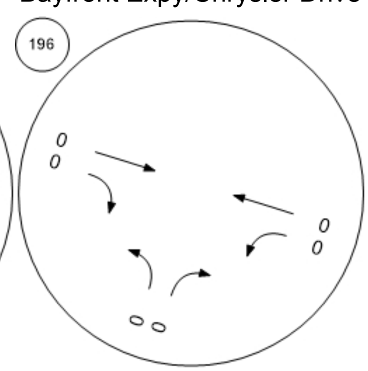

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

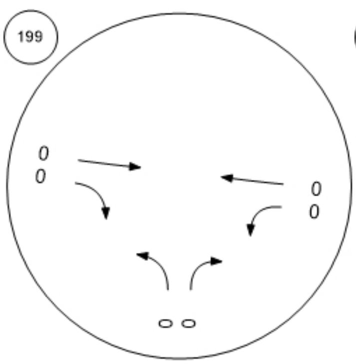


Generated with PTV VISTRO

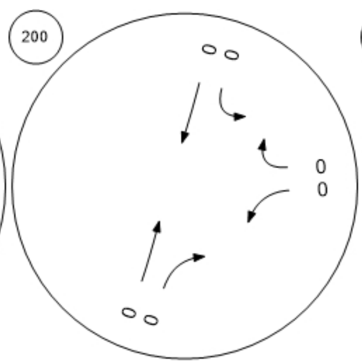
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

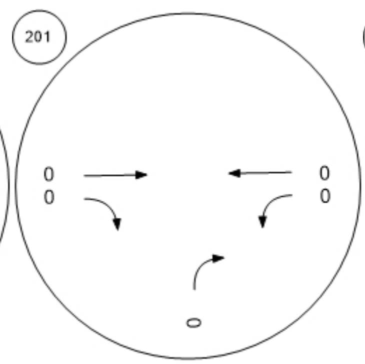

Bayfront Expwy/Bldg 21



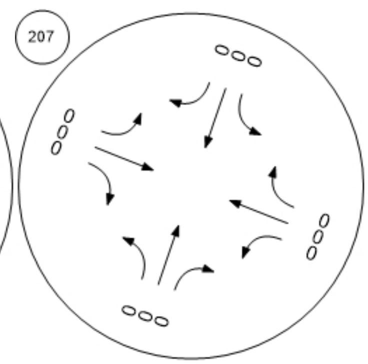

O'Brien Drive/Kavanaugh Dri



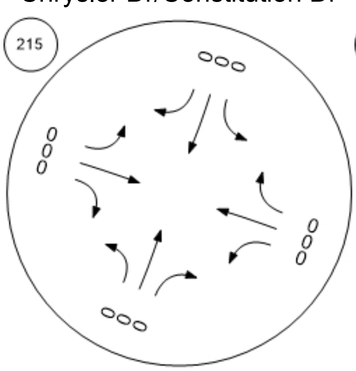

Bayfront Expwy/Bldg 20



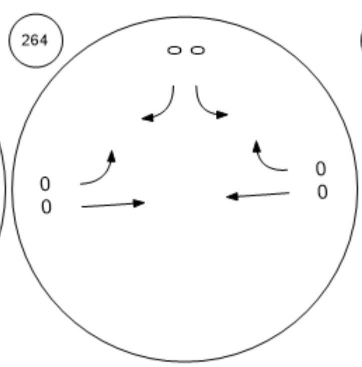

Chilco St/Constitution Dr



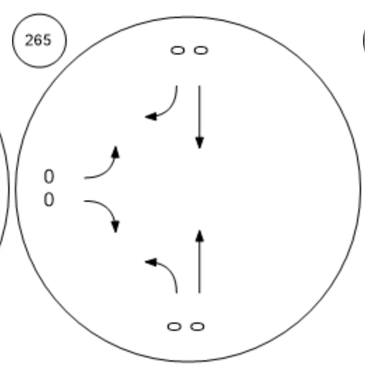

Chrysler Dr/Constitution Dr



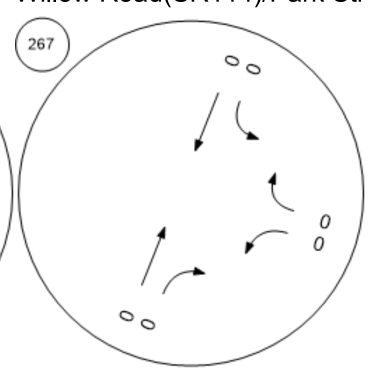

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

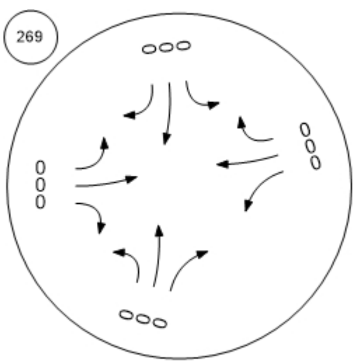



Willow Road(SR114)/Park Str



Traffic Volume - Other Volume

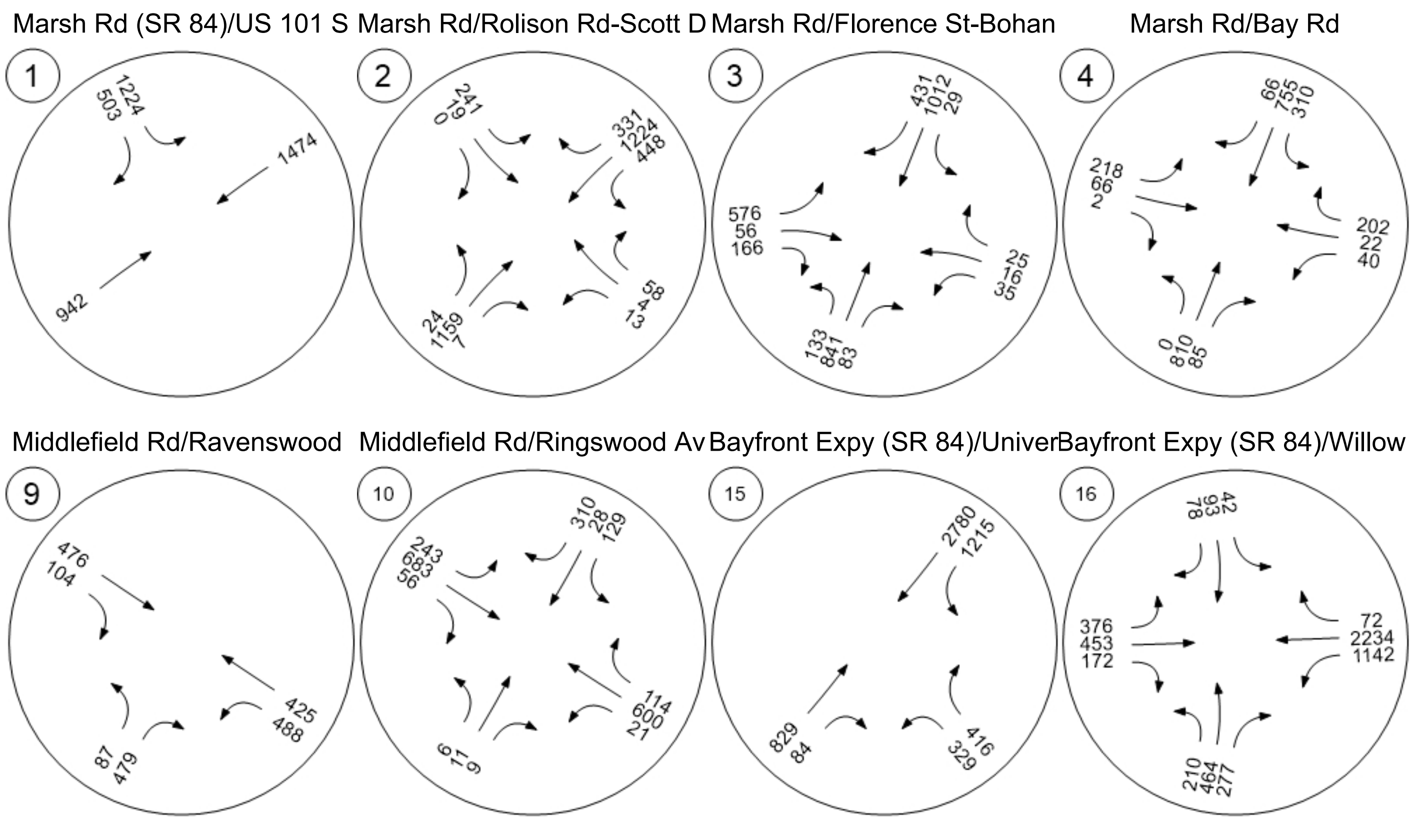

O'Brien Drive/Loop Road



Generated with PTV VISTRO

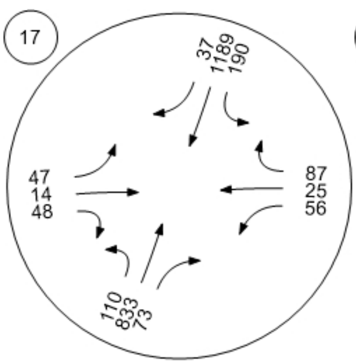
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

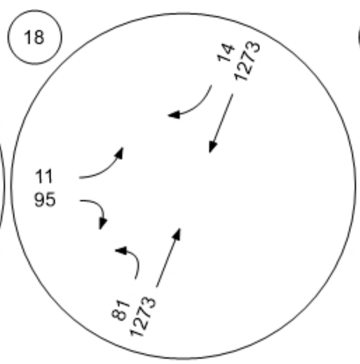



# Traffic Volume - Future Total Volume

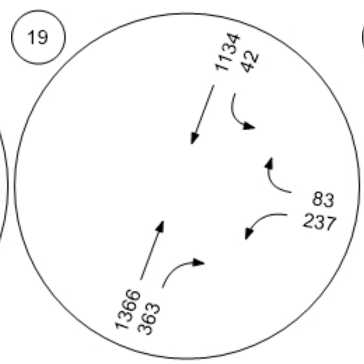

Willow Rd (SR 114)/Hamilton



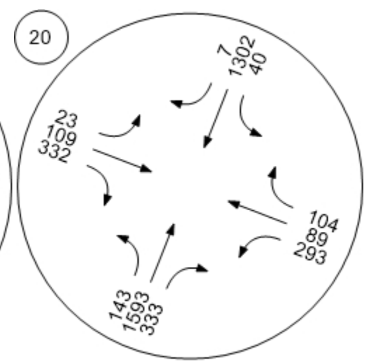

Willow Rd (SR 114)/Ivy Dr



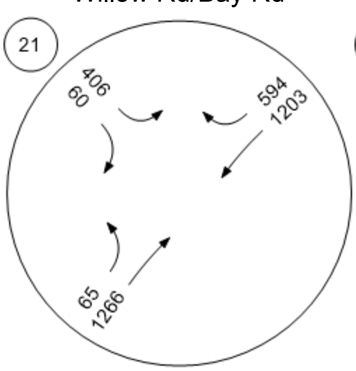

Willow Rd (SR 114)/O'Brien



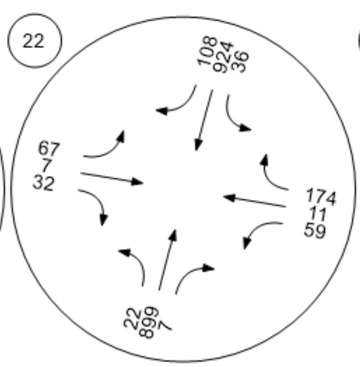

Willow Rd (SR 114)/Newbrid



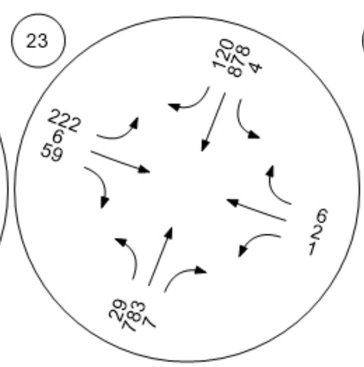

Willow Rd/Bay Rd



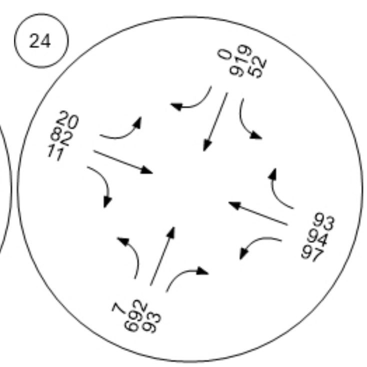

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

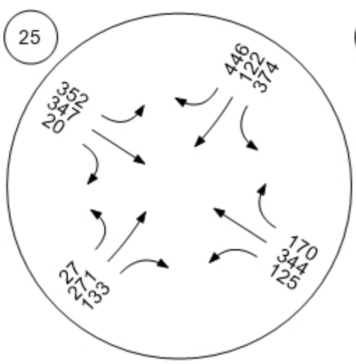


Generated with PTV VISTRO

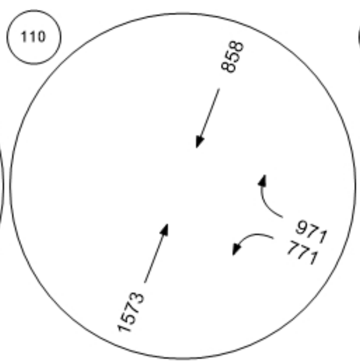
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

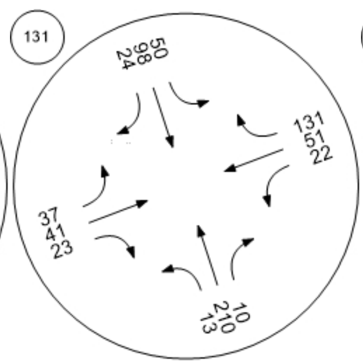

Middlefield Rd-Willow Rd



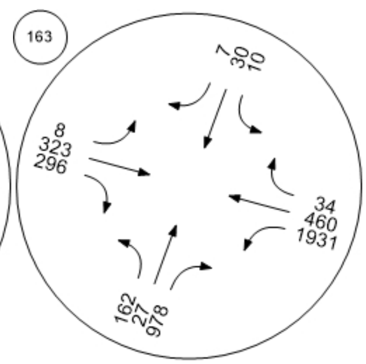

Marsh Road and US 101 NB



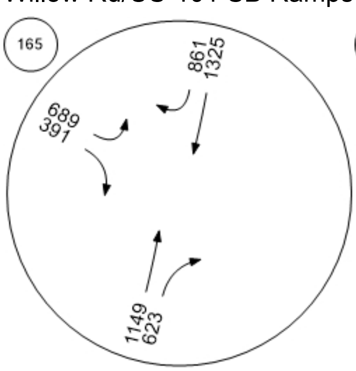

Chilco Street/Hamilton Avenu



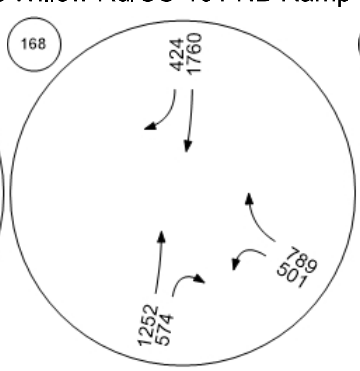

Bayfront Expy/Marsh Rd



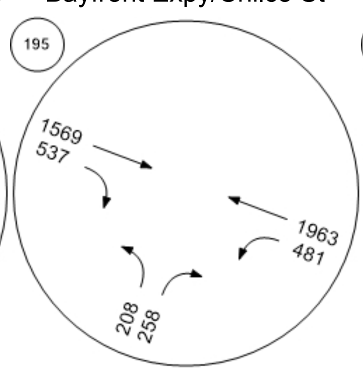

Willow Rd/US-101 SB Ramps



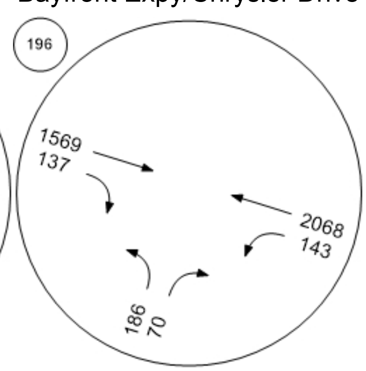

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

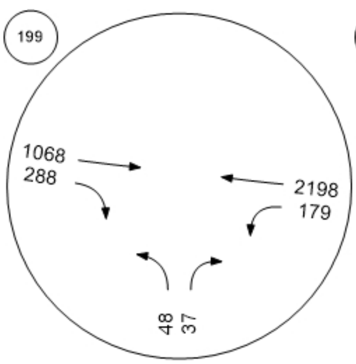


Generated with PTV VISTRO

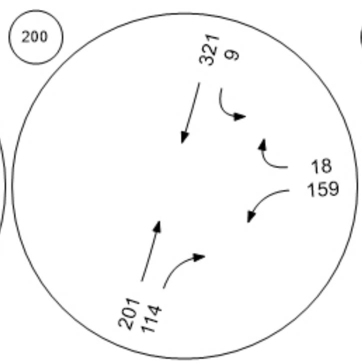
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

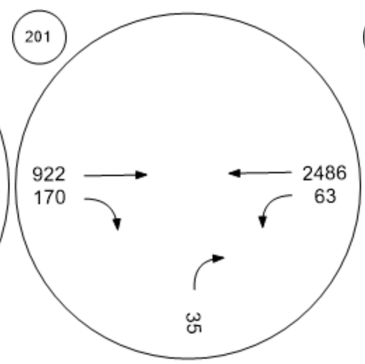

Bayfront Expwy/Bldg 21



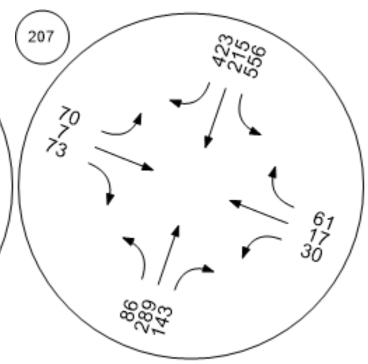

O'Brien Drive/Kavanaugh Dri



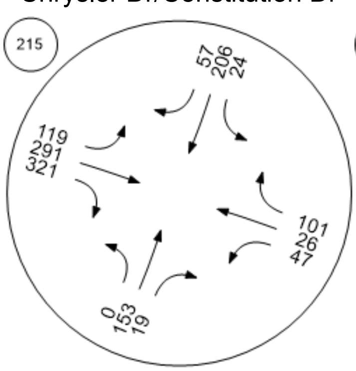

Bayfront Expwy/Bldg 20



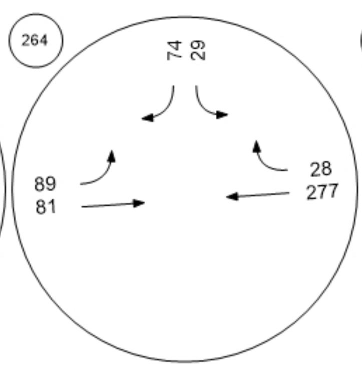

Chilco St/Constitution Dr



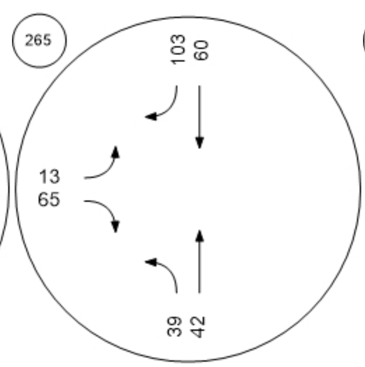

Chrysler Dr/Constitution Dr



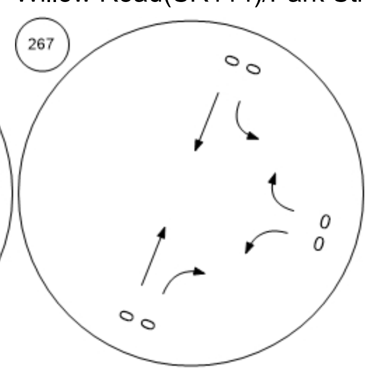

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

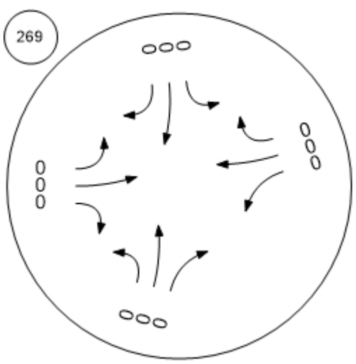


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

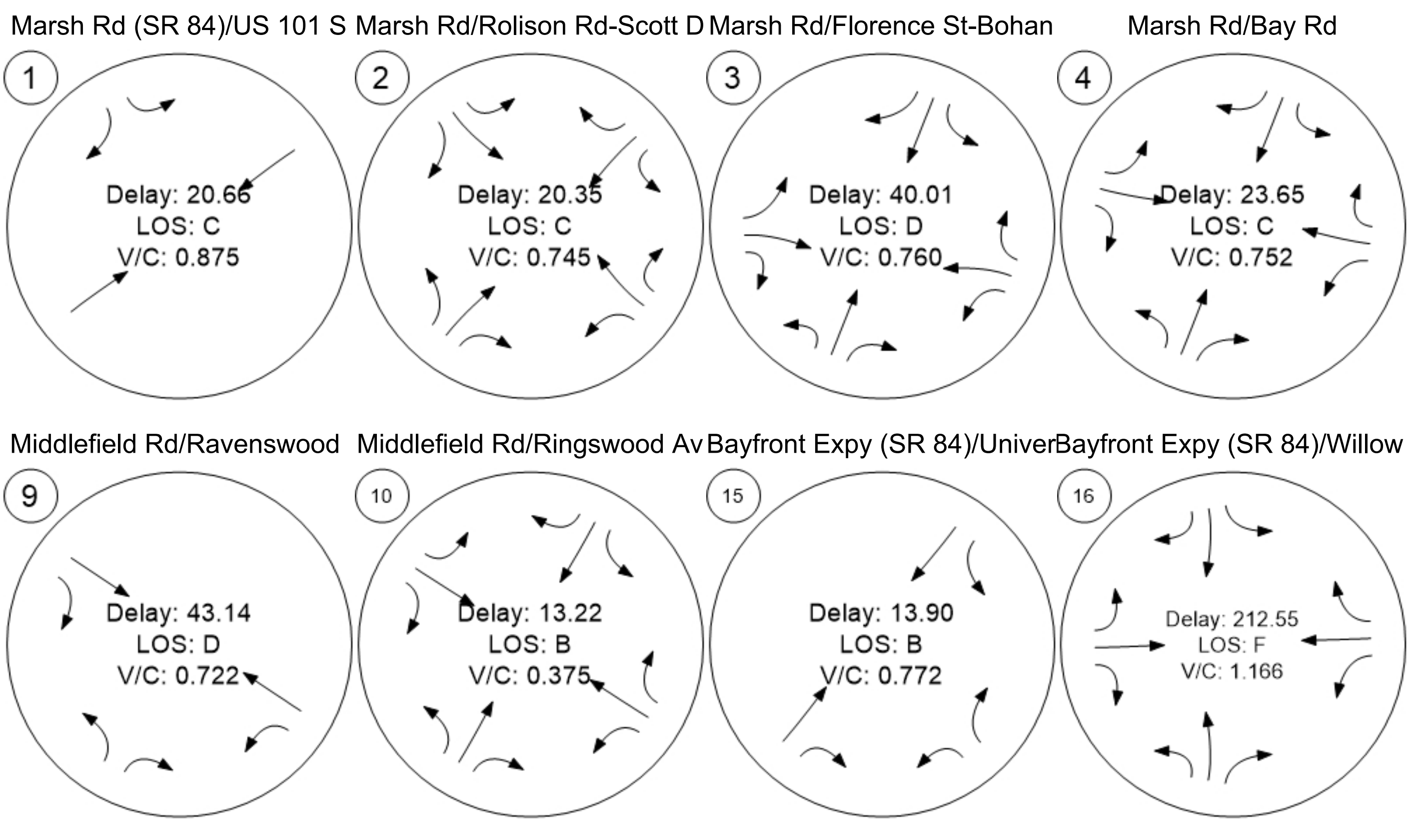

O'Brien Drive/Loop Road



Generated with PTV VISTRO

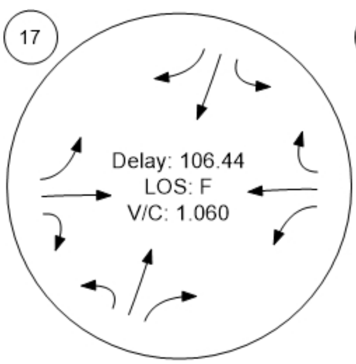
Version 2021 (SP 0-6)

Traffic Conditions

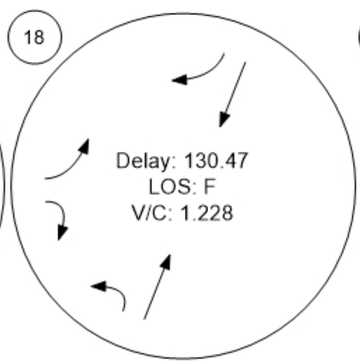



Traffic Conditions

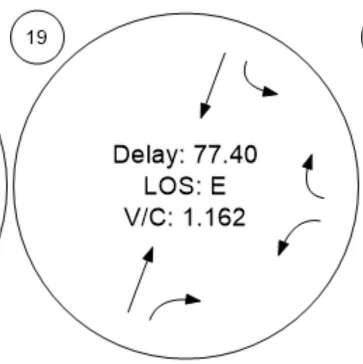

Willow Rd (SR 114)/Hamilton



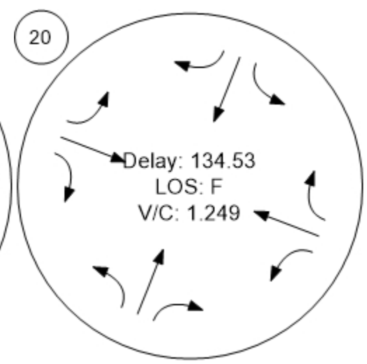

Willow Rd (SR 114)/Ivy Dr



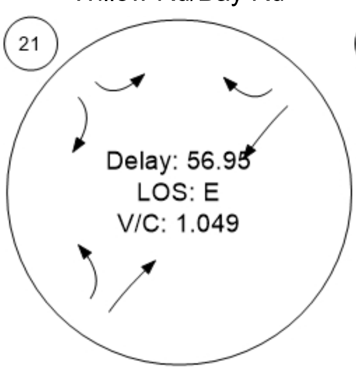

Willow Rd (SR 114)/O'Brien



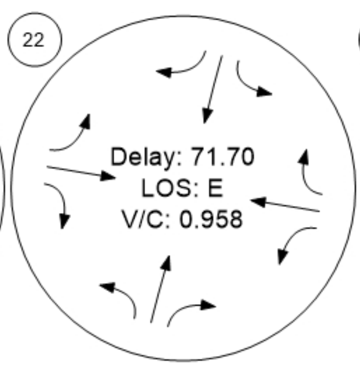

Willow Rd (SR 114)/Newbrid



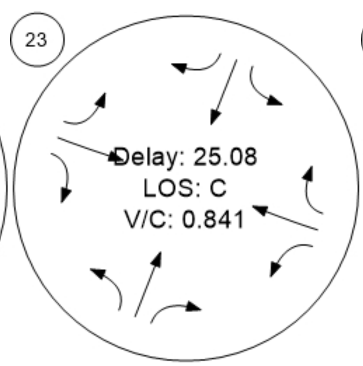

Willow Rd/Bay Rd



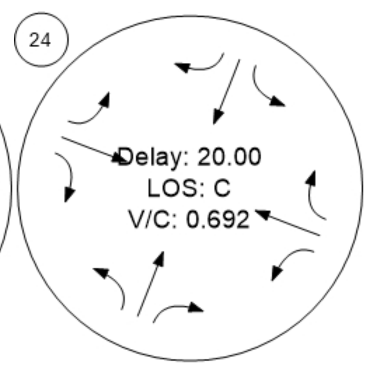

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

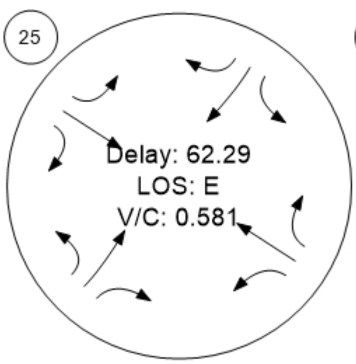


Generated with PTV VISTRO

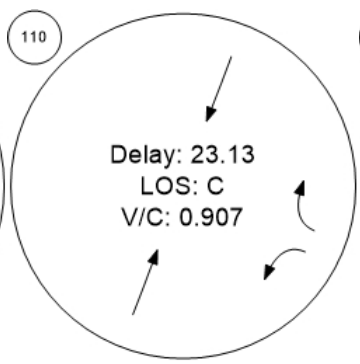
Version 2021 (SP 0-6)

Traffic Conditions

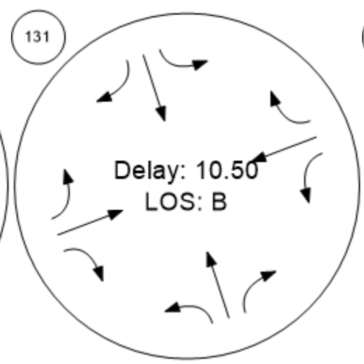

Middlefield Rd-Willow Rd



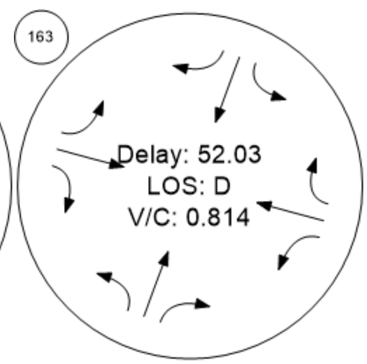

Marsh Road and US 101 NB



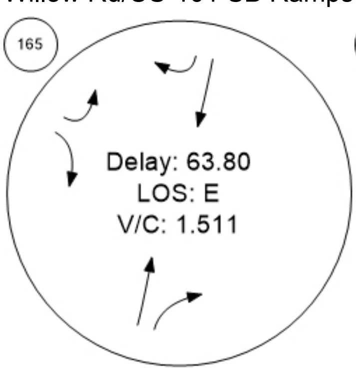

Chilco Street/Hamilton Avenu



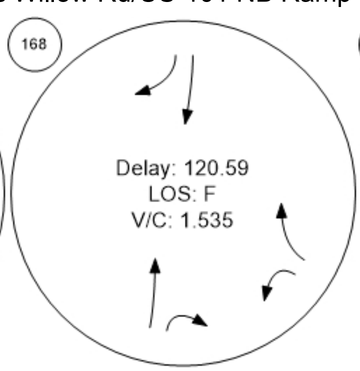

Bayfront Expy/Marsh Rd



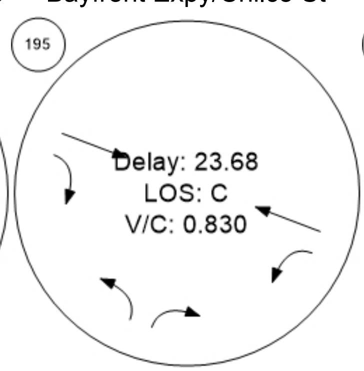

Willow Rd/US-101 SB Ramps



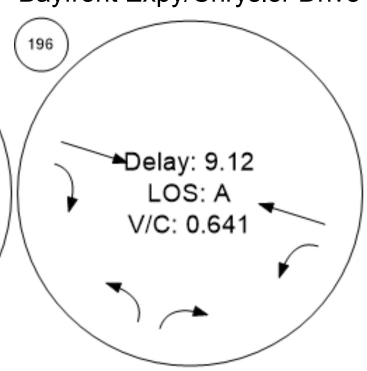

Willow Rd/US-101 NB Ramp



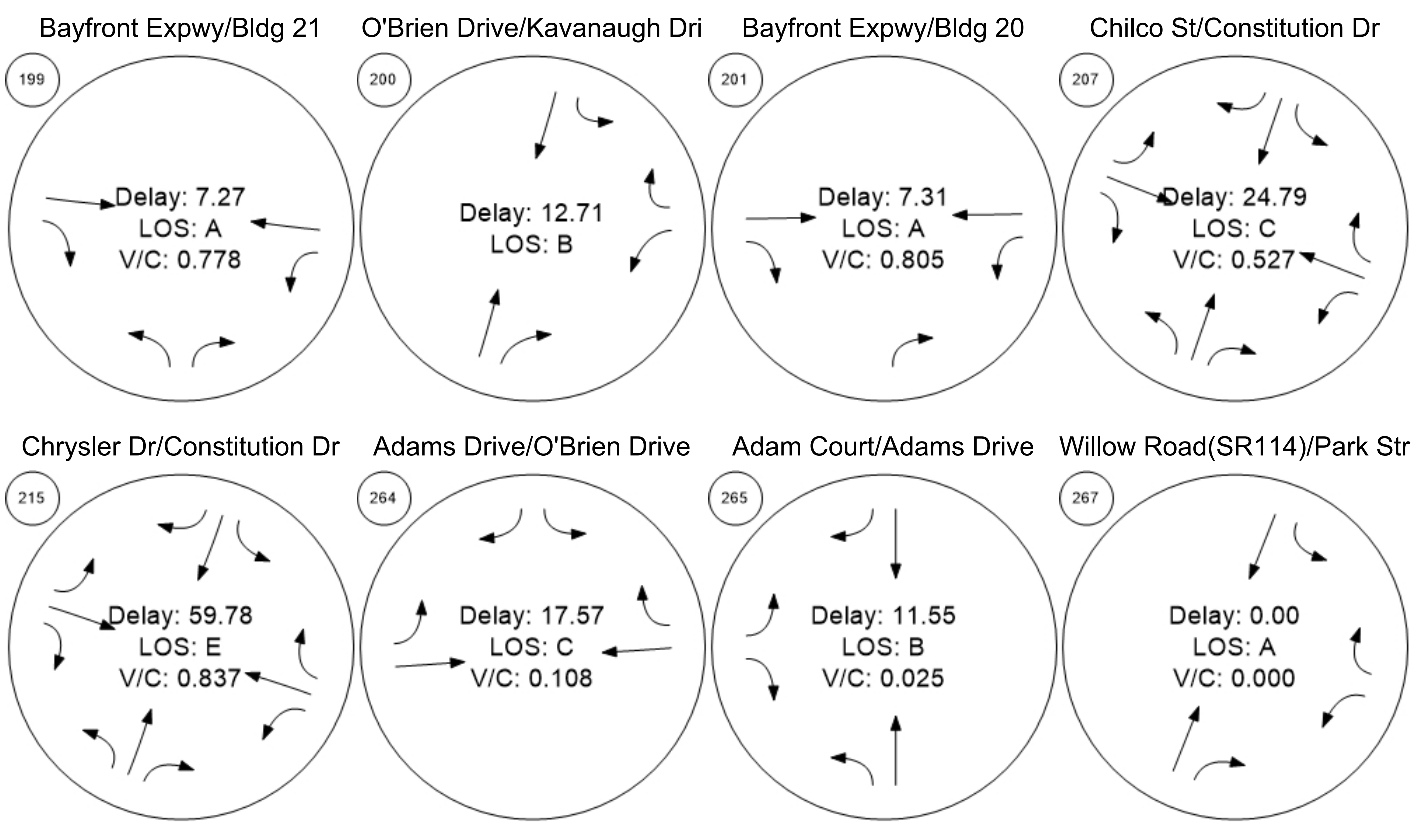

Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



Traffic Conditions

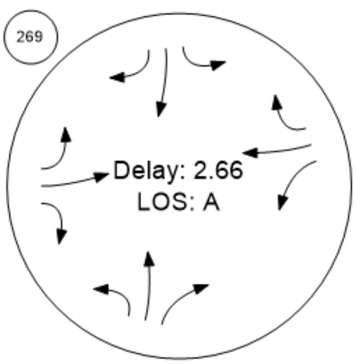



Generated with PTV VISTRO

Version 2021 (SP 0-6)

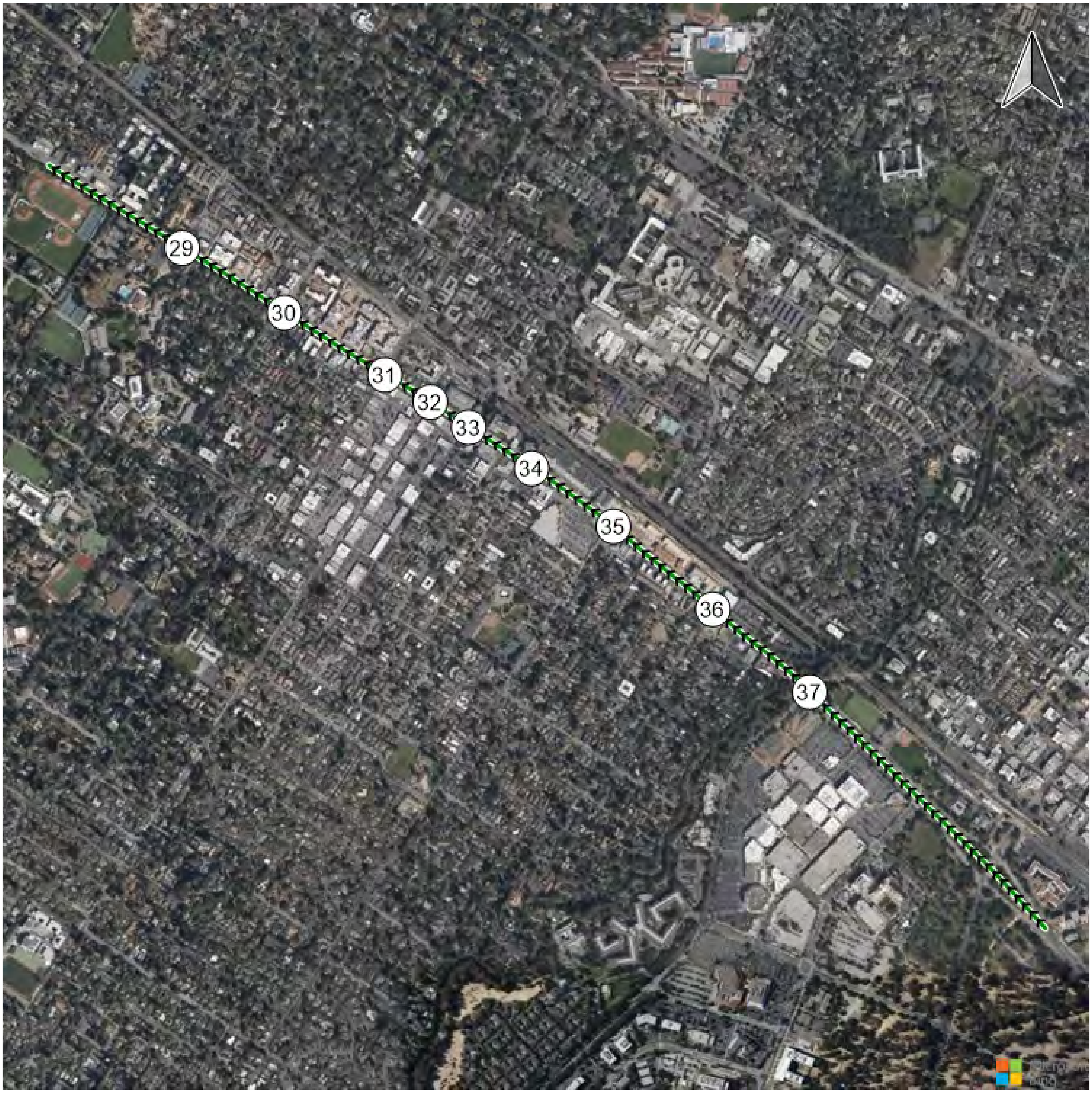
Traffic Conditions


O'Brien Drive/Loop Road



Time Space Diagram - Flowing Off

Route 1: ECR NB



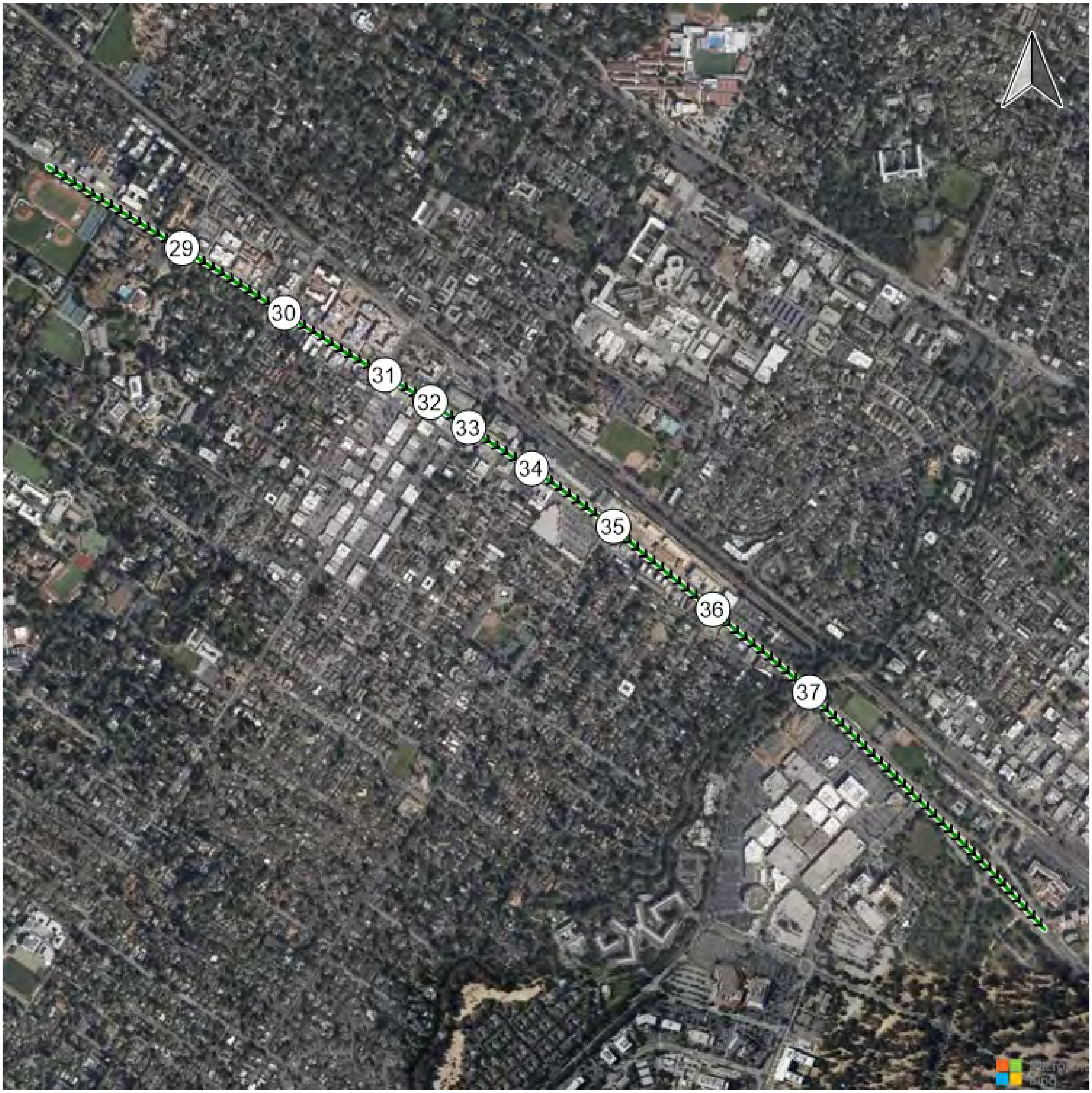
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



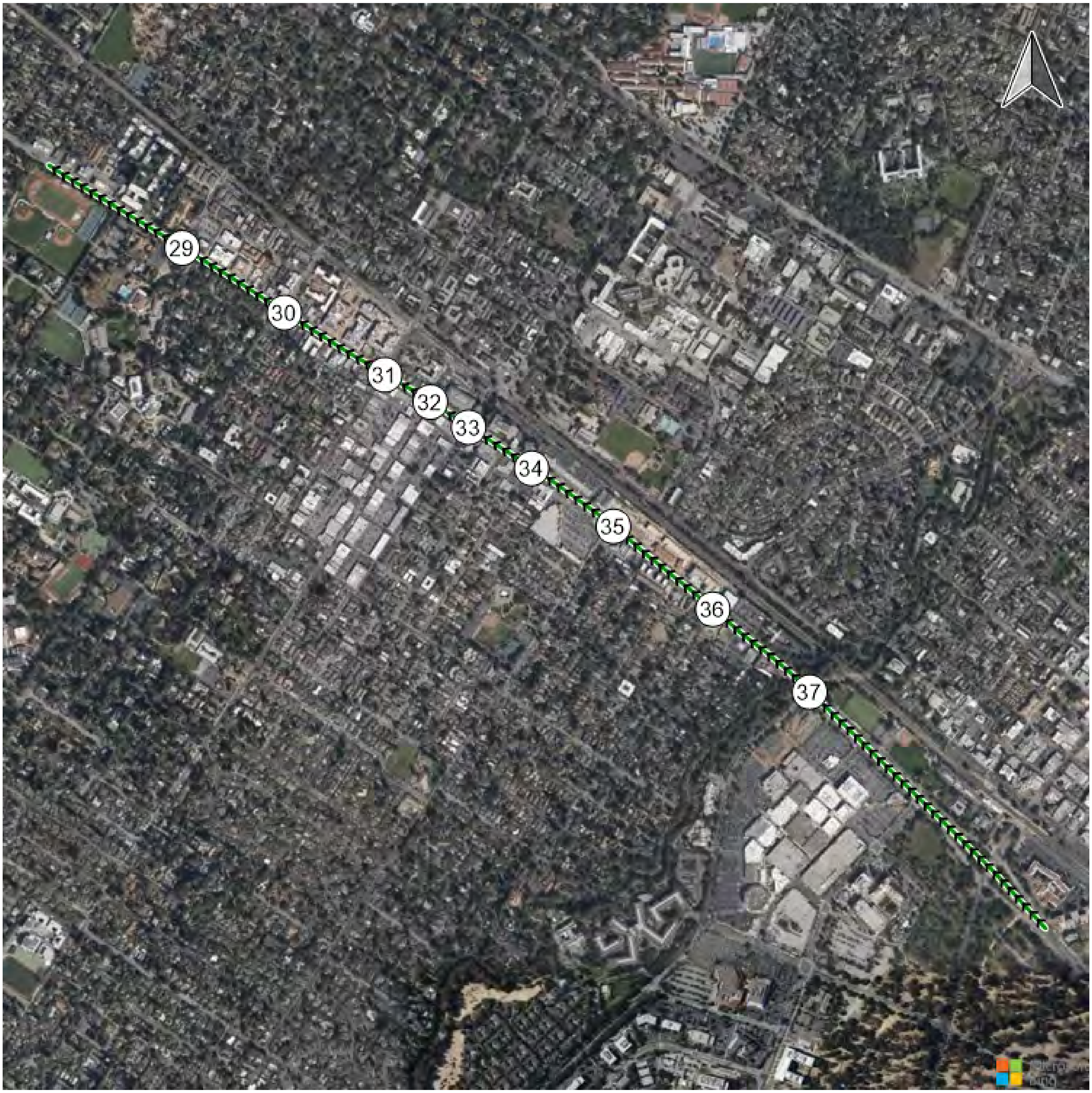
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



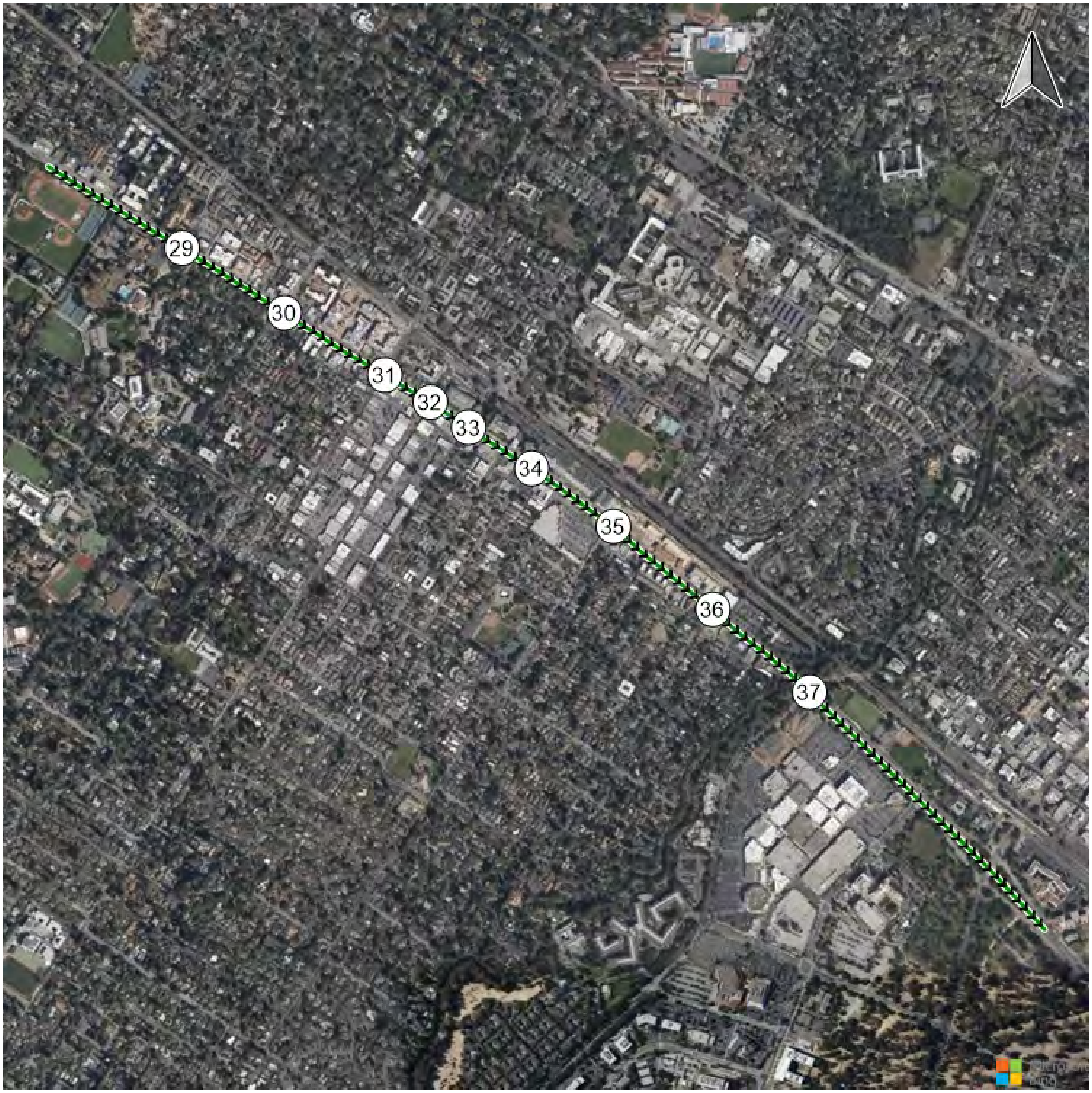
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro

Report File: P:\...\Near-Term PM.pdf

Scenario 17 Near-Term PM (2025 vols)

12/30/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.730 | 17.6 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.493 | 15.9 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.720 | 36.3 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.641 | 18.7 | B |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.415 | 17.6 | B |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.427 | 15.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Right | 1.077 | 105.8 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | EB Thru | 1.023 | 172.1 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Left | 1.284 | 172.5 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.081 | 66.5 | E |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 1.462 | 196.9 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.318 | 166.2 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.379 | 194.7 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.258 | 210.0 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.654 | 11.0 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.537 | 13.0 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NWB Right | 0.615 | 34.5 | C |
|  |  |  | HCM 6th |  |  |  |  |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.858 | 15.8 | B |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 0.802 | 19.0 | C |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | SB Right | 0.882 | 34.9 | C |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.740 | 105.0 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.137 | 152.9 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.953 | 34.1 | C |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.818 | 17.3 | B |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.807 | 13.7 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 0.936 | 29.6 | D |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.799 | 9.7 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Left | 0.712 | 42.9 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 0.515 | 28.5 | C |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.430 | 34.0 | D |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.064 | 11.9 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.730 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 959 | 1010 | 279 | 1255 | 363 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 959 | 1010 | 279 | 1255 | 363 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 245 | 258 | 70 | 320 | 93 |
| Total Analysis Volume [veh/h] | 0 | 979 | 1031 | 279 | 1281 | 370 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 43 | 41 | 33 | 33 |
| g / C, Green / Cycle | 0.54 | 0.51 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.29 | 0.38 | 0.23 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2148 | 1808 | 1389 | 654 |
| d1, Uniform Delay [s] | 11.34 | 13.49 | 22.50 | 18.26 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.70 | 1.31 | 1.19 | 0.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.46 | 0.57 | 0.92 | 0.57 |
| d, Delay for Lane Group [s/veh] | 12.04 | 14.80 | 23.70 | 19.03 |
| Lane Group LOS | B | B | C | B |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.86 | 5.98 | 10.77 | 5.08 |
| 50th-Percentile Queue Length [ft/ln] | 121.55 | 149.38 | 269.27 | 127.03 |
| 95th-Percentile Queue Length [veh/ln] | 8.48 | 9.98 | 16.15 | 8.78 |
| 95th-Percentile Queue Length [ft/ln] | 211.95 | 249.60 | 403.83 | 219.45 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.04 | 14.80 | 0.00 | 23.70 | 19.03 |
| Movement LOS | | B | B | | C | B |
| d_A, Approach Delay [s/veh] | 12.04 | | 14.80 | | 22.65 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 17.60 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.730 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.804 | 0.000 | 2.470 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.81 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.410 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.493 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 38 | 1327 | 7 | 55 | 892 | 194 | 15 | 5 | 388 | 273 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 38 | 1327 | 7 | 55 | 892 | 194 | 15 | 5 | 62 | 273 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 346 | 2 | 14 | 232 | 51 | 4 | 1 | 16 | 71 | 2 | 1 |
| Total Analysis Volume [veh/h] | 40 | 1382 | 7 | 57 | 929 | 202 | 16 | 5 | 65 | 284 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 6 | 102 | 102 | 101 | 101 | 101 | 8 | 8 | 17 | 17 |
| g / C, Green / Cycle | 0.04 | 0.73 | 0.73 | 0.72 | 0.72 | 0.72 | 0.06 | 0.06 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.26 | 0.26 | 0.06 | 0.31 | 0.31 | 0.01 | 0.02 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 887 | 1877 | 1748 | 1830 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 76 | 2575 | 1349 | 664 | 1356 | 1262 | 105 | 162 | 215 | 204 |
| d1, Uniform Delay [s] | 65.50 | 7.09 | 7.09 | 7.18 | 7.84 | 7.88 | 62.86 | 63.60 | 59.15 | 59.16 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.09 | 0.38 | 0.73 | 0.02 | 1.00 | 1.09 | 0.68 | 1.19 | 3.10 | 3.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.35 | 0.35 | 0.09 | 0.43 | 0.43 | 0.20 | 0.40 | 0.70 | 0.70 |
| d, Delay for Lane Group [s/veh] | 69.59 | 7.48 | 7.82 | 7.20 | 8.83 | 8.97 | 63.54 | 64.79 | 62.25 | 62.42 |
| Lane Group LOS | E | A | A | A | A | A | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.48 | 4.77 | 5.13 | 0.25 | 6.87 | 6.53 | 0.74 | 1.16 | 5.38 | 5.11 |
| 50th-Percentile Queue Length [ft/ln] | 37.04 | 119.23 | 128.17 | 6.22 | 171.65 | 163.22 | 18.55 | 28.94 | 134.62 | 127.84 |
| 95th-Percentile Queue Length [veh/ln] | 2.67 | 8.35 | 8.84 | 0.45 | 11.16 | 10.72 | 1.34 | 2.08 | 9.19 | 8.82 |
| 95th-Percentile Queue Length [ft/ln] | 66.67 | 208.77 | 221.00 | 11.20 | 279.09 | 267.98 | 33.39 | 52.08 | 229.77 | 220.55 |

**Movement, Approach, & Intersection Results**

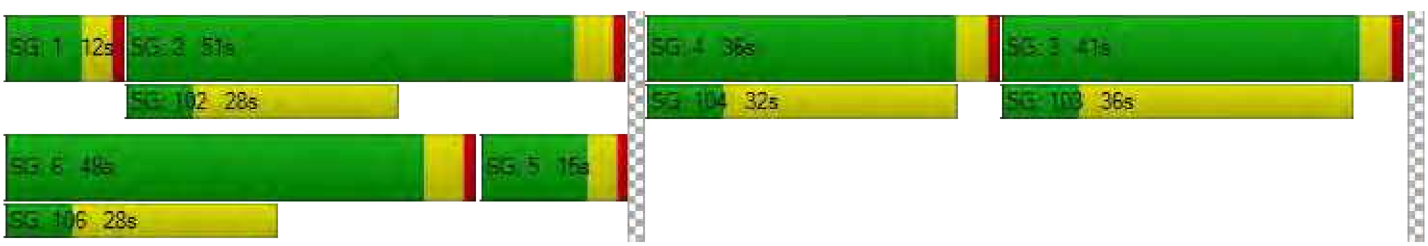
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 69.59 | 7.60 | 7.82 | 7.20 | 8.88 | 8.97 | 63.54 | 63.54 | 64.79 | 62.33 | 62.42 | 62.42 |
| Movement LOS | E | A | A | A | A | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 9.33 | | | 8.82 | | | 64.49 | | | 62.34 | | |
| Approach LOS | A | | | A | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 15.91 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.493 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.924 | 3.142 | 2.918 | 2.108 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.346 | 2.540 | 2.239 | 2.045 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.720 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 196 | 675 | 39 | 13 | 810 | 384 | 446 | 22 | 175 | 109 | 52 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 196 | 675 | 39 | 13 | 810 | 384 | 446 | 22 | 1 | 109 | 52 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 53 | 181 | 10 | 3 | 218 | 103 | 120 | 6 | 0 | 29 | 14 | 11 |
| Total Analysis Volume [veh/h] | 211 | 726 | 42 | 14 | 871 | 413 | 480 | 24 | 1 | 117 | 56 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 89 | 89 | 4 | 73 | 73 | 24 | 24 | 24 | 14 | 14 |
| g / C, Green / Cycle | 0.14 | 0.64 | 0.64 | 0.03 | 0.52 | 0.52 | 0.17 | 0.17 | 0.17 | 0.10 | 0.10 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.21 | 0.21 | 0.01 | 0.36 | 0.37 | 0.14 | 0.14 | 0.00 | 0.07 | 0.06 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1812 | 1714 | 1867 | 1635 | 1774 | 1818 | 1571 | 1751 | 1748 |
| c, Capacity [veh/h] | 252 | 1185 | 1159 | 45 | 978 | 857 | 309 | 317 | 274 | 179 | 179 |
| d1, Uniform Delay [s] | 58.38 | 11.47 | 11.48 | 66.82 | 24.81 | 25.26 | 55.42 | 55.42 | 47.67 | 60.33 | 59.67 |
| k, delay calibration | 0.43 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 24.00 | 0.74 | 0.76 | 1.45 | 3.98 | 5.00 | 3.70 | 3.61 | 0.00 | 2.96 | 1.97 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.84 | 0.33 | 0.33 | 0.31 | 0.69 | 0.71 | 0.80 | 0.80 | 0.00 | 0.65 | 0.55 |
| d, Delay for Lane Group [s/veh] | 82.37 | 12.20 | 12.23 | 68.27 | 28.78 | 30.26 | 59.11 | 59.03 | 47.67 | 63.29 | 61.65 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.91 | 5.60 | 5.50 | 0.51 | 17.38 | 16.19 | 8.83 | 9.04 | 0.03 | 4.19 | 3.48 |
| 50th-Percentile Queue Length [ft/ln] | 222.85 | 139.91 | 137.48 | 12.71 | 434.43 | 404.82 | 220.78 | 226.05 | 0.74 | 104.63 | 86.94 |
| 95th-Percentile Queue Length [veh/ln] | 13.81 | 9.48 | 9.34 | 0.91 | 24.21 | 22.79 | 13.70 | 13.97 | 0.05 | 7.53 | 6.26 |
| 95th-Percentile Queue Length [ft/ln] | 345.26 | 236.91 | 233.62 | 22.87 | 605.34 | 569.81 | 342.62 | 349.34 | 1.34 | 188.33 | 156.50 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 82.37 | 12.22 | 12.23 | 68.27 | 29.12 | 30.26 | 59.07 | 59.03 | 47.67 | 63.29 | 61.65 | 61.65 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 27.34 | | | 29.90 | | | 59.05 | | | 62.54 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 36.33 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.720 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.880 | 3.029 | 2.676 | 2.041 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.630 | 2.680 | 1.916 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.641 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 58 | 167 | 687 | 102 | 69 | 16 | 2 | 65 | 14 | 280 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 58 | 167 | 687 | 102 | 69 | 16 | 2 | 65 | 14 | 280 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 16 | 47 | 193 | 29 | 19 | 4 | 1 | 18 | 4 | 79 |
| Total Analysis Volume [veh/h] | 2 | 837 | 65 | 188 | 772 | 115 | 78 | 18 | 2 | 73 | 16 | 315 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 35 | 35 | 12 | 50 | 50 | 26 | 26 |
| g / C, Green / Cycle | 0.43 | 0.43 | 0.15 | 0.62 | 0.62 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.10 | 0.24 | 0.24 | 0.13 | 0.25 |
| s, saturation flow rate [veh/h] | 1863 | 1647 | 1795 | 1885 | 1787 | 740 | 1638 |
| c, Capacity [veh/h] | 853 | 714 | 273 | 1175 | 1114 | 317 | 576 |
| d1, Uniform Delay [s] | 17.28 | 17.31 | 32.18 | 7.49 | 7.51 | 21.49 | 24.37 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.23 | 0.32 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.66 | 3.63 | 3.09 | 0.96 | 1.03 | 1.17 | 4.48 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.56 | 0.59 | 0.69 | 0.39 | 0.39 | 0.31 | 0.70 |
| d, Delay for Lane Group [s/veh] | 19.94 | 20.94 | 35.27 | 8.45 | 8.53 | 22.66 | 28.85 |
| Lane Group LOS | B | C | D | A | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.73 | 6.14 | 3.54 | 3.45 | 3.33 | 1.54 | 7.21 |
| 50th-Percentile Queue Length [ft/ln] | 168.17 | 153.43 | 88.60 | 86.31 | 83.13 | 38.45 | 180.14 |
| 95th-Percentile Queue Length [veh/ln] | 10.98 | 10.20 | 6.38 | 6.21 | 5.99 | 2.77 | 11.61 |
| 95th-Percentile Queue Length [ft/ln] | 274.50 | 255.00 | 159.48 | 155.35 | 149.64 | 69.21 | 290.20 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.94 | 20.37 | 20.94 | 35.27 | 8.48 | 8.53 | 22.66 | 22.66 | 22.66 | 28.85 | 28.85 | 28.85 |
| Movement LOS | B | C | C | D | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 20.41 | | | 13.17 | | | 22.66 | | | 28.85 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 18.74 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.641 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.79 | 29.79 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.929 | 1.805 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.71 | 8.63 | 17.43 | 17.40 |
| I_b,int, Bicycle LOS Score for Intersection | 2.305 | 2.446 | 1.721 | 2.226 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.415 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 529 | 417 | 567 | 440 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 417 | 567 | 440 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 107 | 146 | 113 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 430 | 585 | 454 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 78 | 78 | 78 | 78 | 78 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 23 | 60 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.29 | 0.76 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.24 | 0.31 | 0.31 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1802 |
| c, Capacity [veh/h] | 273 | 244 | 523 | 1442 | 862 |
| d1, Uniform Delay [s] | 30.59 | 0.00 | 25.94 | 3.21 | 15.55 |
| k, delay calibration | 0.08 | 0.08 | 0.14 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.12 | 0.00 | 4.20 | 0.18 | 3.80 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 0.82 | 0.41 | 0.65 |
| d, Delay for Lane Group [s/veh] | 31.71 | 0.00 | 30.14 | 3.39 | 19.35 |
| Lane Group LOS | C | A | C | A | B |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.47 | 0.00 | 7.59 | 1.82 | 7.63 |
| 50th-Percentile Queue Length [ft/ln] | 61.77 | 0.00 | 189.81 | 45.48 | 190.73 |
| 95th-Percentile Queue Length [veh/ln] | 4.45 | 0.00 | 12.11 | 3.27 | 12.16 |
| 95th-Percentile Queue Length [ft/ln] | 111.18 | 0.00 | 302.78 | 81.86 | 303.98 |

**Movement, Approach, & Intersection Results**

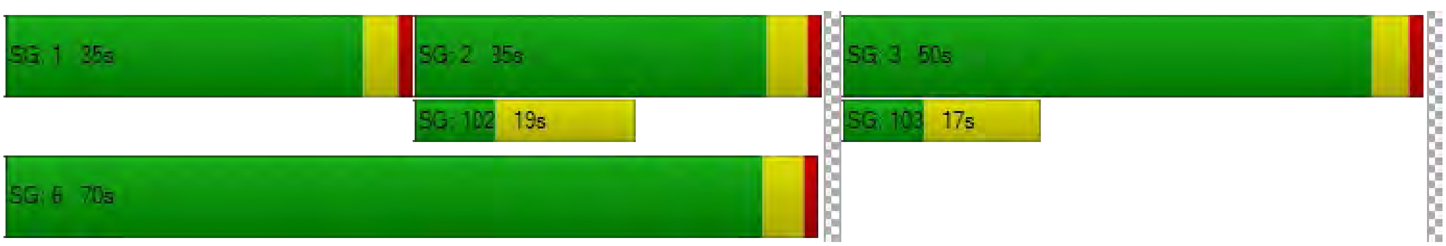
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.71 | 0.00 | 30.14 | 3.39 | 19.35 | 19.35 |
| Movement LOS | C | A | C | A | B | B |
| d_A, Approach Delay [s/veh] | 31.71 | | 14.72 | | 19.35 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 17.63 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 2.415 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.02 | 29.02 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.900 | 2.826 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1167 | 1666 | 775 |
| d_b, Bicycle Delay [s] | 6.85 | 1.11 | 14.80 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.234 | 2.485 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.427 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 70 | 0 | 220 | 2 | 684 | 110 | 318 | 631 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 70 | 0 | 212 | 2 | 684 | 53 | 318 | 631 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 18 | 0 | 56 | 1 | 180 | 14 | 84 | 166 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 74 | 0 | 223 | 2 | 720 | 56 | 335 | 664 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 23 | 23 | 23 | 23 | 93 | 79 | 79 | 91 | 86 | 86 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.19 | 0.78 | 0.66 | 0.66 | 0.75 | 0.72 | 0.72 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.08 | 0.15 | 0.00 | 0.20 | 0.04 | 0.38 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 1420 | 1711 | 973 | 1527 | 807 | 3569 | 1563 | 870 | 1873 | 1870 |
| c, Capacity [veh/h] | 158 | 325 | 245 | 290 | 671 | 2356 | 1032 | 686 | 1348 | 1346 |
| d1, Uniform Delay [s] | 53.34 | 41.00 | 47.17 | 45.81 | 3.81 | 8.69 | 7.18 | 5.20 | 5.74 | 5.74 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.69 | 0.30 | 0.66 | 4.13 | 0.00 | 0.34 | 0.10 | 2.48 | 0.44 | 0.44 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.21 | 0.30 | 0.77 | 0.00 | 0.31 | 0.05 | 0.49 | 0.25 | 0.25 |
| d, Delay for Lane Group [s/veh] | 54.03 | 41.31 | 47.82 | 49.95 | 3.81 | 9.02 | 7.28 | 7.68 | 6.18 | 6.18 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | No | Yes | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.77 | 2.07 | 6.59 | 0.01 | 3.83 | 0.51 | 2.56 | 2.69 | 2.69 |
| 50th-Percentile Queue Length [ft/ln] | 27.15 | 44.17 | 51.71 | 164.71 | 0.26 | 95.64 | 12.67 | 64.02 | 67.36 | 67.30 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 3.18 | 3.72 | 10.80 | 0.02 | 6.89 | 0.91 | 4.61 | 4.85 | 4.85 |
| 95th-Percentile Queue Length [ft/ln] | 48.88 | 79.50 | 93.07 | 269.95 | 0.47 | 172.16 | 22.80 | 115.24 | 121.25 | 121.14 |

**Movement, Approach, & Intersection Results**

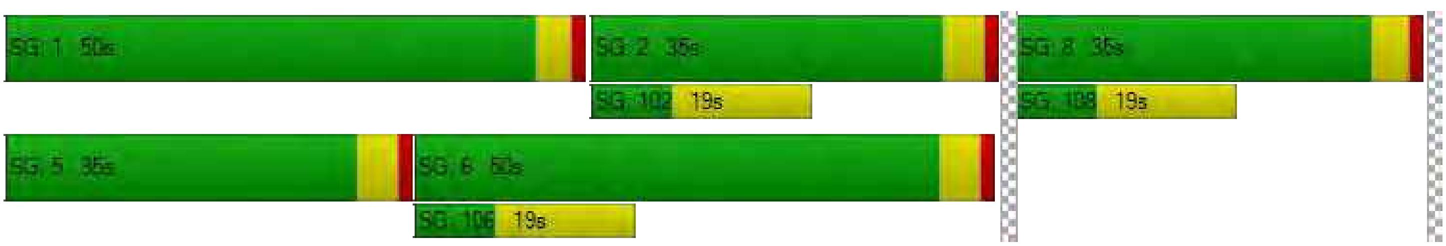
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.03 | 41.31 | 41.31 | 47.82 | 47.82 | 49.95 | 3.81 | 9.02 | 7.28 | 7.68 | 6.18 | 6.18 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 45.71 | | | 49.42 | | | 8.88 | | | 6.68 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 15.15 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.427 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.980 | 2.533 | 2.958 | 2.817 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.063 | 2.248 | 2.385 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 105.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.077 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3417 | 49 | 372 | 975 | 71 | 1841 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3417 | 49 | 372 | 975 | 71 | 1841 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 872 | 13 | 95 | 249 | 18 | 470 |
| Total Analysis Volume [veh/h] | 3487 | 50 | 380 | 995 | 72 | 1879 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 154 | 154 | 154 | 154 | 154 | 154 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 35 | 127 | 15 | 54 |
| g / C, Green / Cycle | 0.58 | 0.58 | 0.23 | 0.83 | 0.10 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.69 | 0.04 | 0.11 | 0.20 | 0.02 | 0.44 |
| s, saturation flow rate [veh/h] | 5077 | 1399 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2968 | 818 | 778 | 4146 | 318 | 1499 |
| d1, Uniform Delay [s] | 31.98 | 13.77 | 51.38 | 2.91 | 64.12 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 79.71 | 0.04 | 0.18 | 0.04 | 0.13 | 114.66 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 0.06 | 0.49 | 0.24 | 0.23 | 1.25 |
| d, Delay for Lane Group [s/veh] | 111.69 | 13.81 | 51.56 | 2.94 | 64.26 | 164.41 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 54.58 | 0.72 | 6.21 | 1.43 | 1.31 | 34.87 |
| 50th-Percentile Queue Length [ft/ln] | 1364.49 | 17.99 | 155.13 | 35.75 | 32.78 | 871.78 |
| 95th-Percentile Queue Length [veh/ln] | 75.81 | 1.30 | 10.29 | 2.57 | 2.36 | 51.21 |
| 95th-Percentile Queue Length [ft/ln] | 1895.26 | 32.38 | 257.26 | 64.35 | 59.01 | 1280.19 |

**Movement, Approach, & Intersection Results**

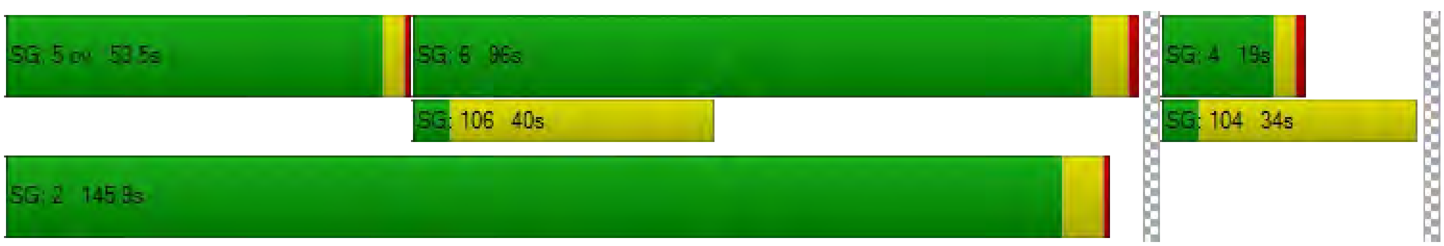
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 111.69 | 13.81 | 51.56 | 2.94 | 64.26 | 164.41 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 110.30 | | 16.38 | | 160.71 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 105.82 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.077 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.19 | 0.00 | 68.19 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.796 | 0.000 | 3.091 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 546 | 572 | 195 |
| d_b, Bicycle Delay [s] | 40.66 | 39.24 | 62.66 |
| I_b,int, Bicycle LOS Score for Intersection | 3.505 | 2.316 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 172.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.023 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 151 | 110 | 1112 | 170 | 213 | 133 | 119 | 2079 | 172 | 588 | 814 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 151 | 110 | 1112 | 170 | 213 | 63 | 119 | 2079 | 127 | 588 | 814 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 39 | 28 | 287 | 44 | 55 | 16 | 31 | 536 | 33 | 152 | 210 | 9 |
| Total Analysis Volume [veh/h] | 156 | 113 | 1146 | 175 | 220 | 65 | 123 | 2143 | 131 | 606 | 839 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 11 | 13 | 39 | 9 | 12 | 12 | 66 | 40 | 40 | 66 | 56 | 56 |
| g / C, Green / Cycle | 0.11 | 0.13 | 0.38 | 0.09 | 0.12 | 0.12 | 0.64 | 0.38 | 0.38 | 0.64 | 0.54 | 0.54 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.08 | 0.28 | 0.10 | 0.14 | 0.04 | 0.12 | 0.69 | 0.15 | 0.42 | 0.17 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4142 | 1748 | 1606 | 1478 | 987 | 3084 | 889 | 1451 | 4959 | 1615 |
| c, Capacity [veh/h] | 190 | 186 | 1566 | 151 | 188 | 173 | 641 | 1185 | 342 | 925 | 2683 | 874 |
| d1, Uniform Delay [s] | 45.47 | 43.10 | 27.72 | 47.59 | 45.98 | 42.31 | 7.95 | 32.07 | 23.16 | 24.66 | 13.20 | 11.21 |
| k, delay calibration | 0.11 | 0.11 | 0.15 | 0.39 | 0.20 | 0.11 | 0.11 | 0.15 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.61 | 3.17 | 0.93 | 114.16 | 96.51 | 1.34 | 0.14 | 364.54 | 0.71 | 0.79 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.61 | 0.73 | 1.16 | 1.17 | 0.37 | 0.19 | 1.81 | 0.38 | 0.66 | 0.31 | 0.04 |
| d, Delay for Lane Group [s/veh] | 54.08 | 46.26 | 28.65 | 161.76 | 142.49 | 43.65 | 8.09 | 396.61 | 23.86 | 25.46 | 13.27 | 11.22 |
| Lane Group LOS | D | D | C | F | F | D | A | F | C | C | B | B |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 4.30 | 1.42 | 7.84 | 8.75 | 4.99 | 1.63 | 0.52 | 49.58 | 2.36 | 2.90 | 3.51 | 0.36 |
| 50th-Percentile Queue Length [ft/ln] | 107.49 | 35.60 | 196.06 | 218.83 | 124.72 | 40.71 | 12.98 | 1239.59 | 58.97 | 72.55 | 87.75 | 9.12 |
| 95th-Percentile Queue Length [veh/ln] | 7.70 | 2.56 | 12.43 | 14.32 | 8.98 | 2.93 | 0.93 | 80.71 | 4.25 | 5.22 | 6.32 | 0.66 |
| 95th-Percentile Queue Length [ft/ln] | 192.50 | 64.08 | 310.87 | 358.07 | 224.50 | 73.27 | 23.36 | 2017.79 | 106.15 | 130.58 | 157.96 | 16.42 |

**Movement, Approach, & Intersection Results**

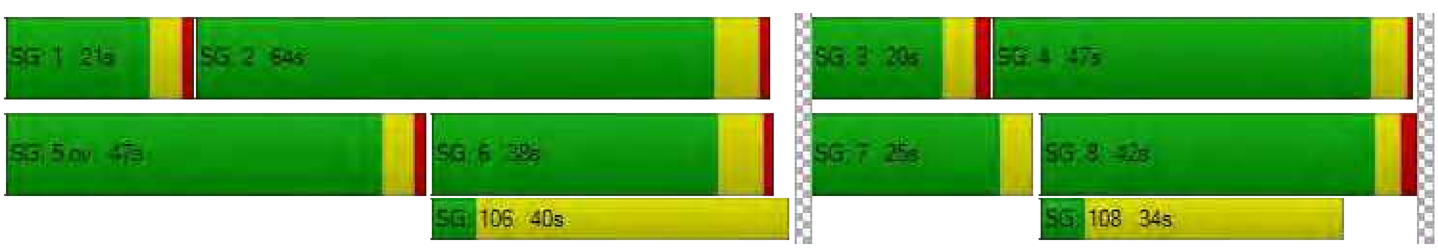
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.08 | 46.26 | 28.65 | 161.76 | 142.49 | 43.65 | 8.09 | 396.61 | 23.86 | 25.46 | 13.27 | 11.22 |
| Movement LOS | D | D | C | F | F | D | A | F | C | C | B | B |
| d_A, Approach Delay [s/veh] | 32.86 | | | 135.85 | | | 356.30 | | | 18.22 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 172.14 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.023 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 43.44 | 0.00 | 43.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.465 | 0.000 | 3.235 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 818 | 720 | 615 | 1114 |
| d_b, Bicycle Delay [s] | 18.18 | 21.34 | 24.97 | 10.21 |
| I_b,int, Bicycle LOS Score for Intersection | 2.727 | 1.997 | 2.903 | 2.374 |
| Bicycle LOS | B | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 172.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.284 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 43 | 1065 | 7 | 142 | 837 | 54 | 94 | 17 | 35 | 193 | 18 | 138 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 1065 | 7 | 142 | 837 | 54 | 94 | 17 | 35 | 193 | 18 | 138 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 303 | 2 | 40 | 238 | 15 | 27 | 5 | 10 | 55 | 5 | 39 |
| Total Analysis Volume [veh/h] | 49 | 1210 | 8 | 161 | 951 | 61 | 107 | 19 | 40 | 219 | 20 | 157 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 83 | 83 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.64 | 0.64 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.74 | 0.74 | 0.33 | 0.62 | 0.62 | 0.37 | 0.58 |
| s, saturation flow rate [veh/h] | 627 | 826 | 824 | 491 | 826 | 803 | 453 | 681 |
| c, Capacity [veh/h] | 182 | 464 | 463 | 163 | 527 | 512 | 160 | 204 |
| d1, Uniform Delay [s] | 32.00 | 28.46 | 28.46 | 43.40 | 22.41 | 22.72 | 53.15 | 47.44 |
| k, delay calibration | 0.16 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.14 | 155.89 | 156.43 | 67.00 | 32.63 | 34.96 | 81.79 | 442.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.27 | 1.31 | 1.31 | 0.99 | 0.97 | 0.98 | 1.04 | 1.94 |
| d, Delay for Lane Group [s/veh] | 33.14 | 184.35 | 184.89 | 110.40 | 55.04 | 57.68 | 134.94 | 489.96 |
| Lane Group LOS | C | F | F | F | E | E | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.45 | 33.31 | 33.28 | 4.72 | 18.45 | 18.55 | 8.97 | 31.66 |
| 50th-Percentile Queue Length [ft/ln] | 11.23 | 832.63 | 831.88 | 117.91 | 461.16 | 463.83 | 224.31 | 791.60 |
| 95th-Percentile Queue Length [veh/ln] | 0.81 | 51.44 | 51.42 | 8.28 | 25.49 | 25.62 | 14.17 | 52.44 |
| 95th-Percentile Queue Length [ft/ln] | 20.21 | 1285.96 | 1285.49 | 206.95 | 637.26 | 640.44 | 354.29 | 1311.07 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.14 | 184.62 | 184.89 | 110.40 | 56.26 | 57.68 | 134.94 | 134.94 | 134.94 | 489.96 | 489.96 | 489.96 |
| Movement LOS | C | F | F | F | E | E | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 178.76 | | | 63.76 | | | 134.94 | | | 489.96 | | |
| Approach LOS | F | | | E | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 172.46 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.284 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.41 | 54.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.296 | 3.054 | 1.898 | 2.102 |
| Crosswalk LOS | C | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1124 | 1078 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.47 | 13.93 | 36.42 | 36.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.605 | 2.527 | 1.834 | 2.213 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 66.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.081 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | ┐‖ | | ‖┝ | | ┐┌ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 80 | 933 | 1204 | 24 | 35 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 80 | 933 | 1204 | 24 | 35 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 251 | 324 | 6 | 9 | 31 |
| Total Analysis Volume [veh/h] | 86 | 1003 | 1295 | 26 | 38 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 10 | 103 | 90 | 90 | 20 | 20 |
| g / C, Green / Cycle | 0.08 | 0.79 | 0.69 | 0.69 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.64 | 0.79 | 0.80 | 0.04 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 824 | 1021 | 897 |
| c, Capacity [veh/h] | 99 | 1252 | 576 | 571 | 155 | 136 |
| d1, Uniform Delay [s] | 59.15 | 7.56 | 19.94 | 19.94 | 48.49 | 53.90 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.50 | 0.04 | 0.13 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.19 | 5.46 | 85.07 | 88.82 | 0.30 | 20.94 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.80 | 1.15 | 1.16 | 0.25 | 0.90 |
| d, Delay for Lane Group [s/veh] | 67.34 | 13.02 | 105.01 | 108.75 | 48.80 | 74.84 |
| Lane Group LOS | E | B | F | F | D | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.99 | 6.60 | 28.16 | 28.52 | 1.11 | 4.73 |
| 50th-Percentile Queue Length [ft/ln] | 74.65 | 165.06 | 704.01 | 713.12 | 27.67 | 118.17 |
| 95th-Percentile Queue Length [veh/ln] | 5.37 | 10.82 | 41.15 | 41.87 | 1.99 | 8.29 |
| 95th-Percentile Queue Length [ft/ln] | 134.36 | 270.42 | 1028.84 | 1046.70 | 49.80 | 207.31 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 67.34 | 13.02 | 106.84 | 108.75 | 48.80 | 74.84 |
| Movement LOS | E | B | F | F | D | E |
| d_A, Approach Delay [s/veh] | 17.31 | | 106.88 | | 68.69 | |
| Approach LOS | B | | F | | E | |
| d_I, Intersection Delay [s/veh] | 66.55 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.081 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.971 | 2.918 | 2.047 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.458 | 2.649 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 196.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.462 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 464 | 57 | 1095 | 274 | 115 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 464 | 57 | 1095 | 274 | 115 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 125 | 15 | 294 | 74 | 31 |
| Total Analysis Volume [veh/h] | 1075 | 499 | 61 | 1177 | 295 | 124 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 0.92 | 0.09 | 0.92 | 0.34 | 0.34 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 578 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 101 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 207.02 | 43.45 | 95.79 | 456.35 | 460.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 1.42 | 0.97 | 1.19 | 1.95 | 1.95 |
| d, Delay for Lane Group [s/veh] | 158.87 | 228.68 | 101.91 | 110.79 | 509.91 | 514.41 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 28.98 | 2.73 | 23.85 | 18.12 | 16.29 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 724.62 | 68.17 | 596.31 | 452.88 | 407.37 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 47.53 | 4.91 | 36.54 | 30.95 | 28.19 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 1188.22 | 122.71 | 913.48 | 773.72 | 704.63 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 228.68 | 101.91 | 110.79 | 511.11 | 514.41 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 181.00 | | 110.35 | | 512.03 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 196.86 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.462 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.276 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 2.858 | 2.581 | 2.251 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 166.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.318 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 326 | 1311 | 272 | 78 | 1206 | 26 | 33 | 177 | 267 | 283 | 274 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 326 | 1311 | 272 | 78 | 1206 | 26 | 33 | 177 | 92 | 283 | 274 | 59 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 90 | 360 | 75 | 21 | 331 | 7 | 9 | 49 | 25 | 78 | 75 | 16 |
| Total Analysis Volume [veh/h] | 358 | 1441 | 299 | 86 | 1325 | 29 | 36 | 195 | 101 | 311 | 301 | 65 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 63 | 63 | 8 | 58 | 58 | 28 | 28 | 28 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.49 | 0.49 | 0.06 | 0.45 | 0.45 | 0.21 | 0.21 | 0.21 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.47 | 0.48 | 0.09 | 0.48 | 0.48 | 0.02 | 0.20 | 0.07 | 0.09 | 0.23 | 0.05 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1190 | 952 | 1853 | 960 | 1810 | 965 | 1537 | 3409 | 1303 | 1414 |
| c, Capacity [veh/h] | 127 | 1208 | 580 | 59 | 831 | 430 | 388 | 207 | 330 | 414 | 158 | 172 |
| d1, Uniform Delay [s] | 58.48 | 32.34 | 32.88 | 60.98 | 35.84 | 35.84 | 40.92 | 50.26 | 42.79 | 55.21 | 57.10 | 52.30 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.16 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 835.70 | 19.16 | 33.95 | 221.06 | 52.38 | 65.01 | 0.04 | 24.13 | 0.19 | 1.04 | 428.88 | 0.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 2.81 | 0.97 | 0.99 | 1.46 | 1.07 | 1.08 | 0.09 | 0.94 | 0.31 | 0.75 | 1.90 | 0.38 |
| d, Delay for Lane Group [s/veh] | 894.19 | 51.50 | 66.83 | 282.04 | 88.22 | 100.84 | 40.96 | 74.39 | 42.98 | 56.25 | 485.98 | 52.81 |
| Lane Group LOS | F | D | E | F | F | F | D | E | D | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 33.71 | 20.02 | 22.17 | 5.57 | 19.07 | 21.26 | 0.94 | 7.61 | 2.76 | 4.99 | 24.04 | 1.98 |
| 50th-Percentile Queue Length [ft/ln] | 842.69 | 500.59 | 554.30 | 139.19 | 476.77 | 531.59 | 23.50 | 190.34 | 69.08 | 124.76 | 600.90 | 49.42 |
| 95th-Percentile Queue Length [veh/ln] | 53.60 | 27.36 | 29.89 | 10.02 | 27.56 | 30.37 | 1.69 | 12.14 | 4.97 | 8.65 | 38.86 | 3.56 |
| 95th-Percentile Queue Length [ft/ln] | 1339.96 | 684.05 | 747.36 | 250.54 | 688.99 | 759.16 | 42.30 | 303.47 | 124.35 | 216.35 | 971.41 | 88.95 |

**Movement, Approach, & Intersection Results**

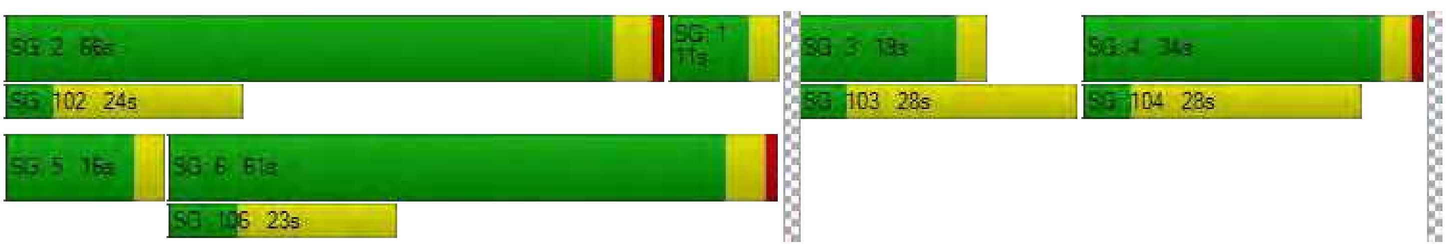
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 894.19 | 54.40 | 66.83 | 282.04 | 92.35 | 100.84 | 40.96 | 74.39 | 42.98 | 56.25 | 485.98 | 52.81 |
| Movement LOS | F | D | E | F | F | F | D | E | D | E | F | D |
| d_A, Approach Delay [s/veh] | 199.47 | | | 103.85 | | | 61.21 | | | 246.98 | | |
| Approach LOS | F | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 166.17 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.318 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.358 | 2.964 | 2.689 | 2.747 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 939 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.53 | 50.13 |
| I_b,int, Bicycle LOS Score for Intersection | 2.714 | 2.352 | 2.396 | 2.751 |
| Bicycle LOS | B | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 194.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.379 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 1375 | 717 | 180 | 283 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 20 | 1375 | 717 | 0 | 283 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 354 | 185 | 0 | 73 | 0 |
| Total Analysis Volume [veh/h] | 21 | 1418 | 739 | 0 | 292 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 79 | 79 | 79 | 79 | 79 | 79 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 2 | 41 | 36 | 36 | 29 | 29 |
| g / C, Green / Cycle | 0.02 | 0.52 | 0.45 | 0.45 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.84 | 0.44 | 0.00 | 0.34 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1615 | 850 | 1596 |
| c, Capacity [veh/h] | 35 | 865 | 762 | 731 | 308 | 579 |
| d1, Uniform Delay [s] | 38.73 | 19.27 | 21.26 | 0.00 | 24.62 | 0.00 |
| k, delay calibration | 0.04 | 0.40 | 0.15 | 0.15 | 0.24 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.18 | 291.59 | 12.32 | 0.00 | 24.53 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.61 | 1.64 | 0.97 | 0.00 | 0.95 | 0.00 |
| d, Delay for Lane Group [s/veh] | 44.90 | 310.86 | 33.58 | 0.00 | 49.16 | 0.00 |
| Lane Group LOS | D | F | C | A | D | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.46 | 42.01 | 7.21 | 0.00 | 7.08 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 11.46 | 1050.33 | 180.21 | 0.00 | 177.05 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 0.83 | 69.10 | 11.61 | 0.00 | 11.45 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 20.63 | 1727.49 | 290.29 | 0.00 | 286.15 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.90 | 310.86 | 33.58 | 0.00 | 49.16 | 0.00 |
| Movement LOS | D | F | C | A | D | A |
| d_A, Approach Delay [s/veh] | 306.98 | | 33.58 | | 49.16 | |
| Approach LOS | F | | C | | D | |
| d_I, Intersection Delay [s/veh] | 194.70 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.379 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 29.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.190 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 906 | 906 | 906 |
| d_b, Bicycle Delay [s] | 11.95 | 11.93 | 11.91 |
| I_b,int, Bicycle LOS Score for Intersection | 2.747 | 2.353 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 210.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.258 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1037 | 4 | 29 | 538 | 18 | 133 | 2 | 31 | 21 | 7 | 46 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1037 | 4 | 29 | 538 | 18 | 133 | 2 | 13 | 21 | 7 | 46 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 288 | 1 | 8 | 149 | 5 | 37 | 1 | 4 | 6 | 2 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1152 | 4 | 32 | 598 | 20 | 148 | 2 | 14 | 23 | 8 | 51 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 4 | 102 | 11 | 11 | 11 | 18 | 18 |
| g / C, Green / Cycle | 0.01 | 0.66 | 0.66 | 0.02 | 0.68 | 0.07 | 0.07 | 0.07 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.90 | 0.91 | 0.02 | 1.04 | 0.04 | 0.04 | 0.03 | 0.01 | 0.11 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1812 | 441 | 1810 | 553 |
| c, Capacity [veh/h] | 10 | 456 | 390 | 43 | 401 | 127 | 132 | 32 | 221 | 68 |
| d1, Uniform Delay [s] | 74.73 | 25.48 | 25.48 | 73.26 | 24.42 | 67.75 | 67.75 | 66.84 | 58.93 | 65.12 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 118.38 | 178.21 | 180.54 | 22.85 | 254.89 | 4.13 | 3.98 | 9.10 | 0.20 | 27.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.96 | 1.37 | 1.37 | 0.75 | 1.54 | 0.58 | 0.58 | 0.44 | 0.10 | 0.87 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 193.11 | 203.69 | 206.01 | 96.11 | 279.31 | 71.88 | 71.73 | 75.94 | 59.13 | 92.12 |
| Lane Group LOS | F | F | F | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.73 | 38.05 | 32.81 | 1.52 | 41.91 | 2.98 | 3.08 | 0.61 | 0.81 | 2.76 |
| 50th-Percentile Queue Length [ft/ln] | 18.36 | 951.24 | 820.32 | 37.92 | 1047.81 | 74.54 | 77.08 | 15.31 | 20.19 | 69.01 |
| 95th-Percentile Queue Length [veh/ln] | 1.32 | 59.81 | 52.26 | 2.73 | 68.96 | 5.37 | 5.55 | 1.10 | 1.45 | 4.97 |
| 95th-Percentile Queue Length [ft/ln] | 33.05 | 1495.33 | 1306.51 | 68.25 | 1724.04 | 134.18 | 138.75 | 27.57 | 36.35 | 124.23 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 193.11 | 204.75 | 206.01 | 96.11 | 279.31 | 279.31 | 71.81 | 71.73 | 75.94 | 59.13 | 92.12 | 92.12 |
| Movement LOS | F | F | F | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 204.66 | | | 270.29 | | | 72.16 | | | 82.87 | | |
| Approach LOS | F | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 209.97 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.258 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.80 | 64.80 | 64.80 | 64.80 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.525 | 2.748 | 2.199 | 1.997 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 265 | 265 | 398 | 398 |
| d_b, Bicycle Delay [s] | 56.81 | 56.99 | 48.41 | 48.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.522 | 2.632 | 1.860 | 1.695 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.654 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┓┣ | | | ┓┣ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 14 | 693 | 5 | 2 | 701 | 101 | 111 | 2 | 37 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 693 | 5 | 2 | 701 | 101 | 111 | 2 | 37 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 190 | 1 | 1 | 193 | 28 | 30 | 1 | 10 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 15 | 762 | 5 | 2 | 770 | 111 | 122 | 2 | 41 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 76 | 76 | 76 | 76 | 16 | 16 |
| g / C, Green / Cycle | 0.76 | 0.76 | 0.76 | 0.76 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.41 | 0.00 | 0.49 | 0.12 | 0.02 |
| s, saturation flow rate [veh/h] | 640 | 1851 | 712 | 1796 | 1409 | 1518 |
| c, Capacity [veh/h] | 388 | 1399 | 469 | 1357 | 291 | 304 |
| d1, Uniform Delay [s] | 13.08 | 5.09 | 9.82 | 5.85 | 39.30 | 35.62 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.19 | 1.55 | 0.02 | 2.42 | 1.73 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.04 | 0.55 | 0.00 | 0.65 | 0.57 | 0.09 |
| d, Delay for Lane Group [s/veh] | 13.27 | 6.64 | 9.84 | 8.27 | 41.04 | 35.75 |
| Lane Group LOS | B | A | A | A | D | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.19 | 5.99 | 0.02 | 7.63 | 3.93 | 0.58 |
| 50th-Percentile Queue Length [ft/ln] | 4.87 | 149.74 | 0.52 | 190.86 | 98.30 | 14.40 |
| 95th-Percentile Queue Length [veh/ln] | 0.35 | 10.00 | 0.04 | 12.17 | 7.08 | 1.04 |
| 95th-Percentile Queue Length [ft/ln] | 8.76 | 250.09 | 0.94 | 304.14 | 176.93 | 25.92 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.27 | 6.64 | 6.64 | 9.84 | 8.27 | 8.27 | 41.04 | 41.04 | 41.04 | 35.75 | 35.75 | 35.75 |
| Movement LOS | B | A | A | A | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 6.77 | | | 8.27 | | | 41.04 | | | 35.75 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 10.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.654 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.59 | 39.59 | 39.59 | 39.59 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.404 | 2.695 | 1.885 | 1.737 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.85 | 4.84 | 29.77 | 29.77 |
| I_b,int, Bicycle LOS Score for Intersection | 2.850 | 3.017 | 1.832 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.537 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 95 | 54 | 687 | 10 | 28 | 105 | 5 | 81 | 50 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 95 | 54 | 687 | 10 | 28 | 105 | 5 | 81 | 50 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 25 | 14 | 179 | 3 | 7 | 27 | 1 | 21 | 13 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 99 | 56 | 716 | 10 | 29 | 109 | 5 | 84 | 52 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 75 | 75 | 75 | 75 | 17 | 17 | 17 | 17 |
| g / C, Green / Cycle | 0.75 | 0.75 | 0.75 | 0.75 | 0.17 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.43 | 0.08 | 0.39 | 0.02 | 0.06 | 0.06 | 0.07 |
| s, saturation flow rate [veh/h] | 740 | 1806 | 702 | 1854 | 1261 | 1852 | 1294 | 1676 |
| c, Capacity [veh/h] | 496 | 1354 | 454 | 1390 | 181 | 312 | 190 | 282 |
| d1, Uniform Delay [s] | 9.13 | 5.53 | 11.29 | 5.15 | 42.74 | 36.84 | 44.16 | 37.05 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 1.80 | 0.56 | 1.41 | 0.41 | 0.72 | 1.61 | 0.90 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.58 | 0.12 | 0.52 | 0.16 | 0.37 | 0.44 | 0.40 |
| d, Delay for Lane Group [s/veh] | 9.15 | 7.33 | 11.85 | 6.56 | 43.15 | 37.56 | 45.78 | 37.95 |
| Lane Group LOS | A | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 6.62 | 0.68 | 5.69 | 0.69 | 2.54 | 2.11 | 2.52 |
| 50th-Percentile Queue Length [ft/ln] | 0.77 | 165.60 | 17.00 | 142.18 | 17.37 | 63.59 | 52.82 | 63.06 |
| 95th-Percentile Queue Length [veh/ln] | 0.06 | 10.84 | 1.22 | 9.60 | 1.25 | 4.58 | 3.80 | 4.54 |
| 95th-Percentile Queue Length [ft/ln] | 1.38 | 271.12 | 30.60 | 239.96 | 31.26 | 114.45 | 95.08 | 113.50 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.15 | 7.33 | 7.33 | 11.85 | 6.56 | 6.56 | 43.15 | 37.56 | 37.56 | 45.78 | 37.95 | 37.95 |
| Movement LOS | A | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 7.34 | | | 6.94 | | | 38.69 | | | 41.31 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 13.02 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.537 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.495 | 2.493 | 2.006 | 2.149 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.855 | 2.850 | 1.796 | 1.883 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.615 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 240 | 244 | 372 | 96 | 291 | 120 | 439 | 204 | 277 | 494 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 240 | 124 | 372 | 96 | 0 | 120 | 439 | 204 | 277 | 494 | 15 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 63 | 33 | 98 | 25 | 0 | 32 | 116 | 54 | 73 | 130 | 4 |
| Total Analysis Volume [veh/h] | 32 | 253 | 131 | 392 | 101 | 0 | 126 | 462 | 215 | 292 | 520 | 16 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 17 | 17 | 17 | 17 | 17 | 17 | 15 | 15 | 15 | 15 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.13 | 0.09 | 0.14 | 0.14 | 0.00 | 0.07 | 0.13 | 0.13 | 0.13 | 0.16 | 0.16 | 0.16 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1455 | 1785 | 1845 | 1584 | 1794 | 1892 | 1870 | 1541 | 1718 | 1892 | 1702 |
| c, Capacity [veh/h] | 356 | 377 | 291 | 347 | 358 | 308 | 323 | 341 | 337 | 278 | 362 | 399 | 359 |
| d1, Uniform Delay [s] | 27.93 | 31.68 | 29.84 | 32.21 | 32.21 | 0.00 | 31.00 | 32.99 | 33.00 | 33.01 | 31.64 | 31.64 | 31.67 |
| k, delay calibration | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 2.32 | 1.09 | 2.56 | 2.47 | 0.00 | 0.77 | 2.62 | 2.68 | 3.59 | 2.97 | 2.69 | 3.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.67 | 0.45 | 0.70 | 0.70 | 0.00 | 0.39 | 0.70 | 0.70 | 0.72 | 0.74 | 0.74 | 0.74 |
| d, Delay for Lane Group [s/veh] | 28.03 | 33.99 | 30.93 | 34.77 | 34.69 | 0.00 | 31.77 | 35.61 | 35.68 | 36.60 | 34.61 | 34.33 | 34.71 |
| Lane Group LOS | C | C | C | C | C | A | C | D | D | D | C | C | C |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.54 | 4.95 | 2.38 | 4.87 | 5.02 | 0.00 | 2.32 | 4.79 | 4.74 | 4.10 | 5.32 | 5.83 | 5.31 |
| 50th-Percentile Queue Length [ft/ln] | 13.39 | 123.73 | 59.60 | 121.70 | 125.57 | 0.00 | 57.91 | 119.6 | 118.6 | 102.4 | 133.08 | 145.64 | 132.66 |
| 95th-Percentile Queue Length [veh/ln] | 0.96 | 8.60 | 4.29 | 8.49 | 8.70 | 0.00 | 4.17 | 8.37 | 8.32 | 7.38 | 9.11 | 9.78 | 9.08 |
| 95th-Percentile Queue Length [ft/ln] | 24.10 | 214.95 | 107.27 | 212.17 | 217.46 | 0.00 | 104.2 | 209.3 | 207.9 | 184.4 | 227.67 | 244.60 | 227.11 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 28.03 | 33.99 | 30.93 | 34.74 | 34.69 | 0.00 | 31.77 | 35.64 | 36.60 | 34.59 | 34.51 | 34.71 |
| Movement LOS | C | C | C | C | C | A | C | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 32.57 | | | 34.73 | | | 35.27 | | | 34.54 | | |
| Approach LOS | C | | | C | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 34.49 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.615 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.58 | 31.58 | 31.58 | 31.58 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.487 | 4.247 | 4.353 | 2.748 |
| Crosswalk LOS | B | D | E | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 672 | 966 | 639 | 803 |
| d_b, Bicycle Delay [s] | 19.34 | 11.52 | 19.83 | 15.42 |
| I_b,int, Bicycle LOS Score for Intersection | 2.444 | 4.023 | 3.047 | 2.243 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.858 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1842 | 0 | 0 | 946 | 570 | 639 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1842 | 0 | 0 | 946 | 570 | 639 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 465 | 0 | 0 | 239 | 144 | 161 |
| Total Analysis Volume [veh/h] | 1861 | 0 | 0 | 956 | 576 | 645 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 52 | 52 | 23 | 23 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.53 | 0.27 | 0.17 | 0.25 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2291 | 2317 | 970 | 743 |
| d1, Uniform Delay [s] | 10.10 | 6.47 | 24.43 | 26.99 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.27 | 0.54 | 0.22 | 1.25 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.41 | 0.59 | 0.87 |
| d, Delay for Lane Group [s/veh] | 13.37 | 7.01 | 24.64 | 28.23 |
| Lane Group LOS | B | A | C | C |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.53 | 3.30 | 4.51 | 5.68 |
| 50th-Percentile Queue Length [ft/ln] | 263.13 | 82.38 | 112.87 | 141.96 |
| 95th-Percentile Queue Length [veh/ln] | 15.85 | 5.93 | 8.00 | 9.59 |
| 95th-Percentile Queue Length [ft/ln] | 396.14 | 148.28 | 199.99 | 239.66 |

**Movement, Approach, & Intersection Results**

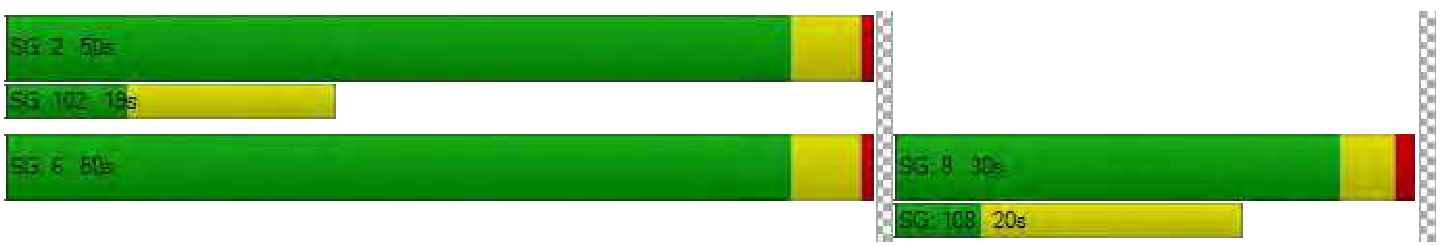
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.37 | 0.00 | 0.00 | 7.01 | 24.64 | 28.23 |
| Movement LOS | B | | | A | C | C |
| d_A, Approach Delay [s/veh] | 13.37 | | 7.01 | | 26.54 | |
| Approach LOS | B | | A | | C | |
| d_I, Intersection Delay [s/veh] | 15.85 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.858 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.971 | 2.422 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.47 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 3.095 | 2.348 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

## Intersection Level Of Service Report
## Intersection 131: Chilco Street/Hamilton Avenue

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 19.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.802 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 112 | 18 | 73 | 424 | 36 | 22 | 124 | 22 | 7 | 16 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 112 | 18 | 73 | 424 | 36 | 22 | 124 | 22 | 7 | 16 | 47 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 30 | 5 | 20 | 115 | 10 | 6 | 35 | 6 | 2 | 4 | 13 |
| Total Analysis Volume [veh/h] | 23 | 121 | 19 | 79 | 459 | 39 | 25 | 140 | 25 | 8 | 17 | 51 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 648 | 719 | 604 | 610 |
| Degree of Utilization, x | 0.25 | 0.80 | 0.31 | 0.12 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.99 | 8.29 | 1.34 | 0.42 |
| 95th-Percentile Queue Length [ft] | 24.80 | 207.21 | 33.56 | 10.62 |
| Approach Delay [s/veh] | 10.41 | 25.01 | 11.67 | 9.75 |
| Approach LOS | B | D | B | A |
| Intersection Delay [s/veh] | 18.97 | | | |
| Intersection LOS | C | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.882 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 179 | 40 | 1676 | 12 | 31 | 5 | 9 | 567 | 208 | 2034 | 393 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 179 | 40 | 1676 | 12 | 31 | 5 | 9 | 567 | 208 | 2034 | 393 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 47 | 10 | 436 | 3 | 8 | 1 | 2 | 148 | 54 | 530 | 102 | 4 |
| Total Analysis Volume [veh/h] | 186 | 42 | 1746 | 13 | 32 | 5 | 9 | 591 | 217 | 2119 | 409 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 4 | | | 4 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 4 | | | 4 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 13 | | | 0 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 13 | | | 0 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 13 | | | 8 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 35 | 125 | 10 | 10 | 29 | 29 | 29 | 76 | 76 |
| g / C, Green / Cycle | 0.22 | 0.78 | 0.06 | 0.06 | 0.18 | 0.18 | 0.18 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.42 | 0.02 | 0.01 | 0.17 | 0.17 | 0.14 | 0.41 | 0.25 |
| s, saturation flow rate [veh/h] | 1826 | 4190 | 1707 | 1588 | 1891 | 1724 | 1552 | 5150 | 1671 |
| c, Capacity [veh/h] | 402 | 3181 | 137 | 97 | 345 | 315 | 284 | 2454 | 796 |
| d1, Uniform Delay [s] | 55.62 | 7.95 | 71.59 | 71.56 | 64.08 | 64.08 | 61.91 | 37.26 | 29.39 |
| k, delay calibration | 0.14 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.68 | 0.69 | 0.27 | 0.45 | 3.81 | 4.15 | 1.63 | 4.34 | 2.54 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.55 | 0.20 | 0.23 | 0.91 | 0.91 | 0.77 | 0.86 | 0.53 |
| d, Delay for Lane Group [s/veh] | 57.30 | 8.64 | 71.86 | 72.01 | 67.89 | 68.22 | 63.54 | 41.60 | 31.93 |
| Lane Group LOS | E | A | E | E | E | E | E | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.47 | 8.00 | 1.10 | 0.89 | 12.95 | 11.83 | 8.53 | 25.43 | 12.14 |
| 50th-Percentile Queue Length [ft/ln] | 211.82 | 200.09 | 27.52 | 22.30 | 323.82 | 295.82 | 213.37 | 635.80 | 303.39 |
| 95th-Percentile Queue Length [veh/ln] | 13.25 | 12.64 | 1.98 | 1.61 | 18.86 | 17.47 | 13.33 | 33.70 | 17.85 |
| 95th-Percentile Queue Length [ft/ln] | 331.16 | 316.09 | 49.54 | 40.15 | 471.38 | 436.86 | 333.15 | 842.56 | 446.22 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 57.30 | 57.30 | 8.64 | 71.86 | 71.94 | 72.01 | 67.89 | 68.05 | 63.54 | 41.60 | 31.93 | 31.93 |
| Movement LOS | E | E | A | E | E | E | E | E | E | D | C | C |
| d_A, Approach Delay [s/veh] | | 14.26 | | | 71.92 | | | 66.85 | | | 39.99 | |
| Approach LOS | | B | | | E | | | E | | | D | |
| d_I, Intersection Delay [s/veh] | 34.93 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.882 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.505 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 4.817 | 1.601 | 2.234 | 5.756 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 105.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.740 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 961 | 199 | 0 | 943 | 699 | 0 | 0 | 0 | 0 | 612 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 961 | 199 | 0 | 943 | 699 | 0 | 0 | 0 | 0 | 612 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 258 | 50 | 0 | 253 | 188 | 0 | 0 | 0 | 0 | 153 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1033 | 199 | 0 | 1014 | 752 | 0 | 0 | 0 | 0 | 612 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 44 | 44 | 44 | | 28 | 28 |
| g / C, Green / Cycle | 0.55 | 0.55 | 0.55 | | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.20 | 1.08 | | 0.17 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2784 | 2739 | 379 | | 1241 | 449 |
| d1, Uniform Delay [s] | 10.29 | 10.28 | 17.53 | | 20.21 | 24.10 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.38 | 0.39 | 452.20 | | 0.30 | 5.34 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.37 | 0.37 | 1.98 | | 0.49 | 0.87 |
| d, Delay for Lane Group [s/veh] | 10.67 | 10.67 | 469.73 | | 20.52 | 29.45 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.21 | 3.15 | 53.43 | | 4.30 | 3.57 |
| 50th-Percentile Queue Length [ft/ln] | 80.14 | 78.66 | 1335.87 | | 107.41 | 89.17 |
| 95th-Percentile Queue Length [veh/ln] | 5.77 | 5.66 | 90.86 | | 7.70 | 6.42 |
| 95th-Percentile Queue Length [ft/ln] | 144.26 | 141.59 | 2271.44 | | 192.39 | 160.51 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

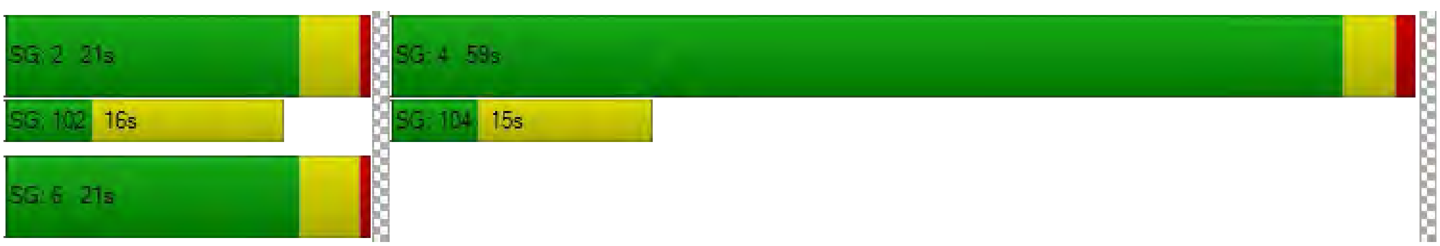
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 10.67 | 0.00 | 0.00 | 10.67 | 469.73 | 0.00 | 0.00 | 0.00 | 0.00 | 20.52 | 29.45 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | 10.67 | | | 206.15 | | | 0.00 | | | 24.00 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 104.98 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.740 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.929 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.128 | 2.531 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 152.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.137 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1211 | 361 | 0 | 1366 | 535 | 0 | 0 | 0 | 271 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1211 | 361 | 0 | 1366 | 535 | 0 | 0 | 0 | 271 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 309 | 92 | 0 | 348 | 134 | 0 | 0 | 0 | 68 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1236 | 368 | 0 | 1394 | 535 | 0 | 0 | 0 | 271 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.41 | 0.23 | 0.46 | | 0.08 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 917 | 474 | 917 | | 2106 | 1010 |
| d1, Uniform Delay [s] | 27.95 | 25.32 | 27.95 | | 6.95 | 14.78 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 164.04 | 11.76 | 239.95 | | 0.03 | 5.39 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.35 | 0.78 | 1.52 | | 0.13 | 0.94 |
| d, Delay for Lane Group [s/veh] | 191.99 | 37.08 | 267.89 | | 6.97 | 20.17 |
| Lane Group LOS | F | D | F | | A | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 19.45 | 7.58 | 25.89 | | 0.89 | 7.36 |
| 50th-Percentile Queue Length [ft/ln] | 486.27 | 189.54 | 647.32 | | 22.25 | 184.00 |
| 95th-Percentile Queue Length [veh/ln] | 31.12 | 12.10 | 41.85 | | 1.60 | 11.81 |
| 95th-Percentile Queue Length [ft/ln] | 777.94 | 302.43 | 1046.23 | | 40.04 | 295.23 |

**Movement, Approach, & Intersection Results**

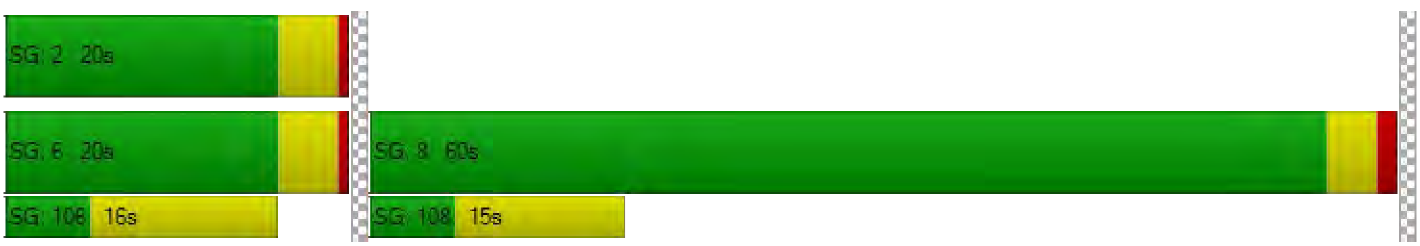
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 191.99 | 37.08 | 0.00 | 267.89 | 0.00 | 0.00 | 0.00 | 0.00 | 6.97 | 0.00 | 20.17 |
| Movement LOS | | F | D | | F | | | | | A | | C |
| d_A, Approach Delay [s/veh] | 156.45 | | | 267.89 | | | 0.00 | | | 17.25 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 152.86 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.137 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.089 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.442 | 2.326 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.953 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 556 | 419 | 2402 | 213 | 180 | 1281 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 556 | 419 | 2402 | 213 | 180 | 1281 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 149 | 113 | 646 | 57 | 48 | 344 |
| Total Analysis Volume [veh/h] | 598 | 451 | 2583 | 229 | 194 | 1377 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 91 | 91 | 91 | 91 | 91 | 91 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 62 | 62 |
| g / C, Green / Cycle | 0.22 | 0.22 | 0.55 | 0.55 | 0.67 | 0.67 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.29 | 0.51 | 0.15 | 0.60 | 0.28 |
| s, saturation flow rate [veh/h] | 3361 | 1544 | 5049 | 1579 | 324 | 4979 |
| c, Capacity [veh/h] | 734 | 337 | 2754 | 861 | 280 | 3353 |
| d1, Uniform Delay [s] | 34.02 | 35.58 | 19.36 | 11.04 | 24.29 | 6.75 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.85 | 170.68 | 0.77 | 0.06 | 13.21 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 1.34 | 0.94 | 0.27 | 0.69 | 0.41 |
| d, Delay for Lane Group [s/veh] | 34.87 | 206.26 | 20.12 | 11.10 | 37.50 | 6.78 |
| Lane Group LOS | C | F | C | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 6.26 | 23.27 | 15.45 | 2.33 | 2.23 | 3.45 |
| 50th-Percentile Queue Length [ft/ln] | 156.47 | 581.69 | 386.15 | 58.17 | 55.87 | 86.22 |
| 95th-Percentile Queue Length [veh/ln] | 10.36 | 35.85 | 21.89 | 4.19 | 4.02 | 6.21 |
| 95th-Percentile Queue Length [ft/ln] | 259.04 | 896.25 | 547.28 | 104.70 | 100.57 | 155.20 |

**Movement, Approach, & Intersection Results**

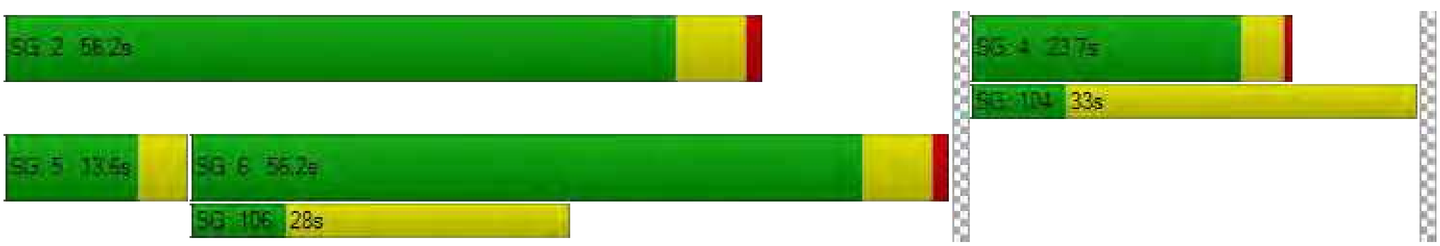
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 34.87 | 206.26 | 20.12 | 11.10 | 37.50 | 6.78 |
| Movement LOS | C | F | C | B | D | A |
| d_A, Approach Delay [s/veh] | 108.55 | | 19.39 | | 10.57 | |
| Approach LOS | F | | B | | B | |
| d_I, Intersection Delay [s/veh] | 34.06 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.953 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 35.40 | 35.40 | 35.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.849 | 3.261 | 3.236 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 437 | 1093 | 1093 |
| d_b, Bicycle Delay [s] | 28.03 | 9.41 | 9.40 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.106 | 2.424 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.818 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 706 | 103 | 2460 | 56 | 56 | 1634 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 706 | 103 | 2460 | 56 | 56 | 1634 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 180 | 26 | 628 | 14 | 14 | 417 |
| Total Analysis Volume [veh/h] | 720 | 105 | 2510 | 57 | 57 | 1667 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 89 | 89 | 89 | 89 | 89 | 89 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 4 | 58 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.56 | 0.56 | 0.04 | 0.65 |
| (v / s)_i Volume / Saturation Flow Rate | 0.21 | 0.07 | 0.50 | 0.04 | 0.03 | 0.34 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 787 | 367 | 2844 | 901 | 79 | 3241 |
| d1, Uniform Delay [s] | 33.52 | 28.40 | 16.93 | 8.85 | 42.00 | 8.12 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.88 | 0.16 | 0.38 | 0.01 | 4.67 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.92 | 0.29 | 0.88 | 0.06 | 0.73 | 0.51 |
| d, Delay for Lane Group [s/veh] | 35.40 | 28.56 | 17.30 | 8.86 | 46.67 | 8.17 |
| Lane Group LOS | D | C | B | A | D | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.67 | 1.86 | 12.09 | 0.43 | 1.28 | 4.21 |
| 50th-Percentile Queue Length [ft/ln] | 191.64 | 46.49 | 302.13 | 10.74 | 32.03 | 105.26 |
| 95th-Percentile Queue Length [veh/ln] | 12.21 | 3.35 | 17.79 | 0.77 | 2.31 | 7.58 |
| 95th-Percentile Queue Length [ft/ln] | 305.16 | 83.68 | 444.66 | 19.33 | 57.65 | 189.39 |

**Movement, Approach, & Intersection Results**

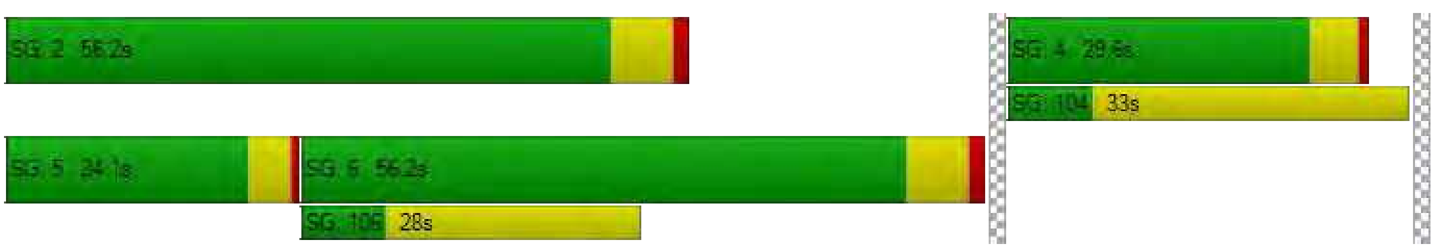
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.40 | 28.56 | 17.30 | 8.86 | 46.67 | 8.17 |
| Movement LOS | D | C | B | A | D | A |
| d_A, Approach Delay [s/veh] | 34.53 | | 17.12 | | 9.44 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 17.34 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.818 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.07 | 34.07 | 34.07 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.321 | 3.630 | 3.499 |
| Crosswalk LOS | B | D | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 563 | 1126 | 1126 |
| d_b, Bicycle Delay [s] | 22.91 | 8.47 | 8.47 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.971 | 2.508 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bafront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.807 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 422 | 119 | 2100 | 43 | 35 | 1113 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 422 | 119 | 2100 | 43 | 35 | 1113 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 108 | 30 | 536 | 11 | 9 | 284 |
| Total Analysis Volume [veh/h] | 431 | 121 | 2143 | 44 | 36 | 1136 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 56 | 56 | 56 | 56 | 56 | 56 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 13 | 13 | 28 | 28 | 34 | 34 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.50 | 0.50 | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.20 | 0.48 | 0.03 | 0.06 | 0.25 |
| s, saturation flow rate [veh/h] | 1438 | 1364 | 4507 | 1406 | 622 | 4470 |
| c, Capacity [veh/h] | 326 | 309 | 2233 | 697 | 462 | 2672 |
| d1, Uniform Delay [s] | 20.99 | 20.99 | 13.68 | 7.40 | 11.26 | 6.11 |
| k, delay calibration | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.49 | 3.72 | 1.42 | 0.01 | 0.03 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.87 | 0.96 | 0.06 | 0.08 | 0.43 |
| d, Delay for Lane Group [s/veh] | 24.47 | 24.71 | 15.10 | 7.42 | 11.29 | 6.15 |
| Lane Group LOS | C | C | B | A | B | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.56 | 3.40 | 7.11 | 0.23 | 0.06 | 1.74 |
| 50th-Percentile Queue Length [ft/ln] | 88.98 | 84.98 | 177.66 | 5.75 | 1.59 | 43.42 |
| 95th-Percentile Queue Length [veh/ln] | 6.41 | 6.12 | 11.48 | 0.41 | 0.11 | 3.13 |
| 95th-Percentile Queue Length [ft/ln] | 160.17 | 152.97 | 286.95 | 10.34 | 2.86 | 78.16 |

**Movement, Approach, & Intersection Results**

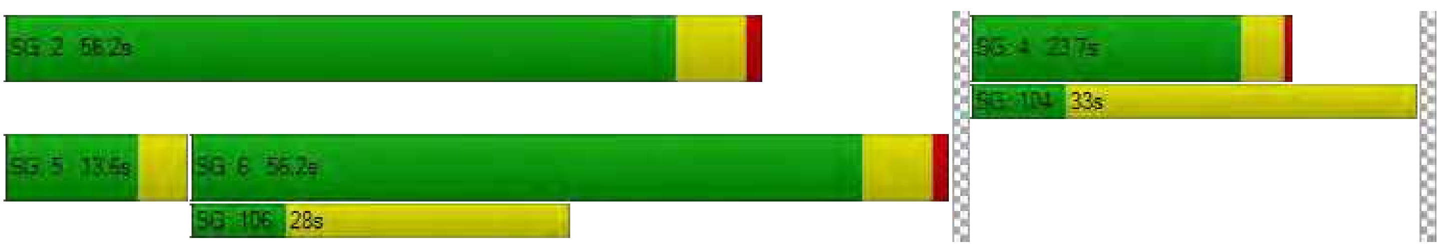
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.55 | 24.71 | 15.10 | 7.42 | 11.29 | 6.15 |
| Movement LOS | C | C | B | A | B | A |
| d_A, Approach Delay [s/veh] | 24.59 | | 14.95 | | 6.31 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 13.72 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.807 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 18.19 | 18.19 | 18.19 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.286 | 3.090 | 3.118 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 711 | 1778 | 1778 |
| d_b, Bicycle Delay [s] | 11.67 | 0.35 | 0.35 |
| I_b,int, Bicycle LOS Score for Intersection | 2.470 | 2.762 | 2.204 |
| Bicycle LOS | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 29.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.936 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 417 | 231 | 18 | 224 | 80 | 17 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 417 | 231 | 18 | 224 | 80 | 17 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 120 | 66 | 5 | 64 | 23 | 5 |
| Total Analysis Volume [veh/h] | 479 | 266 | 21 | 257 | 92 | 20 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 796 | 687 | 565 |
| Degree of Utilization, x | 0.94 | 0.40 | 0.20 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 13.82 | 1.96 | 0.73 |
| 95th-Percentile Queue Length [ft] | 345.53 | 49.05 | 18.31 |
| Approach Delay [s/veh] | 39.04 | 11.75 | 10.94 |
| Approach LOS | E | B | B |
| Intersection Delay [s/veh] | 29.58 | | |
| Intersection LOS | D | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.799 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 130 | 2151 | 17 | 36 | 1181 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 130 | 2151 | 17 | 36 | 1181 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 36 | 591 | 5 | 10 | 324 |
| Total Analysis Volume [veh/h] | 0 | 143 | 2364 | 19 | 40 | 1298 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 48 | 48 | 48 | 48 | 48 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 6 | 26 | 26 | 32 | 32 |
| g / C, Green / Cycle | 0.13 | 0.54 | 0.54 | 0.66 | 0.66 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.52 | 0.01 | 0.14 | 0.30 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 288 | 4342 |
| c, Capacity [veh/h] | 165 | 2459 | 767 | 338 | 2874 |
| d1, Uniform Delay [s] | 20.55 | 10.54 | 5.09 | 10.57 | 3.94 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.34 | 1.35 | 0.00 | 0.06 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.96 | 0.02 | 0.12 | 0.45 |
| d, Delay for Lane Group [s/veh] | 25.89 | 11.88 | 5.10 | 10.63 | 3.98 |
| Lane Group LOS | C | B | A | B | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.66 | 5.65 | 0.06 | 0.07 | 1.03 |
| 50th-Percentile Queue Length [ft/ln] | 41.44 | 141.18 | 1.58 | 1.83 | 25.76 |
| 95th-Percentile Queue Length [veh/ln] | 2.98 | 9.54 | 0.11 | 0.13 | 1.85 |
| 95th-Percentile Queue Length [ft/ln] | 74.60 | 238.61 | 2.85 | 3.29 | 46.37 |

**Movement, Approach, & Intersection Results**

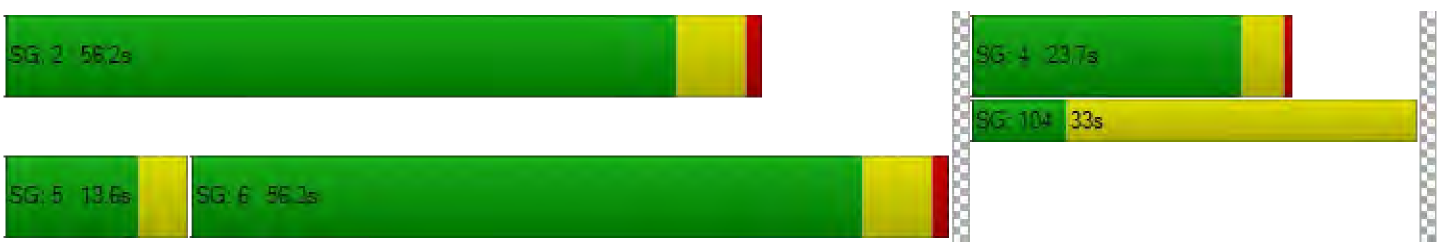
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 25.89 | 11.88 | 5.10 | 10.63 | 3.98 |
| Movement LOS | | C | B | A | B | A |
| d_A, Approach Delay [s/veh] | 25.89 | | 11.83 | | 4.18 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 9.70 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.799 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 30.74 | 14.39 | 14.39 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.841 | 3.071 | 3.094 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 829 | 2071 | 2071 |
| d_b, Bicycle Delay [s] | 8.28 | 0.03 | 0.03 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.870 | 2.296 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

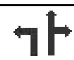
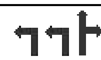
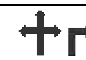
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 42.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.712 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 18 | 268 | 20 | 95 | 327 | 36 | 331 | 15 | 267 | 196 | 13 | 492 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 18 | 268 | 20 | 95 | 327 | 36 | 331 | 15 | 267 | 196 | 13 | 492 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 76 | 6 | 27 | 93 | 10 | 94 | 4 | 76 | 56 | 4 | 140 |
| Total Analysis Volume [veh/h] | 20 | 305 | 23 | 108 | 372 | 41 | 376 | 17 | 303 | 223 | 15 | 559 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 10 | 31 | 0 | 18 | 39 | 0 | 0 | 38 | 38 | 0 | 43 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 2 | 23 | 5 | 26 | 25 | 25 | 26 | 26 |
| g / C, Green / Cycle | 0.02 | 0.24 | 0.05 | 0.27 | 0.26 | 0.26 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.18 | 0.03 | 0.23 | 0.22 | 0.21 | 0.24 | 0.25 |
| s, saturation flow rate [veh/h] | 1767 | 1832 | 3431 | 1788 | 1770 | 1463 | 1685 | 1577 |
| c, Capacity [veh/h] | 39 | 444 | 178 | 487 | 465 | 384 | 463 | 433 |
| d1, Uniform Delay [s] | 45.94 | 33.19 | 44.06 | 32.68 | 33.17 | 31.95 | 32.91 | 33.18 |
| k, delay calibration | 0.11 | 0.13 | 0.11 | 0.25 | 0.23 | 0.20 | 0.28 | 0.29 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.41 | 2.96 | 3.33 | 9.23 | 8.74 | 6.49 | 12.67 | 16.17 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.74 | 0.61 | 0.85 | 0.85 | 0.79 | 0.88 | 0.90 |
| d, Delay for Lane Group [s/veh] | 56.34 | 36.15 | 47.39 | 41.91 | 41.91 | 38.43 | 45.58 | 49.35 |
| Lane Group LOS | E | D | D | D | D | D | D | D |
| Critical Lane Group | Yes | No | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.57 | 7.18 | 1.31 | 9.99 | 9.48 | 6.89 | 10.32 | 10.35 |
| 50th-Percentile Queue Length [ft/ln] | 14.35 | 179.49 | 32.83 | 249.63 | 236.94 | 172.28 | 258.07 | 258.84 |
| 95th-Percentile Queue Length [veh/ln] | 1.03 | 11.57 | 2.36 | 15.17 | 14.53 | 11.20 | 15.59 | 15.63 |
| 95th-Percentile Queue Length [ft/ln] | 25.83 | 289.35 | 59.09 | 379.19 | 363.16 | 279.91 | 389.80 | 390.77 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

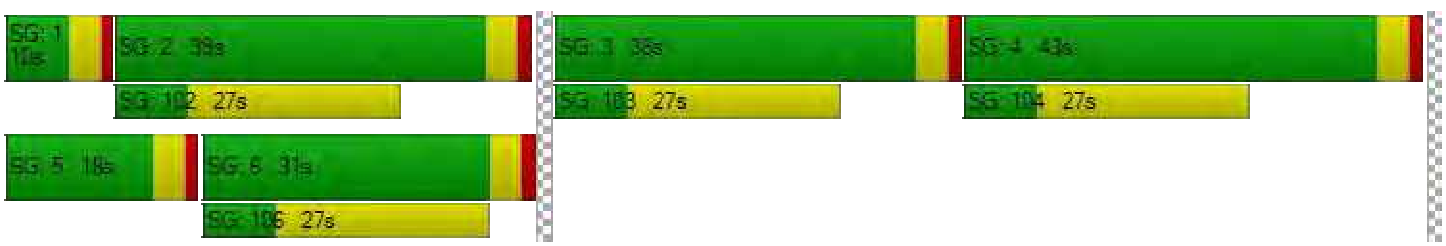
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 56.34 | 36.15 | 36.15 | 47.39 | 41.91 | 41.91 | 41.91 | 41.91 | 38.43 | 45.58 | 45.58 | 48.24 |
| Movement LOS | E | D | D | D | D | D | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | | 37.31 | | | 43.05 | | | 40.40 | | | 47.43 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| d_I, Intersection Delay [s/veh] | | | | | | | 42.90 | | | | | |
| Intersection LOS | | | | | | | D | | | | | |
| Intersection V/C | | | | | | | 0.712 | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 37.02 | 37.02 | 37.02 | 37.02 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.347 | 2.645 | 2.193 | 2.364 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 570 | 739 | 718 | 823 |
| d_b, Bicycle Delay [s] | 24.23 | 18.85 | 19.48 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.134 | 2.419 | 2.708 | 2.875 |
| Bicycle LOS | B | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 28.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.515 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 39 | 36 | 25 | 334 | 36 | 3 | 18 | 4 | 114 | 0 | 490 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 39 | 36 | 25 | 334 | 36 | 3 | 18 | 4 | 114 | 0 | 490 | 14 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 9 | 6 | 84 | 9 | 1 | 5 | 1 | 29 | 0 | 123 | 4 |
| Total Analysis Volume [veh/h] | 39 | 36 | 25 | 334 | 36 | 3 | 18 | 4 | 114 | 0 | 490 | 14 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 8 | | | 7 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 7 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 42 | 21 | 21 | 15 | 42 | 42 |
| g / C, Green / Cycle | 0.47 | 0.23 | 0.23 | 0.17 | 0.47 | 0.47 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.21 | 0.02 | 0.15 | 0.15 | 0.16 |
| s, saturation flow rate [veh/h] | 971 | 1609 | 1663 | 896 | 1710 | 1538 |
| c, Capacity [veh/h] | 508 | 376 | 388 | 150 | 836 | 717 |
| d1, Uniform Delay [s] | 14.10 | 33.39 | 27.10 | 36.81 | 15.21 | 15.22 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.87 | 7.21 | 0.11 | 17.65 | 0.99 | 1.25 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.20 | 0.89 | 0.10 | 0.91 | 0.32 | 0.33 |
| d, Delay for Lane Group [s/veh] | 14.97 | 40.61 | 27.21 | 54.46 | 16.21 | 16.48 |
| Lane Group LOS | B | D | C | D | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.24 | 7.62 | 0.66 | 3.61 | 3.51 | 3.21 |
| 50th-Percentile Queue Length [ft/ln] | 30.91 | 190.54 | 16.57 | 90.36 | 87.72 | 80.27 |
| 95th-Percentile Queue Length [veh/ln] | 2.23 | 12.15 | 1.19 | 6.51 | 6.32 | 5.78 |
| 95th-Percentile Queue Length [ft/ln] | 55.63 | 303.73 | 29.83 | 162.64 | 157.90 | 144.48 |

**Movement, Approach, & Intersection Results**

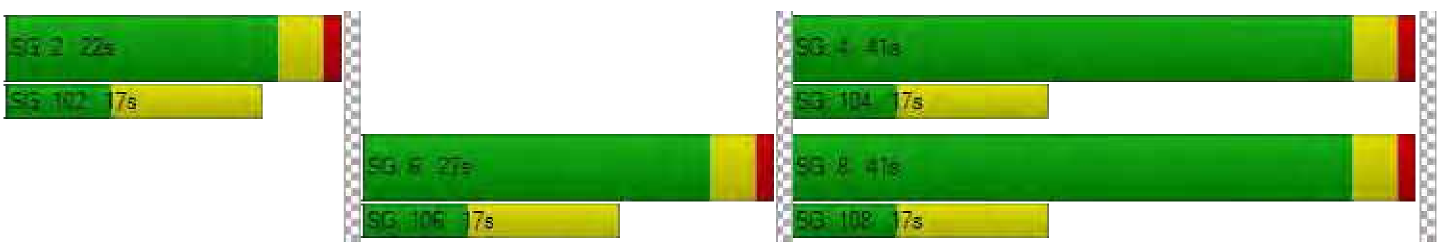
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.97 | 14.97 | 14.97 | 40.61 | 27.21 | 27.21 | 54.46 | 54.46 | 54.46 | 16.21 | 16.33 | 16.48 |
| Movement LOS | B | B | B | D | C | C | D | D | D | B | B | B |
| d_A, Approach Delay [s/veh] | 14.97 | | | 39.21 | | | 54.46 | | | 16.34 | | |
| Approach LOS | B | | | D | | | D | | | B | | |
| d_I, Intersection Delay [s/veh] | 28.54 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.515 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.70 | 34.70 | 34.70 | 34.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.277 | 2.070 | 1.880 | 2.122 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 822 | 511 | 400 | 822 |
| d_b, Bicycle Delay [s] | 15.63 | 24.96 | 28.82 | 15.63 |
| I_b,int, Bicycle LOS Score for Intersection | 1.725 | 2.175 | 1.784 | 1.975 |
| Bicycle LOS | A | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 34.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.430 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 73 | 65 | 229 | 252 | 107 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 73 | 65 | 229 | 252 | 107 | 15 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 20 | 69 | 76 | 32 | 5 |
| Total Analysis Volume [veh/h] | 88 | 78 | 276 | 304 | 129 | 18 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.43 | 0.09 | 0.20 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 33.96 | 20.37 | 8.17 | 0.00 | 0.00 | 0.00 |
| Movement LOS | D | C | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.80 | 2.80 | 0.72 | 0.72 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 70.02 | 70.02 | 18.11 | 18.11 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 27.57 | | 3.89 | | 0.00 | |
| Approach LOS | D | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.65 | | | | | |
| Intersection LOS | D | | | | | |

# Intersection Level Of Service Report
## Intersection 265: Adam Court/ Adams Drive

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.064 |

### Intersection Setup

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 32 | 209 | 35 | 15 | 30 | 49 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 32 | 209 | 35 | 15 | 30 | 49 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 65 | 11 | 5 | 9 | 15 |
| Total Analysis Volume [veh/h] | 40 | 258 | 43 | 19 | 37 | 60 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| d_M, Delay for Movement [s/veh] | 7.46 | 0.00 | 0.00 | 0.00 | 11.94 | 9.38 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.08 | 0.08 | 0.00 | 0.00 | 0.43 | 0.43 |
| 95th-Percentile Queue Length [ft/ln] | 2.05 | 2.05 | 0.00 | 0.00 | 10.77 | 10.77 |
| d_A, Approach Delay [s/veh] | 1.00 | | 0.00 | | 10.35 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 2.85 | | | | | |
| Intersection LOS | B | | | | | |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Near-Term PM.pdf

Scenario 17 Near-Term PM (2025 vols)
12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 959 | 1010 | 1255 | 363 | 3587 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 38 | 1327 | 7 | 55 | 892 | 194 | 15 | 5 | 388 | 273 | 6 | 4 | 3204 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 196 | 675 | 39 | 13 | 810 | 384 | 446 | 22 | 175 | 109 | 52 | 40 | 2961 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 58 | 167 | 687 | 102 | 69 | 16 | 2 | 65 | 14 | 280 | 2207 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 529 | 417 | 567 | 440 | 104 | 2194 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 70 | 0 | 220 | 2 | 684 | 110 | 318 | 631 | 2 | 2135 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3417 | 49 | 372 | 975 | 71 | 1841 | 6725 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 151 | 110 | 1112 | 170 | 213 | 133 | 119 | 2079 | 172 | 588 | 814 | 34 | 5695 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 43 | 1065 | 7 | 142 | 837 | 54 | 94 | 17 | 35 | 193 | 18 | 138 | 2643 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 80 | 933 | 1204 | 24 | 35 | 114 | 2390 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 464 | 57 | 1095 | 274 | 115 | 3005 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 326 | 1311 | 272 | 78 | 1206 | 26 | 33 | 177 | 267 | 283 | 274 | 104 | 4357 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 20 | 1375 | 717 | 180 | 283 | 40 | 2615 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1037 | 4 | 29 | 538 | 18 | 133 | 2 | 31 | 21 | 7 | 46 | 1875 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 14 | 693 | 5 | 2 | 701 | 101 | 111 | 2 | 37 | 15 | 4 | 6 | 1691 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 95 | 54 | 687 | 10 | 28 | 105 | 5 | 81 | 50 | 58 | 1832 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 240 | 244 | 372 | 96 | 291 | 120 | 439 | 204 | 277 | 494 | 15 | 2822 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1842 | 946 | 570 | 639 | 3997 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 21 | 112 | 18 | 73 | 424 | 36 | 22 | 124 | 22 | 7 | 16 | 47 | 922 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 179 | 40 | 1676 | 12 | 31 | 5 | 9 | 567 | 208 | 2034 | 393 | 14 | 5168 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 961 | 199 | 943 | 699 | 612 | 352 | 3766 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1211 | 361 | 1366 | 535 | 271 | 859 | 4603 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 556 | 419 | 2402 | 213 | 180 | 1281 | 5051 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 706 | 103 | 2460 | 56 | 56 | 1634 | 5015 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 422 | 119 | 2100 | 43 | 35 | 1113 | 3832 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 417 | 231 | 18 | 224 | 80 | 17 | 987 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 130 | 2151 | 17 | 36 | 1181 | 3515 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 18 | 268 | 20 | 95 | 327 | 36 | 331 | 15 | 267 | 196 | 13 | 492 | 2078 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 39 | 36 | 25 | 334 | 36 | 3 | 18 | 4 | 114 | 0 | 490 | 14 | 1113 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 73 | 65 | 229 | 252 | 107 | 15 | 741 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 32 | 209 | 35 | 15 | 30 | 49 | 370 |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro

Report File: P:\...\Near-Term PM.pdf

Scenario 17 Near-Term PM (2025 vols)

12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 959 | 1010 | 1255 | 363 | 3587 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **959** | **1010** | **1255** | **363** | **3587** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 38 | 1327 | 7 | 55 | 892 | 194 | 15 | 5 | 388 | 273 | 6 | 4 | 3204 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **38** | **1327** | **7** | **55** | **892** | **194** | **15** | **5** | **388** | **273** | **6** | **4** | **3204** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 196 | 675 | 39 | 13 | 810 | 384 | 446 | 22 | 175 | 109 | 52 | 40 | 2961 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **196** | **675** | **39** | **13** | **810** | **384** | **446** | **22** | **175** | **109** | **52** | **40** | **2961** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 58 | 167 | 687 | 102 | 69 | 16 | 2 | 65 | 14 | 280 | 2207 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **58** | **167** | **687** | **102** | **69** | **16** | **2** | **65** | **14** | **280** | **2207** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 529 | 417 | 567 | 440 | 104 | 2194 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **529** | **417** | **567** | **440** | **104** | **2194** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 70 | 0 | 220 | 2 | 684 | 110 | 318 | 631 | 2 | 2135 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **70** | **0** | **220** | **2** | **684** | **110** | **318** | **631** | **2** | **2135** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3417 | 49 | 372 | 975 | 71 | 1841 | 6725 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3417** | **49** | **372** | **975** | **71** | **1841** | **6725** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 151 | 110 | 1112 | 170 | 213 | 133 | 119 | 2079 | 172 | 588 | 814 | 34 | 5695 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **151** | **110** | **1112** | **170** | **213** | **133** | **119** | **2079** | **172** | **588** | **814** | **34** | **5695** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 43 | 1065 | 7 | 142 | 837 | 54 | 94 | 17 | 35 | 193 | 18 | 138 | 2643 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **43** | **1065** | **7** | **142** | **837** | **54** | **94** | **17** | **35** | **193** | **18** | **138** | **2643** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 80 | 933 | 1204 | 24 | 35 | 114 | 2390 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **80** | **933** | **1204** | **24** | **35** | **114** | **2390** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 464 | 57 | 1095 | 274 | 115 | 3005 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **464** | **57** | **1095** | **274** | **115** | **3005** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 326 | 1311 | 272 | 78 | 1206 | 26 | 33 | 177 | 267 | 283 | 274 | 104 | 4357 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **326** | **1311** | **272** | **78** | **1206** | **26** | **33** | **177** | **267** | **283** | **274** | **104** | **4357** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 20 | 1375 | 717 | 180 | 283 | 40 | 2615 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **1375** | **717** | **180** | **283** | **40** | **2615** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1037 | 4 | 29 | 538 | 18 | 133 | 2 | 31 | 21 | 7 | 46 | 1875 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1037** | **4** | **29** | **538** | **18** | **133** | **2** | **31** | **21** | **7** | **46** | **1875** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 14 | 693 | 5 | 2 | 701 | 101 | 111 | 2 | 37 | 15 | 4 | 6 | 1691 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **14** | **693** | **5** | **2** | **701** | **101** | **111** | **2** | **37** | **15** | **4** | **6** | **1691** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 95 | 54 | 687 | 10 | 28 | 105 | 5 | 81 | 50 | 58 | 1832 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **95** | **54** | **687** | **10** | **28** | **105** | **5** | **81** | **50** | **58** | **1832** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 240 | 244 | 372 | 96 | 291 | 120 | 439 | 204 | 277 | 494 | 15 | 2822 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **240** | **244** | **372** | **96** | **291** | **120** | **439** | **204** | **277** | **494** | **15** | **2822** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1842 | 946 | 570 | 639 | 3997 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1842** | **946** | **570** | **639** | **3997** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 21 | 112 | 18 | 73 | 424 | 36 | 22 | 124 | 22 | 7 | 16 | 47 | 922 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **21** | **112** | **18** | **73** | **424** | **36** | **22** | **124** | **22** | **7** | **16** | **47** | **922** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 179 | 40 | 1676 | 12 | 31 | 5 | 9 | 567 | 208 | 2034 | 393 | 14 | 5168 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **40** | **1676** | **12** | **31** | **5** | **9** | **567** | **208** | **2034** | **393** | **14** | **5168** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 961 | 199 | 943 | 699 | 612 | 352 | 3766 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **961** | **199** | **943** | **699** | **612** | **352** | **3766** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1211 | 361 | 1366 | 535 | 271 | 859 | 4603 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1211** | **361** | **1366** | **535** | **271** | **859** | **4603** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 556 | 419 | 2402 | 213 | 180 | 1281 | 5051 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **556** | **419** | **2402** | **213** | **180** | **1281** | **5051** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 706 | 103 | 2460 | 56 | 56 | 1634 | 5015 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **706** | **103** | **2460** | **56** | **56** | **1634** | **5015** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 422 | 119 | 2100 | 43 | 35 | 1113 | 3832 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **422** | **119** | **2100** | **43** | **35** | **1113** | **3832** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 417 | 231 | 18 | 224 | 80 | 17 | 987 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **417** | **231** | **18** | **224** | **80** | **17** | **987** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 130 | 2151 | 17 | 36 | 1181 | 3515 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **130** | **2151** | **17** | **36** | **1181** | **3515** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 18 | 268 | 20 | 95 | 327 | 36 | 331 | 15 | 267 | 196 | 13 | 492 | 2078 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **18** | **268** | **20** | **95** | **327** | **36** | **331** | **15** | **267** | **196** | **13** | **492** | **2078** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 39 | 36 | 25 | 334 | 36 | 3 | 18 | 4 | 114 | 0 | 490 | 14 | 1113 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **39** | **36** | **25** | **334** | **36** | **3** | **18** | **4** | **114** | **0** | **490** | **14** | **1113** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 73 | 65 | 229 | 252 | 107 | 15 | 741 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **73** | **65** | **229** | **252** | **107** | **15** | **741** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 32 | 209 | 35 | 15 | 30 | 49 | 370 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **32** | **209** | **35** | **15** | **30** | **49** | **370** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 151 | 533 | 70 | 168 |
| 2 | 146 | 517 | 68 | 163 |
| 3 | 143 | 506 | 67 | 160 |
| 4 | 134 | 474 | 62 | 150 |
| 5 | 119 | 421 | 55 | 133 |
| 6 | 118 | 416 | 55 | 131 |
| 7 | 116 | 410 | 54 | 129 |
| 8 | 106 | 373 | 49 | 118 |
| 9 | 104 | 368 | 48 | 116 |
| 10 | 103 | 362 | 48 | 114 |
| 11 | 89 | 314 | 41 | 99 |
| 12 | 83 | 293 | 39 | 92 |
| 13 | 82 | 288 | 38 | 91 |
| 14 | 60 | 213 | 28 | 67 |
| 15 | 60 | 213 | 28 | 67 |
| 16 | 42 | 149 | 20 | 47 |
| 17 | 24 | 85 | 11 | 27 |
| 18 | 24 | 85 | 11 | 27 |
| 19 | 14 | 48 | 6 | 15 |
| 20 | 8 | 27 | 4 | 8 |
| 21 | 5 | 16 | 2 | 5 |
| 22 | 2 | 5 | 1 | 2 |
| 23 | 2 | 5 | 1 | 2 |
| 24 | 2 | 5 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 684 | 1 | 168 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 663 | 1 | 163 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 3 | 1 | 649 | 1 | 160 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 4 | 1 | 608 | 1 | 150 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 5 | 1 | 540 | 1 | 133 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 6 | 1 | 534 | 1 | 131 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 7 | 1 | 526 | 1 | 129 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 8 | 1 | 479 | 1 | 118 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 9 | 1 | 472 | 1 | 116 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 10 | 1 | 465 | 1 | 114 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 11 | 1 | 403 | 1 | 99 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 1 | 376 | 1 | 92 | No | No | No | Yes | No | No | No | No | No | No |
| 13 | 1 | 370 | 1 | 91 | No | No | No | Yes | No | No | No | No | No | No |
| 14 | 1 | 273 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 273 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 191 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 109 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 109 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 62 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 35 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 21 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 7 | 10 | 13 | 0 | 4 | 7 | 10 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.7 | 11.7 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:11 | 0:32 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 70 | 168 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 922 | 922 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 242 | 648 | 97 |
| 2 | 235 | 629 | 94 |
| 3 | 230 | 616 | 92 |
| 4 | 215 | 577 | 86 |
| 5 | 191 | 512 | 77 |
| 6 | 189 | 505 | 76 |
| 7 | 186 | 499 | 75 |
| 8 | 169 | 454 | 68 |
| 9 | 167 | 447 | 67 |
| 10 | 165 | 441 | 66 |
| 11 | 143 | 382 | 57 |
| 12 | 133 | 356 | 53 |
| 13 | 131 | 350 | 52 |
| 14 | 97 | 259 | 39 |
| 15 | 97 | 259 | 39 |
| 16 | 68 | 181 | 27 |
| 17 | 39 | 104 | 16 |
| 18 | 39 | 104 | 16 |
| 19 | 22 | 58 | 9 |
| 20 | 12 | 32 | 5 |
| 21 | 7 | 19 | 3 |
| 22 | 2 | 6 | 1 |
| 23 | 2 | 6 | 1 |
| 24 | 2 | 6 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 890 | 1 | 97 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 2 | 1 | 864 | 1 | 94 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 3 | 1 | 846 | 1 | 92 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 4 | 1 | 792 | 1 | 86 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 5 | 1 | 703 | 1 | 77 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 694 | 1 | 76 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 685 | 1 | 75 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 623 | 1 | 68 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 614 | 1 | 67 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 10 | 1 | 606 | 1 | 66 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 11 | 1 | 525 | 1 | 57 | No | No | No | No | No | No | Yes | Yes | No | No |
| 12 | 1 | 489 | 1 | 53 | No | No | No | No | No | No | No | Yes | No | No |
| 13 | 1 | 481 | 1 | 52 | No | No | No | No | No | No | No | Yes | No | No |
| 14 | 1 | 356 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 356 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 249 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 143 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 143 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 80 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 44 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 26 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 4 | 10 | 11 | 13 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:17 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 97 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 987 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 122 | 481 | 138 |
| 2 | 118 | 467 | 134 |
| 3 | 116 | 457 | 131 |
| 4 | 109 | 428 | 123 |
| 5 | 96 | 380 | 109 |
| 6 | 95 | 375 | 108 |
| 7 | 94 | 370 | 106 |
| 8 | 85 | 337 | 97 |
| 9 | 84 | 332 | 95 |
| 10 | 83 | 327 | 94 |
| 11 | 72 | 284 | 81 |
| 12 | 67 | 265 | 76 |
| 13 | 66 | 260 | 75 |
| 14 | 49 | 192 | 55 |
| 15 | 49 | 192 | 55 |
| 16 | 34 | 135 | 39 |
| 17 | 20 | 77 | 22 |
| 18 | 20 | 77 | 22 |
| 19 | 11 | 43 | 12 |
| 20 | 6 | 24 | 7 |
| 21 | 4 | 14 | 4 |
| 22 | 1 | 5 | 1 |
| 23 | 1 | 5 | 1 |
| 24 | 1 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 603 | 1 | 138 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 2 | 1 | 585 | 1 | 134 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 3 | 1 | 573 | 1 | 131 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 4 | 1 | 537 | 1 | 123 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 5 | 1 | 476 | 1 | 109 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 1 | 470 | 1 | 108 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 1 | 464 | 1 | 106 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 1 | 422 | 1 | 97 | No | No | No | Yes | No | No | No | Yes | No | No |
| 9 | 1 | 416 | 1 | 95 | No | No | No | Yes | No | No | No | No | No | No |
| 10 | 1 | 410 | 1 | 94 | No | No | No | Yes | No | No | No | No | No | No |
| 11 | 1 | 356 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 332 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 326 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 241 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 241 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 169 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 97 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 97 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 54 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 30 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 18 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 10 | 0 | 1 | 4 | 8 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 27.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:03 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 138 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 741 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 241 | 50 | 79 |
| 2 | 234 | 49 | 77 |
| 3 | 229 | 48 | 75 |
| 4 | 214 | 45 | 70 |
| 5 | 190 | 40 | 62 |
| 6 | 188 | 39 | 62 |
| 7 | 186 | 39 | 61 |
| 8 | 169 | 35 | 55 |
| 9 | 166 | 35 | 55 |
| 10 | 164 | 34 | 54 |
| 11 | 142 | 30 | 47 |
| 12 | 133 | 28 | 43 |
| 13 | 130 | 27 | 43 |
| 14 | 96 | 20 | 32 |
| 15 | 96 | 20 | 32 |
| 16 | 67 | 14 | 22 |
| 17 | 39 | 8 | 13 |
| 18 | 39 | 8 | 13 |
| 19 | 22 | 5 | 7 |
| 20 | 12 | 3 | 4 |
| 21 | 7 | 2 | 2 |
| 22 | 2 | 1 | 1 |
| 23 | 2 | 1 | 1 |
| 24 | 2 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 291 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 283 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 277 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 259 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 230 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 227 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 225 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 204 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 201 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 198 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 172 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 161 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 157 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 116 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 116 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 81 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 47 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 47 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 27 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 15 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 79 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 370 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

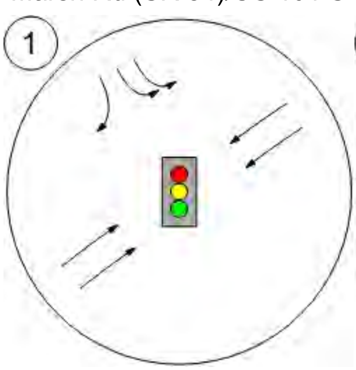
Study Intersections

Generated with PTV VISTRO

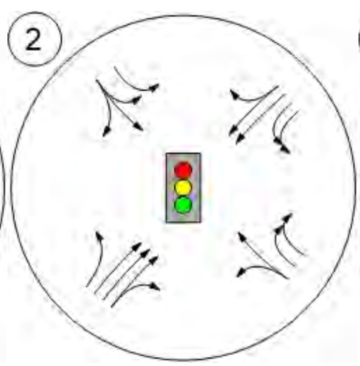
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

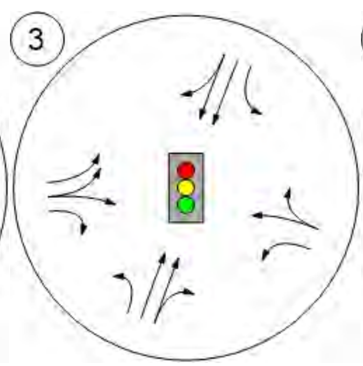

Marsh Rd (SR 84)/US 101 S



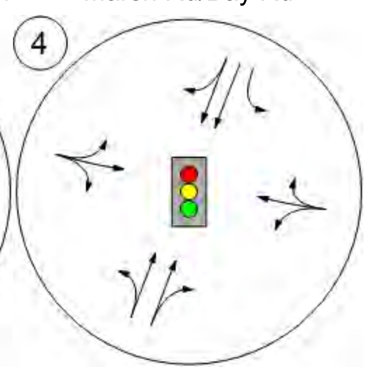

Marsh Rd/Rolison Rd-Scott D



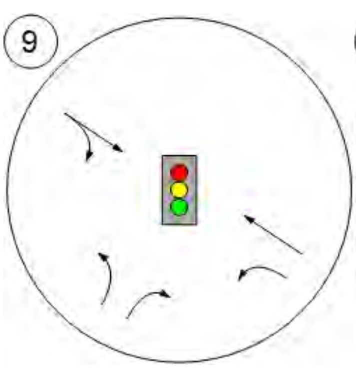

Marsh Rd/Florence St-Bohan



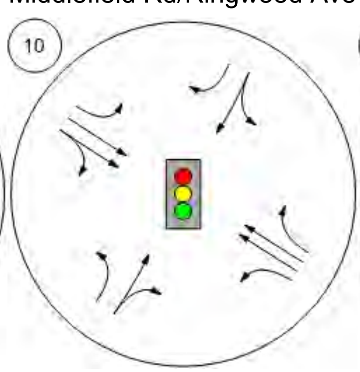

Marsh Rd/Bay Rd



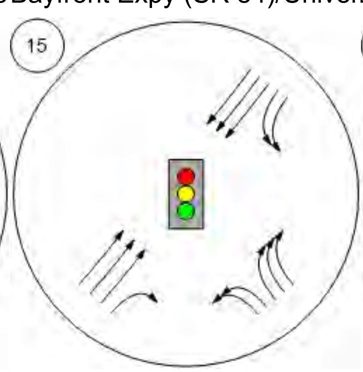

Middlefield Rd/Ravenswood



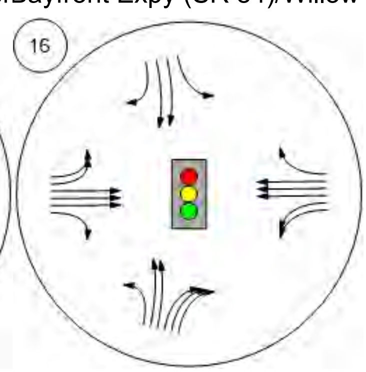

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

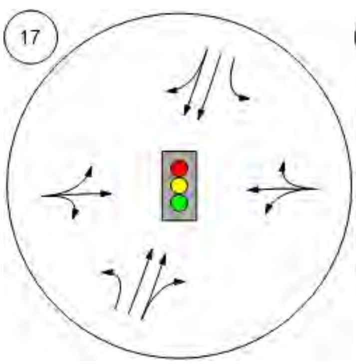


Generated with PTV VISTRO

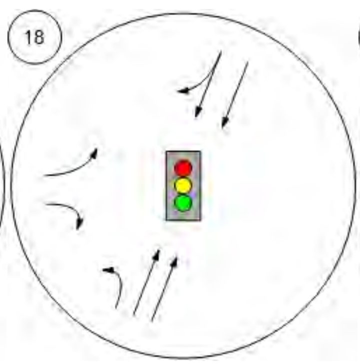
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

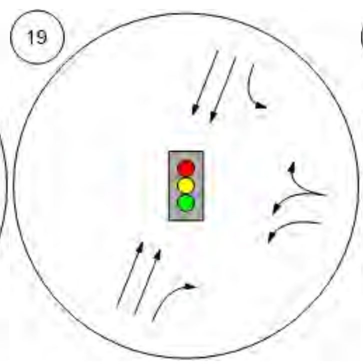

Willow Rd (SR 114)/Hamilton



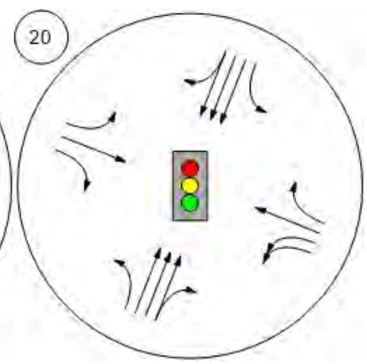

Willow Rd (SR 114)/Ivy Dr



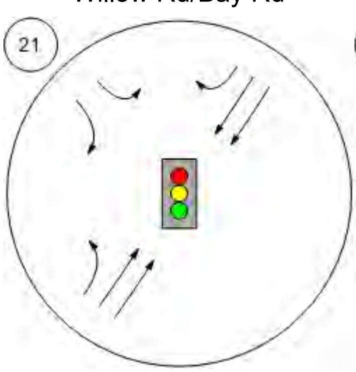

Willow Rd (SR 114)/O'Brien



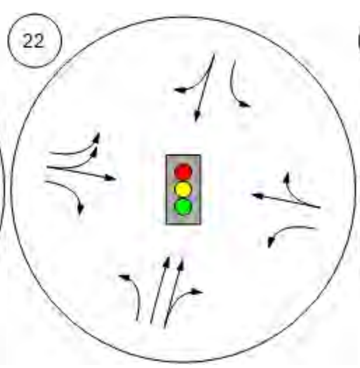

Willow Rd (SR 114)/Newbrid



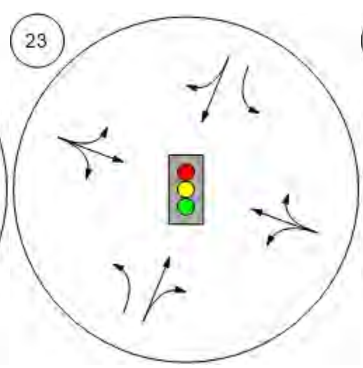

Willow Rd/Bay Rd



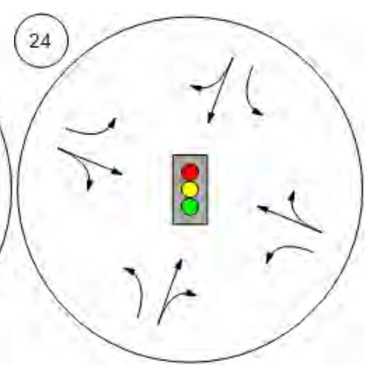

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



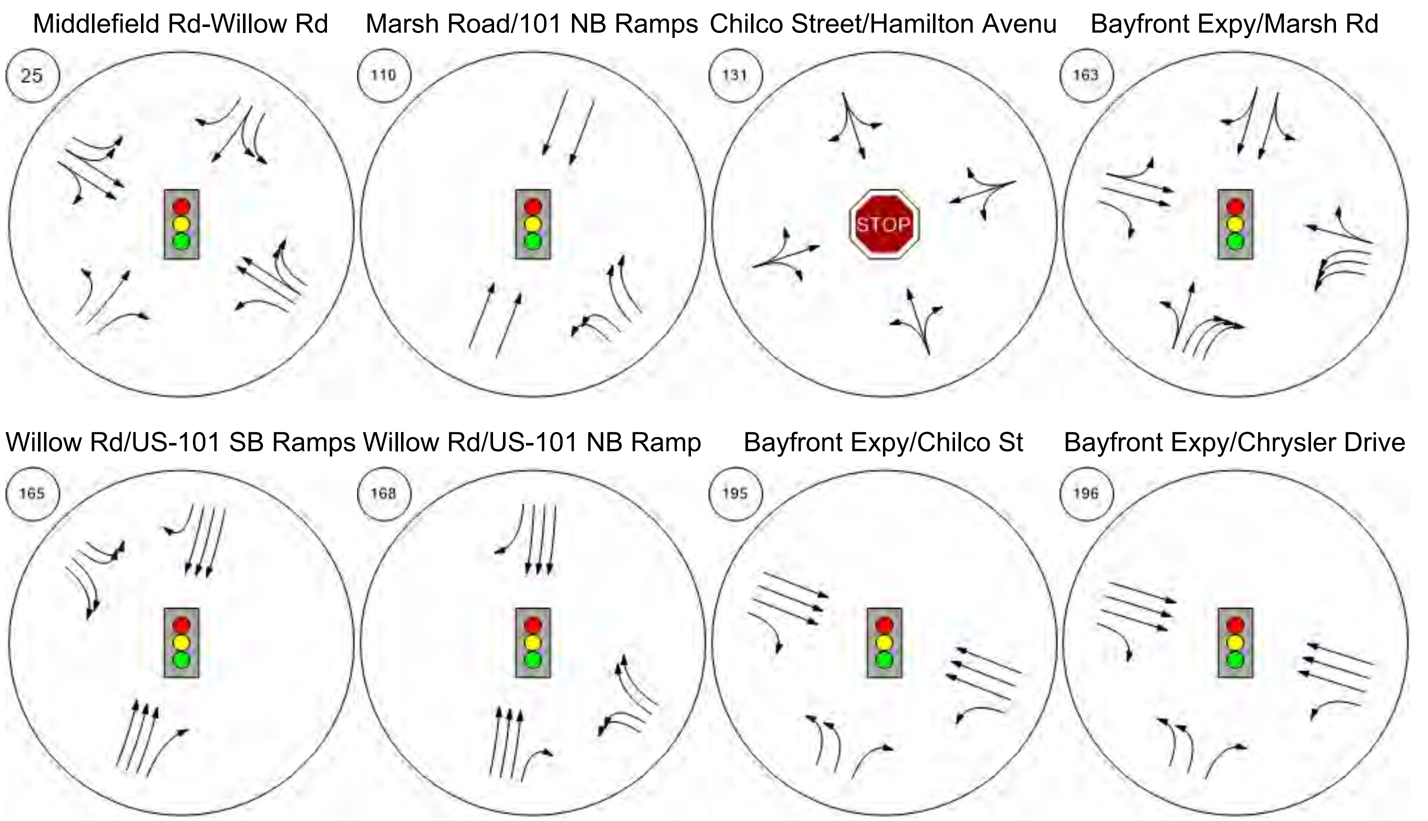

Willow Rd/Gilbert Ave



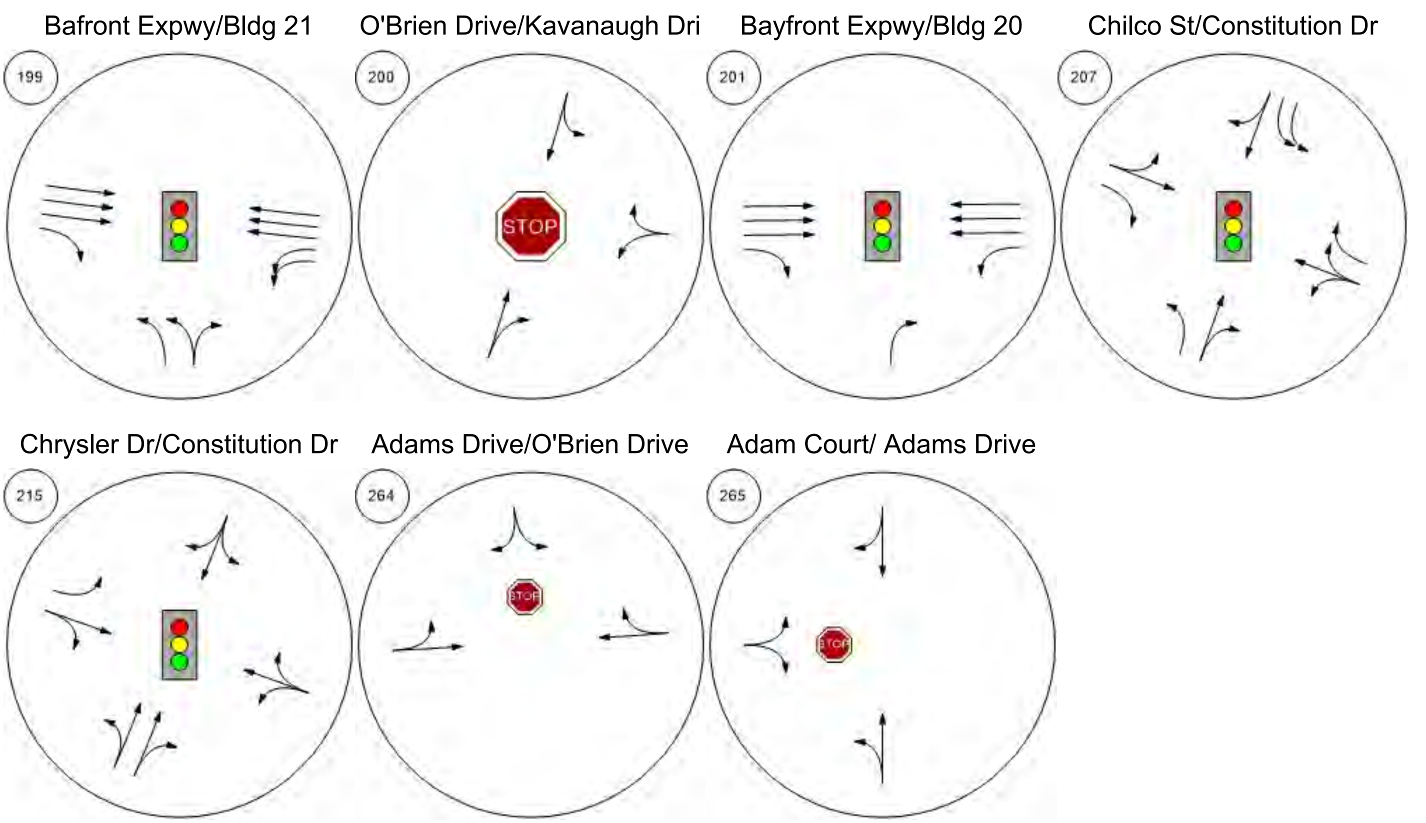
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

Lane Configuration and Traffic Control

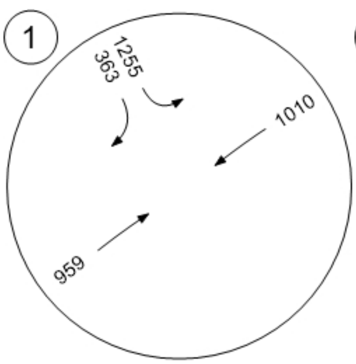



Generated with PTV VISTRO

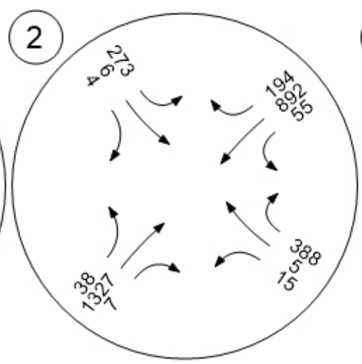
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

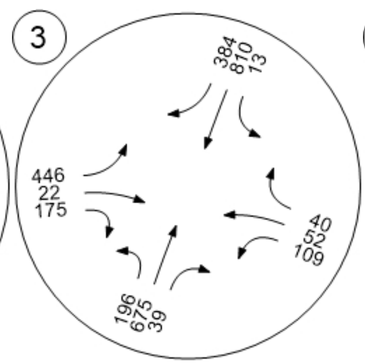

Marsh Rd (SR 84)/US 101 S



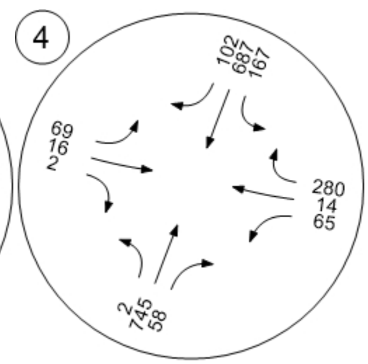

Marsh Rd/Rolison Rd-Scott D



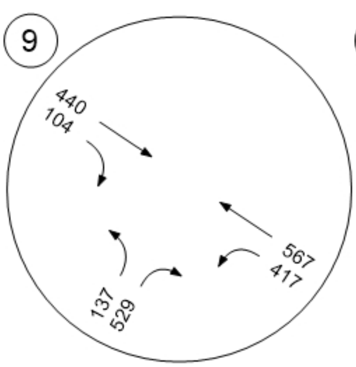

Marsh Rd/Florence St-Bohan



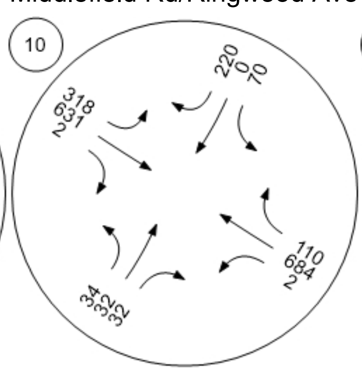

Marsh Rd/Bay Rd



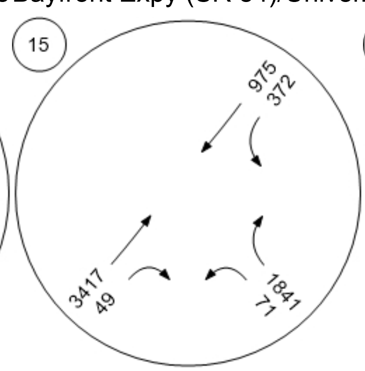

Middlefield Rd/Ravenswood



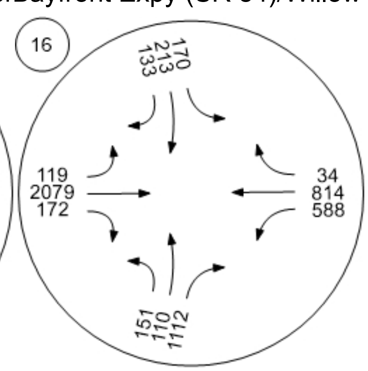

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer

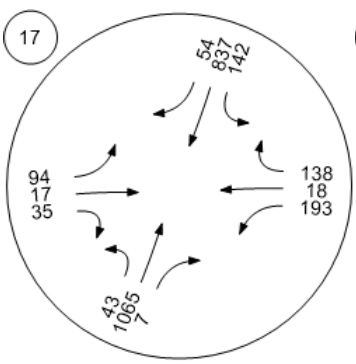



Bayfront Expy (SR 84)/Willow

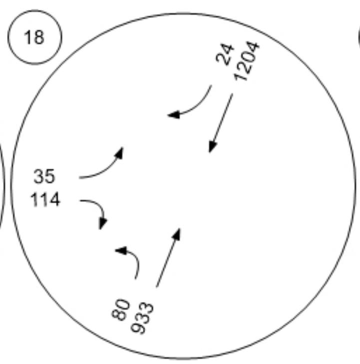


# Traffic Volume - Base Volume

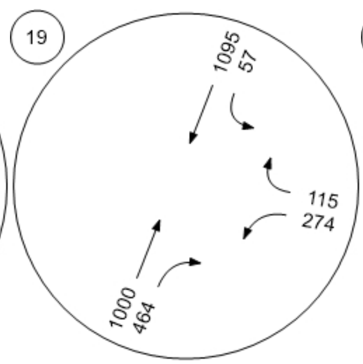

Willow Rd (SR 114)/Hamilton



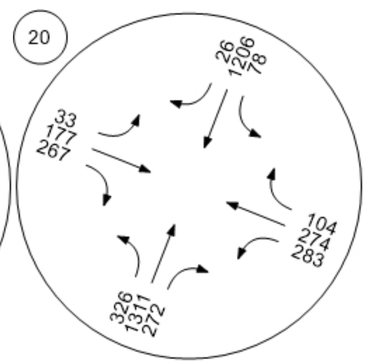

Willow Rd (SR 114)/Ivy Dr



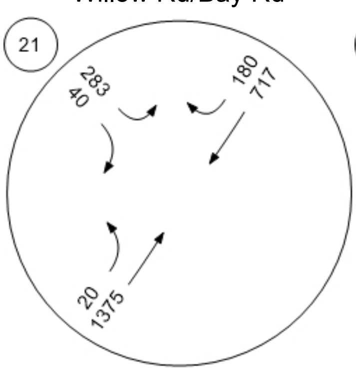

Willow Rd (SR 114)/O'Brien



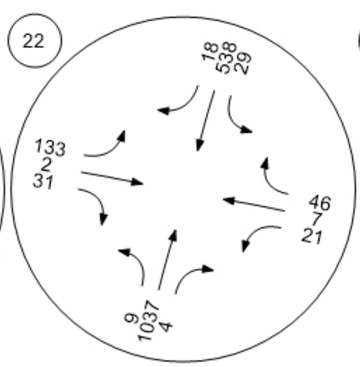

Willow Rd (SR 114)/Newbrid



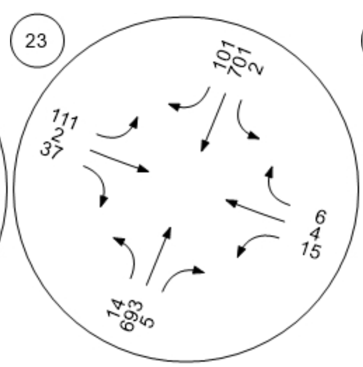

Willow Rd/Bay Rd



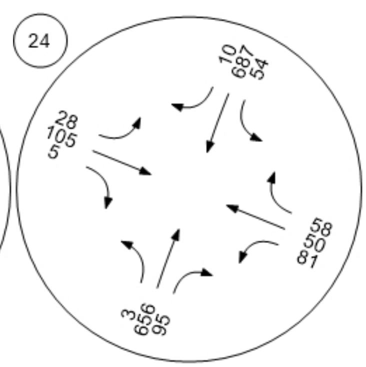

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

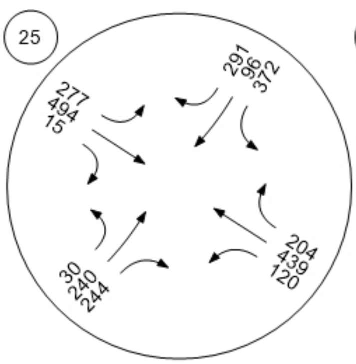


Generated with PTV VISTRO

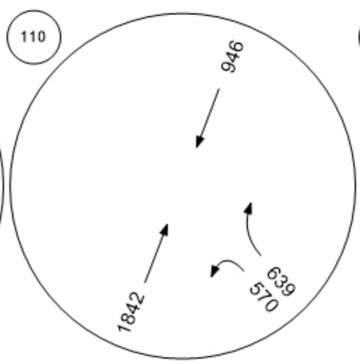
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

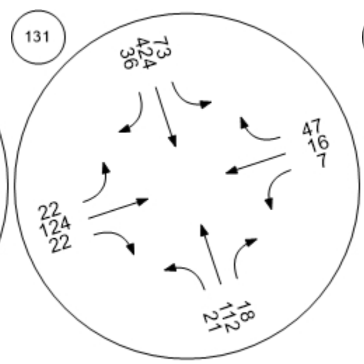

Middlefield Rd-Willow Rd



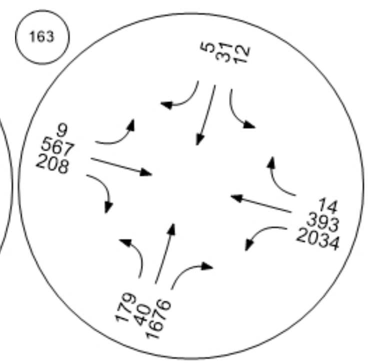

Marsh Road/101 NB Ramps



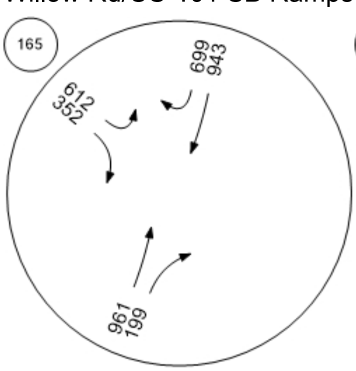

Chilco Street/Hamilton Avenu



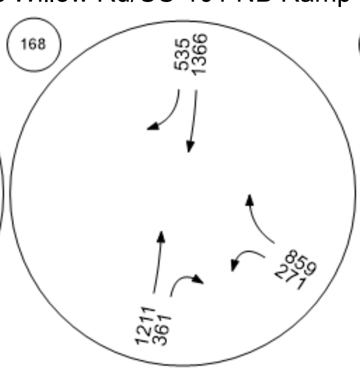

Bayfront Expy/Marsh Rd



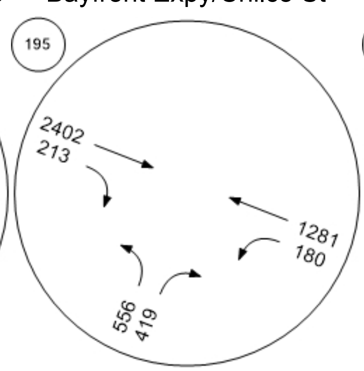

Willow Rd/US-101 SB Ramps



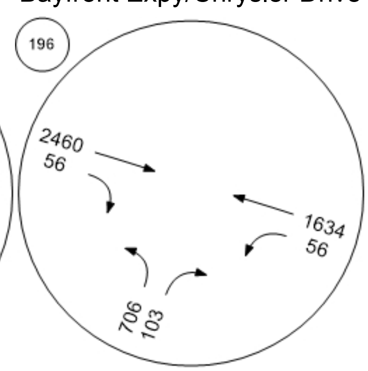

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

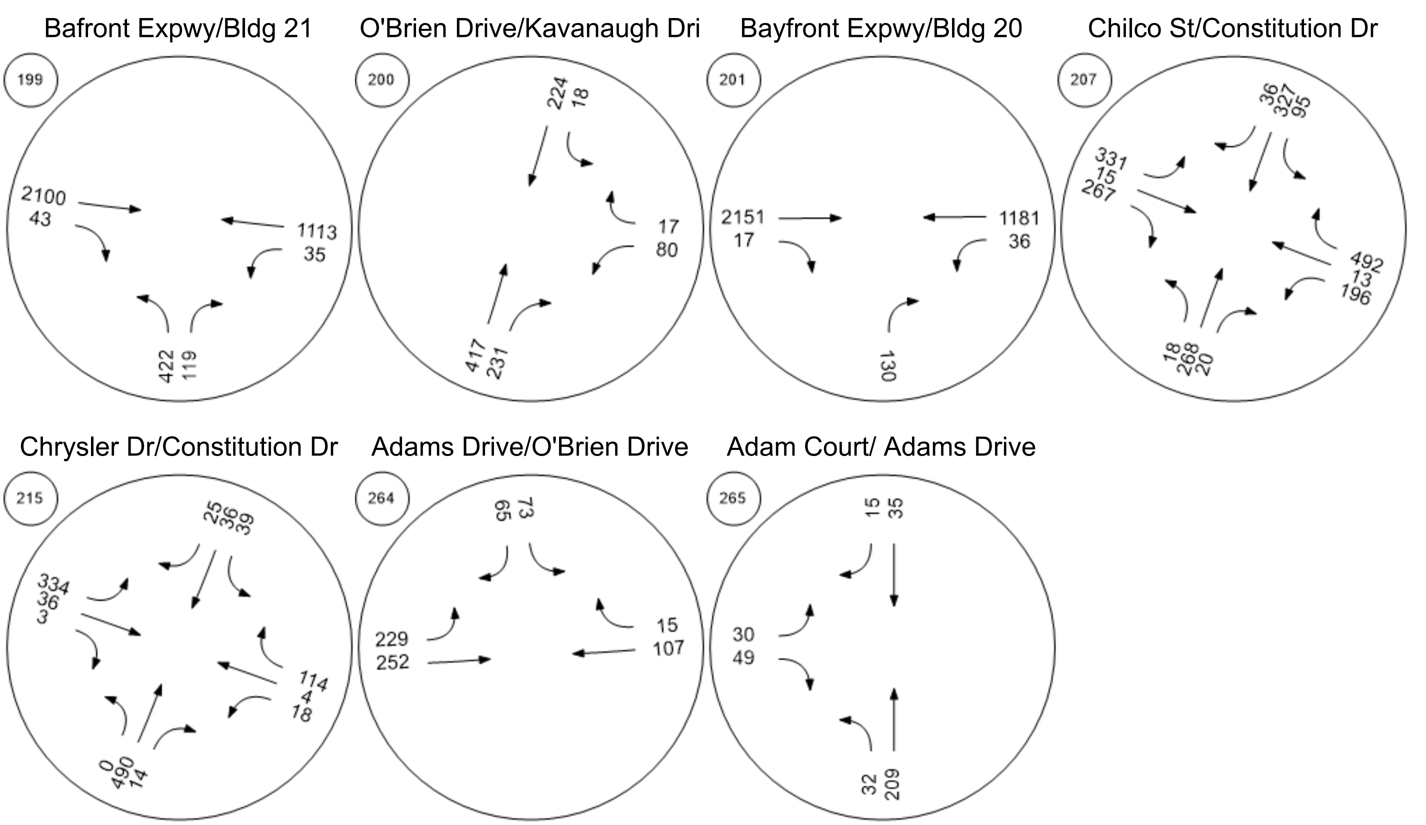



Bayfront Expy/Chrysler Drive



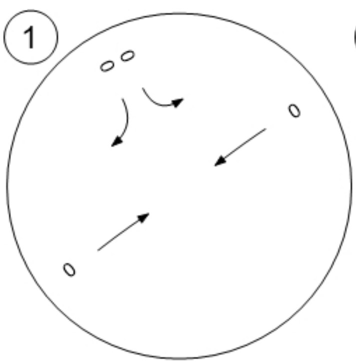
Generated with PTV VISTRO
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

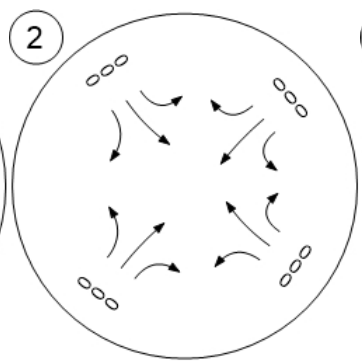



Traffic Volume - In-Process Volume

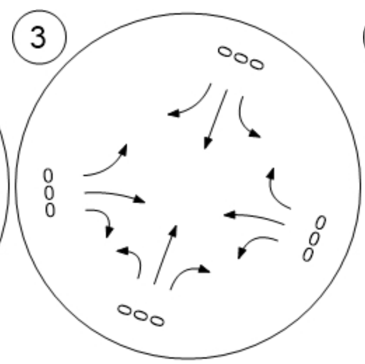

Marsh Rd (SR 84)/US 101 S



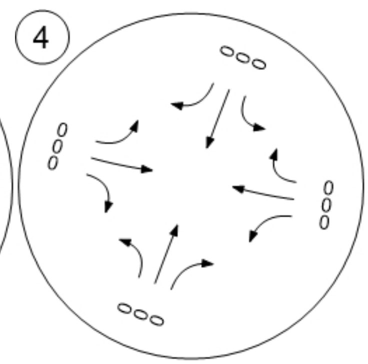

Marsh Rd/Rolison Rd-Scott D



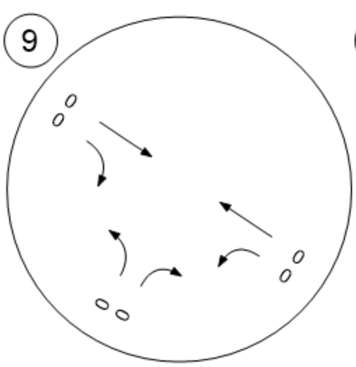

Marsh Rd/Florence St-Bohan



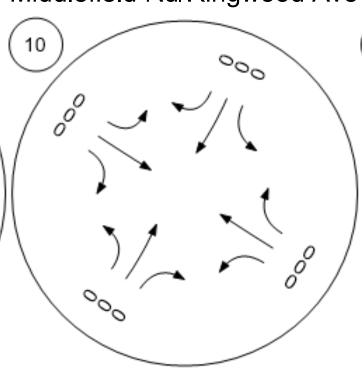

Marsh Rd/Bay Rd



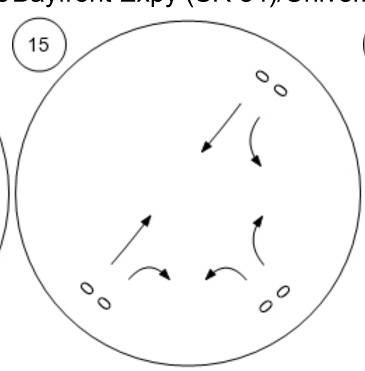

Middlefield Rd/Ravenswood



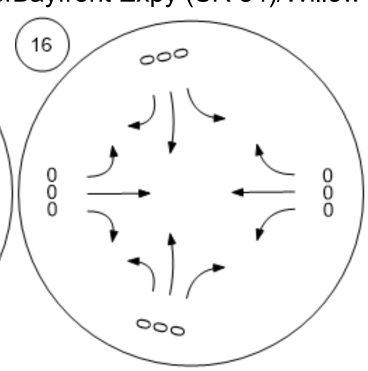

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

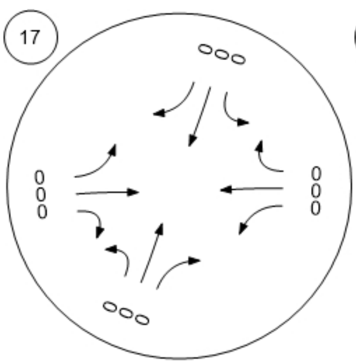


Generated with PTV VISTRO

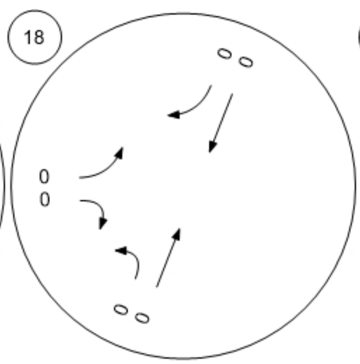
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

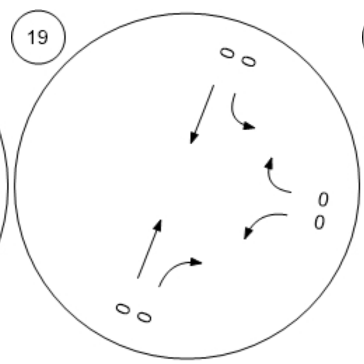

Willow Rd (SR 114)/Hamilton



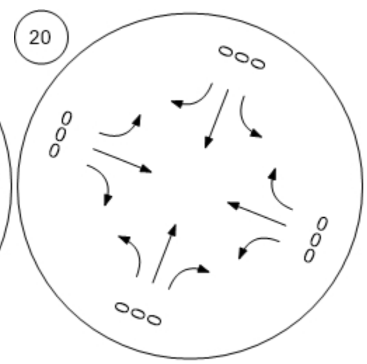

Willow Rd (SR 114)/Ivy Dr



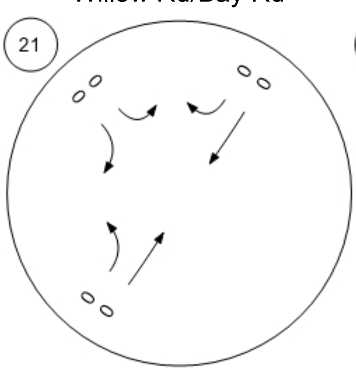

Willow Rd (SR 114)/O'Brien



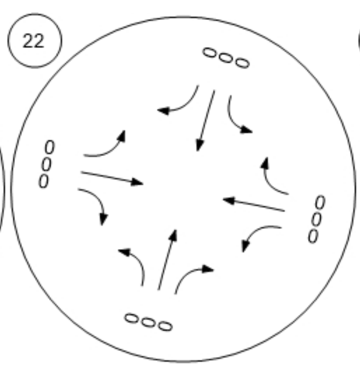

Willow Rd (SR 114)/Newbrid



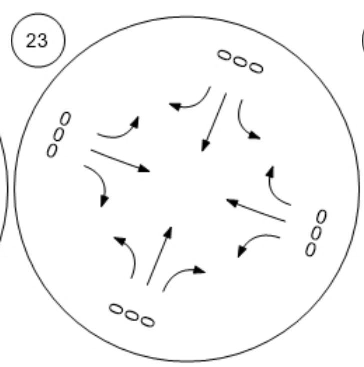

Willow Rd/Bay Rd



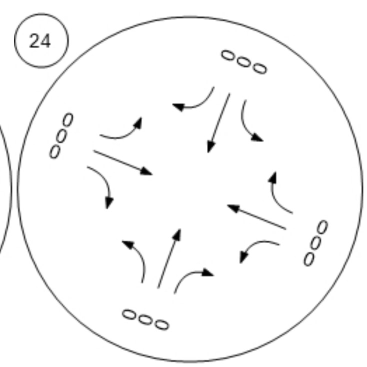

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

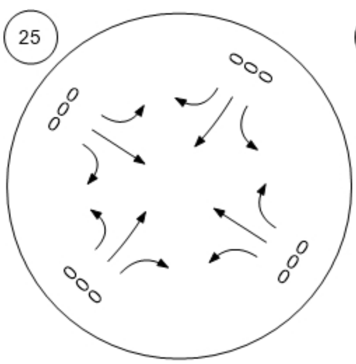


Generated with PTV VISTRO

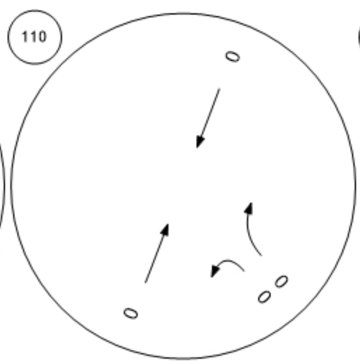
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

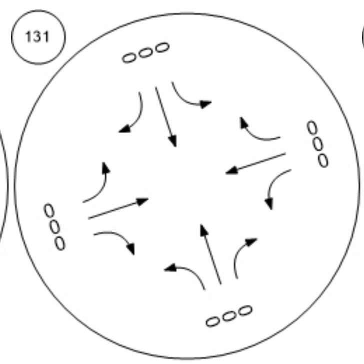

Middlefield Rd-Willow Rd



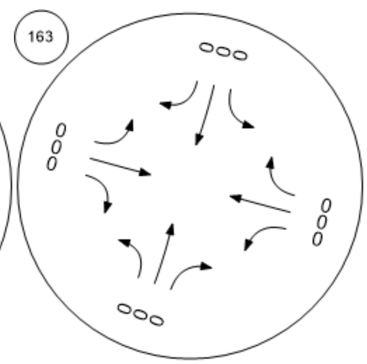

Marsh Road/101 NB Ramps



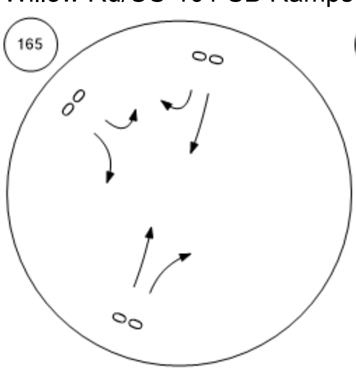

Chilco Street/Hamilton Avenu



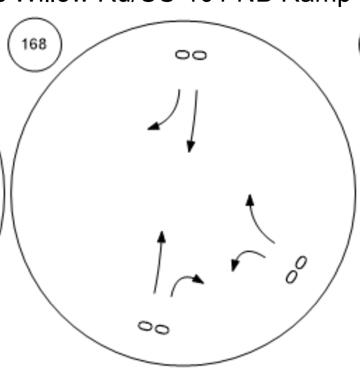

Bayfront Expy/Marsh Rd



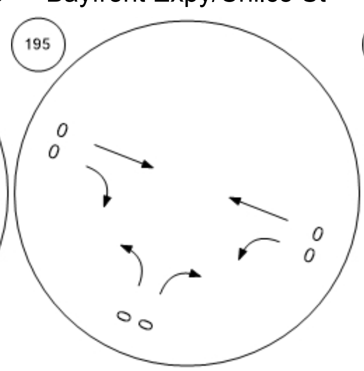

Willow Rd/US-101 SB Ramps



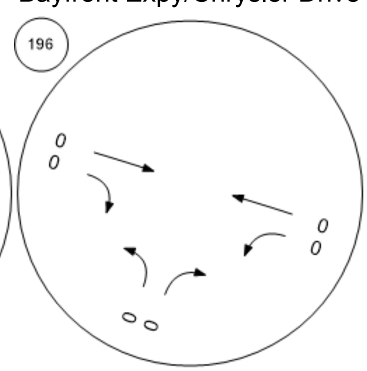

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

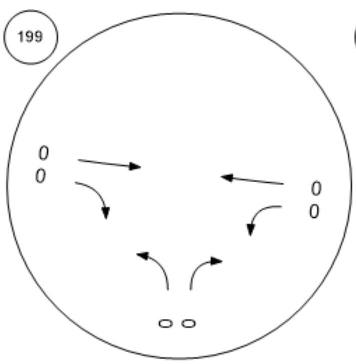



Bayfront Expy/Chrysler Drive

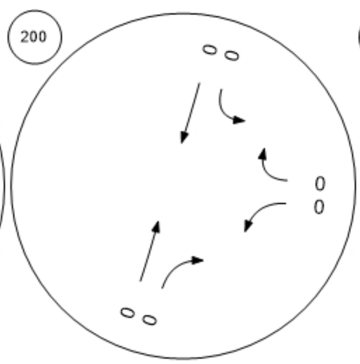


Traffic Volume - In-Process Volume

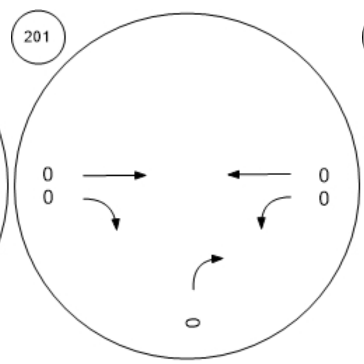

Bafront Expwy/Bldg 21



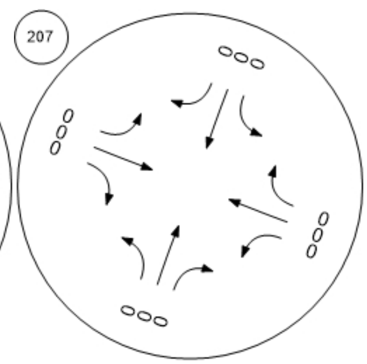

O'Brien Drive/Kavanaugh Dri



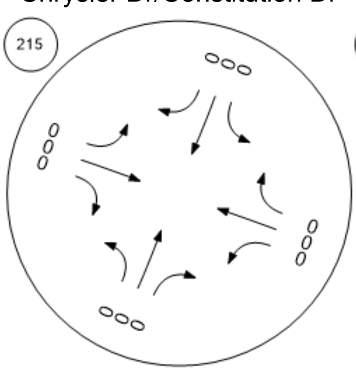

Bayfront Expwy/Bldg 20



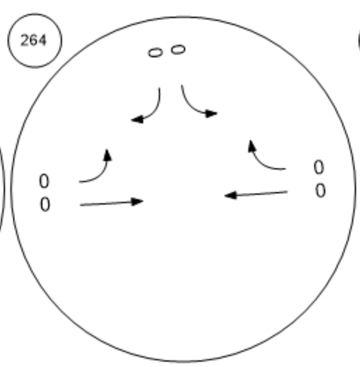

Chilco St/Constitution Dr



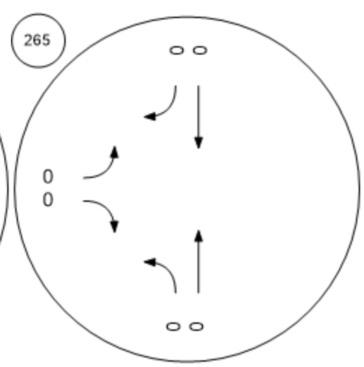

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



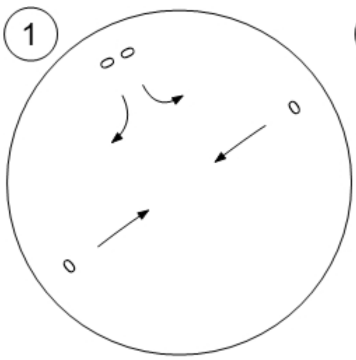
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

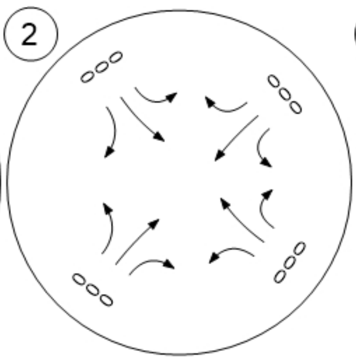

Marsh Rd (SR 84)/US 101 S

1



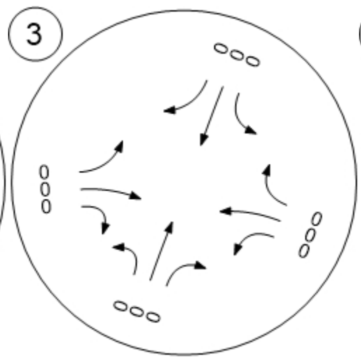
Marsh Rd/Rolison Rd-Scott D

2



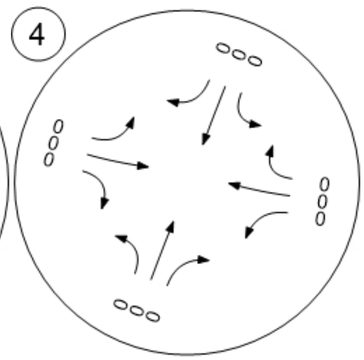
Marsh Rd/Florence St-Bohan

3



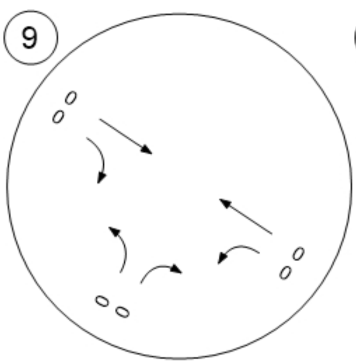
Marsh Rd/Bay Rd

4



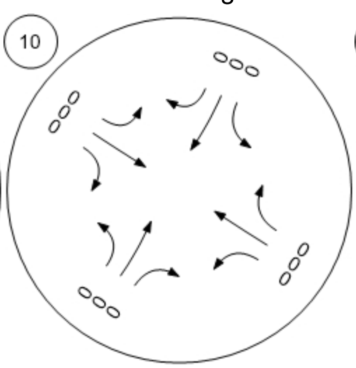
Middlefield Rd/Ravenswood

9



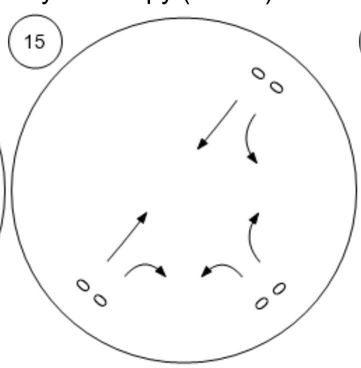
Middlefield Rd/Ringwood Ave

10



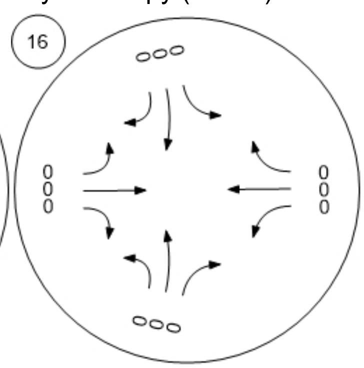
Bayfront Expy (SR 84)/Univer

15



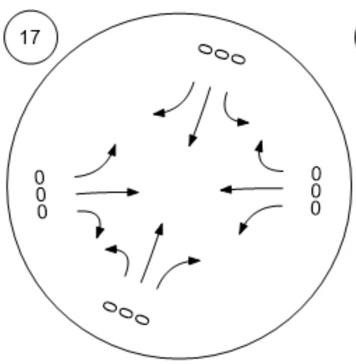
Bayfront Expy (SR 84)/Willow

16

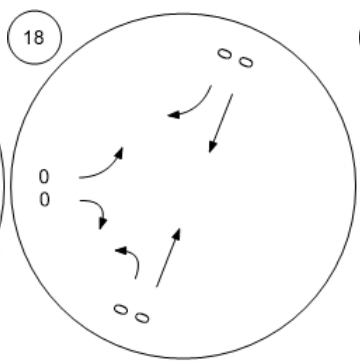


Traffic Volume - Net New Site Trips

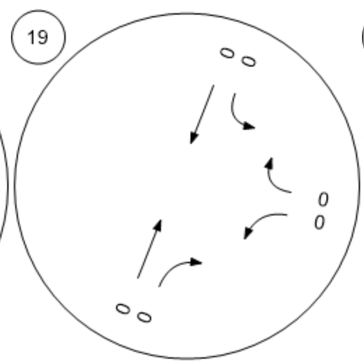

Willow Rd (SR 114)/Hamilton



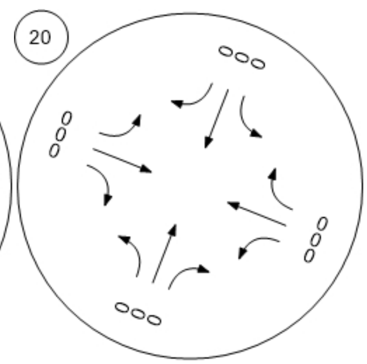

Willow Rd (SR 114)/Ivy Dr



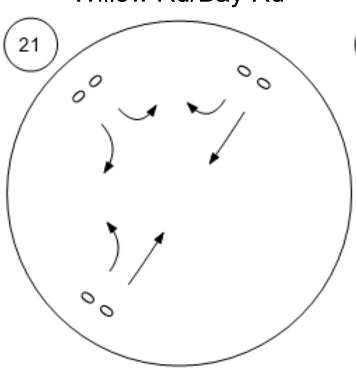

Willow Rd (SR 114)/O'Brien



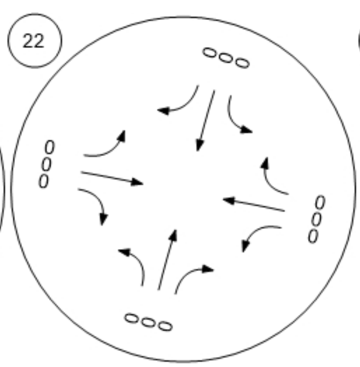

Willow Rd (SR 114)/Newbrid



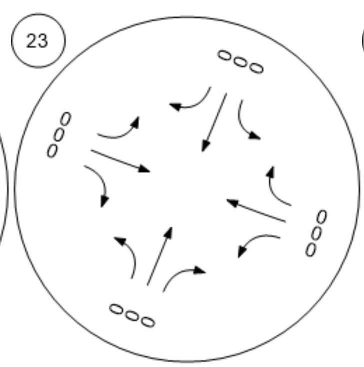

Willow Rd/Bay Rd



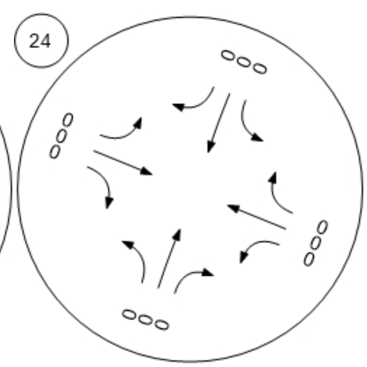

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

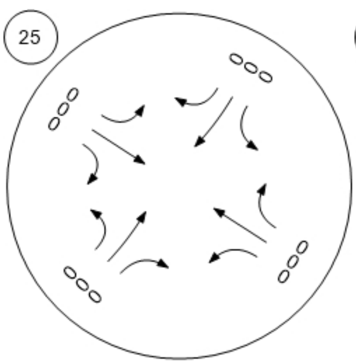


Generated with PTV VISTRO

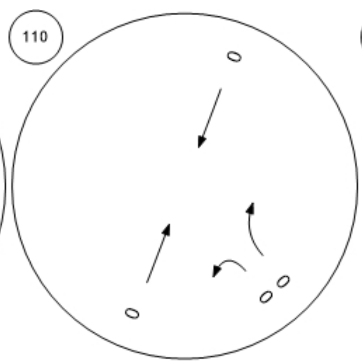
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

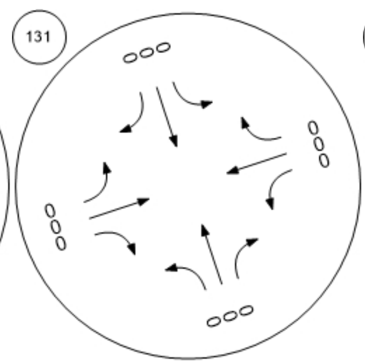

Middlefield Rd-Willow Rd



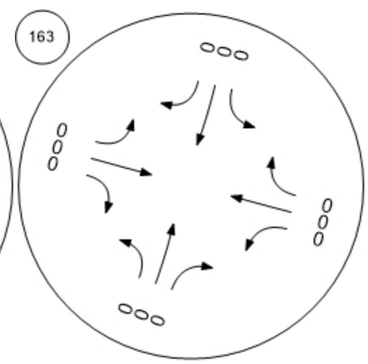

Marsh Road/101 NB Ramps



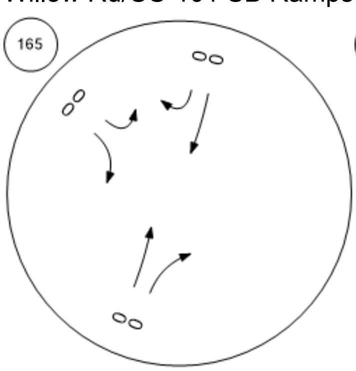

Chilco Street/Hamilton Avenu



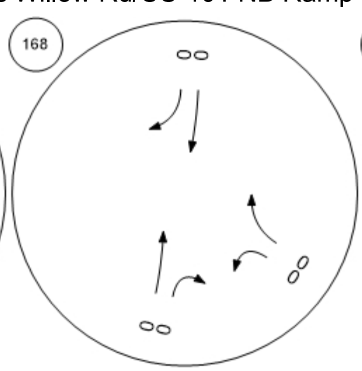

Bayfront Expy/Marsh Rd



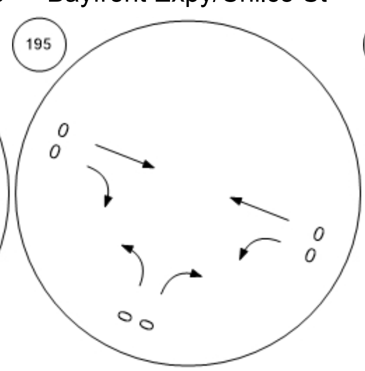

Willow Rd/US-101 SB Ramps



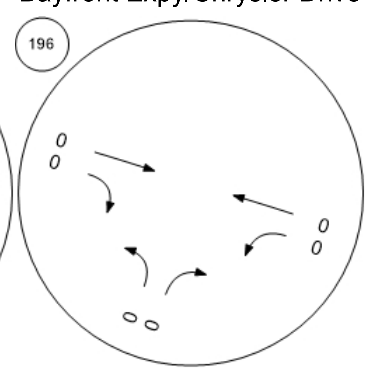

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

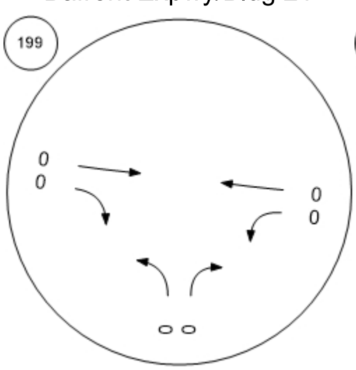


Generated with PTV VISTRO

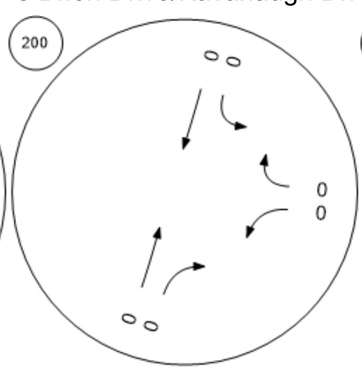
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

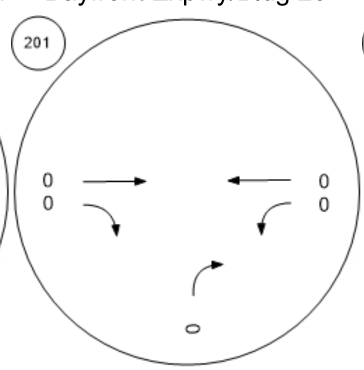

Bafront Expwy/Bldg 21



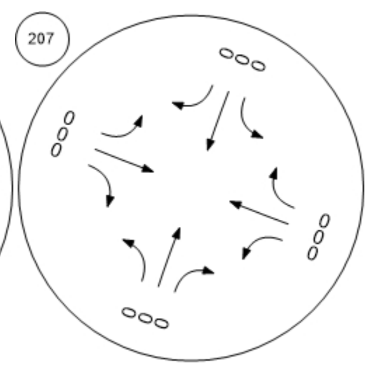

O'Brien Drive/Kavanaugh Dri



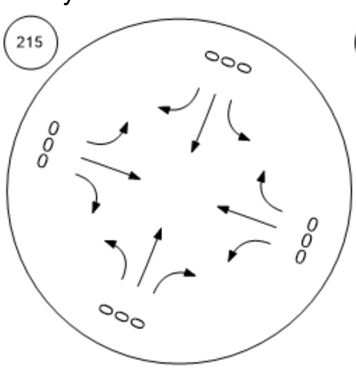

Bayfront Expwy/Bldg 20



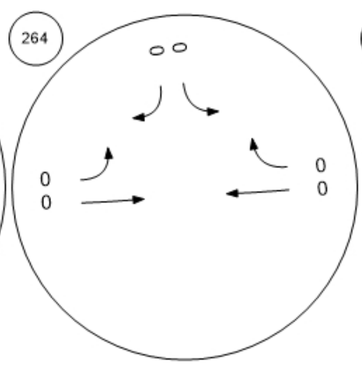

Chilco St/Constitution Dr



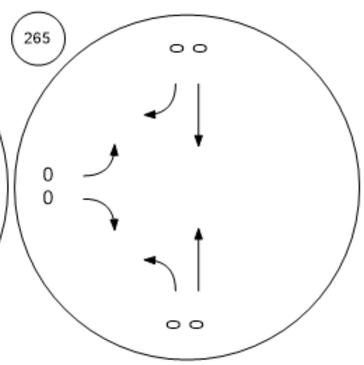

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive



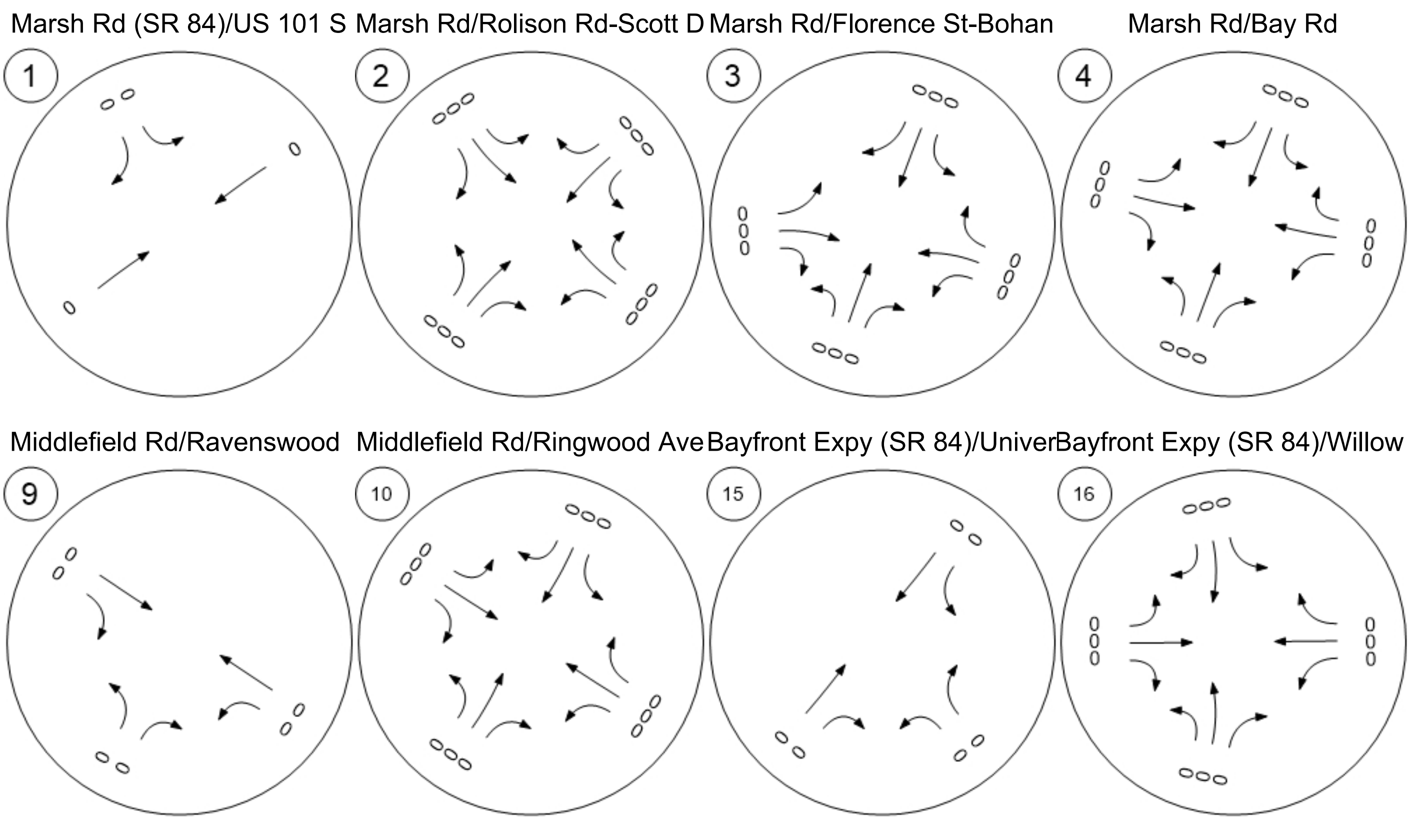

Adam Court/ Adams Drive



Generated with PTV VISTRO

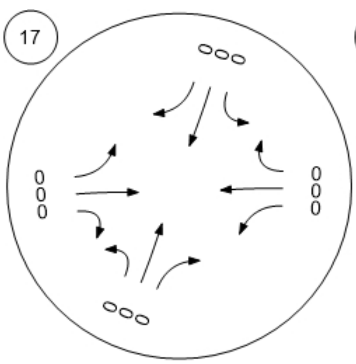
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

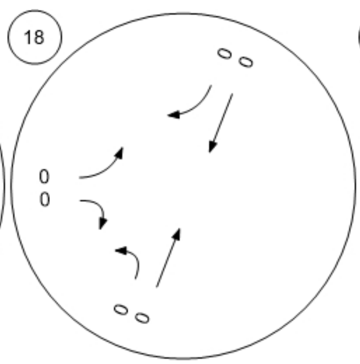



## Traffic Volume - Other Volume

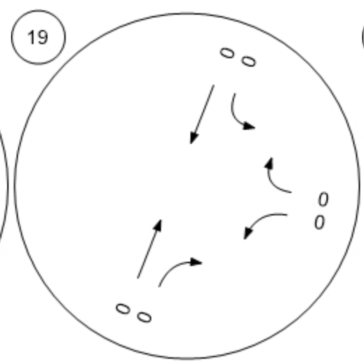

Willow Rd (SR 114)/Hamilton



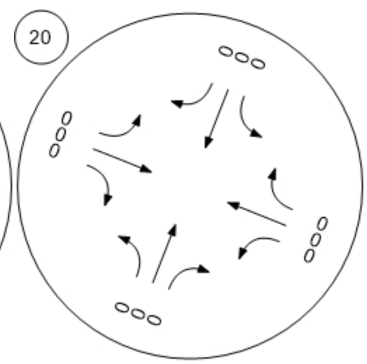

Willow Rd (SR 114)/Ivy Dr



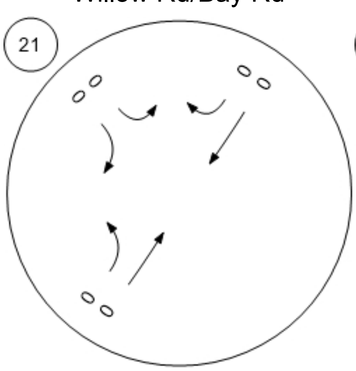

Willow Rd (SR 114)/O'Brien



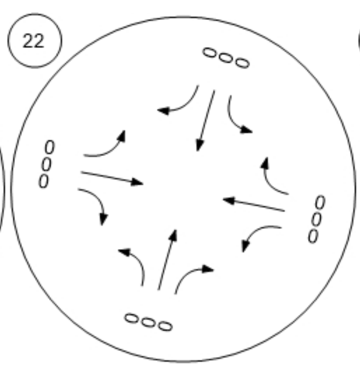

Willow Rd (SR 114)/Newbrid



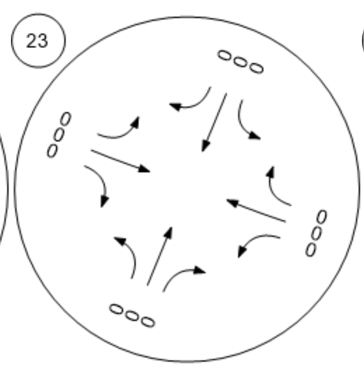

Willow Rd/Bay Rd



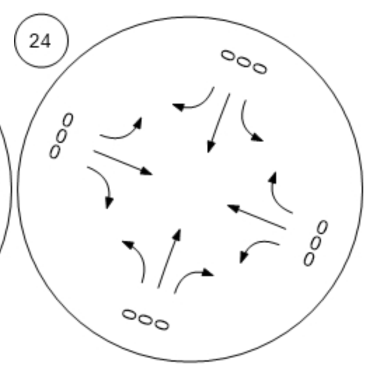

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

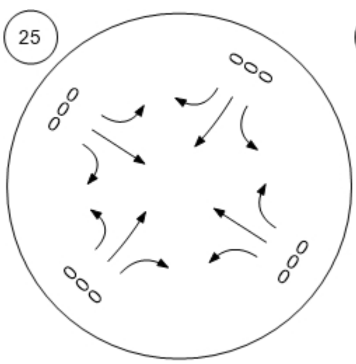


Generated with PTV VISTRO

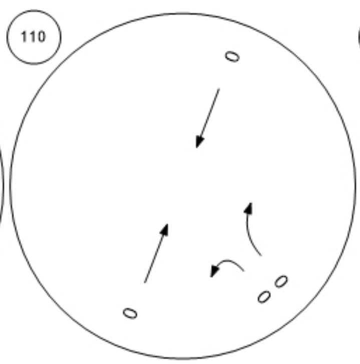
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

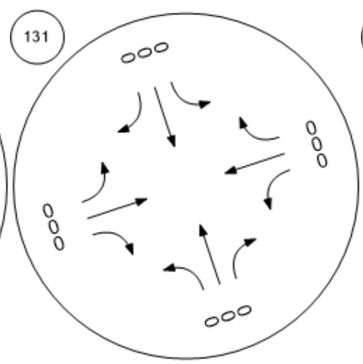

Middlefield Rd-Willow Rd



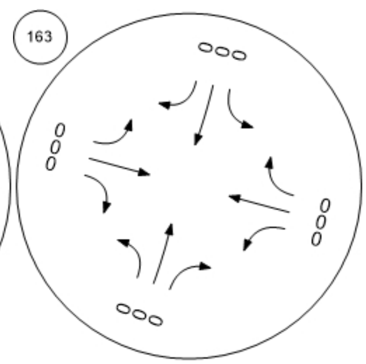

Marsh Road/101 NB Ramps



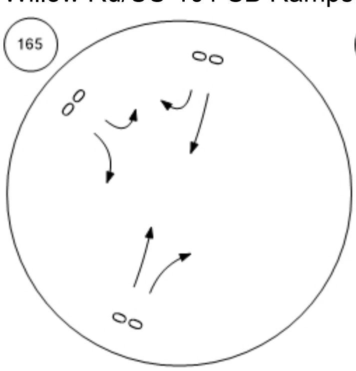

Chilco Street/Hamilton Avenu



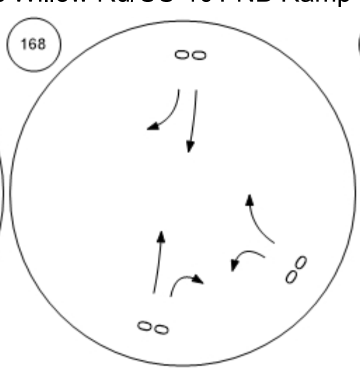

Bayfront Expy/Marsh Rd



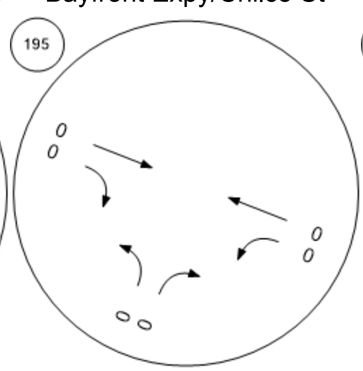

Willow Rd/US-101 SB Ramps



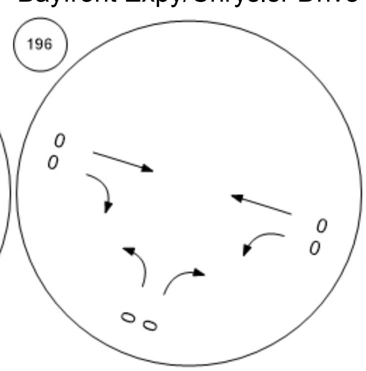

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

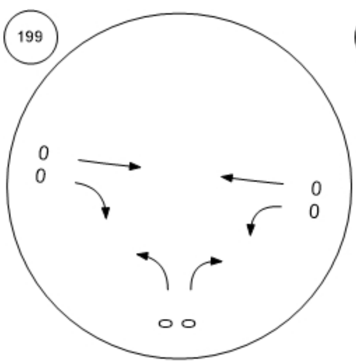


Generated with PTV VISTRO

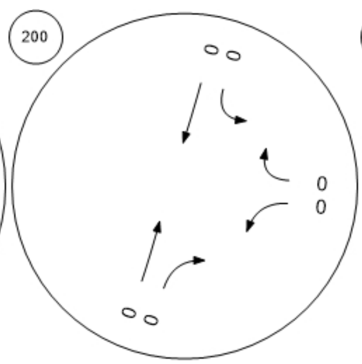
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

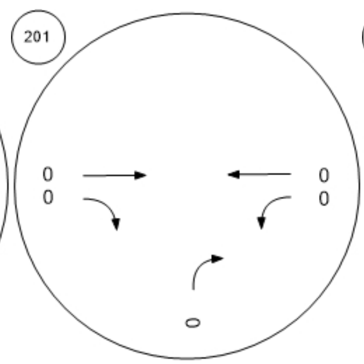

Bafront Expwy/Bldg 21



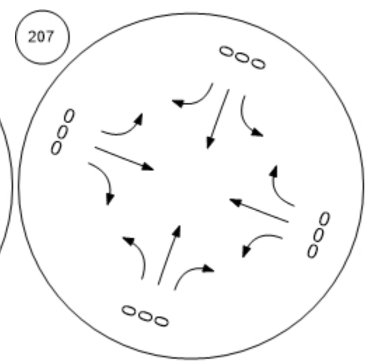

O'Brien Drive/Kavanaugh Dri



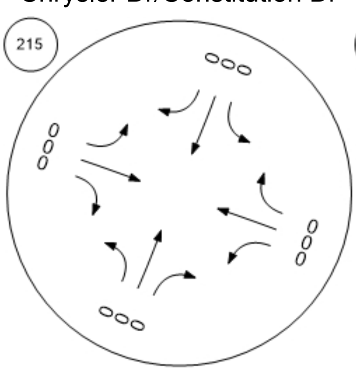

Bayfront Expwy/Bldg 20



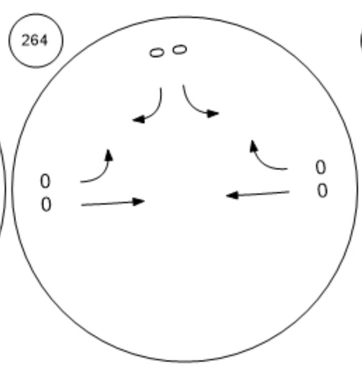

Chilco St/Constitution Dr



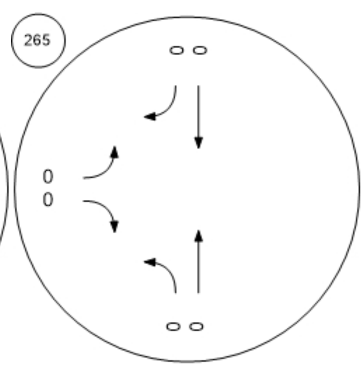

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive



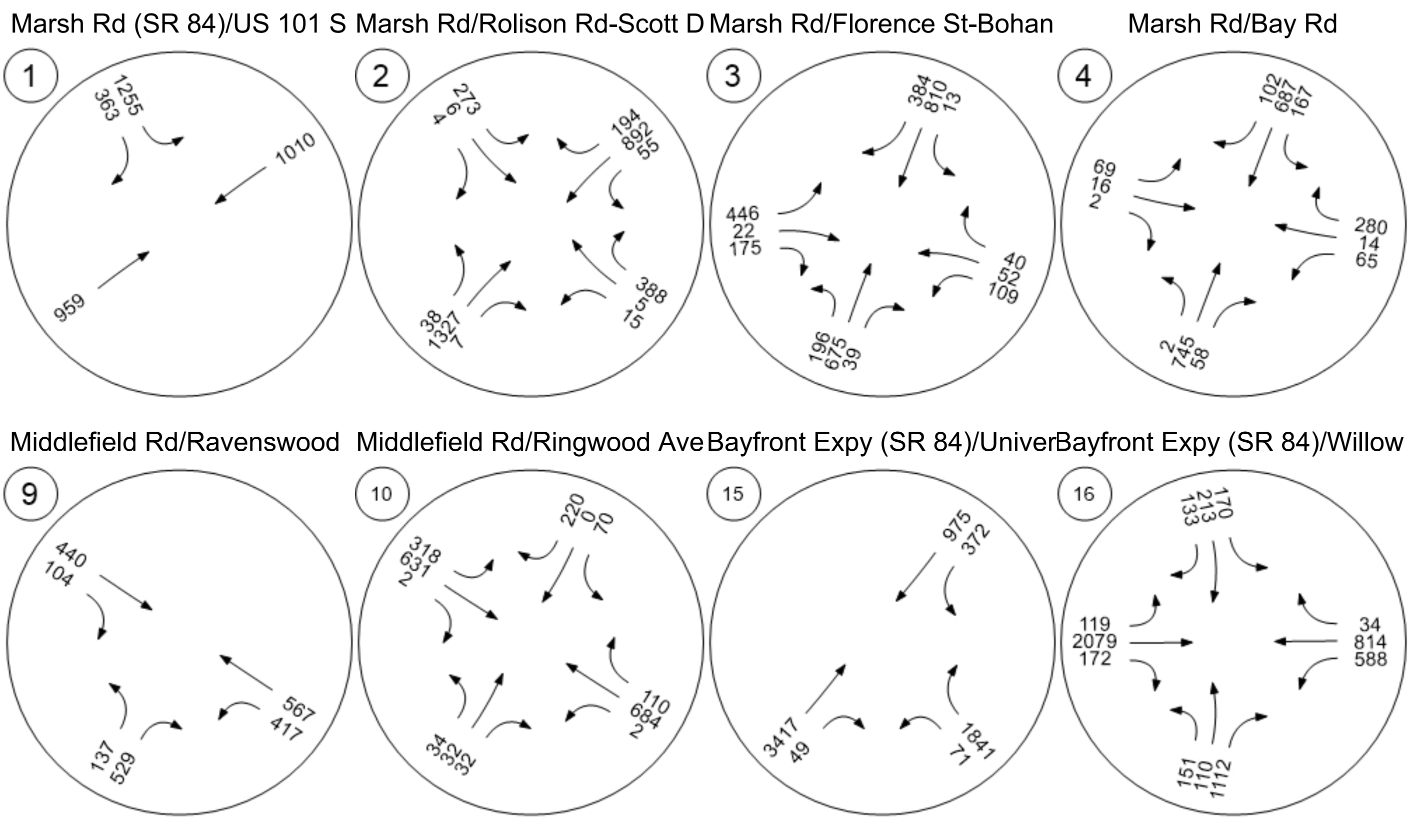

Adam Court/ Adams Drive



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

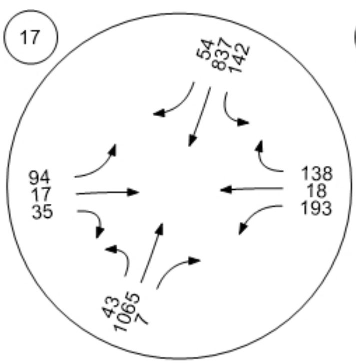



Generated with PTV VISTRO

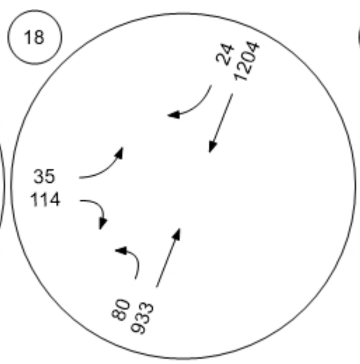
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

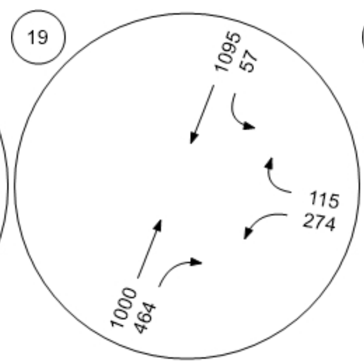

Willow Rd (SR 114)/Hamilton



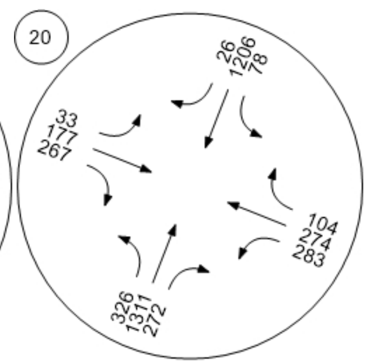

Willow Rd (SR 114)/Ivy Dr



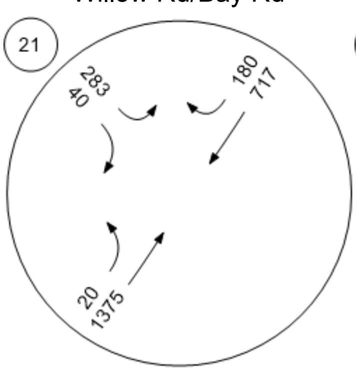

Willow Rd (SR 114)/O'Brien



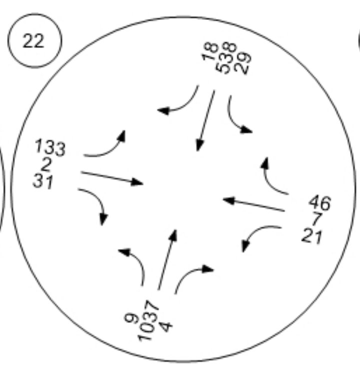

Willow Rd (SR 114)/Newbrid



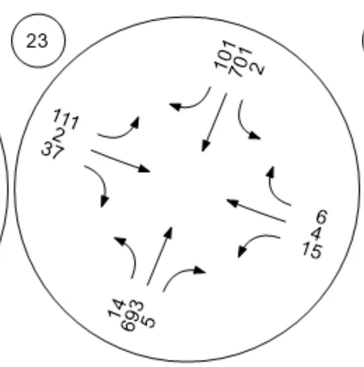

Willow Rd/Bay Rd



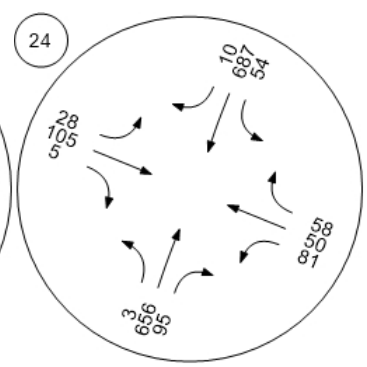

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

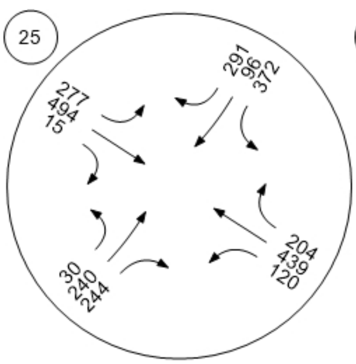


Generated with PTV VISTRO

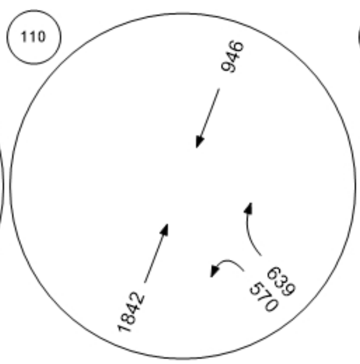
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

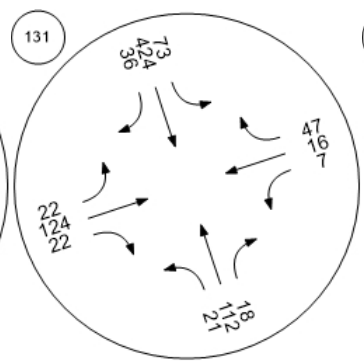

Middlefield Rd-Willow Rd



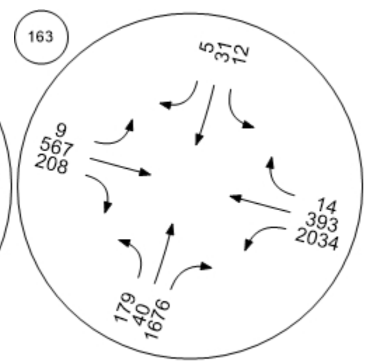

Marsh Road/101 NB Ramps



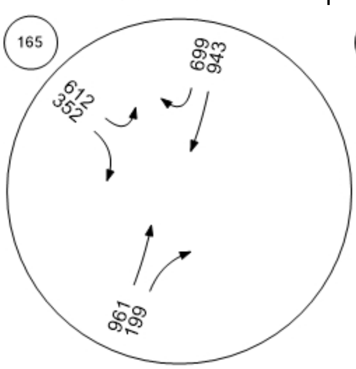

Chilco Street/Hamilton Avenu



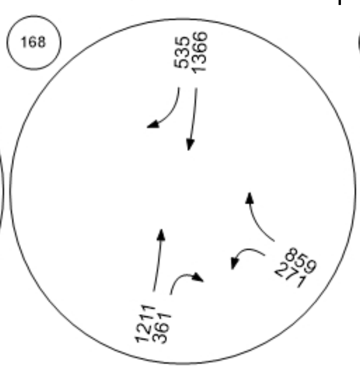

Bayfront Expy/Marsh Rd



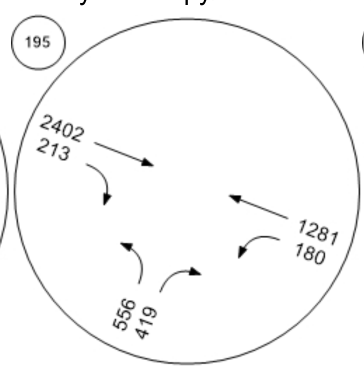

Willow Rd/US-101 SB Ramps



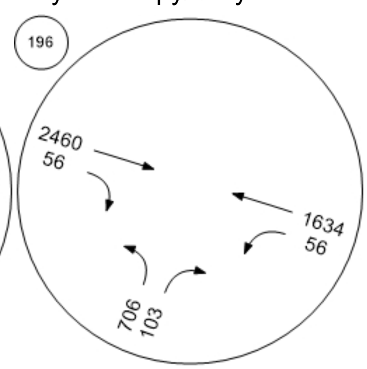

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

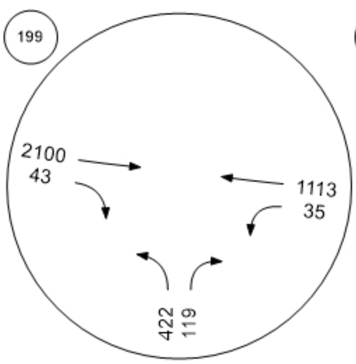


Generated with PTV VISTRO

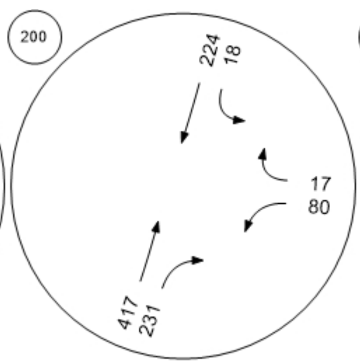
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

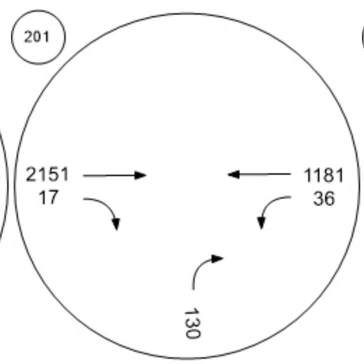

Bafront Expwy/Bldg 21



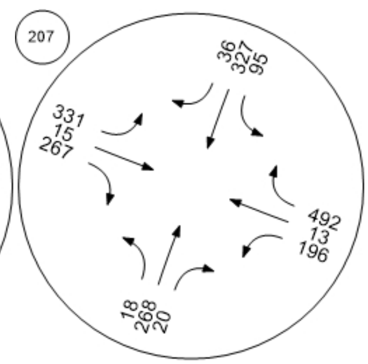

O'Brien Drive/Kavanaugh Dri



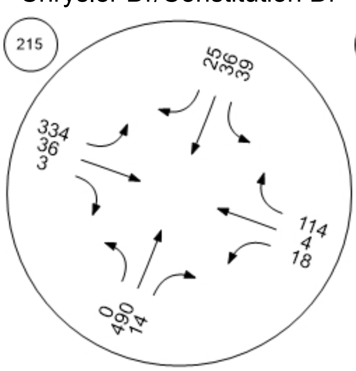

Bayfront Expwy/Bldg 20



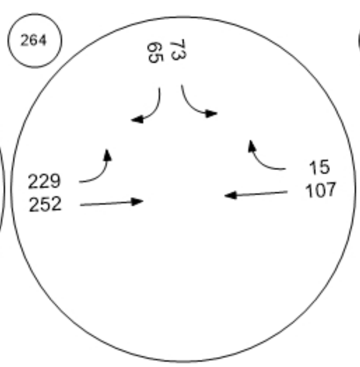

Chilco St/Constitution Dr



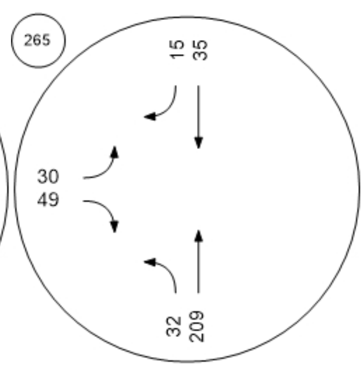

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

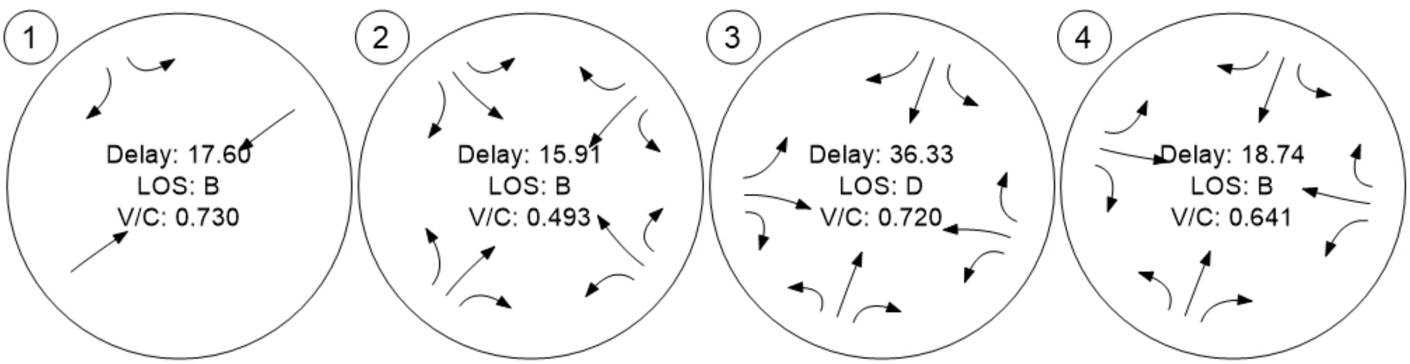


Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Traffic Conditions


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd



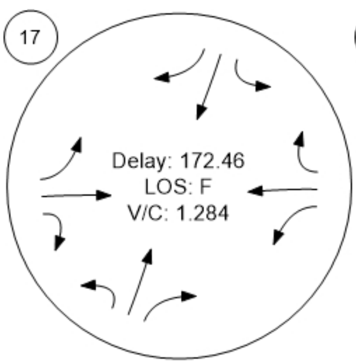

Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

Generated with PTV VISTRO

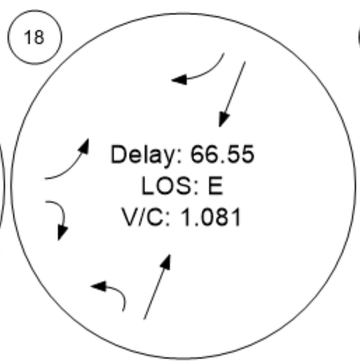
Version 2021 (SP 0-6)

## Traffic Conditions

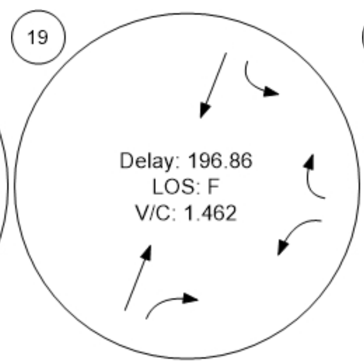

Willow Rd (SR 114)/Hamilton



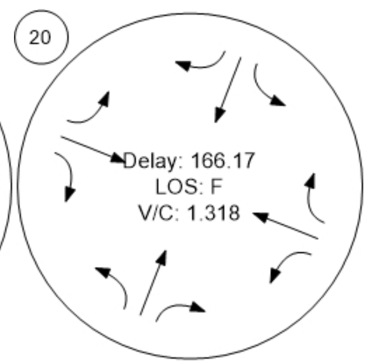

Willow Rd (SR 114)/Ivy Dr



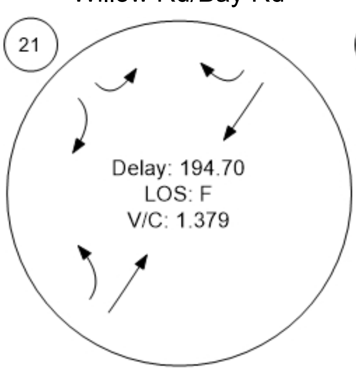

Willow Rd (SR 114)/O'Brien



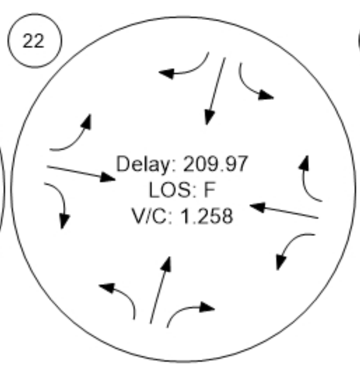

Willow Rd (SR 114)/Newbrid



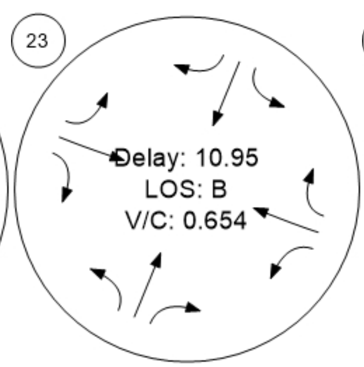

Willow Rd/Bay Rd



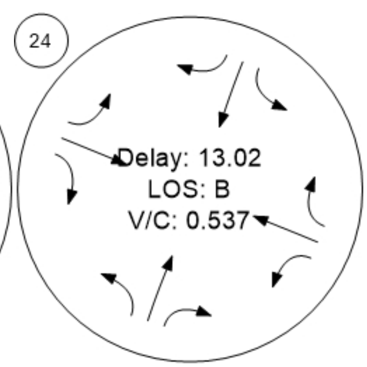

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

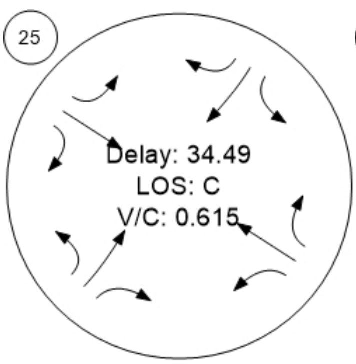


Generated with PTV VISTRO

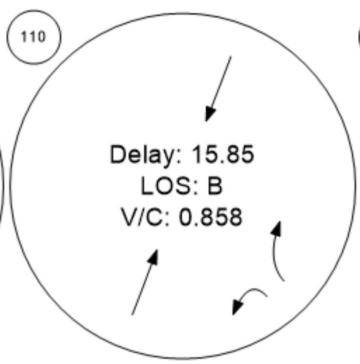
Version 2021 (SP 0-6)

## Traffic Conditions

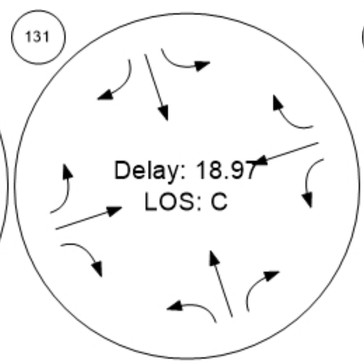

Middlefield Rd-Willow Rd



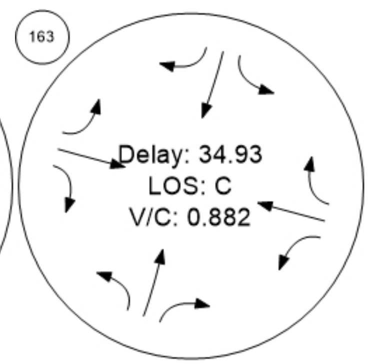

Marsh Road/101 NB Ramps



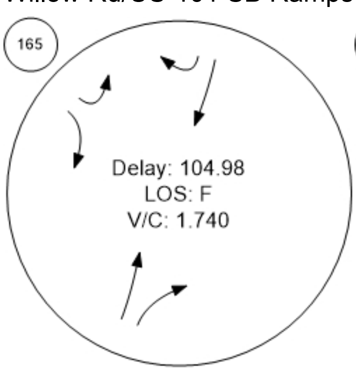

Chilco Street/Hamilton Avenu



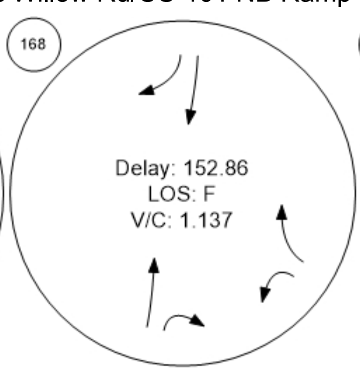

Bayfront Expy/Marsh Rd



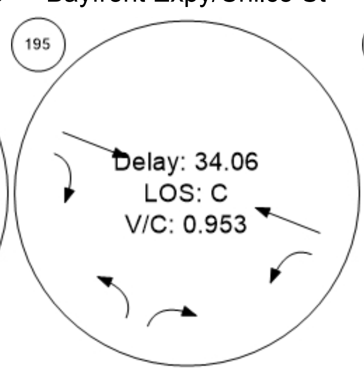

Willow Rd/US-101 SB Ramps



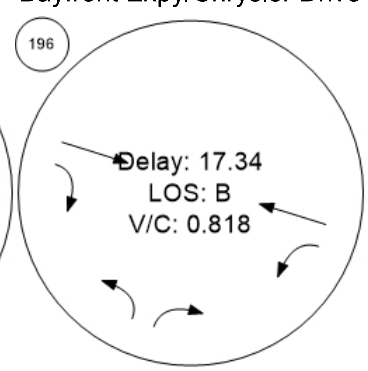

Willow Rd/US-101 NB Ramp



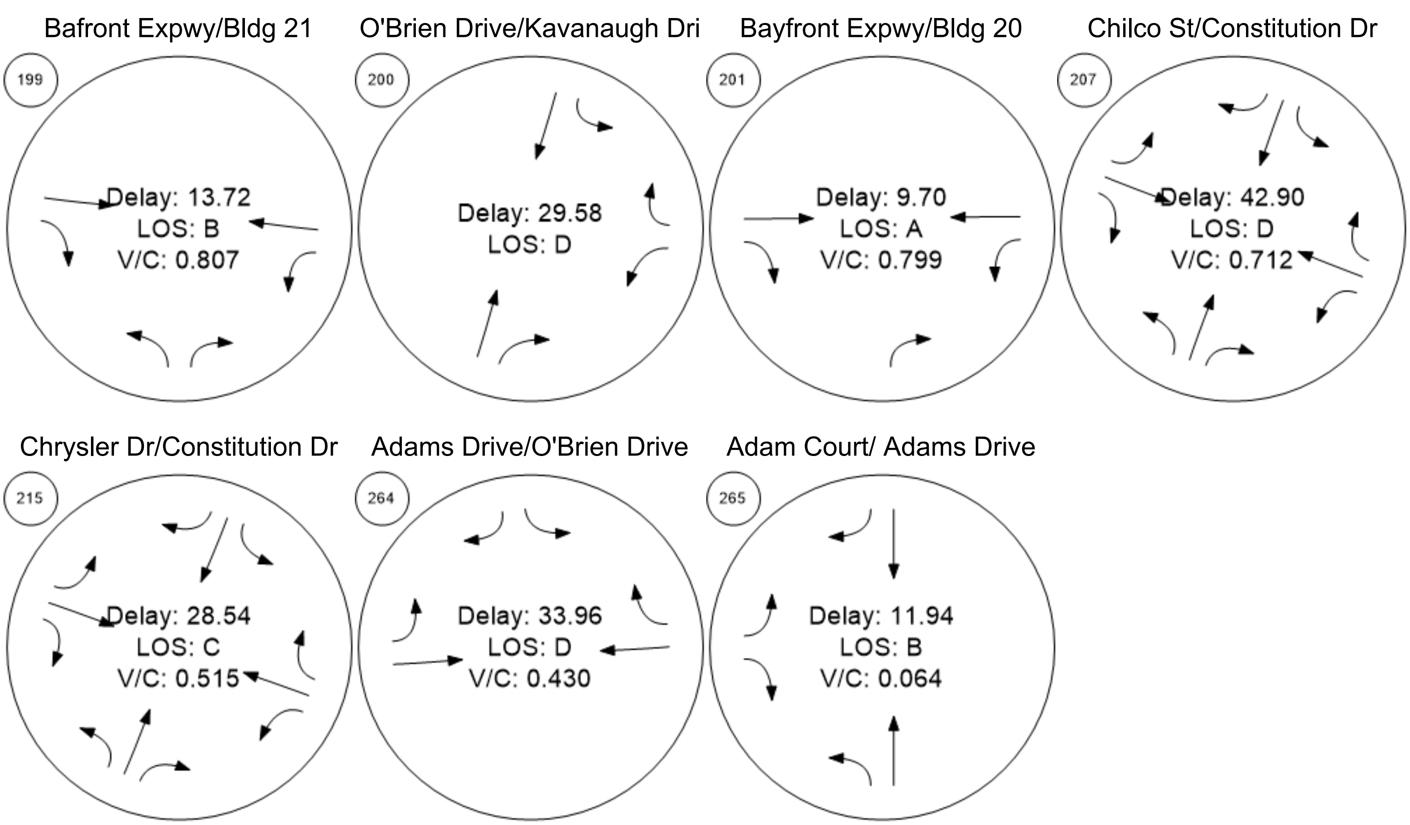

Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



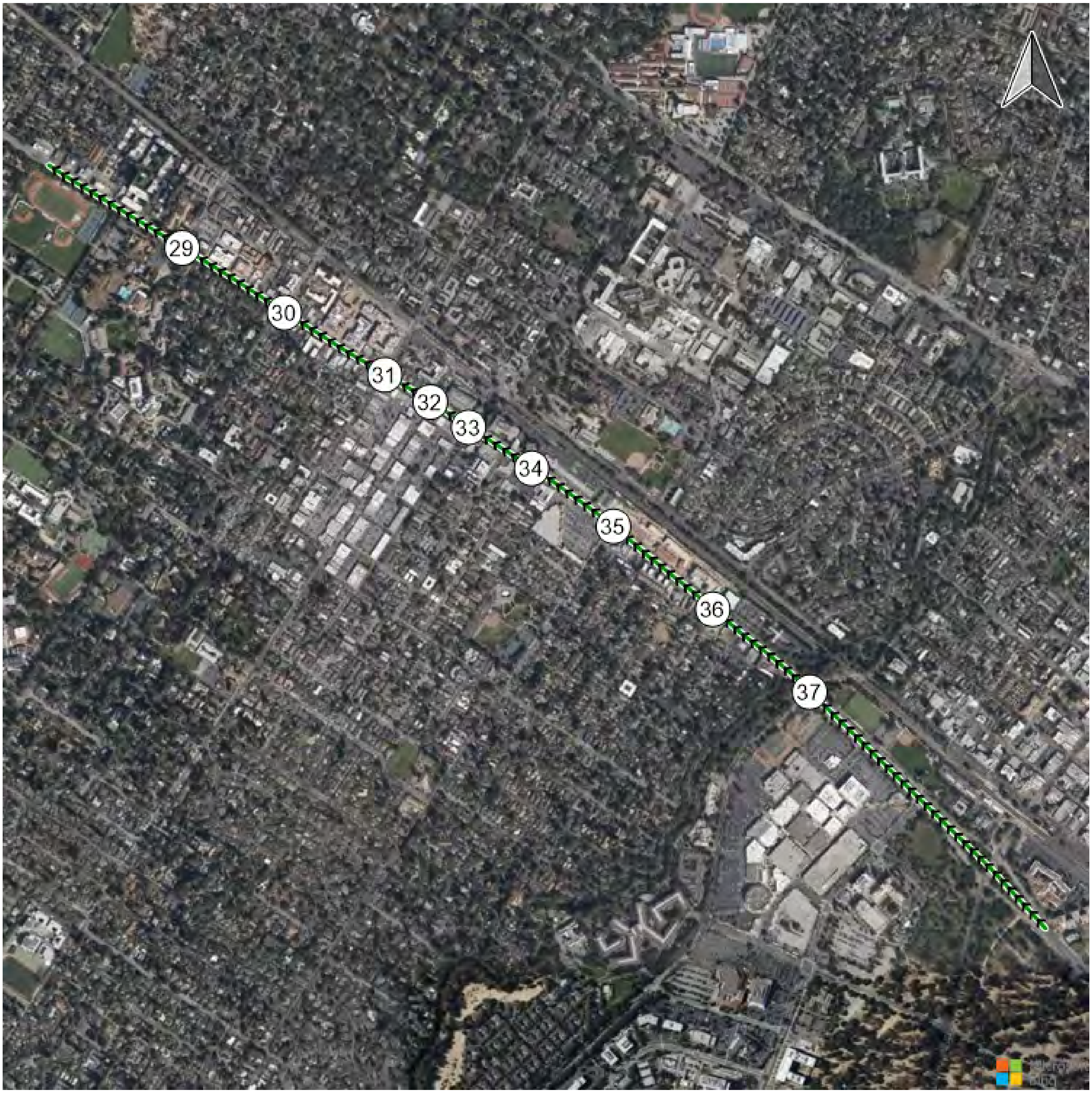
## Traffic Conditions

Generated with PTV VISTRO
Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 1: ECR NB



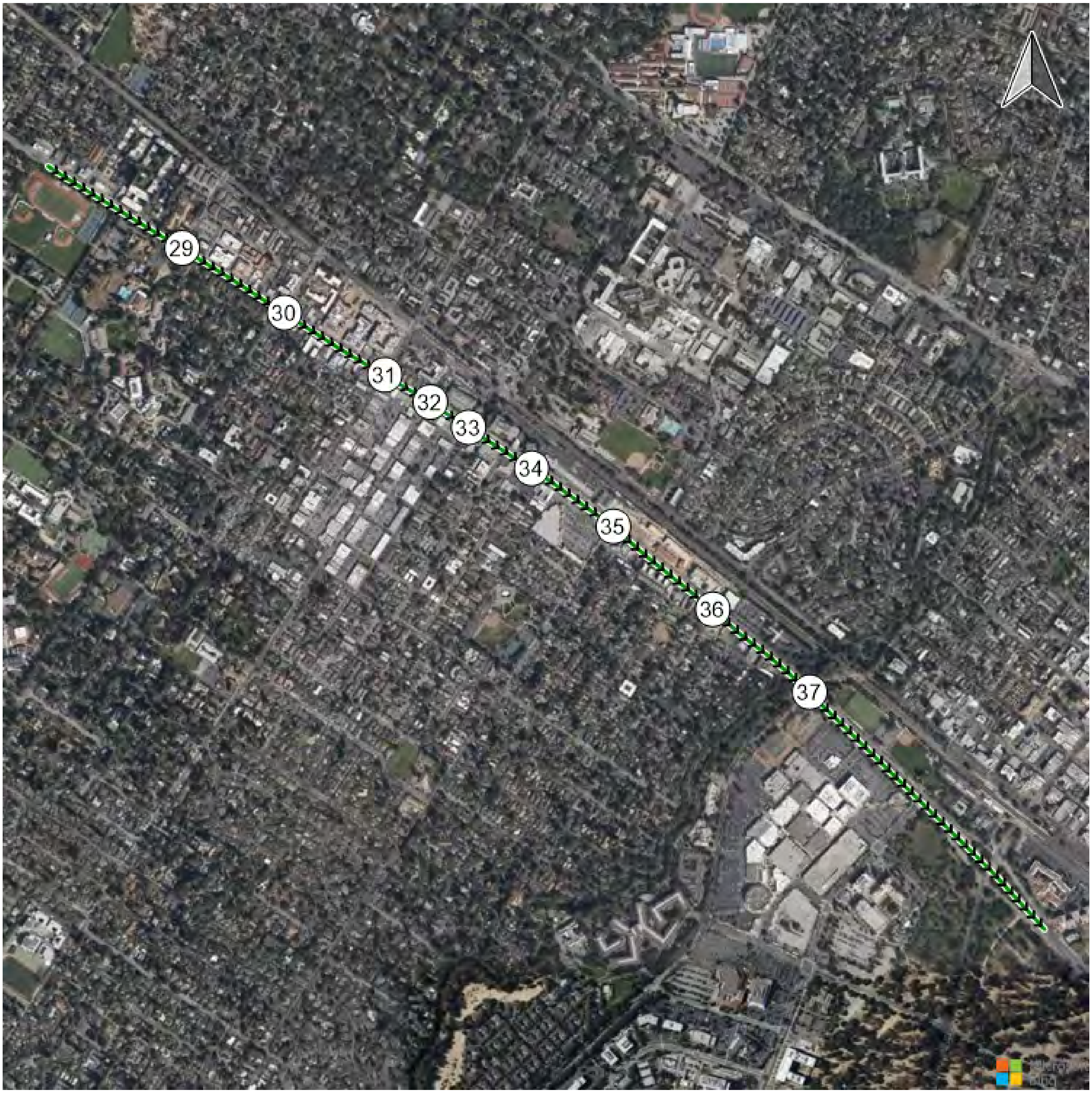
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



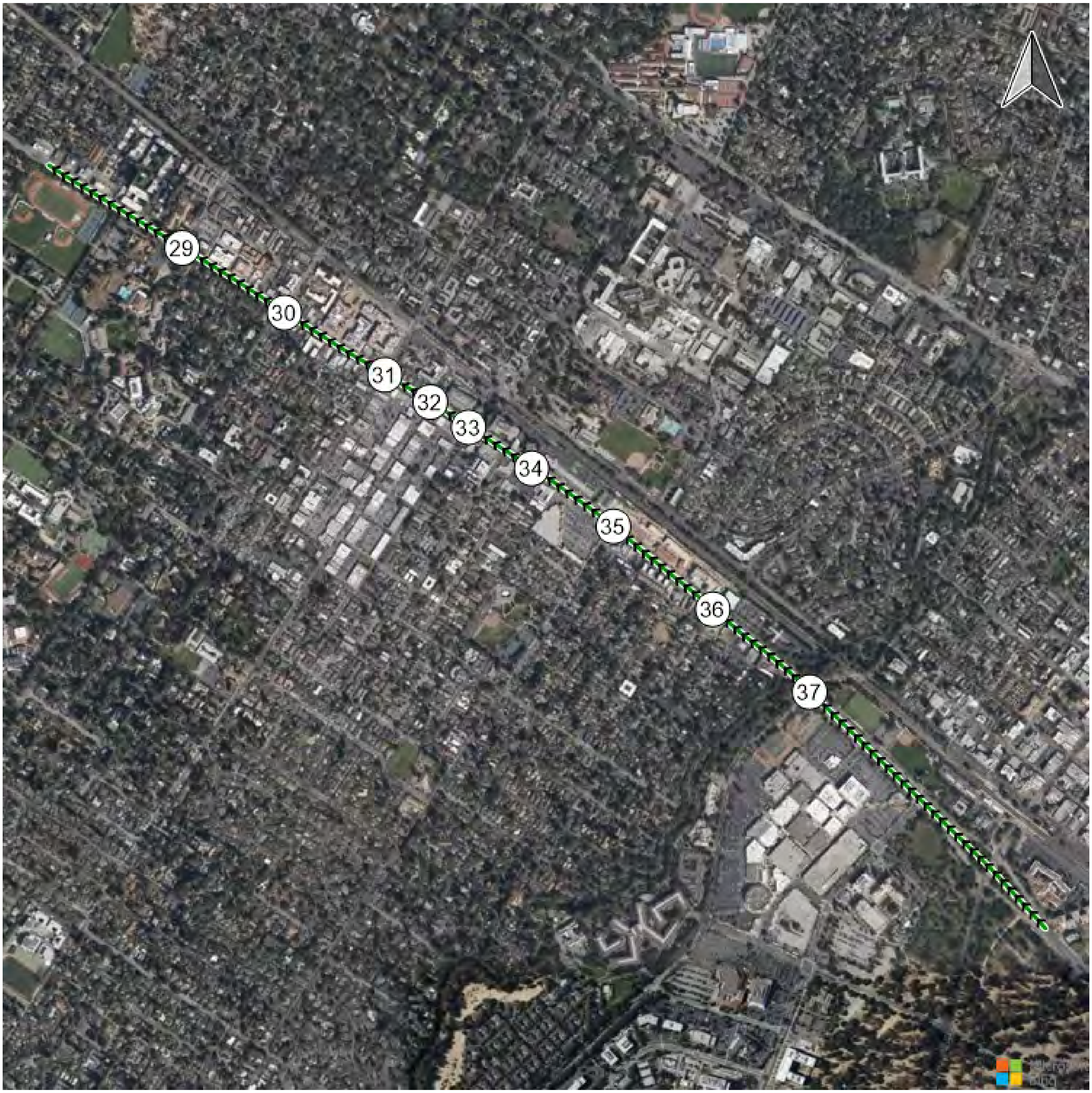
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



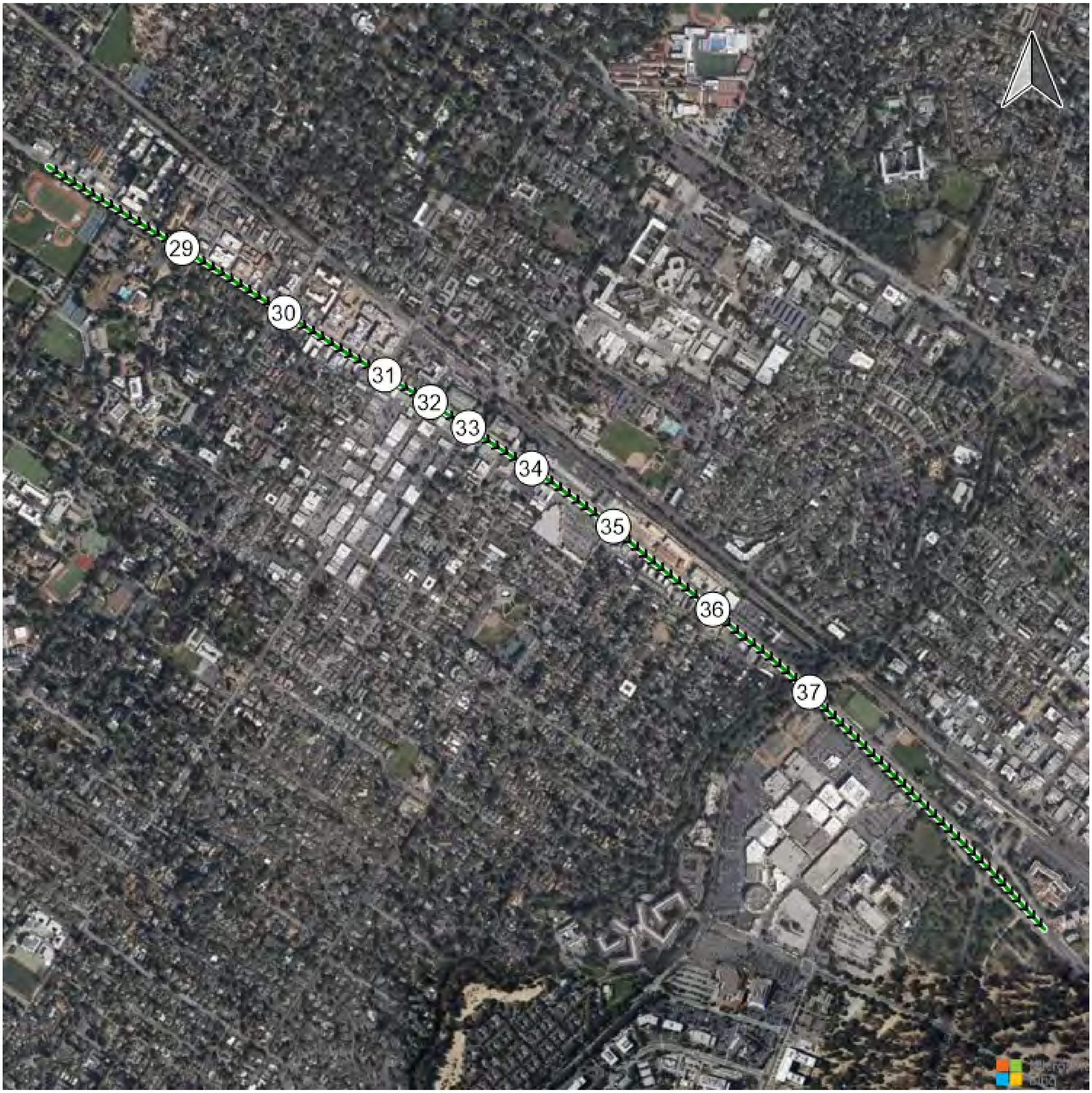
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term + P AM.pdf

Scenario 18 Near-Term AM (2025 vols)+Project
12/30/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.872 | 20.7 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.743 | 20.5 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.775 | 41.6 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.775 | 25.2 | C |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.730 | 44.9 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.390 | 13.7 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.736 | 12.1 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.201 | 226.5 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Right | 1.150 | 150.5 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.324 | 151.4 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.109 | 57.2 | E |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | SB Right | 1.351 | 174.8 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.088 | 60.0 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | NB Left | 0.917 | 57.2 | E |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.832 | 23.9 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | EB Left | 0.699 | 19.9 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.585 | 62.5 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.963 | 39.0 | D |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.380 | 10.8 | B |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.835 | 56.2 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.618 | 82.1 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.556 | 122.8 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.832 | 25.6 | C |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.672 | 9.4 | A |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.795 | 7.4 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.358 | 107.7 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.827 | 7.5 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Left | 0.540 | 24.6 | C |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | EB Right | 0.825 | 55.1 | E |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.322 | 62.5 | F |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.025 | 11.6 | B |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.581 | 36.8 | D |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Right | | 7.4 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.872 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 942 | 1462 | 217 | 1226 | 512 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 942 | 1462 | 217 | 1226 | 512 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 240 | 373 | 54 | 313 | 131 |
| Total Analysis Volume [veh/h] | 0 | 961 | 1492 | 217 | 1251 | 522 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 43 | 41 | 32 | 32 |
| g / C, Green / Cycle | 0.54 | 0.51 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.42 | 0.37 | 0.33 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2165 | 1810 | 1357 | 632 |
| d1, Uniform Delay [s] | 11.06 | 16.33 | 22.68 | 21.36 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.34 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.66 | 4.42 | 1.21 | 8.34 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.82 | 0.92 | 0.83 |
| d, Delay for Lane Group [s/veh] | 11.72 | 20.74 | 23.89 | 29.70 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.68 | 11.05 | 10.55 | 9.58 |
| 50th-Percentile Queue Length [ft/ln] | 116.98 | 276.24 | 263.67 | 239.41 |
| 95th-Percentile Queue Length [veh/ln] | 8.23 | 16.50 | 15.87 | 14.65 |
| 95th-Percentile Queue Length [ft/ln] | 205.67 | 412.52 | 396.83 | 366.29 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.72 | 20.74 | 0.00 | 23.89 | 29.70 |
| Movement LOS | | B | C | | C | C |
| d_A, Approach Delay [s/veh] | 11.72 | | 20.74 | | 25.60 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 20.73 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.872 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.973 | 0.000 | 2.553 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.352 | 2.791 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.743 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 31 | 1196 | 7 | 448 | 1239 | 310 | 13 | 4 | 58 | 238 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 1196 | 7 | 448 | 1239 | 310 | 13 | 4 | 0 | 238 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 332 | 2 | 124 | 344 | 86 | 4 | 1 | 0 | 66 | 5 | 0 |
| Total Analysis Volume [veh/h] | 34 | 1329 | 8 | 498 | 1377 | 344 | 14 | 4 | 0 | 264 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 6 | 106 | 106 | 120 | 112 | 112 | 6 | 6 | 28 | 28 |
| g / C, Green / Cycle | 0.04 | 0.66 | 0.66 | 0.75 | 0.70 | 0.70 | 0.04 | 0.04 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.25 | 0.25 | 0.47 | 0.47 | 0.50 | 0.01 | 0.00 | 0.15 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1051 | 1840 | 1719 | 1829 | 2572 | 1785 | 1900 |
| c, Capacity [veh/h] | 65 | 2333 | 1221 | 783 | 1288 | 1203 | 72 | 101 | 309 | 329 |
| d1, Uniform Delay [s] | 75.54 | 12.25 | 12.26 | 9.88 | 13.49 | 14.38 | 74.49 | 0.00 | 64.09 | 55.22 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.27 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.69 | 0.46 | 0.89 | 3.92 | 2.76 | 3.65 | 1.34 | 0.00 | 14.70 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.52 | 0.38 | 0.38 | 0.64 | 0.67 | 0.72 | 0.25 | 0.00 | 0.85 | 0.06 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 80.23 | 12.72 | 13.14 | 13.81 | 16.25 | 18.03 | 75.83 | 0.00 | 78.79 | 55.28 |
| Lane Group LOS | F | B | B | B | B | B | E | A | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.46 | 7.14 | 7.62 | 3.00 | 17.49 | 18.81 | 0.75 | 0.00 | 11.81 | 0.73 |
| 50th-Percentile Queue Length [ft/ln] | 36.50 | 178.46 | 190.48 | 75.11 | 437.21 | 470.28 | 18.86 | 0.00 | 295.30 | 18.21 |
| 95th-Percentile Queue Length [veh/ln] | 2.63 | 11.52 | 12.15 | 5.41 | 24.35 | 25.92 | 1.36 | 0.00 | 17.45 | 1.31 |
| 95th-Percentile Queue Length [ft/ln] | 65.71 | 288.00 | 303.65 | 135.19 | 608.67 | 648.10 | 33.94 | 0.00 | 436.21 | 32.78 |

**Movement, Approach, & Intersection Results**

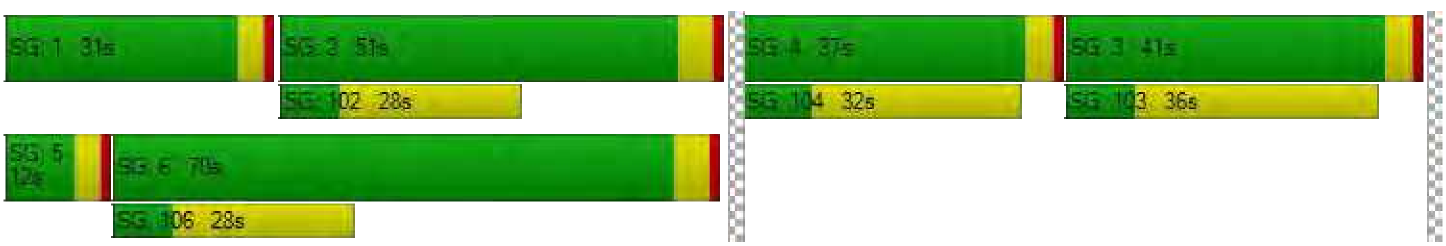
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 80.23 | 12.86 | 13.14 | 13.81 | 16.92 | 18.03 | 75.83 | 75.83 | 0.00 | 78.79 | 55.28 | 55.28 |
| Movement LOS | F | B | B | B | B | B | E | E | A | E | E | E |
| d_A, Approach Delay [s/veh] | 14.54 | | | 16.39 | | | 75.83 | | | 77.06 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 20.45 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.743 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.40 | 68.40 | 69.33 | 69.33 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.069 | 3.250 | 2.986 | 2.148 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.59 | 28.16 | 47.39 | 50.52 |
| I_b,int, Bicycle LOS Score for Intersection | 2.314 | 3.390 | 1.687 | 2.030 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 41.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.775 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 138 | 857 | 84 | 29 | 1030 | 422 | 607 | 56 | 165 | 35 | 16 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 138 | 857 | 84 | 29 | 1030 | 422 | 607 | 56 | 150 | 35 | 16 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 221 | 22 | 7 | 265 | 109 | 156 | 14 | 39 | 9 | 4 | 6 |
| Total Analysis Volume [veh/h] | 142 | 884 | 87 | 30 | 1062 | 435 | 626 | 58 | 155 | 36 | 16 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 98 | 98 | 5 | 91 | 91 | 37 | 37 | 37 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.61 | 0.61 | 0.03 | 0.57 | 0.57 | 0.23 | 0.23 | 0.23 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.26 | 0.26 | 0.02 | 0.42 | 0.44 | 0.20 | 0.20 | 0.10 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1809 | 1704 | 1823 | 1647 | 1717 | 1702 | 1526 | 1439 | 1196 |
| c, Capacity [veh/h] | 142 | 1151 | 1110 | 58 | 1033 | 934 | 395 | 391 | 351 | 104 | 86 |
| d1, Uniform Delay [s] | 73.42 | 16.18 | 16.21 | 75.88 | 26.08 | 26.72 | 59.29 | 59.22 | 52.64 | 70.60 | 71.34 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.15 | 0.14 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 74.81 | 1.17 | 1.22 | 2.58 | 4.99 | 6.22 | 7.93 | 7.69 | 0.65 | 1.47 | 3.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.00 | 0.43 | 0.43 | 0.51 | 0.75 | 0.77 | 0.87 | 0.87 | 0.44 | 0.35 | 0.49 |
| d, Delay for Lane Group [s/veh] | 148.23 | 17.35 | 17.43 | 78.45 | 31.07 | 32.94 | 67.21 | 66.91 | 53.29 | 72.07 | 74.48 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.78 | 9.78 | 9.52 | 1.26 | 23.18 | 22.41 | 14.45 | 14.22 | 5.49 | 1.47 | 1.75 |
| 50th-Percentile Queue Length [ft/ln] | 219.61 | 244.61 | 237.94 | 31.42 | 579.48 | 560.14 | 361.14 | 355.62 | 137.28 | 36.66 | 43.85 |
| 95th-Percentile Queue Length [veh/ln] | 13.64 | 14.91 | 14.58 | 2.26 | 31.07 | 30.17 | 20.68 | 20.41 | 9.33 | 2.64 | 3.16 |
| 95th-Percentile Queue Length [ft/ln] | 341.12 | 372.86 | 364.42 | 56.56 | 776.87 | 754.22 | 516.97 | 510.26 | 233.36 | 65.99 | 78.93 |

**Movement, Approach, & Intersection Results**

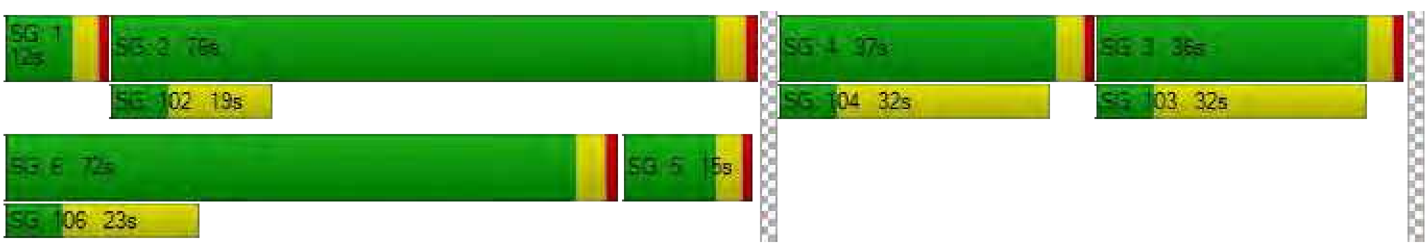
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 148.23 | 17.38 | 17.43 | 78.45 | 31.57 | 32.94 | 67.08 | 66.91 | 53.29 | 72.07 | 74.48 | 74.48 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 34.08 | | | 32.88 | | | 64.52 | | | 73.37 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 41.61 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.775 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.932 | 3.061 | 2.474 | 2.036 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.478 | 2.819 | 2.969 | 1.688 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 25.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.775 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 810 | 84 | 326 | 755 | 61 | 226 | 66 | 2 | 40 | 22 | 208 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 810 | 84 | 326 | 755 | 61 | 226 | 66 | 2 | 40 | 22 | 208 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 207 | 21 | 83 | 193 | 16 | 58 | 17 | 1 | 10 | 6 | 53 |
| Total Analysis Volume [veh/h] | 0 | 827 | 86 | 333 | 770 | 62 | 231 | 67 | 2 | 41 | 22 | 212 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 28 | 28 | 16 | 47 | 47 | 29 | 29 |
| g / C, Green / Cycle | 0.35 | 0.35 | 0.20 | 0.59 | 0.59 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.19 | 0.23 | 0.23 | 0.28 | 0.17 |
| s, saturation flow rate [veh/h] | 1882 | 1653 | 1708 | 1807 | 1751 | 1060 | 1643 |
| c, Capacity [veh/h] | 699 | 574 | 342 | 1058 | 1025 | 458 | 639 |
| d1, Uniform Delay [s] | 23.00 | 23.01 | 31.82 | 8.98 | 9.00 | 24.48 | 20.05 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.37 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.65 | 8.47 | 17.29 | 1.12 | 1.17 | 5.29 | 0.98 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.70 | 0.74 | 0.97 | 0.40 | 0.40 | 0.65 | 0.43 |
| d, Delay for Lane Group [s/veh] | 28.65 | 31.48 | 49.10 | 10.11 | 10.17 | 29.77 | 21.03 |
| Lane Group LOS | C | C | D | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.55 | 7.91 | 7.72 | 3.68 | 3.60 | 5.75 | 3.98 |
| 50th-Percentile Queue Length [ft/ln] | 213.78 | 197.64 | 192.88 | 91.93 | 90.08 | 143.69 | 99.56 |
| 95th-Percentile Queue Length [veh/ln] | 13.35 | 12.52 | 12.27 | 6.62 | 6.49 | 9.68 | 7.17 |
| 95th-Percentile Queue Length [ft/ln] | 333.67 | 312.92 | 306.76 | 165.47 | 162.14 | 241.99 | 179.21 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 28.65 | 29.82 | 31.48 | 49.10 | 10.14 | 10.17 | 29.77 | 29.77 | 29.77 | 21.03 | 21.03 | 21.03 |
| Movement LOS | C | C | C | D | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | | 29.97 | | | 21.28 | | | 29.77 | | | 21.03 | |
| Approach LOS | | C | | | C | | | C | | | C | |
| d_I, Intersection Delay [s/veh] | 25.21 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.775 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.79 | 29.79 | 29.79 | 19.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.674 | 3.176 | 1.864 | 2.063 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.70 | 8.68 | 17.47 | 17.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.313 | 2.521 | 2.055 | 2.013 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 44.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.730 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 503 | 495 | 433 | 480 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 495 | 433 | 480 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 132 | 115 | 128 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 527 | 461 | 511 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.30 | 0.25 | 0.35 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1777 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1004 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.17 | 17.47 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 65.96 | 0.49 | 2.87 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.09 | 0.30 | 0.62 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 109.48 | 2.65 | 20.34 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 23.00 | 1.66 | 11.68 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 574.95 | 41.52 | 292.06 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 32.46 | 2.99 | 17.29 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 811.47 | 74.73 | 432.20 |

**Movement, Approach, & Intersection Results**

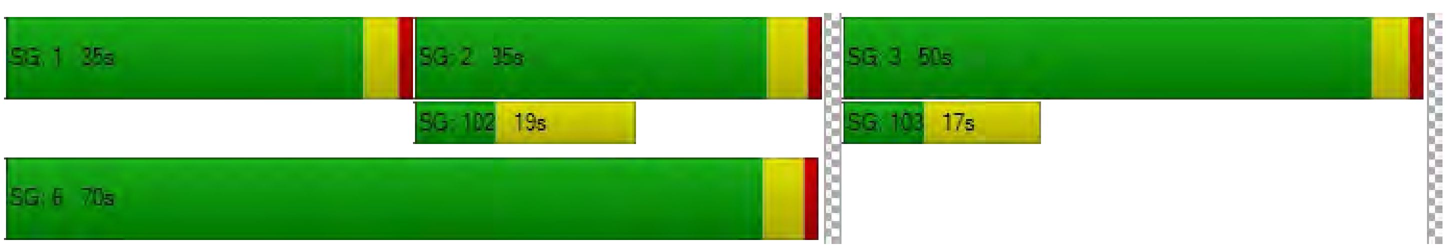
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 109.48 | 2.65 | 20.34 | 20.34 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 59.64 | | 20.34 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 44.87 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.730 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.939 | 2.856 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.190 | 2.586 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.390 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 135 | 28 | 318 | 21 | 606 | 114 | 267 | 683 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 135 | 28 | 96 | 21 | 606 | 18 | 267 | 683 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 36 | 7 | 26 | 6 | 161 | 5 | 71 | 182 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 144 | 30 | 102 | 22 | 645 | 19 | 284 | 727 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 25 | 25 | 25 | 25 | 91 | 78 | 78 | 89 | 83 | 83 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.21 | 0.21 | 0.76 | 0.65 | 0.65 | 0.74 | 0.69 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.14 | 0.07 | 0.03 | 0.18 | 0.01 | 0.32 | 0.22 | 0.22 |
| s, saturation flow rate [veh/h] | 1401 | 1737 | 1282 | 1483 | 749 | 3526 | 1471 | 894 | 1840 | 1774 |
| c, Capacity [veh/h] | 123 | 359 | 320 | 306 | 602 | 2288 | 954 | 694 | 1265 | 1220 |
| d1, Uniform Delay [s] | 54.94 | 38.25 | 45.64 | 40.40 | 4.58 | 9.05 | 7.49 | 5.39 | 7.48 | 7.50 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 0.07 | 1.38 | 0.60 | 0.02 | 0.31 | 0.04 | 1.79 | 0.65 | 0.69 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.05 | 0.06 | 0.54 | 0.33 | 0.04 | 0.28 | 0.02 | 0.41 | 0.32 | 0.32 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 55.09 | 38.32 | 47.02 | 41.00 | 4.60 | 9.36 | 7.52 | 7.18 | 8.13 | 8.19 |
| Lane Group LOS | E | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.54 | 4.95 | 2.62 | 0.13 | 3.50 | 0.18 | 2.24 | 3.94 | 3.86 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 13.55 | 123.75 | 65.59 | 3.22 | 87.39 | 4.39 | 56.08 | 98.51 | 96.41 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 0.98 | 8.60 | 4.72 | 0.23 | 6.29 | 0.32 | 4.04 | 7.09 | 6.94 |
| 95th-Percentile Queue Length [ft/ln] | 8.21 | 24.39 | 214.97 | 118.06 | 5.79 | 157.29 | 7.90 | 100.94 | 177.32 | 173.53 |

**Movement, Approach, & Intersection Results**

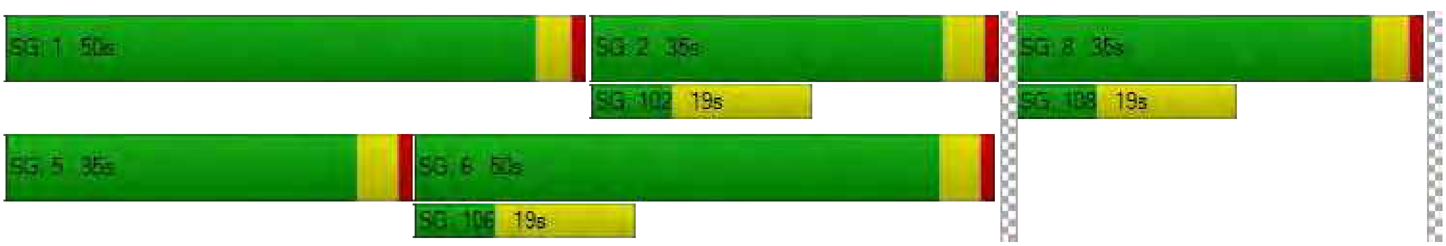
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.09 | 38.32 | 38.32 | 47.02 | 47.02 | 41.00 | 4.60 | 9.36 | 7.52 | 7.18 | 8.16 | 8.19 |
| Movement LOS | E | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 41.91 | | | 44.80 | | | 9.16 | | | 7.90 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.72 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.390 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.007 | 2.825 | 3.123 | 2.788 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.381 | 2.205 | 2.443 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.736 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 864 | 67 | 1234 | 2778 | 205 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 864 | 67 | 1234 | 2778 | 205 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 223 | 17 | 318 | 716 | 53 | 107 |
| Total Analysis Volume [veh/h] | 891 | 69 | 1272 | 2864 | 211 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 69 | 69 | 69 | 69 | 69 | 69 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 20 | 28 | 52 | 7 | 40 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.41 | 0.75 | 0.10 | 0.58 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.04 | 0.37 | 0.57 | 0.06 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1549 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1414 | 442 | 1439 | 3800 | 356 | 2401 |
| d1, Uniform Delay [s] | 21.38 | 18.34 | 18.56 | 4.85 | 29.42 | 6.87 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.56 | 0.20 | 0.75 | 0.38 | 0.59 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.16 | 0.88 | 0.75 | 0.59 | 0.18 |
| d, Delay for Lane Group [s/veh] | 21.94 | 18.54 | 19.31 | 5.23 | 30.00 | 6.89 |
| Lane Group LOS | C | B | B | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.55 | 0.72 | 7.31 | 1.66 | 1.60 | 0.79 |
| 50th-Percentile Queue Length [ft/ln] | 88.67 | 17.91 | 182.71 | 41.58 | 39.98 | 19.85 |
| 95th-Percentile Queue Length [veh/ln] | 6.38 | 1.29 | 11.74 | 2.99 | 2.88 | 1.43 |
| 95th-Percentile Queue Length [ft/ln] | 159.61 | 32.23 | 293.55 | 74.84 | 71.96 | 35.74 |

**Movement, Approach, & Intersection Results**

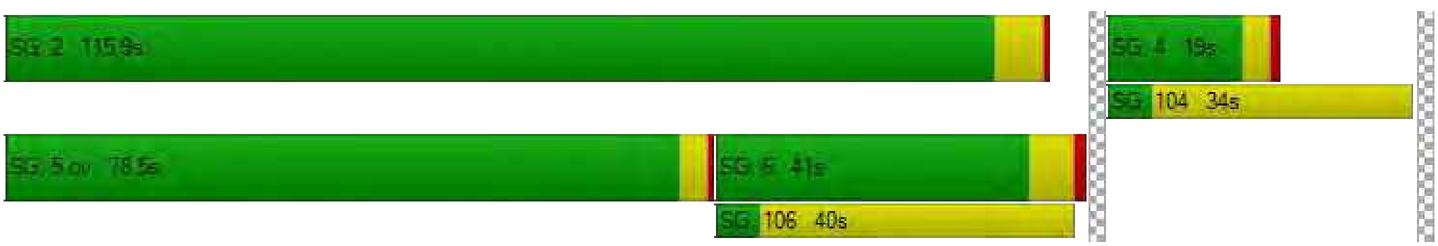
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.94 | 18.54 | 19.31 | 5.23 | 30.00 | 6.89 |
| Movement LOS | C | B | B | A | C | A |
| d_A, Approach Delay [s/veh] | 21.70 | | 9.56 | | 14.51 | |
| Approach LOS | C | | A | | B | |
| d_I, Intersection Delay [s/veh] | 12.14 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.736 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 25.88 | 0.00 | 25.88 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.612 | 0.000 | 2.904 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1021 | 408 | 438 |
| d_b, Bicycle Delay [s] | 8.22 | 21.72 | 20.93 |
| I_b,int, Bicycle LOS Score for Intersection | 2.088 | 3.834 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 226.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.201 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 225 | 585 | 279 | 36 | 91 | 88 | 375 | 439 | 172 | 1122 | 2238 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 225 | 585 | 279 | 36 | 91 | 72 | 375 | 439 | 66 | 1122 | 2238 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 149 | 71 | 9 | 23 | 18 | 96 | 112 | 17 | 286 | 571 | 18 |
| Total Analysis Volume [veh/h] | 230 | 597 | 285 | 37 | 93 | 73 | 383 | 448 | 67 | 1145 | 2284 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 3 | | | 2 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 0 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 0 | | | 4 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.31 | 0.27 | 0.07 | 0.06 | 0.03 | 0.07 | 0.25 | 0.09 | 0.05 | 0.42 | 0.45 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.46 | 57.58 | 56.29 | 58.26 | 50.09 | 24.65 | 23.48 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.48 | 0.11 | 0.17 | 0.11 | 0.27 | 0.15 | 0.11 | 0.11 | 0.47 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 386.34 | 289.51 | 0.05 | 32.64 | 1.77 | 63.29 | 111.33 | 0.06 | 0.08 | 513.59 | 68.07 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.79 | 1.62 | 0.18 | 0.77 | 0.47 | 0.95 | 1.23 | 0.23 | 0.11 | 2.13 | 1.15 | 0.11 |
| d, Delay for Lane Group [s/veh] | 438.49 | 342.05 | 24.52 | 90.22 | 58.07 | 121.55 | 161.42 | 24.70 | 23.57 | 564.17 | 106.15 | 24.16 |
| Lane Group LOS | F | F | C | F | E | F | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 17.74 | 20.58 | 1.82 | 1.61 | 1.50 | 3.71 | 9.73 | 2.97 | 1.28 | 46.84 | 32.63 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 443.50 | 514.40 | 45.48 | 40.34 | 37.46 | 92.67 | 243.13 | 74.26 | 31.98 | 1171.08 | 815.86 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 30.00 | 33.48 | 3.27 | 2.90 | 2.70 | 6.67 | 16.27 | 5.35 | 2.30 | 74.67 | 46.16 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 749.98 | 836.99 | 81.86 | 72.60 | 67.43 | 166.81 | 406.68 | 133.67 | 57.56 | 1866.83 | 1154.10 | 63.56 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

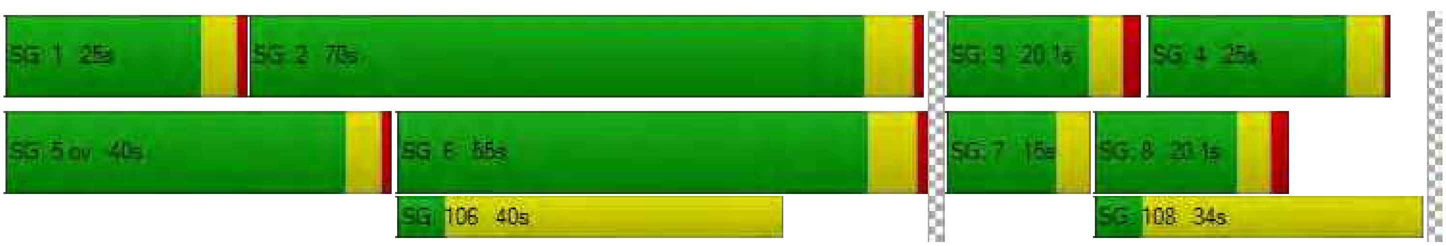
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 438.49 | 342.05 | 24.52 | 90.22 | 58.07 | 121.55 | 161.42 | 24.70 | 23.57 | 564.17 | 106.15 | 24.16 |
| Movement LOS | F | F | C | F | E | F | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | 280.61 | | | 86.75 | | | 82.93 | | | 254.19 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 226.48 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.201 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.135 | 0.000 | 3.332 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.63 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.477 | 1.740 | 2.112 | 3.486 |
| Bicycle LOS | B | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 150.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.150 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 111 | 946 | 80 | 337 | 1394 | 37 | 47 | 16 | 48 | 18 | 6 | 128 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 111 | 946 | 80 | 337 | 1394 | 37 | 47 | 16 | 48 | 18 | 6 | 128 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 30 | 254 | 22 | 91 | 375 | 10 | 13 | 4 | 13 | 5 | 2 | 34 |
| Total Analysis Volume [veh/h] | 119 | 1017 | 86 | 362 | 1499 | 40 | 51 | 17 | 52 | 19 | 6 | 138 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 50 | 100 | 74 | 24 | 74 | 100 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 120 | 96 | 96 | 120 | 101 | 101 | 33 | 33 | 33 | 33 |
| g / C, Green / Cycle | 0.75 | 0.60 | 0.60 | 0.75 | 0.63 | 0.63 | 0.21 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.69 | 0.70 | 0.34 | 0.82 | 0.84 | 0.04 | 0.10 | 0.02 | 0.20 |
| s, saturation flow rate [veh/h] | 402 | 808 | 782 | 1078 | 934 | 921 | 1251 | 705 | 1092 | 729 |
| c, Capacity [veh/h] | 143 | 485 | 470 | 312 | 591 | 583 | 45 | 144 | 150 | 150 |
| d1, Uniform Delay [s] | 50.86 | 31.93 | 31.93 | 51.86 | 29.34 | 29.34 | 80.00 | 56.05 | 64.84 | 62.81 |
| k, delay calibration | 0.49 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.44 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 40.46 | 89.37 | 92.55 | 102.36 | 147.97 | 155.27 | 102.84 | 0.91 | 0.38 | 58.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.83 | 1.15 | 1.16 | 1.16 | 1.30 | 1.32 | 1.13 | 0.48 | 0.13 | 0.96 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 91.32 | 121.30 | 124.48 | 154.22 | 177.30 | 184.61 | 182.84 | 56.96 | 65.22 | 121.00 |
| Lane Group LOS | F | F | F | F | F | F | F | E | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.69 | 29.59 | 29.08 | 6.00 | 45.93 | 46.49 | 3.17 | 2.54 | 0.65 | 8.28 |
| 50th-Percentile Queue Length [ft/ln] | 67.22 | 739.69 | 726.97 | 149.88 | 1148.22 | 1162.23 | 79.15 | 63.40 | 16.22 | 207.09 |
| 95th-Percentile Queue Length [veh/ln] | 4.84 | 42.91 | 42.42 | 10.79 | 69.14 | 70.41 | 5.70 | 4.56 | 1.17 | 13.00 |
| 95th-Percentile Queue Length [ft/ln] | 121.00 | 1072.70 | 1060.39 | 269.78 | 1728.60 | 1760.18 | 142.47 | 114.11 | 29.20 | 325.09 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

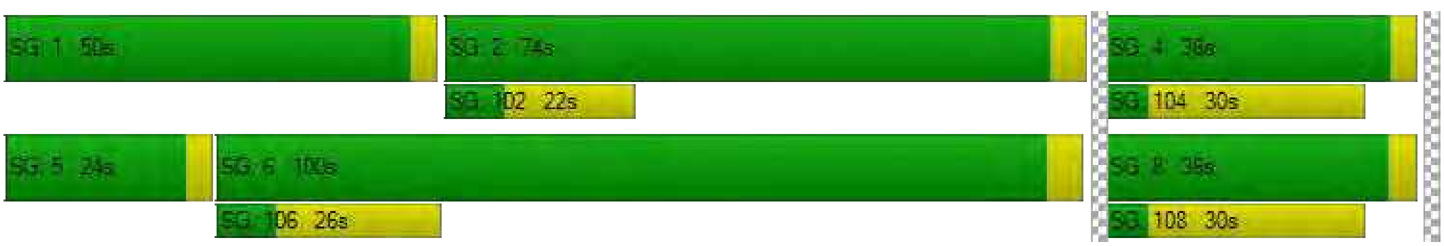
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 91.32 | 122.73 | 124.48 | 154.22 | 180.86 | 184.61 | 182.84 | 56.96 | 56.96 | 65.22 | 121.00 | 121.00 |
| Movement LOS | F | F | F | F | F | F | F | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 119.79 | | | 175.86 | | | 110.46 | | | 114.50 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 150.51 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.150 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 71.25 | 71.25 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.167 | 3.128 | 2.154 | 2.602 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1200 | 875 | 410 | 413 |
| d_b, Bicycle Delay [s] | 12.90 | 25.80 | 50.69 | 50.68 |
| I_b,int, Bicycle LOS Score for Intersection | 2.568 | 3.128 | 1.758 | 1.829 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 151.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.324 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 91 | 1221 | 1383 | 14 | 65 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 91 | 1221 | 1383 | 14 | 65 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 25 | 332 | 376 | 4 | 18 | 26 |
| Total Analysis Volume [veh/h] | 99 | 1327 | 1503 | 15 | 71 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 103 | 87 | 87 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.86 | 0.97 | 0.98 | 0.04 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 778 | 1744 | 779 |
| c, Capacity [veh/h] | 80 | 1230 | 525 | 523 | 262 | 117 |
| d1, Uniform Delay [s] | 58.39 | 13.24 | 21.26 | 21.26 | 48.87 | 53.80 |
| k, delay calibration | 0.26 | 0.50 | 0.50 | 0.50 | 0.04 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 151.08 | 49.72 | 211.05 | 213.64 | 0.20 | 39.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.24 | 1.08 | 1.45 | 1.45 | 0.27 | 0.88 |
| d, Delay for Lane Group [s/veh] | 209.47 | 62.96 | 232.31 | 234.90 | 49.07 | 92.88 |
| Lane Group LOS | F | F | F | F | D | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.93 | 20.66 | 44.38 | 44.58 | 2.07 | 4.55 |
| 50th-Percentile Queue Length [ft/ln] | 148.31 | 516.48 | 1109.58 | 1114.51 | 51.76 | 113.81 |
| 95th-Percentile Queue Length [veh/ln] | 10.64 | 30.00 | 70.82 | 71.24 | 3.73 | 8.05 |
| 95th-Percentile Queue Length [ft/ln] | 266.09 | 749.99 | 1770.58 | 1780.99 | 93.17 | 201.29 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 209.47 | 62.96 | 233.59 | 234.90 | 49.07 | 92.88 |
| Movement LOS | F | F | F | F | D | F |
| d_A, Approach Delay [s/veh] | 73.13 | | 233.60 | | 75.00 | |
| Approach LOS | E | | F | | E | |
| d_I, Intersection Delay [s/veh] | 151.36 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.324 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.107 | 3.098 | 2.051 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.736 | 2.812 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 57.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.109 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1316 | 713 | 42 | 1143 | 237 | 45 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1316 | 713 | 42 | 1143 | 237 | 45 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 350 | 190 | 11 | 304 | 63 | 12 |
| Total Analysis Volume [veh/h] | 1400 | 759 | 45 | 1216 | 252 | 48 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 100 | 100 | 4 | 107 | 15 | 15 |
| g / C, Green / Cycle | 0.77 | 0.77 | 0.03 | 0.83 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.90 | 0.51 | 0.03 | 0.81 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 1549 | 1480 | 1704 | 1494 | 1312 | 1630 |
| c, Capacity [veh/h] | 1193 | 1140 | 57 | 1236 | 154 | 192 |
| d1, Uniform Delay [s] | 14.92 | 6.73 | 62.26 | 10.43 | 56.27 | 56.30 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.09 | 0.09 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 87.12 | 3.09 | 8.38 | 22.05 | 10.91 | 9.50 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 0.67 | 0.78 | 0.98 | 0.86 | 0.87 |
| d, Delay for Lane Group [s/veh] | 102.04 | 9.82 | 70.64 | 32.48 | 67.18 | 65.80 |
| Lane Group LOS | F | A | E | C | E | E |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.31 | 8.37 | 1.59 | 13.29 | 4.77 | 5.88 |
| 50th-Percentile Queue Length [ft/ln] | 682.76 | 209.13 | 39.79 | 332.35 | 119.22 | 146.92 |
| 95th-Percentile Queue Length [veh/ln] | 40.84 | 13.11 | 2.86 | 19.27 | 8.35 | 9.85 |
| 95th-Percentile Queue Length [ft/ln] | 1020.98 | 327.71 | 71.61 | 481.84 | 208.76 | 246.31 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 102.04 | 9.82 | 70.64 | 32.48 | 66.55 | 65.80 |
| Movement LOS | F | A | E | C | E | E |
| d_A, Approach Delay [s/veh] | 69.62 | | 33.84 | | 66.42 | |
| Approach LOS | E | | C | | E | |
| d_I, Intersection Delay [s/veh] | 57.24 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.109 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.317 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.17 | 3.45 | 44.18 |
| I_b,int, Bicycle LOS Score for Intersection | 3.341 | 2.600 | 2.055 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 174.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.351 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 374 | 260 | 88 | 133 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 471 | 85 | 11 | 355 | 2 | 5 | 26 | 99 | 69 | 23 | 35 |
| Total Analysis Volume [veh/h] | 152 | 1884 | 340 | 43 | 1420 | 7 | 18 | 104 | 398 | 277 | 94 | 141 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 4 | 47 | 47 | 36 | 36 | 36 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.03 | 0.36 | 0.36 | 0.27 | 0.27 | 0.27 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.43 | 0.45 | 0.02 | 0.63 | 0.63 | 0.01 | 0.07 | 0.30 | 0.18 | 0.12 | 0.21 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1655 | 1781 | 1491 | 781 | 1420 | 1577 | 1322 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 176 | 1481 | 710 | 55 | 538 | 281 | 385 | 428 | 359 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 57.69 | 37.14 | 37.14 | 62.54 | 41.56 | 41.56 | 34.96 | 36.95 | 46.80 | 55.02 | 52.77 | 54.28 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.46 | 0.07 | 0.22 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.17 | 23.56 | 46.31 | 8.43 | 341.56 | 348.63 | 0.02 | 0.11 | 78.62 | 85.01 | 17.91 | 217.76 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.86 | 1.00 | 1.05 | 0.78 | 1.74 | 1.74 | 0.05 | 0.24 | 1.11 | 1.17 | 0.77 | 1.37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 62.85 | 60.69 | 83.45 | 70.97 | 383.12 | 390.19 | 34.97 | 37.06 | 125.42 | 140.02 | 70.68 | 272.04 |
| Lane Group LOS | E | F | F | E | F | F | C | D | F | F | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.11 | 27.34 | 30.69 | 1.55 | 34.12 | 36.28 | 0.43 | 2.61 | 19.19 | 6.64 | 3.56 | 9.52 |
| 50th-Percentile Queue Length [ft/ln] | 127.63 | 683.62 | 767.29 | 38.85 | 852.96 | 907.12 | 10.70 | 65.35 | 479.85 | 166.08 | 88.99 | 238.07 |
| 95th-Percentile Queue Length [veh/ln] | 8.81 | 35.94 | 41.14 | 2.80 | 56.41 | 59.69 | 0.77 | 4.71 | 28.04 | 11.58 | 6.41 | 16.41 |
| 95th-Percentile Queue Length [ft/ln] | 220.27 | 898.52 | 1028.58 | 69.93 | 1410.18 | 1492.16 | 19.25 | 117.63 | 701.12 | 289.54 | 160.18 | 410.20 |

**Movement, Approach, & Intersection Results**

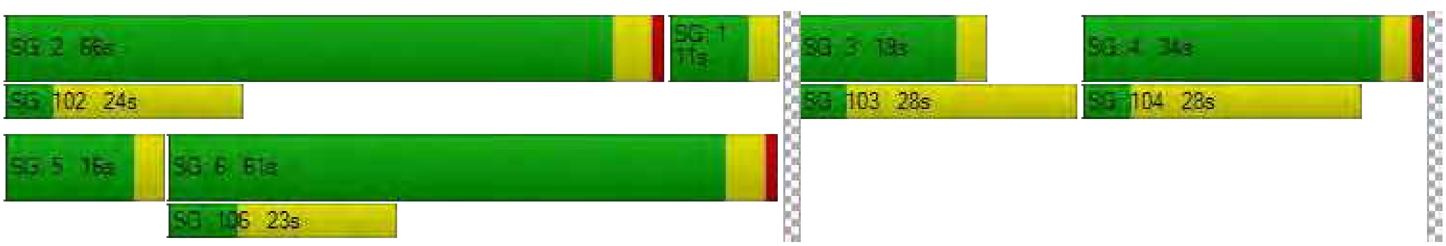
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.85 | 65.55 | 83.45 | 70.97 | 385.52 | 390.19 | 34.97 | 37.06 | 125.42 | 140.02 | 70.68 | 272.04 |
| Movement LOS | E | E | F | E | F | F | C | D | F | F | E | F |
| d_A, Approach Delay [s/veh] | 67.94 | | | 376.35 | | | 104.62 | | | 163.65 | | |
| Approach LOS | E | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 174.83 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.351 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.451 | 3.025 | 2.410 | 2.569 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.866 | 2.368 | 2.490 | 2.461 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 60.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.088 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1216 | 1202 | 570 | 438 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1216 | 1202 | 271 | 438 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 304 | 301 | 68 | 110 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1216 | 1202 | 271 | 438 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.46 | 0.43 | 0.22 | 0.47 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 21.55 | 27.29 | 20.97 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.18 | 0.15 | 0.16 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 6.14 | 46.69 | 1.44 | 108.70 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 0.94 | 1.09 | 0.55 | 1.19 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 27.68 | 73.98 | 22.40 | 135.99 | 0.00 |
| Lane Group LOS | D | C | F | C | F | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 12.25 | 18.12 | 4.35 | 18.63 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 306.33 | 453.02 | 108.74 | 465.63 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 17.99 | 26.62 | 7.77 | 28.61 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 449.85 | 665.50 | 194.25 | 715.37 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 27.68 | 73.98 | 22.40 | 135.99 | 0.00 |
| Movement LOS | D | C | F | C | F | A |
| d_A, Approach Delay [s/veh] | 28.83 | | 64.49 | | 135.99 | |
| Approach LOS | C | | E | | F | |
| d_I, Intersection Delay [s/veh] | 59.99 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.088 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.423 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.616 | 3.022 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 57.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.917 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 897 | 7 | 36 | 924 | 108 | 66 | 7 | 31 | 59 | 12 | 125 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 897 | 7 | 36 | 924 | 108 | 66 | 7 | 25 | 59 | 12 | 125 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 234 | 2 | 9 | 241 | 28 | 17 | 2 | 7 | 15 | 3 | 33 |
| Total Analysis Volume [veh/h] | 23 | 934 | 7 | 38 | 963 | 113 | 69 | 7 | 26 | 61 | 13 | 130 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 13 | 13 | 13 | 21 | 21 |
| g / C, Green / Cycle | 0.02 | 0.62 | 0.62 | 0.04 | 0.64 | 0.08 | 0.08 | 0.08 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.28 | 0.28 | 0.04 | 0.70 | 0.03 | 0.03 | 0.02 | 0.06 | 0.12 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1386 | 1334 | 952 | 1208 |
| c, Capacity [veh/h] | 23 | 902 | 1182 | 41 | 989 | 79 | 114 | 110 | 128 | 162 |
| d1, Uniform Delay [s] | 75.85 | 15.29 | 15.29 | 74.08 | 27.71 | 67.62 | 67.61 | 66.49 | 62.22 | 66.05 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 89.90 | 0.76 | 0.58 | 47.25 | 55.72 | 3.20 | 2.19 | 1.09 | 2.74 | 19.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.01 | 0.45 | 0.45 | 0.92 | 1.09 | 0.40 | 0.39 | 0.24 | 0.48 | 0.88 |
| d, Delay for Lane Group [s/veh] | 165.75 | 16.05 | 15.87 | 121.32 | 83.43 | 70.82 | 69.80 | 67.58 | 64.95 | 85.42 |
| Lane Group LOS | F | B | B | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.49 | 7.86 | 10.25 | 2.07 | 50.50 | 1.28 | 1.82 | 1.03 | 2.36 | 6.50 |
| 50th-Percentile Queue Length [ft/ln] | 37.28 | 196.39 | 256.22 | 51.74 | 1262.42 | 31.89 | 45.42 | 25.67 | 58.95 | 162.48 |
| 95th-Percentile Queue Length [veh/ln] | 2.68 | 12.45 | 15.50 | 3.73 | 66.93 | 2.30 | 3.27 | 1.85 | 4.24 | 10.68 |
| 95th-Percentile Queue Length [ft/ln] | 67.11 | 311.30 | 387.47 | 93.13 | 1673.16 | 57.41 | 81.76 | 46.21 | 106.11 | 267.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 165.75 | 15.95 | 15.87 | 121.32 | 83.43 | 83.43 | 70.27 | 69.80 | 67.58 | 64.95 | 85.42 | 85.42 |
| Movement LOS | F | B | B | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 19.52 | | | 84.72 | | | 69.55 | | | 79.30 | | |
| Approach LOS | B | | | F | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 57.25 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.917 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 67.02 | 67.02 | 67.02 | 67.02 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.567 | 2.783 | 2.186 | 2.035 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 258 | 258 | 386 | 386 |
| d_b, Bicycle Delay [s] | 58.98 | 58.95 | 50.68 | 50.58 |
| I_b,int, Bicycle LOS Score for Intersection | 2.355 | 3.398 | 1.738 | 1.896 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | | | |
|---|---|---|---|---|---|
| Control Type: | Signalized | | | Delay (sec / veh): | 23.9 |
| Analysis Method: | HCM 6th Edition | | | Level Of Service: | C |
| Analysis Period: | 15 minutes | | | Volume to Capacity (v/c): | 0.832 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 783 | 7 | 4 | 878 | 121 | 210 | 6 | 59 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 783 | 7 | 4 | 878 | 121 | 210 | 6 | 59 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 206 | 2 | 1 | 231 | 32 | 55 | 2 | 16 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 31 | 824 | 7 | 4 | 924 | 127 | 221 | 6 | 62 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 109 | 109 | 109 | 109 | 33 | 33 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.73 | 0.73 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.46 | 0.01 | 0.58 | 0.21 | 0.01 |
| s, saturation flow rate [veh/h] | 526 | 1826 | 671 | 1797 | 1389 | 1721 |
| c, Capacity [veh/h] | 222 | 1326 | 374 | 1305 | 347 | 404 |
| d1, Uniform Delay [s] | 35.73 | 10.33 | 19.93 | 13.56 | 57.34 | 45.96 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.34 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.31 | 2.25 | 0.05 | 5.39 | 14.80 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.14 | 0.63 | 0.01 | 0.81 | 0.83 | 0.02 |
| d, Delay for Lane Group [s/veh] | 37.04 | 12.58 | 19.98 | 18.94 | 72.14 | 45.98 |
| Lane Group LOS | D | B | B | B | E | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.91 | 14.20 | 0.08 | 23.59 | 12.22 | 0.27 |
| 50th-Percentile Queue Length [ft/ln] | 22.82 | 355.11 | 2.00 | 589.69 | 305.61 | 6.82 |
| 95th-Percentile Queue Length [veh/ln] | 1.64 | 20.39 | 0.14 | 31.55 | 17.96 | 0.49 |
| 95th-Percentile Queue Length [ft/ln] | 41.08 | 509.63 | 3.60 | 788.82 | 448.95 | 12.27 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 37.04 | 12.58 | 12.58 | 19.98 | 18.94 | 18.94 | 72.14 | 72.14 | 72.14 | 45.98 | 45.98 | 45.98 |
| Movement LOS | D | B | B | B | B | B | E | E | E | D | D | D |
| d_A, Approach Delay [s/veh] | 13.46 | | | 18.95 | | | 72.14 | | | 45.98 | | |
| Approach LOS | B | | | B | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 23.86 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.832 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.39 | 64.39 | 64.39 | 64.39 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.467 | 2.963 | 2.002 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.78 | 42.90 | 42.65 |
| I_b,int, Bicycle LOS Score for Intersection | 2.982 | 3.300 | 2.036 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.699 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 706 | 81 | 52 | 930 | 0 | 20 | 82 | 11 | 90 | 94 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 706 | 81 | 52 | 930 | 0 | 20 | 82 | 11 | 90 | 94 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 192 | 22 | 14 | 253 | 0 | 5 | 22 | 3 | 24 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 767 | 88 | 57 | 1011 | 0 | 22 | 89 | 12 | 98 | 102 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 117 | 117 | 117 | 117 | 25 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.78 | 0.78 | 0.78 | 0.78 | 0.17 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.48 | 0.09 | 0.55 | 0.02 | 0.05 | 0.08 | 0.12 |
| s, saturation flow rate [veh/h] | 566 | 1784 | 617 | 1846 | 1169 | 1839 | 1258 | 1710 |
| c, Capacity [veh/h] | 336 | 1390 | 400 | 1438 | 91 | 306 | 175 | 284 |
| d1, Uniform Delay [s] | 18.38 | 7.03 | 15.24 | 8.09 | 70.90 | 55.12 | 65.74 | 59.11 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.13 | 2.05 | 0.75 | 2.90 | 1.37 | 0.63 | 2.81 | 4.64 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.02 | 0.62 | 0.14 | 0.70 | 0.24 | 0.33 | 0.56 | 0.71 |
| d, Delay for Lane Group [s/veh] | 18.51 | 9.08 | 15.99 | 10.99 | 72.27 | 55.74 | 68.55 | 63.75 |
| Lane Group LOS | B | A | B | B | E | E | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.16 | 11.54 | 1.04 | 15.79 | 0.87 | 3.48 | 3.83 | 7.75 |
| 50th-Percentile Queue Length [ft/ln] | 3.92 | 288.53 | 25.99 | 394.87 | 21.86 | 86.99 | 95.86 | 193.82 |
| 95th-Percentile Queue Length [veh/ln] | 0.28 | 17.11 | 1.87 | 22.31 | 1.57 | 6.26 | 6.90 | 12.32 |
| 95th-Percentile Queue Length [ft/ln] | 7.06 | 427.82 | 46.78 | 557.81 | 39.35 | 156.59 | 172.56 | 307.98 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 18.51 | 9.08 | 9.08 | 15.99 | 10.99 | 10.99 | 72.27 | 55.74 | 55.74 | 68.55 | 63.75 | 63.75 |
| Movement LOS | B | A | A | B | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 9.16 | | | 11.26 | | | 58.70 | | | 65.31 | | |
| Approach LOS | A | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 19.88 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.699 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.641 | 2.584 | 2.039 | 2.190 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.85 | 4.86 | 48.32 | 48.32 |
| I_b,int, Bicycle LOS Score for Intersection | 2.984 | 3.322 | 1.763 | 2.056 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 62.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.585 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 271 | 135 | 374 | 124 | 446 | 125 | 346 | 170 | 350 | 359 | 21 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 271 | 16 | 374 | 124 | 0 | 125 | 346 | 170 | 350 | 359 | 21 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 71 | 4 | 97 | 32 | 0 | 33 | 90 | 44 | 91 | 93 | 5 |
| Total Analysis Volume [veh/h] | 28 | 282 | 17 | 390 | 129 | 0 | 130 | 360 | 177 | 365 | 374 | 22 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 26 | 26 | 26 | 61 | 61 | 61 | 19 | 19 | 19 | 19 | 26 | 26 | 26 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.17 | 0.41 | 0.41 | 0.41 | 0.13 | 0.13 | 0.13 | 0.13 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.15 | 0.01 | 0.14 | 0.14 | 0.00 | 0.07 | 0.10 | 0.10 | 0.11 | 0.15 | 0.15 | 0.15 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1442 | 1772 | 1813 | 1567 | 1774 | 1892 | 1851 | 1487 | 1734 | 1807 | 1635 |
| c, Capacity [veh/h] | 313 | 316 | 250 | 722 | 739 | 638 | 223 | 238 | 233 | 187 | 296 | 309 | 279 |
| d1, Uniform Delay [s] | 52.04 | 60.60 | 51.80 | 30.77 | 30.77 | 0.00 | 61.80 | 63.69 | 63.74 | 63.80 | 60.37 | 60.35 | 60.46 |
| k, delay calibration | 0.11 | 0.30 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.13 | 0.15 | 0.15 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 20.16 | 0.11 | 1.37 | 1.34 | 0.00 | 2.40 | 6.35 | 6.80 | 11.96 | 9.51 | 9.07 | 10.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.89 | 0.07 | 0.36 | 0.36 | 0.00 | 0.58 | 0.80 | 0.81 | 0.85 | 0.86 | 0.86 | 0.87 |
| d, Delay for Lane Group [s/veh] | 52.16 | 80.76 | 51.91 | 32.14 | 32.10 | 0.00 | 64.20 | 70.04 | 70.54 | 75.76 | 69.88 | 69.43 | 71.23 |
| Lane Group LOS | D | F | D | C | C | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.91 | 12.29 | 0.55 | 6.89 | 7.04 | 0.00 | 4.85 | 7.54 | 7.45 | 6.53 | 10.21 | 10.59 | 9.82 |
| 50th-Percentile Queue Length [ft/ln] | 22.69 | 307.25 | 13.75 | 172.24 | 176.05 | 0.00 | 121.2 | 188.4 | 186.2 | 163.1 | 255.31 | 264.74 | 245.51 |
| 95th-Percentile Queue Length [veh/ln] | 1.63 | 18.04 | 0.99 | 11.19 | 11.39 | 0.00 | 8.46 | 12.04 | 11.93 | 10.72 | 15.45 | 15.93 | 14.96 |
| 95th-Percentile Queue Length [ft/ln] | 40.84 | 450.98 | 24.75 | 279.86 | 284.85 | 0.00 | 211.5 | 300.9 | 298.1 | 267.9 | 386.33 | 398.16 | 374.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.16 | 80.76 | 51.91 | 32.12 | 32.10 | 0.00 | 64.20 | 70.28 | 75.76 | 69.74 | 70.49 | 71.23 |
| Movement LOS | D | F | D | C | C | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 76.81 | | | 32.12 | | | 70.40 | | | 70.15 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 62.50 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.585 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.45 | 63.45 | 63.45 | 63.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.501 | 4.289 | 4.316 | 2.743 |
| Crosswalk LOS | B | E | E | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 458 |
| d_b, Bicycle Delay [s] | 49.74 | 39.79 | 50.30 | 45.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.296 | 4.066 | 2.935 | 2.187 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 39.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.963 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1582 | 0 | 0 | 858 | 771 | 1101 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1582 | 0 | 0 | 858 | 771 | 1101 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 408 | 0 | 0 | 221 | 199 | 284 |
| Total Analysis Volume [veh/h] | 1631 | 0 | 0 | 885 | 795 | 1135 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.47 | 0.26 | 0.23 | 0.41 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 12.41 | 8.87 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.13 | 0.66 | 0.23 | 81.61 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.79 | 0.43 | 0.66 | 1.17 |
| d, Delay for Lane Group [s/veh] | 15.54 | 9.53 | 22.10 | 107.56 |
| Lane Group LOS | B | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.31 | 3.84 | 6.00 | 19.57 |
| 50th-Percentile Queue Length [ft/ln] | 257.71 | 95.95 | 149.89 | 489.29 |
| 95th-Percentile Queue Length [veh/ln] | 15.57 | 6.91 | 10.01 | 29.56 |
| 95th-Percentile Queue Length [ft/ln] | 389.35 | 172.71 | 250.29 | 738.99 |

**Movement, Approach, & Intersection Results**

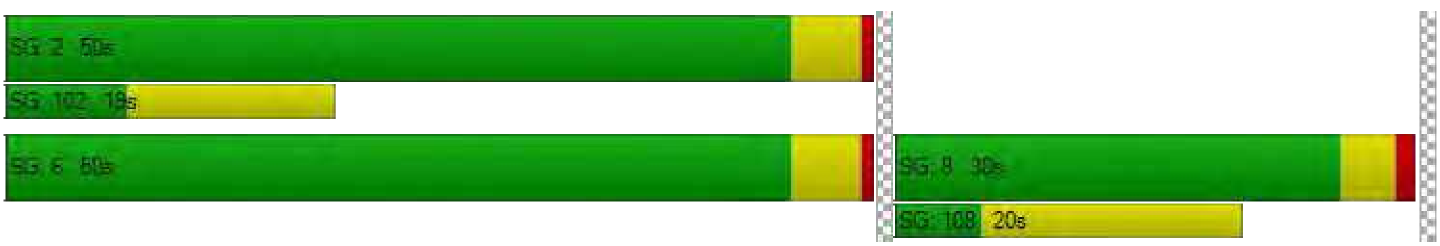
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.54 | 0.00 | 0.00 | 9.53 | 22.10 | 107.56 |
| Movement LOS | B | | | A | C | F |
| d_A, Approach Delay [s/veh] | 15.54 | | 9.53 | | 72.36 | |
| Approach LOS | B | | A | | E | |
| d_I, Intersection Delay [s/veh] | 39.01 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.963 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.017 | 2.595 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.905 | 2.290 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 10.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.380 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 59 | 3 | 16 | 31 | 11 | 12 | 13 | 8 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 236 | 10 | 64 | 123 | 44 | 47 | 52 | 31 | 24 | 56 | 146 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 685 | 684 | 647 | 704 |
| Degree of Utilization, x | 0.38 | 0.34 | 0.20 | 0.32 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 1.78 | 1.49 | 0.75 | 1.39 |
| 95th-Percentile Queue Length [ft] | 44.46 | 37.23 | 18.65 | 34.66 |
| Approach Delay [s/veh] | 11.45 | 10.92 | 9.96 | 10.51 |
| Approach LOS | B | B | A | B |
| Intersection Delay [s/veh] | 10.82 | | | |
| Intersection LOS | B | | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 56.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.835 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 289 | 3 | 8 | 2 | 2 | 89 | 77 | 528 | 133 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1155 | 10 | 31 | 7 | 8 | 354 | 308 | 2113 | 533 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.12 | 0.55 | 0.18 | 0.18 | 0.22 | 0.22 | 0.22 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.28 | 0.01 | 0.01 | 0.12 | 0.12 | 0.21 | 0.42 | 0.32 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1623 | 1480 | 1444 | 5075 | 1797 |
| c, Capacity [veh/h] | 211 | 2152 | 339 | 293 | 364 | 332 | 324 | 2122 | 751 |
| d1, Uniform Delay [s] | 70.11 | 25.23 | 54.28 | 54.32 | 54.51 | 54.51 | 60.61 | 46.42 | 39.62 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.11 | 0.11 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 46.58 | 0.97 | 0.03 | 0.04 | 1.15 | 1.26 | 28.34 | 18.59 | 6.99 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.93 | 0.54 | 0.07 | 0.08 | 0.52 | 0.52 | 0.95 | 1.00 | 0.76 |
| d, Delay for Lane Group [s/veh] | 116.68 | 26.19 | 54.31 | 54.36 | 55.67 | 55.78 | 88.95 | 65.00 | 46.60 |
| Lane Group LOS | F | C | D | D | E | E | F | E | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.78 | 9.97 | 0.86 | 0.78 | 6.89 | 6.29 | 14.80 | 31.36 | 20.53 |
| 50th-Percentile Queue Length [ft/ln] | 269.44 | 249.29 | 21.43 | 19.47 | 172.25 | 157.29 | 369.92 | 784.10 | 513.30 |
| 95th-Percentile Queue Length [veh/ln] | 16.16 | 15.15 | 1.54 | 1.40 | 11.19 | 10.41 | 21.11 | 40.55 | 27.96 |
| 95th-Percentile Queue Length [ft/ln] | 404.04 | 378.76 | 38.58 | 35.04 | 279.86 | 260.13 | 527.63 | 1013.71 | 699.08 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 116.68 | 116.68 | 26.19 | 54.31 | 54.34 | 54.36 | 55.67 | 55.72 | 88.95 | 65.00 | 46.60 | 46.60 |
| Movement LOS | F | F | C | D | D | D | E | E | F | E | D | D |
| d_A, Approach Delay [s/veh] | 39.38 | | | 54.33 | | | 71.00 | | | 61.11 | | |
| Approach LOS | D | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 56.25 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.835 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.496 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 3.790 | 1.599 | 2.112 | 5.983 |
| Bicycle LOS | D | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 82.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.618 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1115 | 623 | 0 | 1345 | 874 | 0 | 0 | 0 | 937 | 0 | 391 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1115 | 623 | 0 | 1345 | 874 | 0 | 0 | 0 | 937 | 0 | 391 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 287 | 156 | 0 | 347 | 225 | 0 | 0 | 0 | 234 | 0 | 109 |
| Total Analysis Volume [veh/h] | 0 | 1149 | 623 | 0 | 1387 | 901 | 0 | 0 | 0 | 937 | 0 | 434 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 46 | 46 | 46 | | 26 | 26 |
| g / C, Green / Cycle | 0.58 | 0.58 | 0.58 | | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.27 | 1.03 | | 0.27 | 0.15 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 2929 | 2929 | 508 | | 1125 | 915 |
| d1, Uniform Delay [s] | 9.13 | 9.72 | 16.31 | | 25.14 | 21.74 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.40 | 0.55 | 355.32 | | 1.68 | 0.38 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.39 | 0.47 | 1.77 | | 0.83 | 0.47 |
|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 9.52 | 10.27 | 371.63 | | 26.83 | 22.12 |
| Lane Group LOS | A | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.31 | 4.27 | 57.78 | | 8.05 | 3.17 |
| 50th-Percentile Queue Length [ft/ln] | 82.74 | 106.65 | 1444.57 | | 201.24 | 79.17 |
| 95th-Percentile Queue Length [veh/ln] | 5.96 | 7.65 | 95.89 | | 12.70 | 5.70 |
| 95th-Percentile Queue Length [ft/ln] | 148.93 | 191.33 | 2397.16 | | 317.57 | 142.51 |

**Movement, Approach, & Intersection Results**

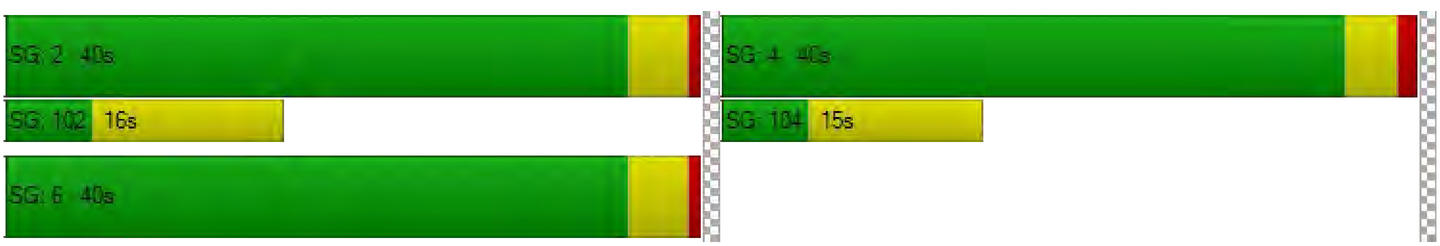
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 9.52 | 0.00 | 0.00 | 10.27 | 371.63 | 0.00 | 0.00 | 0.00 | 26.83 | 0.00 | 22.12 |
| Movement LOS | | A | | | B | F | | | | C | | C |
| d_A, Approach Delay [s/veh] | 9.52 | | | 152.57 | | | 0.00 | | | 25.34 | | |
| Approach LOS | A | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 82.11 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.618 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.003 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.192 | 2.818 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 122.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.556 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1548 | 508 | 0 | 1803 | 424 | 0 | 0 | 0 | 493 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1548 | 508 | 0 | 1803 | 424 | 0 | 0 | 0 | 493 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 399 | 131 | 0 | 465 | 106 | 0 | 0 | 0 | 123 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1596 | 524 | 0 | 1859 | 424 | 0 | 0 | 0 | 493 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.32 | 0.34 | 0.68 | | 0.14 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 17.75 | 18.04 | 21.97 | | 14.02 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.91 | 7.33 | 239.84 | | 0.11 | 113.55 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.75 | 1.52 | | 0.31 | 1.24 |
| d, Delay for Lane Group [s/veh] | 19.66 | 25.38 | 261.81 | | 14.13 | 135.26 |
| Lane Group LOS | B | C | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 7.68 | 8.71 | 33.99 | | 2.70 | 17.05 |
| 50th-Percentile Queue Length [ft/ln] | 192.03 | 217.82 | 849.68 | | 67.41 | 426.36 |
| 95th-Percentile Queue Length [veh/ln] | 12.23 | 13.55 | 55.00 | | 4.85 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 305.66 | 338.84 | 1374.96 | | 121.34 | 680.74 |

**Movement, Approach, & Intersection Results**

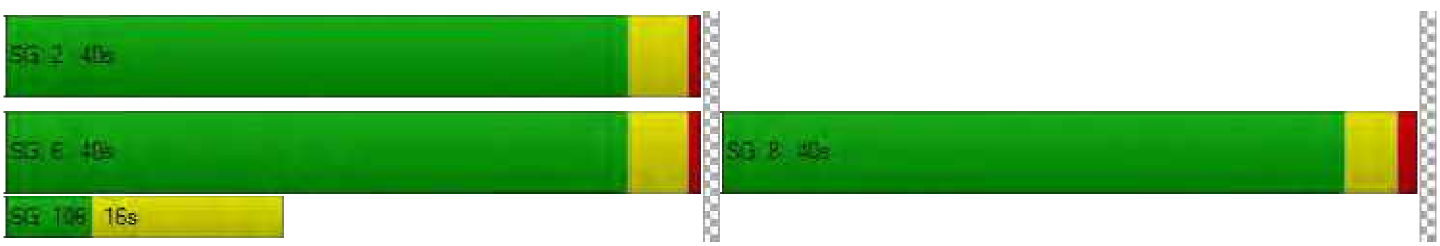
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 19.66 | 25.38 | 0.00 | 261.81 | 0.00 | 0.00 | 0.00 | 0.00 | 14.13 | 0.00 | 135.26 |
| Movement LOS | | B | C | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 21.07 | | | 261.81 | | | 0.00 | | | 91.67 | | |
| Approach LOS | C | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 122.82 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.556 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.726 | 2.582 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 195: Bayfront Expy/Chilco St

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 25.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.832 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 200 | 258 | 1731 | 547 | 480 | 2135 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 200 | 258 | 1731 | 547 | 480 | 2135 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 53 | 68 | 456 | 144 | 126 | 562 |
| Total Analysis Volume [veh/h] | 211 | 272 | 1822 | 576 | 505 | 2247 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 94 | 94 | 94 | 94 | 94 | 94 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 36 | 36 | 64 | 64 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.39 | 0.39 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.21 | 0.37 | 0.37 | 0.60 | 0.45 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 838 | 5020 |
| c, Capacity [veh/h] | 731 | 282 | 1919 | 598 | 596 | 3416 |
| d1, Uniform Delay [s] | 30.83 | 36.44 | 27.83 | 28.07 | 25.22 | 8.65 |
| k, delay calibration | 0.04 | 0.40 | 0.04 | 0.17 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.08 | 39.49 | 1.33 | 14.49 | 13.96 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.29 | 0.96 | 0.95 | 0.96 | 0.85 | 0.66 |
| d, Delay for Lane Group [s/veh] | 30.91 | 75.93 | 29.16 | 42.56 | 39.19 | 8.73 |
| Lane Group LOS | C | E | C | D | D | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.98 | 9.10 | 11.89 | 13.56 | 5.70 | 6.45 |
| 50th-Percentile Queue Length [ft/ln] | 49.49 | 227.55 | 297.31 | 338.88 | 142.51 | 161.33 |
| 95th-Percentile Queue Length [veh/ln] | 3.56 | 14.05 | 17.55 | 19.59 | 9.62 | 10.62 |
| 95th-Percentile Queue Length [ft/ln] | 89.08 | 351.24 | 438.70 | 489.83 | 240.40 | 265.48 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

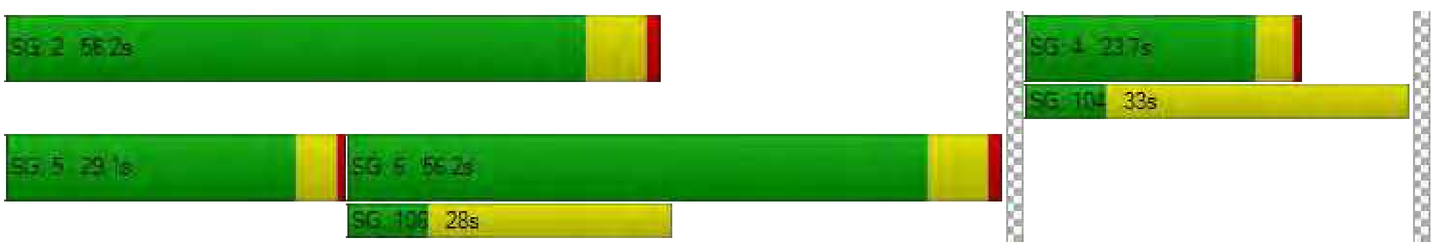
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.91 | 75.93 | 29.16 | 42.56 | 39.19 | 8.73 |
| Movement LOS | C | E | C | D | D | A |
| d_A, Approach Delay [s/veh] | 56.26 | | 32.38 | | 14.32 | |
| Approach LOS | E | | C | | B | |
| d_I, Intersection Delay [s/veh] | 25.60 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.832 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.40 | 36.40 | 36.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.001 | 3.713 | 3.608 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 428 | 1069 | 1069 |
| d_b, Bicycle Delay [s] | 28.89 | 10.12 | 10.12 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.879 | 3.073 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.672 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 186 | 71 | 1741 | 119 | 147 | 2234 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 186 | 71 | 1741 | 119 | 147 | 2234 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 48 | 18 | 449 | 31 | 38 | 576 |
| Total Analysis Volume [veh/h] | 192 | 73 | 1795 | 123 | 152 | 2303 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 40 | 40 | 40 | 40 | 40 | 40 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 16 | 16 | 4 | 24 |
| g / C, Green / Cycle | 0.12 | 0.12 | 0.40 | 0.40 | 0.11 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.05 | 0.36 | 0.08 | 0.08 | 0.46 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1493 | 1810 | 5024 |
| c, Capacity [veh/h] | 379 | 180 | 1963 | 591 | 197 | 3055 |
| d1, Uniform Delay [s] | 16.36 | 16.15 | 11.34 | 7.87 | 17.19 | 5.62 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.39 | 0.54 | 0.77 | 0.06 | 2.44 | 0.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.40 | 0.91 | 0.21 | 0.77 | 0.75 |
| d, Delay for Lane Group [s/veh] | 16.74 | 16.69 | 12.10 | 7.93 | 19.63 | 5.77 |
| Lane Group LOS | B | B | B | A | B | A |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.74 | 0.57 | 3.03 | 0.42 | 1.17 | 1.10 |
| 50th-Percentile Queue Length [ft/ln] | 18.43 | 14.13 | 75.67 | 10.56 | 29.19 | 27.61 |
| 95th-Percentile Queue Length [veh/ln] | 1.33 | 1.02 | 5.45 | 0.76 | 2.10 | 1.99 |
| 95th-Percentile Queue Length [ft/ln] | 33.18 | 25.44 | 136.21 | 19.01 | 52.54 | 49.69 |

**Movement, Approach, & Intersection Results**

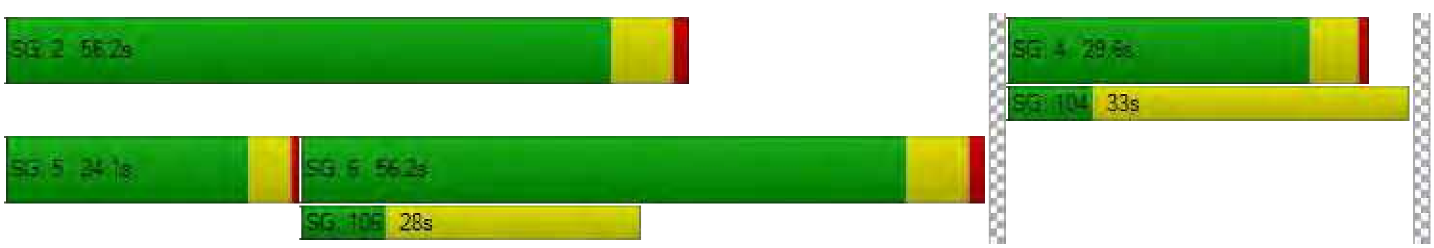
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.74 | 16.69 | 12.10 | 7.93 | 19.63 | 5.77 |
| Movement LOS | B | B | B | A | B | A |
| d_A, Approach Delay [s/veh] | 16.73 | | 11.84 | | 6.63 | |
| Approach LOS | B | | B | | A | |
| d_I, Intersection Delay [s/veh] | 9.36 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.672 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 10.31 | 10.31 | 10.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.192 | 3.483 | 3.448 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1264 | 2528 | 2528 |
| d_b, Bicycle Delay [s] | 2.68 | 1.38 | 1.38 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.615 | 2.910 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 199: Bayfront Expwy/Bldg 21

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 7.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.795 |

### Intersection Setup

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 48 | 37 | 1081 | 288 | 179 | 2250 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 48 | 37 | 1081 | 288 | 179 | 2250 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 10 | 282 | 75 | 47 | 586 |
| Total Analysis Volume [veh/h] | 50 | 39 | 1126 | 300 | 186 | 2344 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 31 | 31 | 31 | 31 | 31 | 31 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 3 | 10 | 10 | 18 | 18 |
| g / C, Green / Cycle | 0.09 | 0.09 | 0.33 | 0.33 | 0.59 | 0.59 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.04 | 0.27 | 0.23 | 0.12 | 0.52 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1597 | 4496 |
| c, Capacity [veh/h] | 104 | 94 | 1382 | 431 | 1168 | 2655 |
| d1, Uniform Delay [s] | 13.33 | 13.37 | 9.53 | 9.05 | 3.89 | 5.40 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.07 | 1.34 | 0.46 | 0.76 | 0.02 | 0.41 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.44 | 0.47 | 0.81 | 0.70 | 0.16 | 0.88 |
|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 14.40 | 14.70 | 9.98 | 9.81 | 3.92 | 5.81 |
| Lane Group LOS | B | B | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.26 | 0.26 | 1.18 | 0.94 | 0.00 | 0.10 |
| 50th-Percentile Queue Length [ft/ln] | 6.55 | 6.46 | 29.43 | 23.50 | 0.09 | 2.49 |
| 95th-Percentile Queue Length [veh/ln] | 0.47 | 0.47 | 2.12 | 1.69 | 0.01 | 0.18 |
| 95th-Percentile Queue Length [ft/ln] | 11.80 | 11.63 | 52.97 | 42.31 | 0.17 | 4.48 |

**Movement, Approach, & Intersection Results**

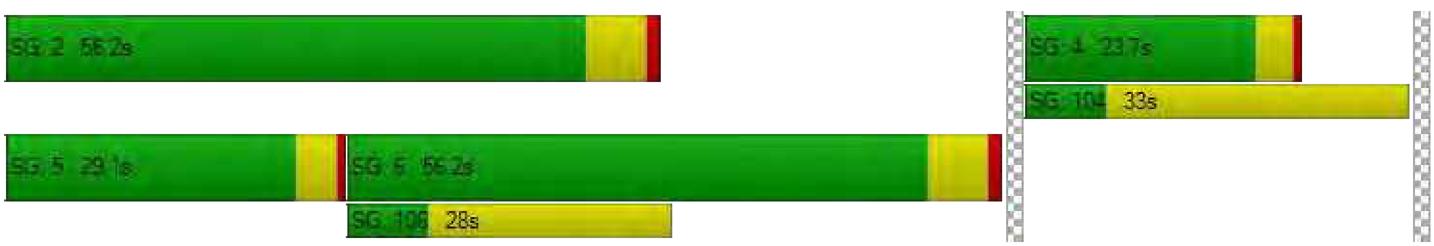
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.43 | 14.70 | 9.98 | 9.81 | 3.92 | 5.81 |
| Movement LOS | B | B | A | A | A | A |
| d_A, Approach Delay [s/veh] | 14.55 | | 9.95 | | 5.67 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.37 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.795 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 6.34 | 6.34 | 6.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.306 | 3.323 | 3.332 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1301 | 3252 | 3252 |
| d_b, Bicycle Delay [s] | 1.88 | 6.03 | 6.03 |
| I_b,int, Bicycle LOS Score for Intersection | 1.706 | 2.344 | 2.951 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 107.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.358 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 617 | 96 | 70 | 325 | 128 | 194 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 617 | 96 | 70 | 325 | 128 | 194 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 175 | 27 | 20 | 92 | 36 | 55 |
| Total Analysis Volume [veh/h] | 701 | 109 | 80 | 369 | 145 | 220 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 810 | 571 | 554 |
| Degree of Utilization, x | 1.36 | 0.79 | 0.66 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 35.30 | 7.41 | 4.81 |
| 95th-Percentile Queue Length [ft] | 882.55 | 185.36 | 120.28 |
| Approach Delay [s/veh] | 190.51 | 28.57 | 21.15 |
| Approach LOS | F | D | C |
| Intersection Delay [s/veh] | 107.67 | | |
| Intersection LOS | F | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 7.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.827 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 35 | 936 | 170 | 63 | 2538 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 35 | 936 | 170 | 63 | 2538 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 9 | 249 | 45 | 17 | 675 |
| Total Analysis Volume [veh/h] | 0 | 37 | 996 | 181 | 67 | 2700 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 56 | 56 | 56 | 56 | 56 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 36 | 36 | 44 | 44 |
| g / C, Green / Cycle | 0.05 | 0.64 | 0.64 | 0.78 | 0.78 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.24 | 0.14 | 0.11 | 0.61 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 633 | 4426 |
| c, Capacity [veh/h] | 21 | 2687 | 839 | 619 | 3432 |
| d1, Uniform Delay [s] | 26.79 | 4.89 | 4.34 | 1.89 | 3.65 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 344.25 | 0.03 | 0.05 | 0.03 | 0.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.73 | 0.37 | 0.22 | 0.11 | 0.79 |
| d, Delay for Lane Group [s/veh] | 371.04 | 4.92 | 4.38 | 1.92 | 3.80 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.33 | 0.93 | 0.46 | 0.00 | 0.05 |
| 50th-Percentile Queue Length [ft/ln] | 58.21 | 23.28 | 11.43 | 0.12 | 1.23 |
| 95th-Percentile Queue Length [veh/ln] | 4.19 | 1.68 | 0.82 | 0.01 | 0.09 |
| 95th-Percentile Queue Length [ft/ln] | 104.77 | 41.91 | 20.57 | 0.22 | 2.21 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 371.04 | 4.92 | 4.38 | 1.92 | 3.80 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 371.04 | | 4.84 | | 3.76 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.49 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.827 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 18.20 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.378 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 711 | 1778 | 1778 |
| d_b, Bicycle Delay [s] | 11.68 | 0.35 | 0.35 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.207 | 3.081 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.540 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 109 | 281 | 142 | 556 | 228 | 423 | 70 | 7 | 73 | 30 | 17 | 61 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 109 | 281 | 142 | 556 | 228 | 423 | 70 | 7 | 73 | 30 | 17 | 61 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 28 | 72 | 36 | 142 | 58 | 108 | 18 | 2 | 19 | 8 | 4 | 16 |
| Total Analysis Volume [veh/h] | 111 | 287 | 145 | 567 | 233 | 432 | 71 | 7 | 74 | 31 | 17 | 62 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 9 | 52 | 0 | 16 | 59 | 0 | 0 | 31 | 0 | 0 | 31 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C | R |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 68 | 68 | 68 | 68 | 68 | 68 | 68 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 6 | 25 | 14 | 34 | 8 | 4 | 4 |
| g / C, Green / Cycle | 0.08 | 0.37 | 0.21 | 0.50 | 0.12 | 0.06 | 0.06 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.26 | 0.17 | 0.40 | 0.04 | 0.03 | 0.03 |
| s, saturation flow rate [veh/h] | 1767 | 1664 | 3431 | 1664 | 1774 | 1761 | 1577 |
| c, Capacity [veh/h] | 147 | 613 | 724 | 825 | 213 | 114 | 102 |
| d1, Uniform Delay [s] | 30.43 | 18.29 | 25.31 | 14.36 | 27.49 | 30.68 | 30.74 |
| k, delay calibration | 0.11 | 0.15 | 0.11 | 0.38 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.54 | 2.05 | 1.90 | 6.41 | 1.05 | 3.28 | 4.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 0.70 | 0.78 | 0.81 | 0.37 | 0.49 | 0.53 |
| d, Delay for Lane Group [s/veh] | 37.98 | 20.34 | 27.22 | 20.77 | 28.54 | 33.96 | 34.90 |
| Lane Group LOS | D | C | C | C | C | C | C |
| Critical Lane Group | Yes | No | No | Yes | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.01 | 5.60 | 4.26 | 8.78 | 1.18 | 0.96 | 0.94 |
| 50th-Percentile Queue Length [ft/ln] | 50.27 | 139.99 | 106.41 | 219.46 | 29.45 | 24.00 | 23.40 |
| 95th-Percentile Queue Length [veh/ln] | 3.62 | 9.48 | 7.64 | 13.64 | 2.12 | 1.73 | 1.68 |
| 95th-Percentile Queue Length [ft/ln] | 90.49 | 237.01 | 191.00 | 340.93 | 53.01 | 43.19 | 42.12 |

**Movement, Approach, & Intersection Results**

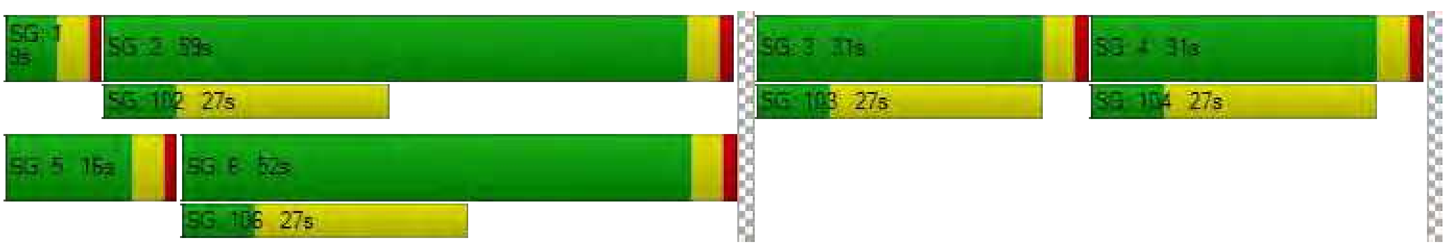
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 37.98 | 20.34 | 20.34 | 27.22 | 20.77 | 20.77 | 28.54 | 28.54 | 0.00 | 33.96 | 33.96 | 34.79 |
| Movement LOS | D | C | C | C | C | C | C | C | | C | C | C |
| d_A, Approach Delay [s/veh] | 23.95 | | | 23.74 | | | 28.54 | | | 34.42 | | |
| Approach LOS | C | | | C | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 24.58 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.540 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 23.77 | 23.77 | 23.77 | 23.77 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.187 | 2.606 | 2.132 | 2.318 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1417 | 1624 | 797 | 797 |
| d_b, Bicycle Delay [s] | 2.88 | 1.20 | 12.25 | 12.25 |
| I_b,int, Bicycle LOS Score for Intersection | 2.456 | 3.592 | 1.688 | 1.741 |
| Bicycle LOS | B | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 55.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.825 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 191 | 59 | 119 | 255 | 349 | 48 | 28 | 101 | 0 | 153 | 19 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 191 | 59 | 119 | 255 | 349 | 48 | 28 | 101 | 0 | 153 | 19 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 53 | 16 | 33 | 71 | 97 | 13 | 8 | 28 | 0 | 43 | 5 |
| Total Analysis Volume [veh/h] | 22 | 212 | 66 | 132 | 283 | 388 | 53 | 31 | 112 | 0 | 170 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 75 | 75 | 75 | 75 | 75 | 75 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 17 | 30 | 30 | 16 | 17 | 17 |
| g / C, Green / Cycle | 0.23 | 0.40 | 0.40 | 0.21 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.10 | 0.44 | 0.19 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 1481 | 1357 | 1539 | 1050 | 1378 | 1278 |
| c, Capacity [veh/h] | 393 | 541 | 614 | 222 | 365 | 294 |
| d1, Uniform Delay [s] | 27.83 | 15.06 | 22.61 | 28.75 | 23.85 | 24.02 |
| k, delay calibration | 0.11 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.12 | 0.23 | 64.44 | 10.99 | 0.39 | 0.61 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.76 | 0.24 | 1.09 | 0.88 | 0.27 | 0.32 |
|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 30.95 | 15.29 | 87.05 | 39.74 | 24.24 | 24.63 |
| Lane Group LOS | C | B | F | D | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.29 | 1.45 | 20.83 | 3.95 | 1.42 | 1.38 |
| 50th-Percentile Queue Length [ft/ln] | 132.16 | 36.13 | 520.67 | 98.73 | 35.44 | 34.43 |
| 95th-Percentile Queue Length [veh/ln] | 9.06 | 2.60 | 30.08 | 7.11 | 2.55 | 2.48 |
| 95th-Percentile Queue Length [ft/ln] | 226.43 | 65.03 | 752.07 | 177.72 | 63.80 | 61.97 |

**Movement, Approach, & Intersection Results**

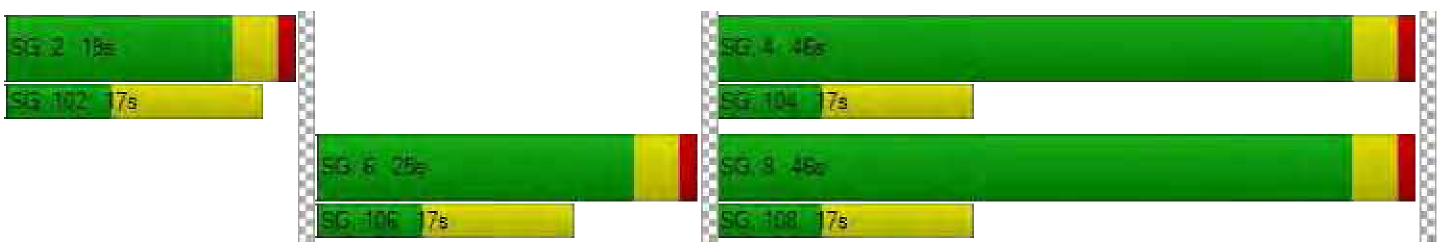
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.95 | 30.95 | 30.95 | 15.29 | 87.05 | 87.05 | 39.74 | 39.74 | 39.74 | 24.24 | 24.41 | 24.63 |
| Movement LOS | C | C | C | B | F | F | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 30.95 | | | 75.26 | | | 39.74 | | | 24.43 | | |
| Approach LOS | C | | | E | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 55.15 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.825 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 27.35 | 27.35 | 27.35 | 27.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.162 | 2.223 | 1.991 | 2.204 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1119 | 559 | 400 | 1119 |
| d_b, Bicycle Delay [s] | 7.29 | 19.48 | 24.04 | 7.29 |
| I_b,int, Bicycle LOS Score for Intersection | 2.055 | 2.885 | 1.883 | 1.717 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 62.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.322 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 72 | 86 | 164 | 752 | 28 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 72 | 86 | 164 | 752 | 28 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 23 | 28 | 53 | 244 | 9 |
| Total Analysis Volume [veh/h] | 38 | 94 | 112 | 213 | 977 | 36 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.32 | 0.32 | 0.17 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 62.49 | 44.28 | 11.42 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | E | B | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 3.81 | 3.81 | 0.59 | 0.59 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 95.30 | 95.30 | 14.86 | 14.86 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 49.52 | | 3.94 | | 0.00 | |
| Approach LOS | E | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.32 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.025 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 38 | 42 | 60 | 123 | 13 | 65 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 38 | 42 | 60 | 123 | 13 | 65 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 12 | 18 | 36 | 4 | 19 |
| Total Analysis Volume [veh/h] | 45 | 49 | 71 | 145 | 15 | 76 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.10 |
| d_M, Delay for Movement [s/veh] | 7.88 | 0.00 | 0.00 | 0.00 | 11.65 | 10.16 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.00 | 0.00 | 0.41 | 0.41 |
| 95th-Percentile Queue Length [ft/ln] | 2.70 | 2.70 | 0.00 | 0.00 | 10.20 | 10.20 |
| d_A, Approach Delay [s/veh] | 3.77 | | 0.00 | | 10.41 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 3.25 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.581 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1076 | 368 | 205 | 1255 | 293 | 59 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1076 | 368 | 205 | 1255 | 293 | 59 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 92 | 51 | 314 | 73 | 15 |
| Total Analysis Volume [veh/h] | 1076 | 368 | 205 | 1255 | 293 | 59 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 90 | 0 | 10 | 100 | 60 | 0 |
| Amber [s] | 3.5 | 0.0 | 3.5 | 3.5 | 3.5 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 81 | 0 | 24 | 105 | 55 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 77 | 77 | 20 | 101 | 51 | 51 |
| g / C, Green / Cycle | 0.48 | 0.48 | 0.12 | 0.63 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.39 | 0.42 | 0.06 | 0.35 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 1870 | 1716 | 3459 | 3560 | 1781 | 1711 |
| c, Capacity [veh/h] | 894 | 820 | 422 | 2236 | 562 | 540 |
| d1, Uniform Delay [s] | 35.49 | 37.62 | 65.58 | 17.09 | 41.66 | 41.68 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.75 | 12.99 | 3.97 | 1.02 | 1.49 | 1.56 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.88 | 0.49 | 0.56 | 0.32 | 0.32 |
| d, Delay for Lane Group [s/veh] | 43.24 | 50.61 | 69.55 | 18.11 | 43.16 | 43.24 |
| Lane Group LOS | D | D | E | B | D | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 25.28 | 27.71 | 4.12 | 13.10 | 5.72 | 5.52 |
| 50th-Percentile Queue Length [ft/ln] | 631.97 | 692.83 | 103.04 | 327.51 | 143.05 | 138.08 |
| 95th-Percentile Queue Length [veh/ln] | 33.52 | 36.35 | 7.42 | 19.04 | 9.65 | 9.38 |
| 95th-Percentile Queue Length [ft/ln] | 838.11 | 908.67 | 185.46 | 475.91 | 241.13 | 234.43 |

**Movement, Approach, & Intersection Results**

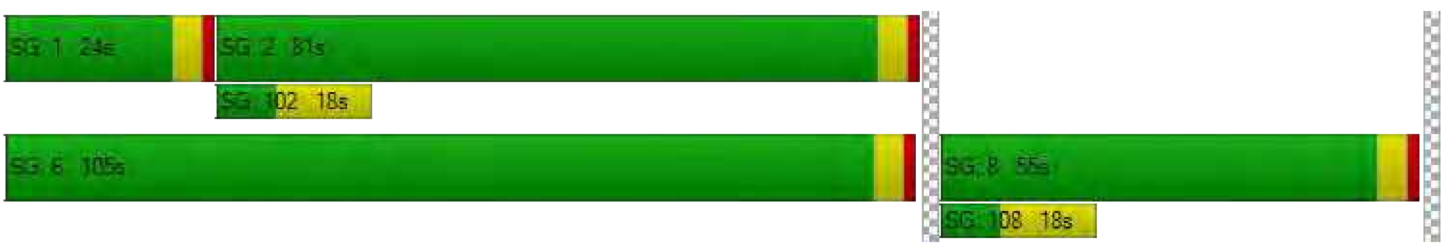
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 45.67 | 50.61 | 69.55 | 18.11 | 43.19 | 43.24 |
| Movement LOS | D | D | E | B | D | D |
| d_A, Approach Delay [s/veh] | 46.93 | | 25.33 | | 43.20 | |
| Approach LOS | D | | C | | D | |
| d_I, Intersection Delay [s/veh] | 36.84 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.581 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.38 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.131 | 3.042 | 2.384 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 956 | 1256 | 631 |
| d_b, Bicycle Delay [s] | 21.79 | 11.06 | 37.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.751 | 2.764 | 2.140 |
| Bicycle LOS | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 269: O'Brien Drive/Loop Road

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 7.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

### Intersection Setup

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

### Volumes

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 81 | 23 | 16 | 18 | 7 | 31 | 17 | 17 | 11 | 7 | 71 |
| Total Analysis Volume [veh/h] | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 261 | | | 86 | | | 180 | | | 473 | | |
| Exiting Flow Rate [veh/h] | 186 | | | 750 | | | 71 | | | 227 | | |
| Demand Flow Rate [veh/h] | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 |
| Adjusted Demand Flow Rate [veh/h] | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 440 | 166 | 268 | 363 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1058 | 1265 | 1150 | 852 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1037 | 1240 | 1127 | 835 |
| X, volume / capacity | 0.42 | 0.13 | 0.23 | 0.43 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | A | A | A |
| 95th-Percentile Queue Length [veh] | 2.08 | 0.45 | 0.90 | 2.14 |
| 95th-Percentile Queue Length [ft] | 51.95 | 11.24 | 22.54 | 53.57 |
| Approach Delay [s/veh] | 8.00 | 3.99 | 5.32 | 9.59 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 7.35 | | | |
| Intersection LOS | A | | | |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term + P AM.pdf

Scenario 18 Near-Term AM (2025 vols)+Project
12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 942 | 1462 | 1226 | 512 | 4142 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 31 | 1196 | 7 | 448 | 1239 | 310 | 13 | 4 | 58 | 238 | 19 | 0 | 3563 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 138 | 857 | 84 | 29 | 1030 | 422 | 607 | 56 | 165 | 35 | 16 | 25 | 3464 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 810 | 84 | 326 | 755 | 61 | 226 | 66 | 2 | 40 | 22 | 208 | 2600 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 503 | 495 | 433 | 480 | 104 | 2102 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 135 | 28 | 318 | 21 | 606 | 114 | 267 | 683 | 56 | 2254 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 864 | 67 | 1234 | 2778 | 205 | 416 | 5564 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 225 | 585 | 279 | 36 | 91 | 88 | 375 | 439 | 172 | 1122 | 2238 | 72 | 5722 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 111 | 946 | 80 | 337 | 1394 | 37 | 47 | 16 | 48 | 18 | 6 | 128 | 3168 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 91 | 1221 | 1383 | 14 | 65 | 95 | 2869 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1316 | 713 | 42 | 1143 | 237 | 45 | 3496 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 | 4664 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1216 | 1202 | 570 | 438 | 60 | 3551 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 897 | 7 | 36 | 924 | 108 | 66 | 7 | 31 | 59 | 12 | 125 | 2294 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 29 | 783 | 7 | 4 | 878 | 121 | 210 | 6 | 59 | 1 | 2 | 6 | 2106 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 706 | 81 | 52 | 930 | 0 | 20 | 82 | 11 | 90 | 94 | 93 | 2166 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 271 | 135 | 374 | 124 | 446 | 125 | 346 | 170 | 350 | 359 | 21 | 2748 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1582 | 858 | 771 | 1101 | 4312 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 | 741 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 | 4563 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1115 | 623 | 1345 | 874 | 937 | 391 | 5285 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1548 | 508 | 1803 | 424 | 493 | 789 | 5565 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 200 | 258 | 1731 | 547 | 480 | 2135 | 5351 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 186 | 71 | 1741 | 119 | 147 | 2234 | 4498 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 48 | 37 | 1081 | 288 | 179 | 2250 | 3883 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 617 | 96 | 70 | 325 | 128 | 194 | 1430 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 35 | 936 | 170 | 63 | 2538 | 3742 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 109 | 281 | 142 | 556 | 228 | 423 | 70 | 7 | 73 | 30 | 17 | 61 | 1997 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 20 | 191 | 59 | 119 | 255 | 349 | 48 | 28 | 101 | 0 | 153 | 19 | 1342 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 29 | 72 | 86 | 164 | 752 | 28 | 1131 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 38 | 42 | 60 | 123 | 13 | 65 | 341 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1076 | 368 | 205 | 1255 | 293 | 59 | 3256 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 | 1210 |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Near-Term + P AM.pdf

Scenario 18 Near-Term AM (2025 vols)+Project
12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 942 | 1462 | 1226 | 512 | 4142 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **942** | **1462** | **1226** | **512** | **4142** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 31 | 1196 | 7 | 448 | 1239 | 310 | 13 | 4 | 58 | 238 | 19 | 0 | 3563 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **31** | **1196** | **7** | **448** | **1239** | **310** | **13** | **4** | **58** | **238** | **19** | **0** | **3563** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 138 | 857 | 84 | 29 | 1030 | 422 | 607 | 56 | 165 | 35 | 16 | 25 | 3464 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **138** | **857** | **84** | **29** | **1030** | **422** | **607** | **56** | **165** | **35** | **16** | **25** | **3464** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 810 | 84 | 326 | 755 | 61 | 226 | 66 | 2 | 40 | 22 | 208 | 2600 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **810** | **84** | **326** | **755** | **61** | **226** | **66** | **2** | **40** | **22** | **208** | **2600** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 503 | 495 | 433 | 480 | 104 | 2102 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **503** | **495** | **433** | **480** | **104** | **2102** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 135 | 28 | 318 | 21 | 606 | 114 | 267 | 683 | 56 | 2254 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **135** | **28** | **318** | **21** | **606** | **114** | **267** | **683** | **56** | **2254** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 864 | 67 | 1234 | 2778 | 205 | 416 | 5564 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **864** | **67** | **1234** | **2778** | **205** | **416** | **5564** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 225 | 585 | 279 | 36 | 91 | 88 | 375 | 439 | 172 | 1122 | 2238 | 72 | 5722 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **225** | **585** | **279** | **36** | **91** | **88** | **375** | **439** | **172** | **1122** | **2238** | **72** | **5722** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 111 | 946 | 80 | 337 | 1394 | 37 | 47 | 16 | 48 | 18 | 6 | 128 | 3168 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **111** | **946** | **80** | **337** | **1394** | **37** | **47** | **16** | **48** | **18** | **6** | **128** | **3168** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 91 | 1221 | 1383 | 14 | 65 | 95 | 2869 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **91** | **1221** | **1383** | **14** | **65** | **95** | **2869** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1316 | 713 | 42 | 1143 | 237 | 45 | 3496 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1316** | **713** | **42** | **1143** | **237** | **45** | **3496** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 | 4664 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1771** | **320** | **40** | **1335** | **7** | **17** | **98** | **418** | **260** | **88** | **167** | **4664** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1216 | 1202 | 570 | 438 | 60 | 3551 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1216** | **1202** | **570** | **438** | **60** | **3551** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 897 | 7 | 36 | 924 | 108 | 66 | 7 | 31 | 59 | 12 | 125 | 2294 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **897** | **7** | **36** | **924** | **108** | **66** | **7** | **31** | **59** | **12** | **125** | **2294** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 29 | 783 | 7 | 4 | 878 | 121 | 210 | 6 | 59 | 1 | 2 | 6 | 2106 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **783** | **7** | **4** | **878** | **121** | **210** | **6** | **59** | **1** | **2** | **6** | **2106** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 706 | 81 | 52 | 930 | 0 | 20 | 82 | 11 | 90 | 94 | 93 | 2166 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **706** | **81** | **52** | **930** | **0** | **20** | **82** | **11** | **90** | **94** | **93** | **2166** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 271 | 135 | 374 | 124 | 446 | 125 | 346 | 170 | 350 | 359 | 21 | 2748 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **271** | **135** | **374** | **124** | **446** | **125** | **346** | **170** | **350** | **359** | **21** | **2748** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1582 | 858 | 771 | 1101 | 4312 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1582** | **858** | **771** | **1101** | **4312** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 | 741 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **226** | **10** | **51** | **98** | **35** | **37** | **41** | **24** | **22** | **51** | **133** | **741** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 | 4563 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1109** | **10** | **30** | **7** | **8** | **340** | **296** | **2028** | **512** | **34** | **4563** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1115 | 623 | 1345 | 874 | 937 | 391 | 5285 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1115** | **623** | **1345** | **874** | **937** | **391** | **5285** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1548 | 508 | 1803 | 424 | 493 | 789 | 5565 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1548** | **508** | **1803** | **424** | **493** | **789** | **5565** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 200 | 258 | 1731 | 547 | 480 | 2135 | 5351 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **200** | **258** | **1731** | **547** | **480** | **2135** | **5351** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 186 | 71 | 1741 | 119 | 147 | 2234 | 4498 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **186** | **71** | **1741** | **119** | **147** | **2234** | **4498** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 48 | 37 | 1081 | 288 | 179 | 2250 | 3883 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **37** | **1081** | **288** | **179** | **2250** | **3883** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 617 | 96 | 70 | 325 | 128 | 194 | 1430 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **617** | **96** | **70** | **325** | **128** | **194** | **1430** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 35 | 936 | 170 | 63 | 2538 | 3742 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **35** | **936** | **170** | **63** | **2538** | **3742** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 109 | 281 | 142 | 556 | 228 | 423 | 70 | 7 | 73 | 30 | 17 | 61 | 1997 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **109** | **281** | **142** | **556** | **228** | **423** | **70** | **7** | **73** | **30** | **17** | **61** | **1997** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 20 | 191 | 59 | 119 | 255 | 349 | 48 | 28 | 101 | 0 | 153 | 19 | 1342 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **191** | **59** | **119** | **255** | **349** | **48** | **28** | **101** | **0** | **153** | **19** | **1342** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 29 | 72 | 86 | 164 | 752 | 28 | 1131 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **72** | **86** | **164** | **752** | **28** | **1131** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 38 | 42 | 60 | 123 | 13 | 65 | 341 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **38** | **42** | **60** | **123** | **13** | **65** | **341** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1076 | 368 | 205 | 1255 | 293 | 59 | 3256 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1076** | **368** | **205** | **1255** | **293** | **59** | **3256** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 14 | 325 | 92 | 62 | 71 | 29 | 125 | 69 | 68 | 43 | 27 | 285 | 1210 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **14** | **325** | **92** | **62** | **71** | **29** | **125** | **69** | **68** | **43** | **27** | **285** | **1210** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 249 | 184 | 206 | 102 |
| 2 | 242 | 178 | 200 | 99 |
| 3 | 237 | 175 | 196 | 97 |
| 4 | 222 | 164 | 183 | 91 |
| 5 | 197 | 145 | 163 | 81 |
| 6 | 194 | 144 | 161 | 80 |
| 7 | 192 | 142 | 159 | 79 |
| 8 | 174 | 129 | 144 | 71 |
| 9 | 172 | 127 | 142 | 70 |
| 10 | 169 | 125 | 140 | 69 |
| 11 | 147 | 109 | 122 | 60 |
| 12 | 137 | 101 | 113 | 56 |
| 13 | 134 | 99 | 111 | 55 |
| 14 | 100 | 74 | 82 | 41 |
| 15 | 100 | 74 | 82 | 41 |
| 16 | 70 | 52 | 58 | 29 |
| 17 | 40 | 29 | 33 | 16 |
| 18 | 40 | 29 | 33 | 16 |
| 19 | 22 | 17 | 19 | 9 |
| 20 | 12 | 9 | 10 | 5 |
| 21 | 7 | 6 | 6 | 3 |
| 22 | 2 | 2 | 2 | 1 |
| 23 | 2 | 2 | 2 | 1 |
| 24 | 2 | 2 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 433 | 1 | 206 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 2 | 1 | 420 | 1 | 200 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 3 | 1 | 412 | 1 | 196 | No | Yes | Yes | Yes | No | No | No | No | No | No |
| 4 | 1 | 386 | 1 | 183 | No | No | Yes | Yes | No | No | No | No | No | No |
| 5 | 1 | 342 | 1 | 163 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 338 | 1 | 161 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 334 | 1 | 159 | No | No | No | Yes | No | No | No | No | No | No |
| 8 | 1 | 303 | 1 | 144 | No | No | No | Yes | No | No | No | No | No | No |
| 9 | 1 | 299 | 1 | 142 | No | No | No | Yes | No | No | No | No | No | No |
| 10 | 1 | 294 | 1 | 140 | No | No | No | Yes | No | No | No | No | No | No |
| 11 | 1 | 256 | 1 | 122 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 238 | 1 | 113 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 233 | 1 | 111 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 174 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 174 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 122 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 69 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 69 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 39 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 21 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 13 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 3 | 4 | 10 | 0 | 0 | 0 | 2 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.5 | 10 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:36 | 0:16 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 206 | 102 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 741 | 741 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 395 | 713 | 322 |
| 2 | 383 | 692 | 312 |
| 3 | 375 | 677 | 306 |
| 4 | 352 | 635 | 287 |
| 5 | 312 | 563 | 254 |
| 6 | 308 | 556 | 251 |
| 7 | 304 | 549 | 248 |
| 8 | 277 | 499 | 225 |
| 9 | 273 | 492 | 222 |
| 10 | 269 | 485 | 219 |
| 11 | 233 | 421 | 190 |
| 12 | 217 | 392 | 177 |
| 13 | 213 | 385 | 174 |
| 14 | 158 | 285 | 129 |
| 15 | 158 | 285 | 129 |
| 16 | 111 | 200 | 90 |
| 17 | 63 | 114 | 52 |
| 18 | 63 | 114 | 52 |
| 19 | 36 | 64 | 29 |
| 20 | 20 | 36 | 16 |
| 21 | 12 | 21 | 10 |
| 22 | 4 | 7 | 3 |
| 23 | 4 | 7 | 3 |
| 24 | 4 | 7 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1108 | 1 | 322 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1075 | 1 | 312 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1052 | 1 | 306 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 987 | 1 | 287 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 875 | 1 | 254 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 864 | 1 | 251 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 853 | 1 | 248 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 776 | 1 | 225 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 765 | 1 | 222 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 754 | 1 | 219 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 654 | 1 | 190 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 609 | 1 | 177 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 598 | 1 | 174 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 14 | 1 | 443 | 1 | 129 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 443 | 1 | 129 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 311 | 1 | 90 | No | No | No | Yes | No | No | No | No | No | No |
| 17 | 1 | 177 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 177 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 100 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 56 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 33 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 11 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 11 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 11 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 15 | 15 | 16 | 10 | 12 | 13 | 15 | 10 | 3 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | E |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 21.2 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:53 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 322 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1430 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 780 | 250 | 101 |
| 2 | 757 | 243 | 98 |
| 3 | 741 | 238 | 96 |
| 4 | 694 | 223 | 90 |
| 5 | 616 | 198 | 80 |
| 6 | 608 | 195 | 79 |
| 7 | 601 | 193 | 78 |
| 8 | 546 | 175 | 71 |
| 9 | 538 | 173 | 70 |
| 10 | 530 | 170 | 69 |
| 11 | 460 | 148 | 60 |
| 12 | 429 | 138 | 56 |
| 13 | 421 | 135 | 55 |
| 14 | 312 | 100 | 40 |
| 15 | 312 | 100 | 40 |
| 16 | 218 | 70 | 28 |
| 17 | 125 | 40 | 16 |
| 18 | 125 | 40 | 16 |
| 19 | 70 | 23 | 9 |
| 20 | 39 | 13 | 5 |
| 21 | 23 | 8 | 3 |
| 22 | 8 | 3 | 1 |
| 23 | 8 | 3 | 1 |
| 24 | 8 | 3 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1030 | 1 | 101 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1000 | 1 | 98 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 3 | 1 | 979 | 1 | 96 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 4 | 1 | 917 | 1 | 90 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 5 | 1 | 814 | 1 | 80 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 6 | 1 | 803 | 1 | 79 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 7 | 1 | 794 | 1 | 78 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 8 | 1 | 721 | 1 | 71 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 711 | 1 | 70 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 10 | 1 | 700 | 1 | 69 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 11 | 1 | 608 | 1 | 60 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 567 | 1 | 56 | No | No | No | No | No | No | Yes | Yes | No | No |
| 13 | 1 | 556 | 1 | 55 | No | No | No | No | No | No | Yes | Yes | No | No |
| 14 | 1 | 412 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 412 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 288 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 165 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 165 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 93 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 52 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 31 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 11 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 11 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 11 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 7 | 11 | 13 | 13 | 1 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 49.5 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:23 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 101 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1131 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 80 | 183 | 78 |
| 2 | 78 | 178 | 76 |
| 3 | 76 | 174 | 74 |
| 4 | 71 | 163 | 69 |
| 5 | 63 | 145 | 62 |
| 6 | 62 | 143 | 61 |
| 7 | 62 | 141 | 60 |
| 8 | 56 | 128 | 55 |
| 9 | 55 | 126 | 54 |
| 10 | 54 | 124 | 53 |
| 11 | 47 | 108 | 46 |
| 12 | 44 | 101 | 43 |
| 13 | 43 | 99 | 42 |
| 14 | 32 | 73 | 31 |
| 15 | 32 | 73 | 31 |
| 16 | 22 | 51 | 22 |
| 17 | 13 | 29 | 12 |
| 18 | 13 | 29 | 12 |
| 19 | 7 | 16 | 7 |
| 20 | 4 | 9 | 4 |
| 21 | 2 | 5 | 2 |
| 22 | 1 | 2 | 1 |
| 23 | 1 | 2 | 1 |
| 24 | 1 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 263 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 256 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 250 | 1 | 74 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 234 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 208 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 205 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 203 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 184 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 181 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 178 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 155 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 145 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 142 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 105 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 105 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 73 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 42 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 42 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 23 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 13 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 78 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 341 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

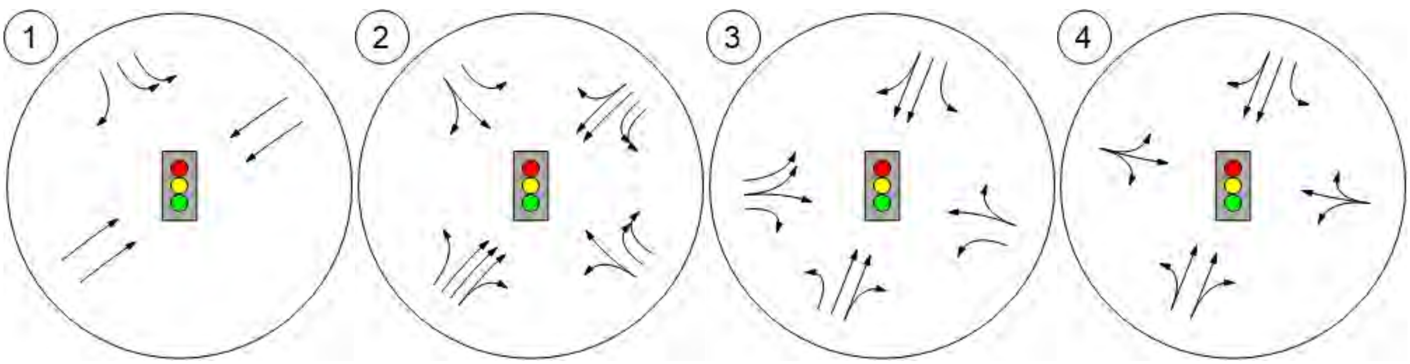
Study Intersections

Generated with PTV VISTRO

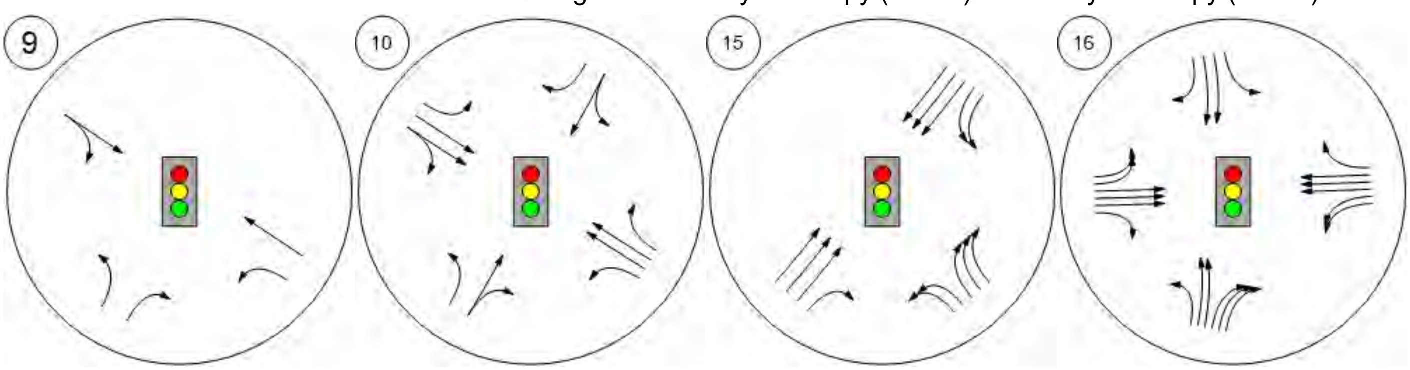
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

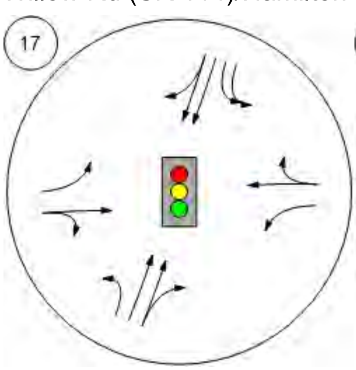


Generated with PTV VISTRO

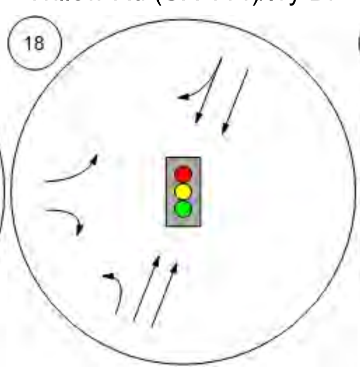
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

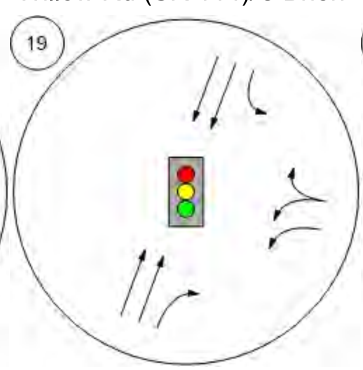

Willow Rd (SR 114)/Hamilton



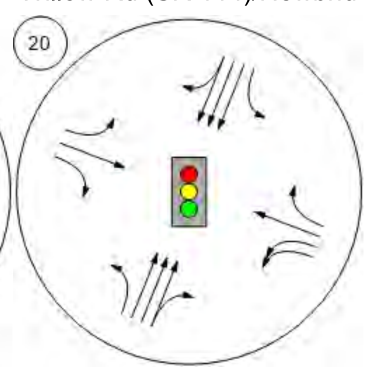

Willow Rd (SR 114)/Ivy Dr



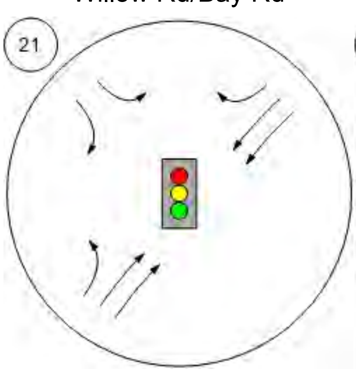

Willow Rd (SR 114)/O'Brien



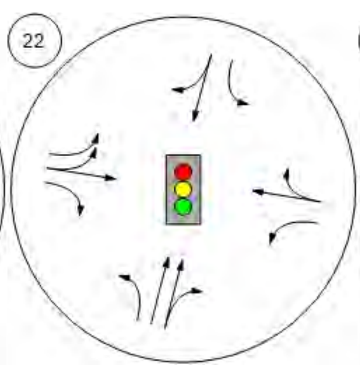

Willow Rd (SR 114)/Newbrid



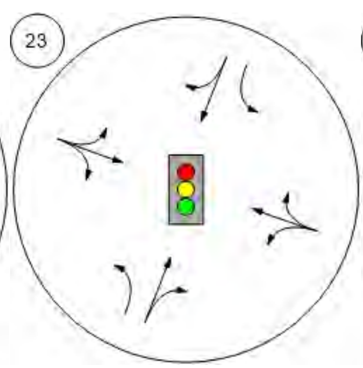

Willow Rd/Bay Rd



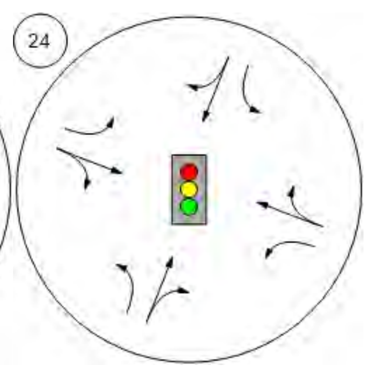

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



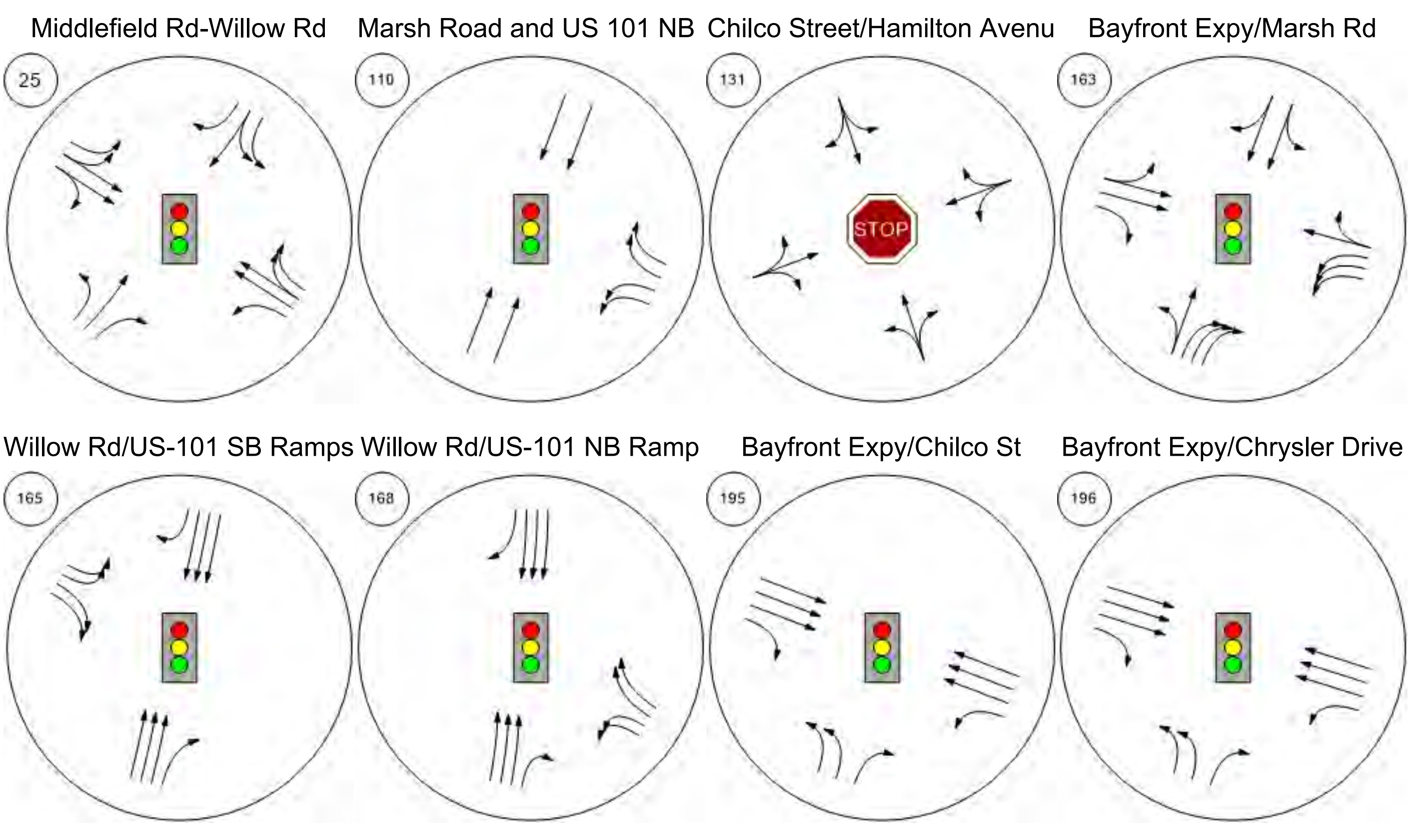

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-6)

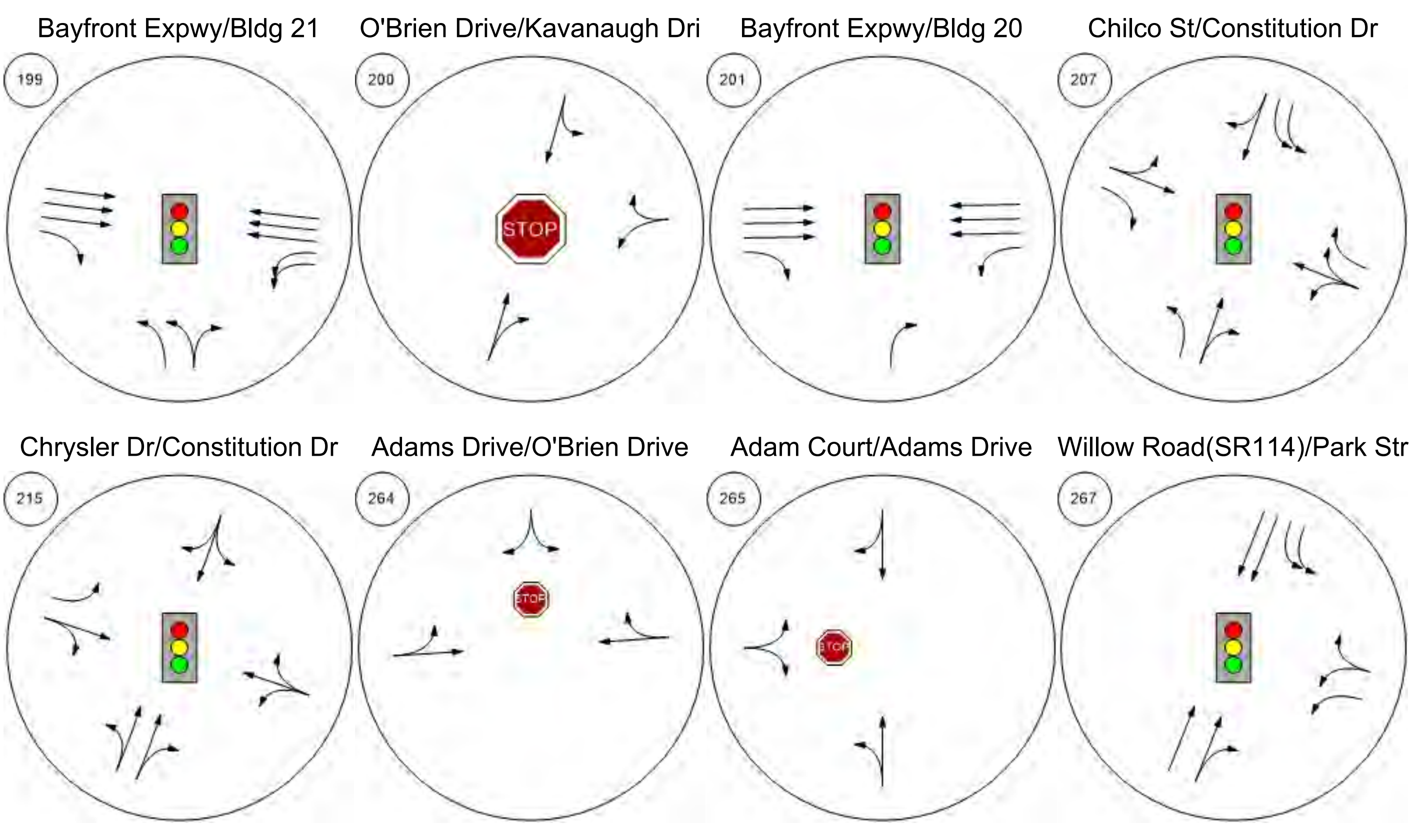
Lane Configuration and Traffic Control

Generated with PTV VISTRO

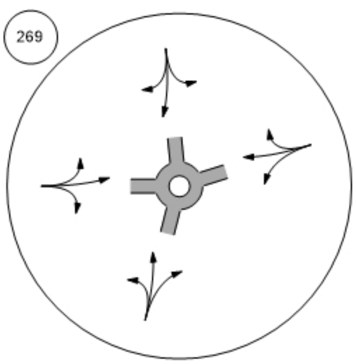
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

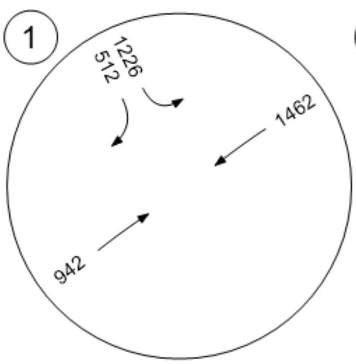


Generated with PTV VISTRO

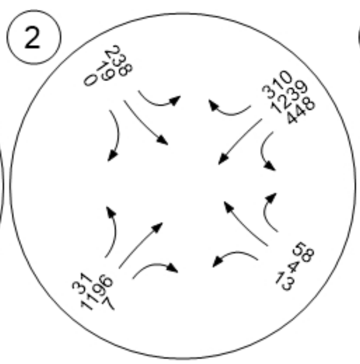
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

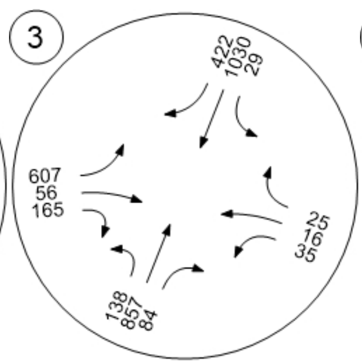

Marsh Rd (SR 84)/US 101 S



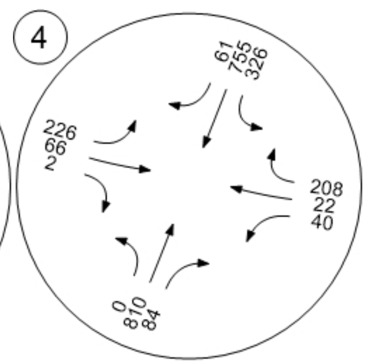

Marsh Rd/Rolison Rd-Scott D



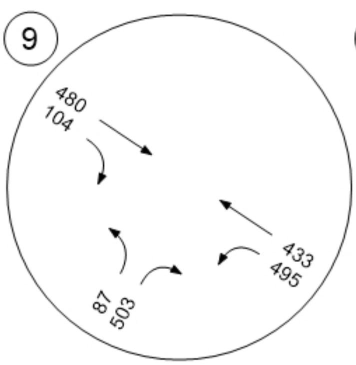

Marsh Rd/Florence St-Bohan



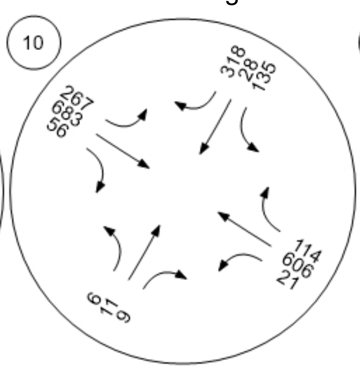

Marsh Rd/Bay Rd



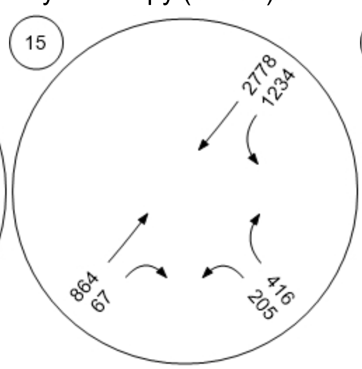

Middlefield Rd/Ravenswood



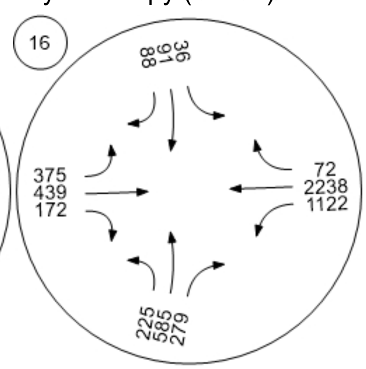

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

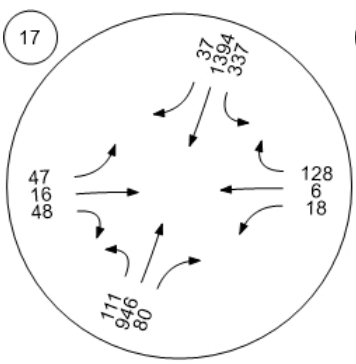


Generated with PTV VISTRO

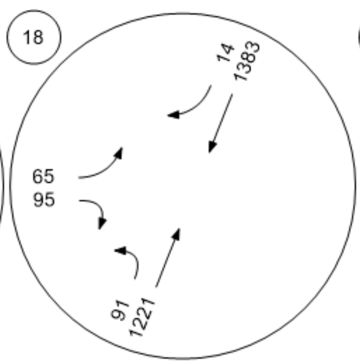
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

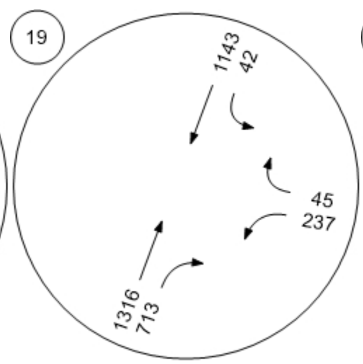

Willow Rd (SR 114)/Hamilton



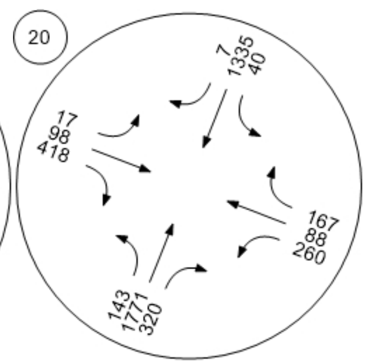

Willow Rd (SR 114)/Ivy Dr



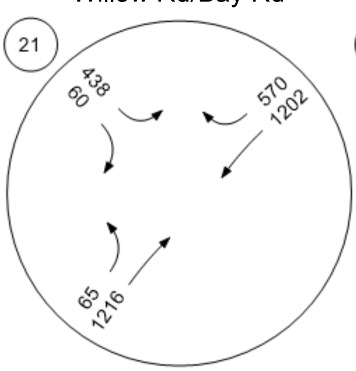

Willow Rd (SR 114)/O'Brien



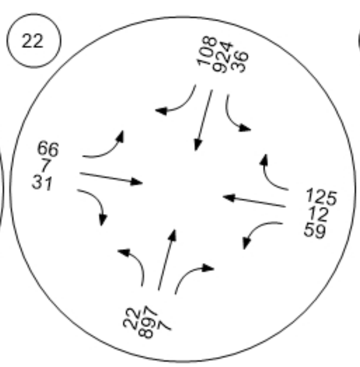

Willow Rd (SR 114)/Newbrid



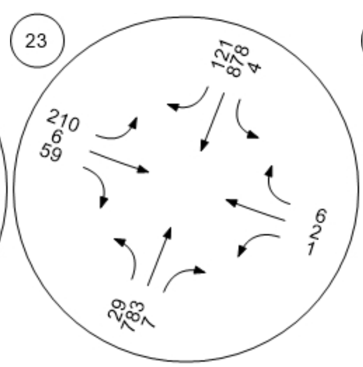

Willow Rd/Bay Rd



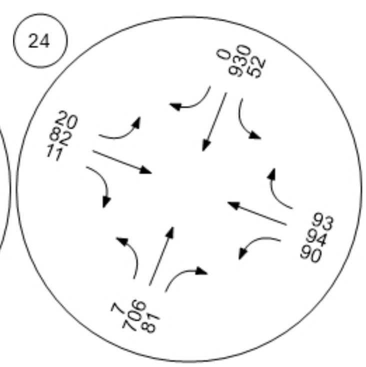

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

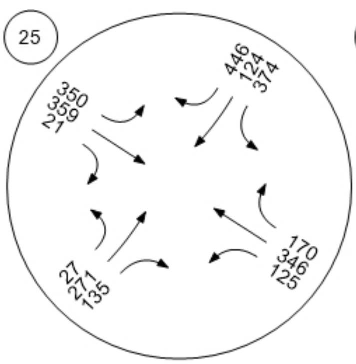


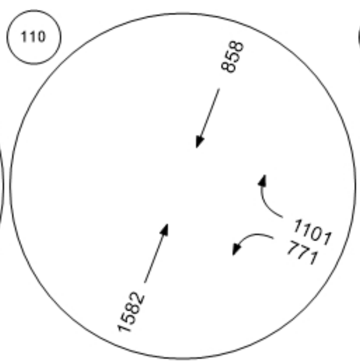
Generated with PTV VISTRO

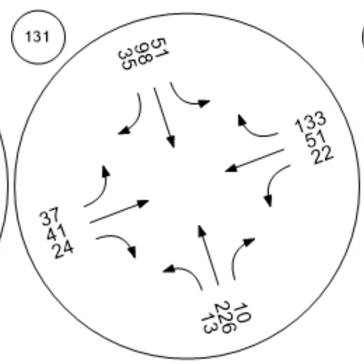
Version 2021 (SP 0-6)

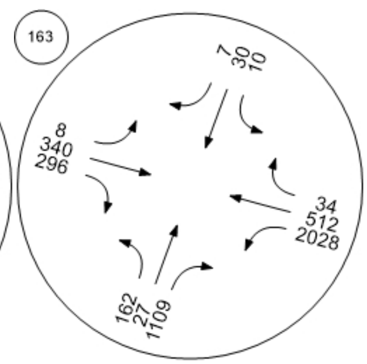
Traffic Volume - Base Volume


Middlefield Rd-Willow Rd | Marsh Road and US 101 NB | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd

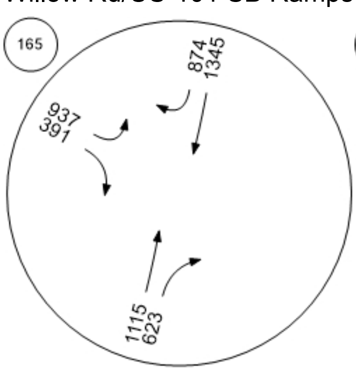


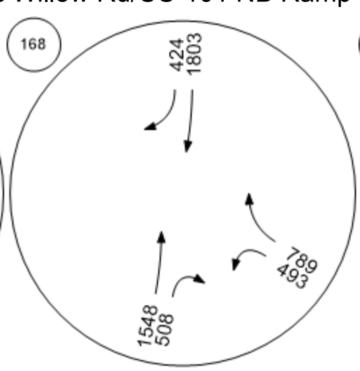



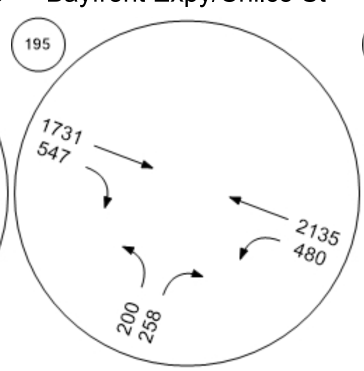



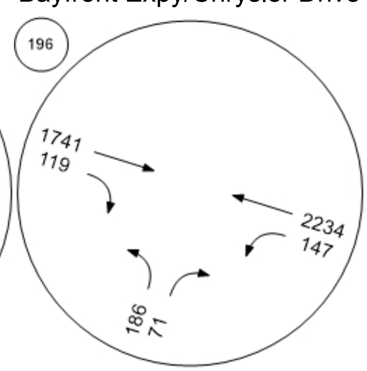




Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive



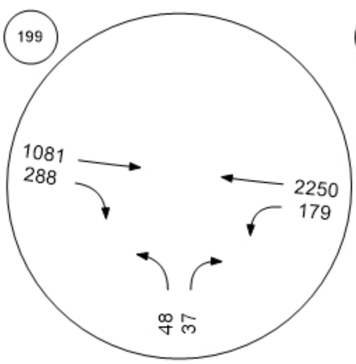



Generated with PTV VISTRO

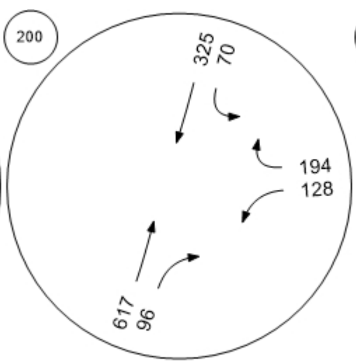
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

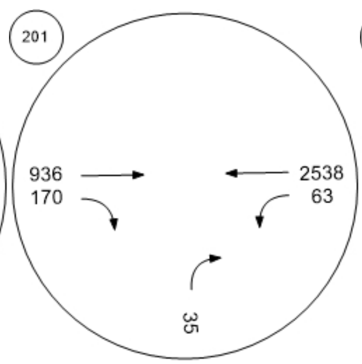

### Bayfront Expwy/Bldg 21



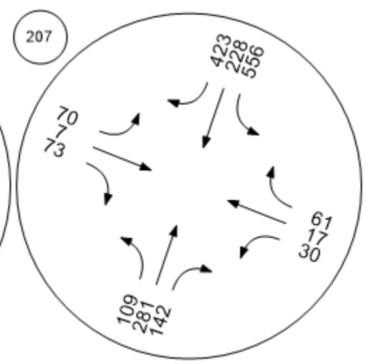

### O'Brien Drive/Kavanaugh Dri



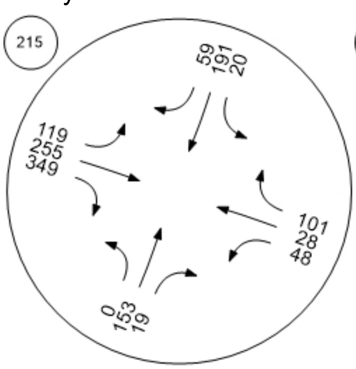

### Bayfront Expwy/Bldg 20



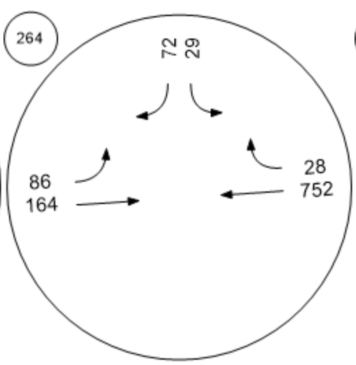

### Chilco St/Constitution Dr



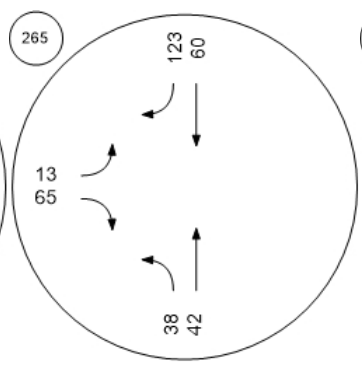

### Chrysler Dr/Constitution Dr



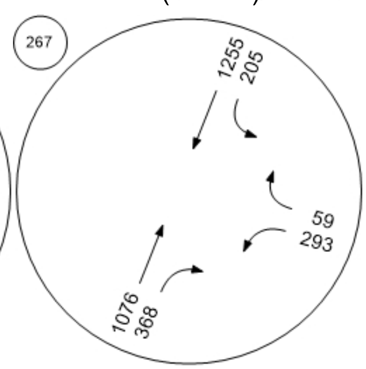

### Adams Drive/O'Brien Drive




### Adam Court/Adams Drive




### Willow Road(SR114)/Park Str

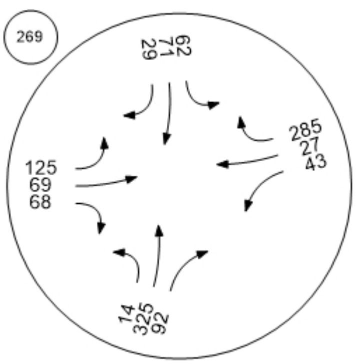


Generated with PTV VISTRO

Version 2021 (SP 0-6)

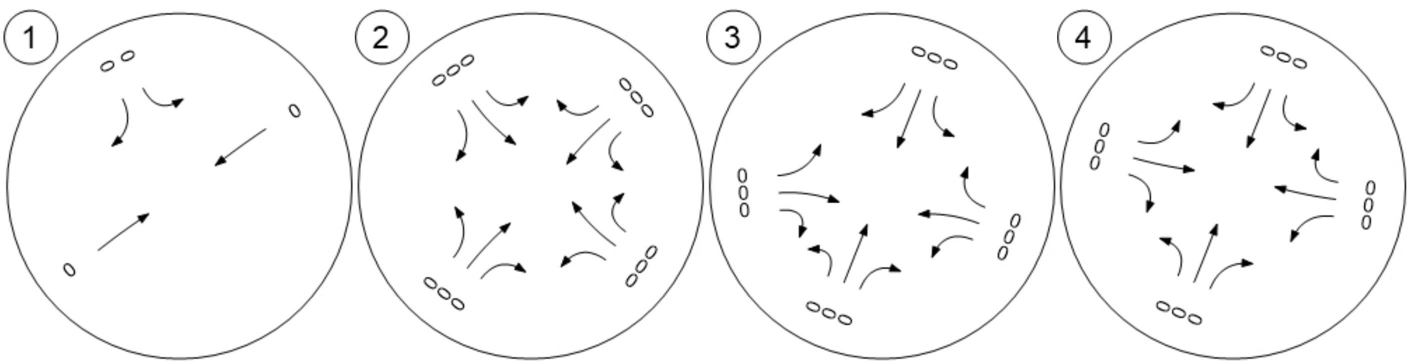
Traffic Volume - Base Volume


O'Brien Drive/Loop Road

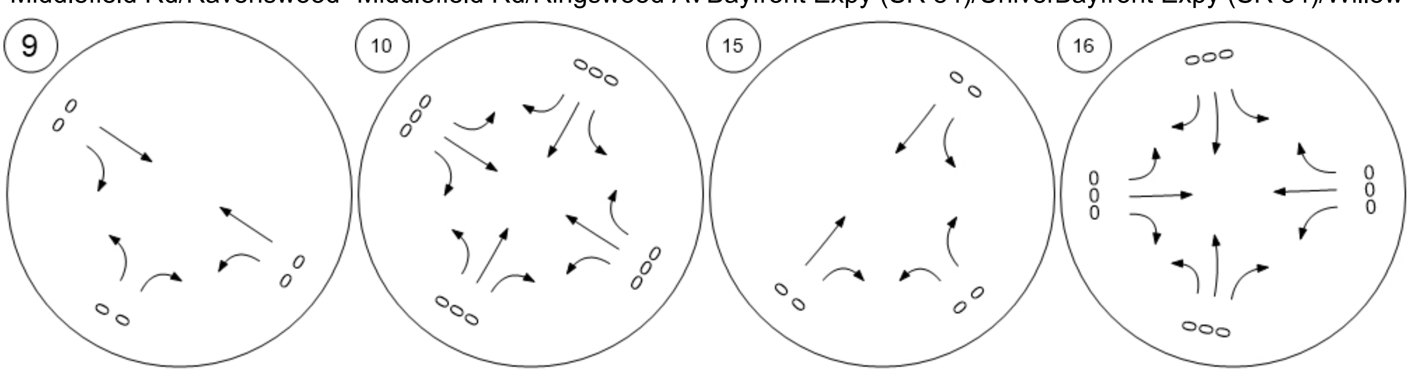


Traffic Volume - In-Process Volume


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow



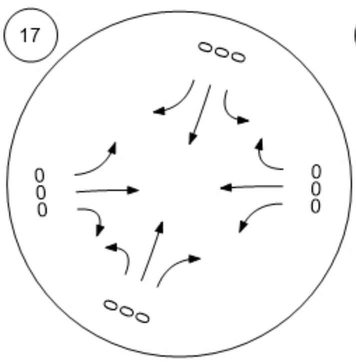
Generated with PTV VISTRO

Version 2021 (SP 0-6)

# Traffic Volume - In-Process Volume

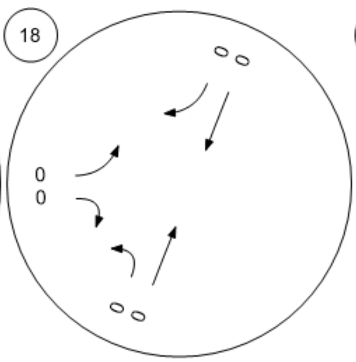

Willow Rd (SR 114)/Hamilton

17



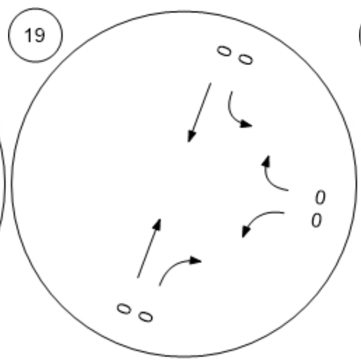
Willow Rd (SR 114)/Ivy Dr

18



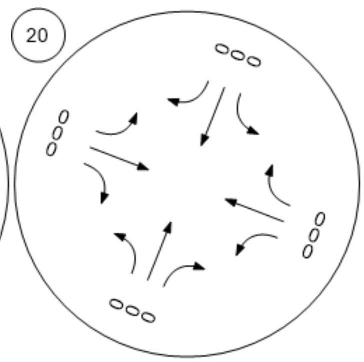
Willow Rd (SR 114)/O'Brien

19



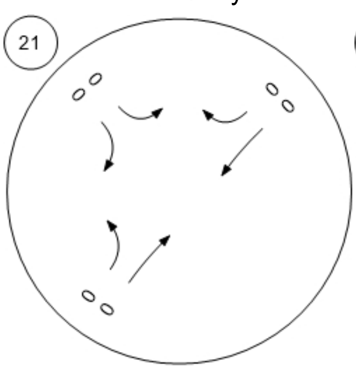
Willow Rd (SR 114)/Newbrid

20



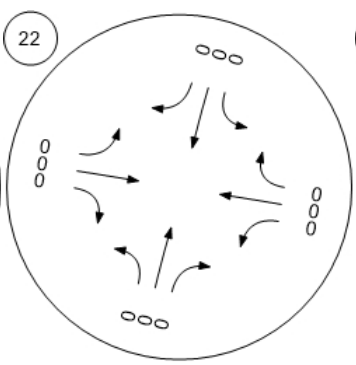
Willow Rd/Bay Rd

21



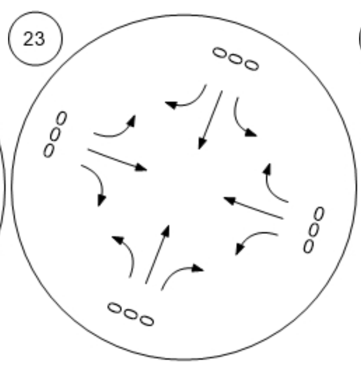
Willow Rd/Durham St-VA Me

22



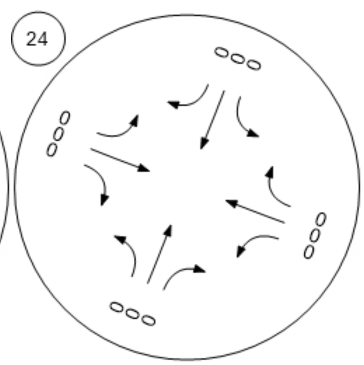
Willow Rd/Coleman Ave

23

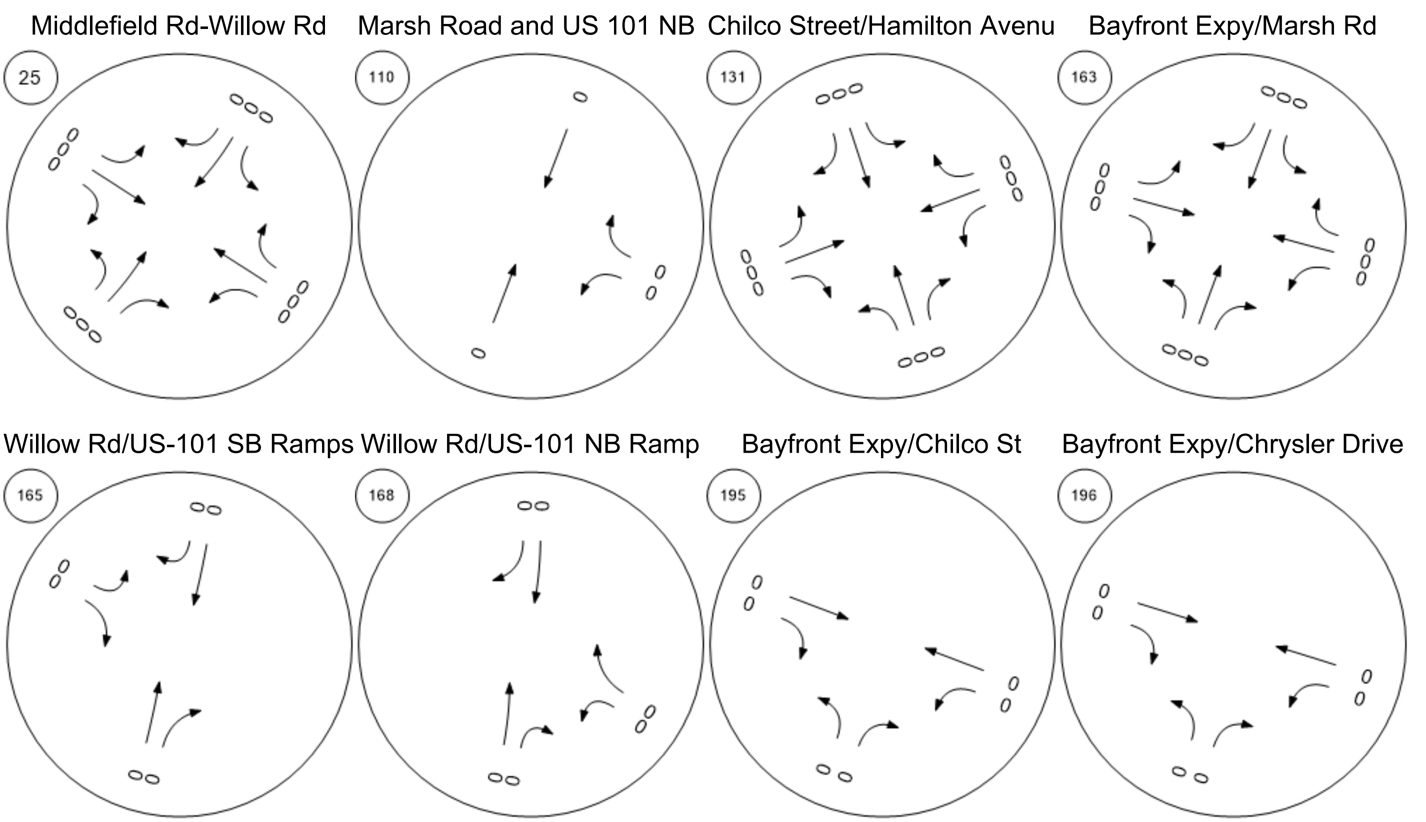


Willow Rd/Gilbert Ave

24



Traffic Volume - In-Process Volume

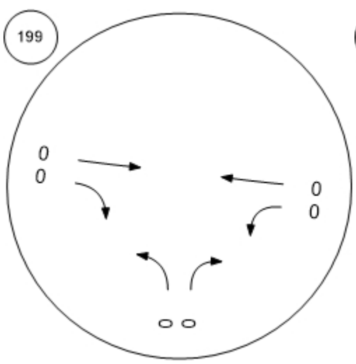



Generated with PTV VISTRO

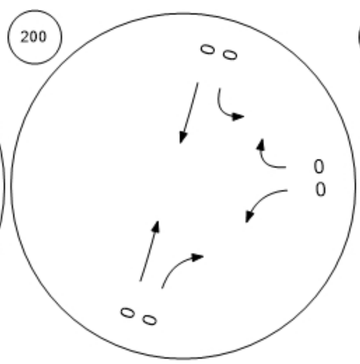
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

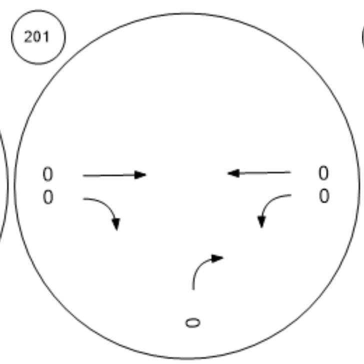

Bayfront Expwy/Bldg 21



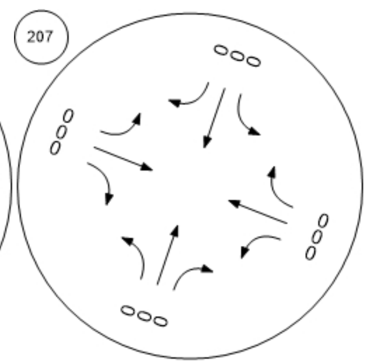

O'Brien Drive/Kavanaugh Dri



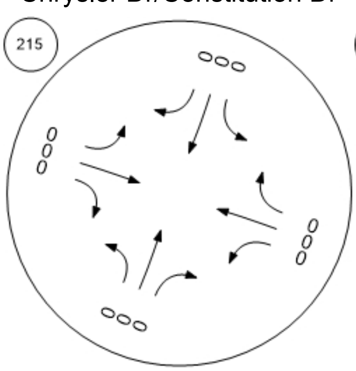

Bayfront Expwy/Bldg 20



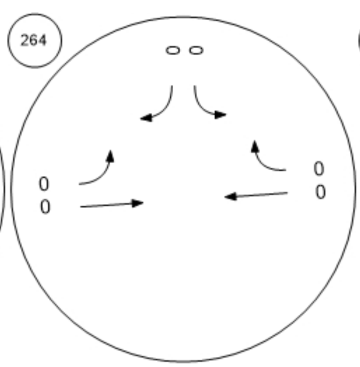

Chilco St/Constitution Dr



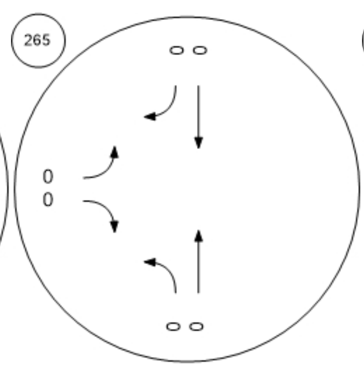

Chrysler Dr/Constitution Dr



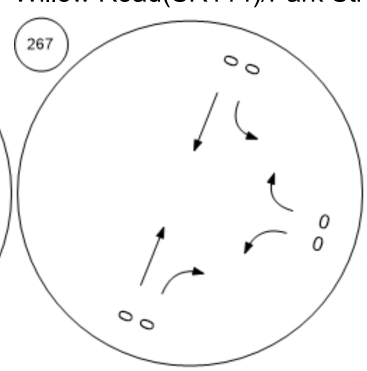

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

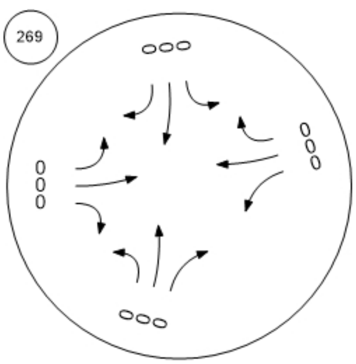


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road

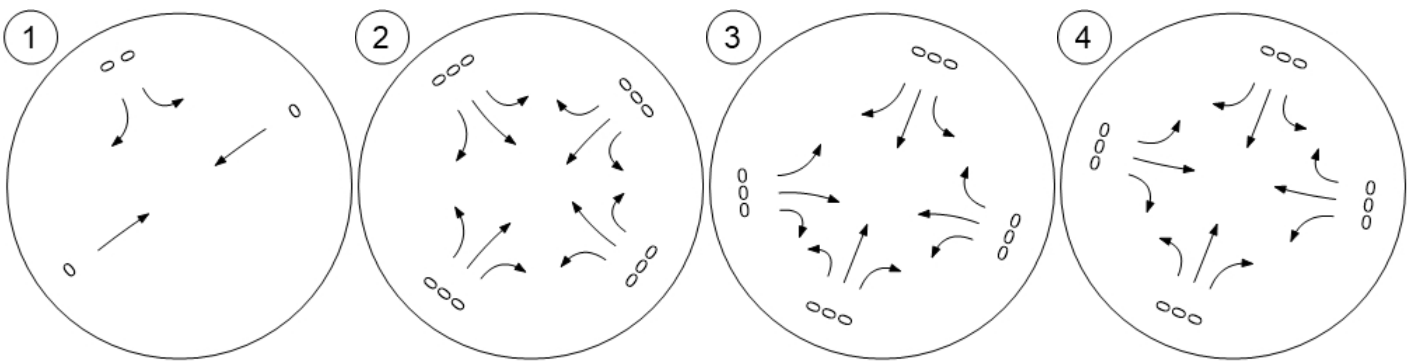


Generated with PTV VISTRO

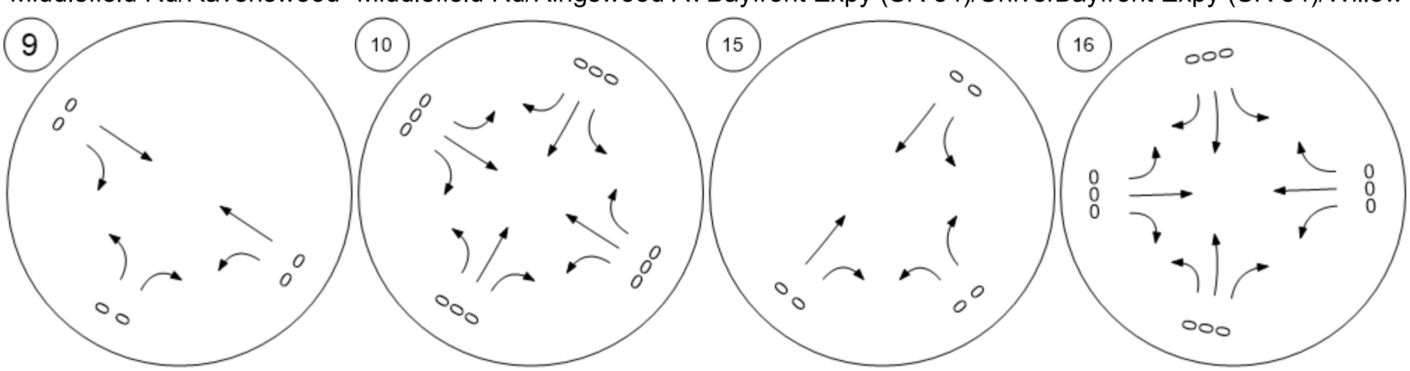
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

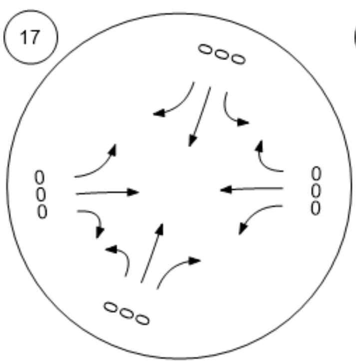


Generated with PTV VISTRO

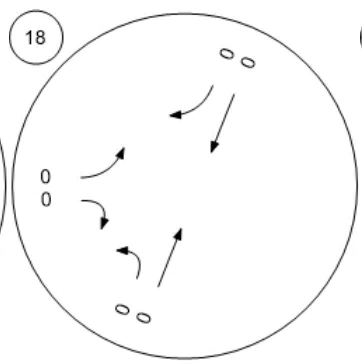
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

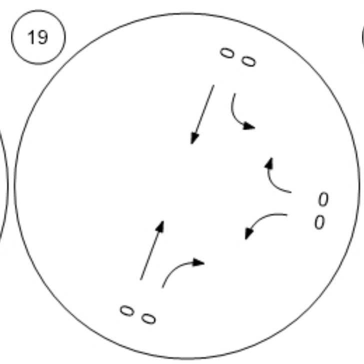

Willow Rd (SR 114)/Hamilton



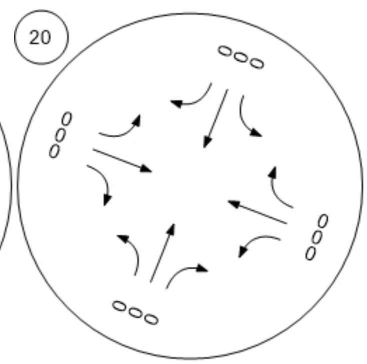

Willow Rd (SR 114)/Ivy Dr



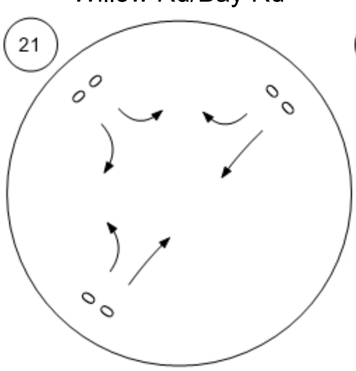

Willow Rd (SR 114)/O'Brien



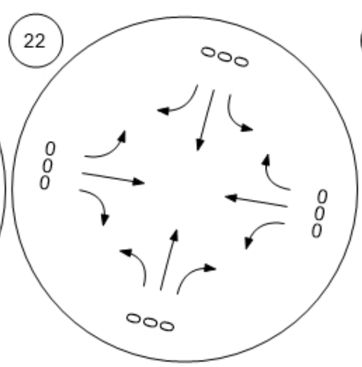

Willow Rd (SR 114)/Newbrid



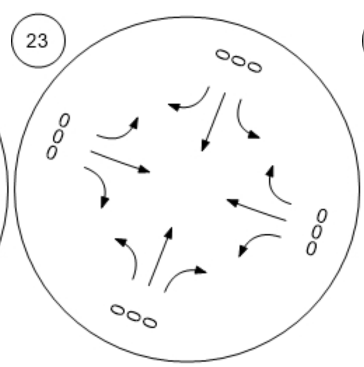

Willow Rd/Bay Rd



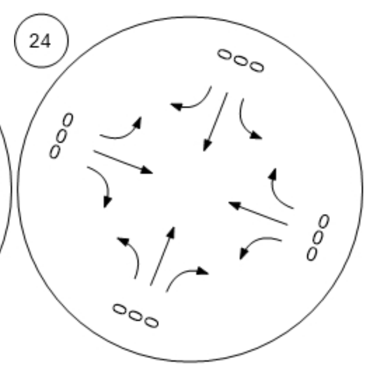

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

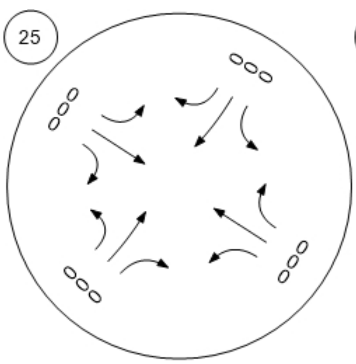


Generated with PTV VISTRO

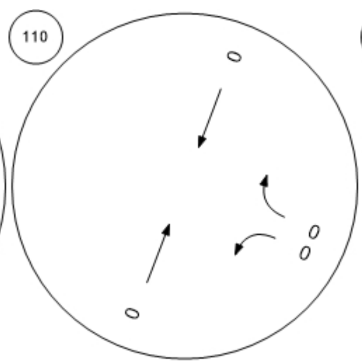
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

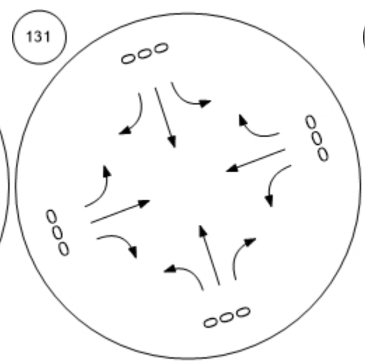

Middlefield Rd-Willow Rd



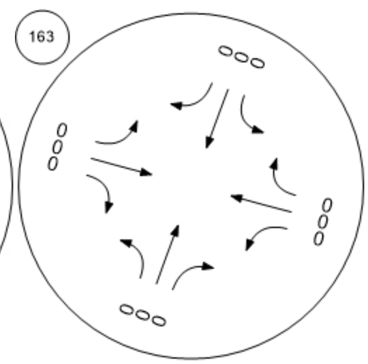

Marsh Road and US 101 NB



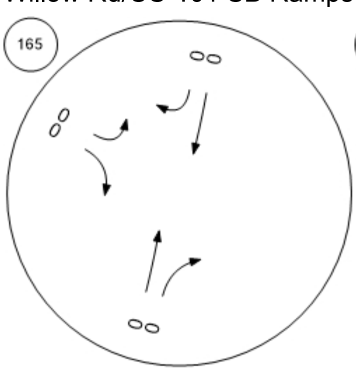

Chilco Street/Hamilton Avenu



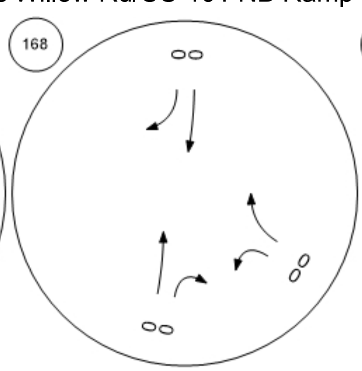

Bayfront Expy/Marsh Rd



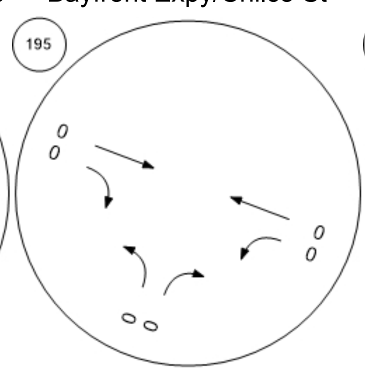

Willow Rd/US-101 SB Ramps



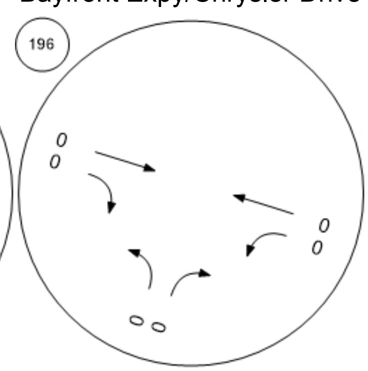

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

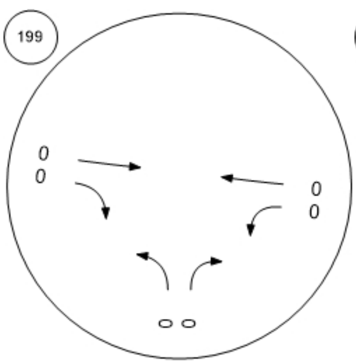


Generated with PTV VISTRO

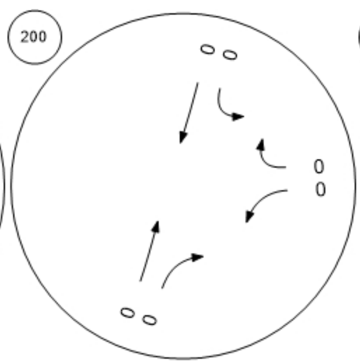
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

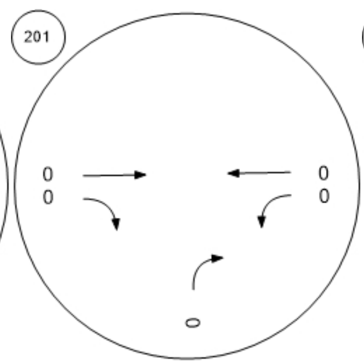

Bayfront Expwy/Bldg 21



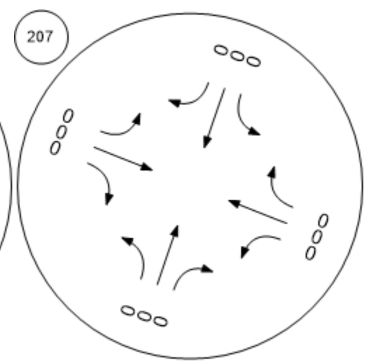

O'Brien Drive/Kavanaugh Dri



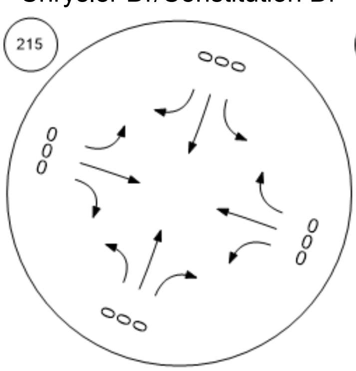

Bayfront Expwy/Bldg 20



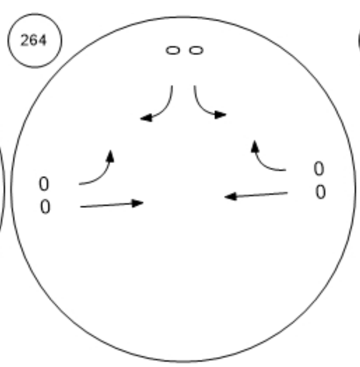

Chilco St/Constitution Dr



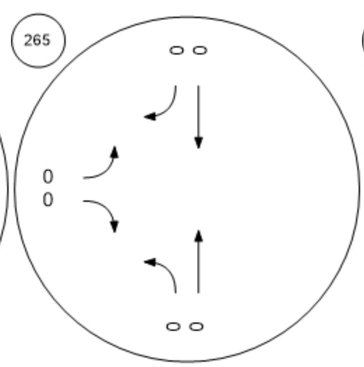

Chrysler Dr/Constitution Dr



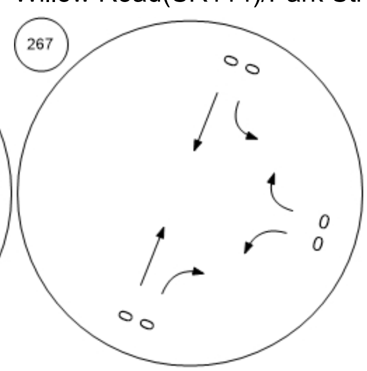

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

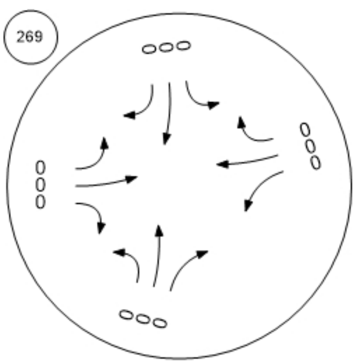


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

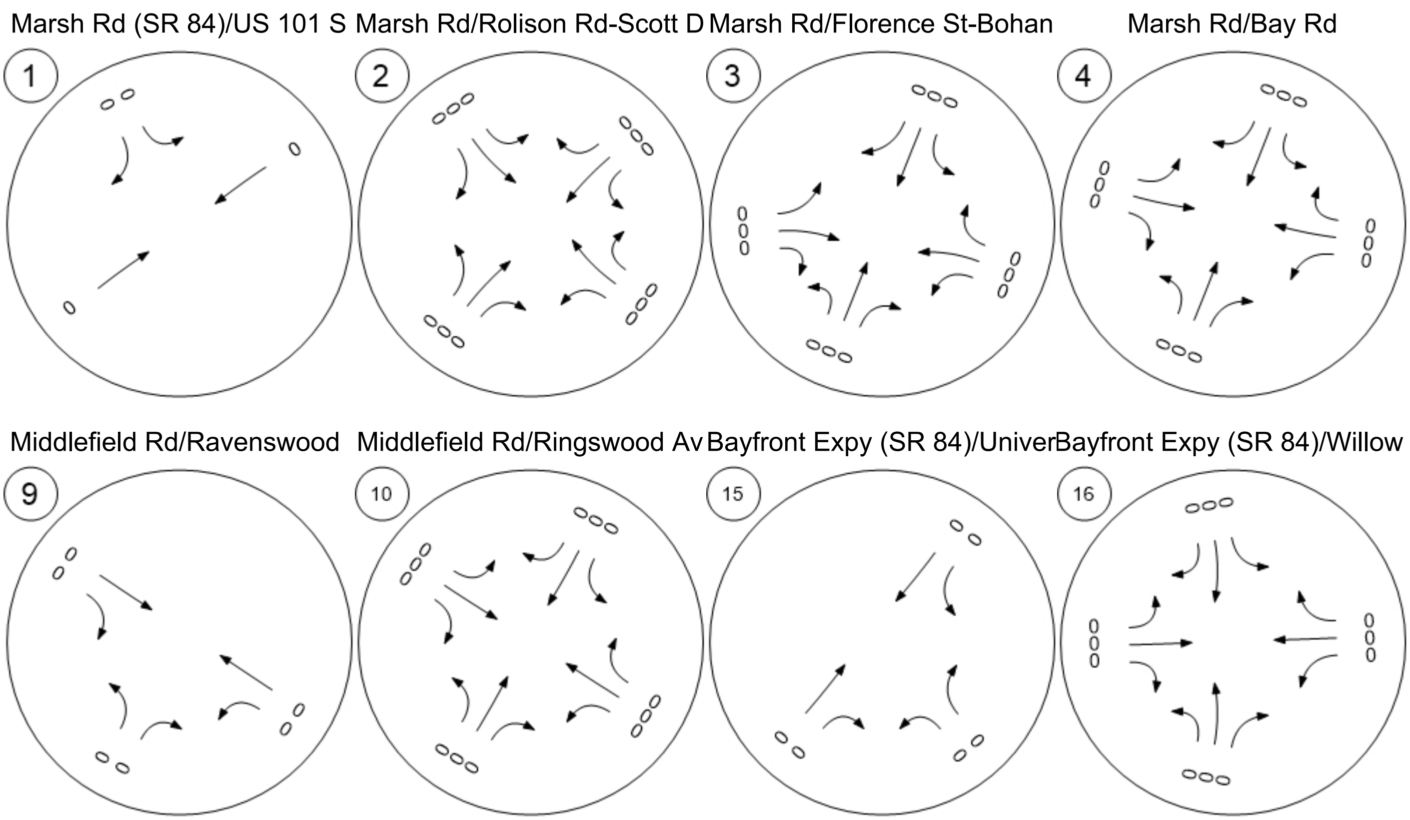

O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume

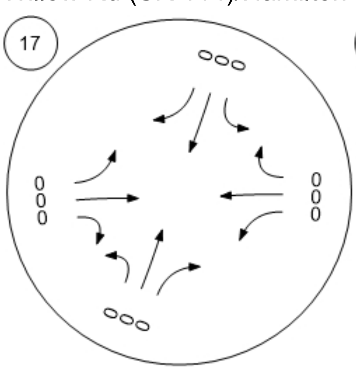



Generated with PTV VISTRO

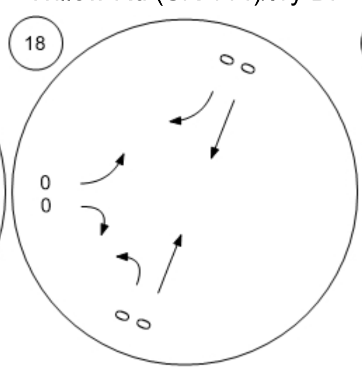
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

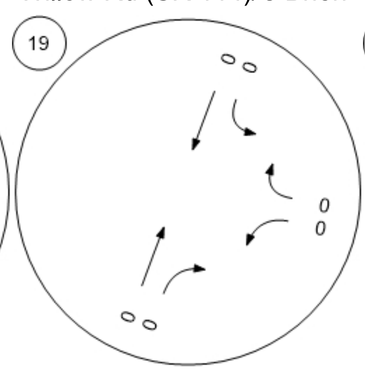

Willow Rd (SR 114)/Hamilton



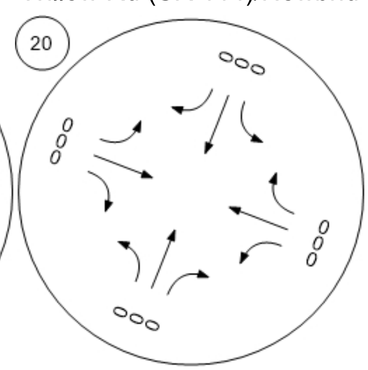

Willow Rd (SR 114)/Ivy Dr



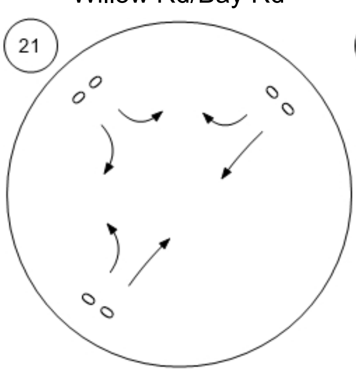

Willow Rd (SR 114)/O'Brien



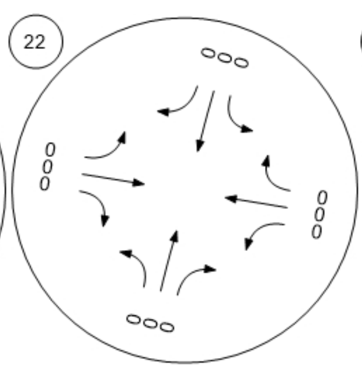

Willow Rd (SR 114)/Newbrid



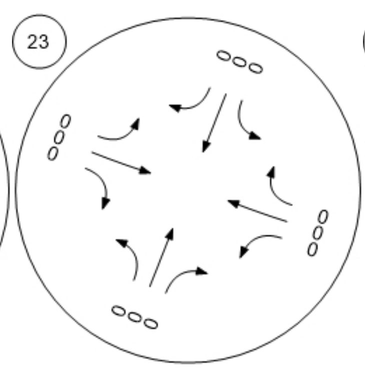

Willow Rd/Bay Rd



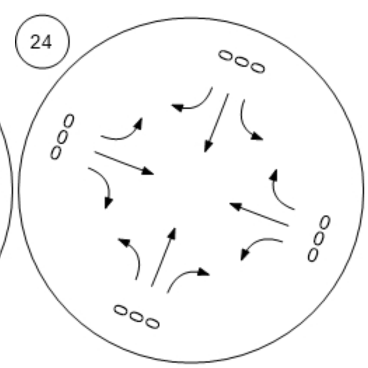

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



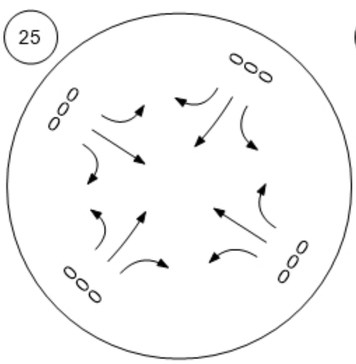
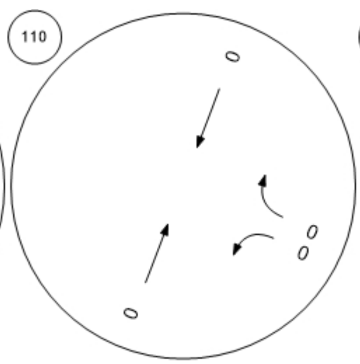
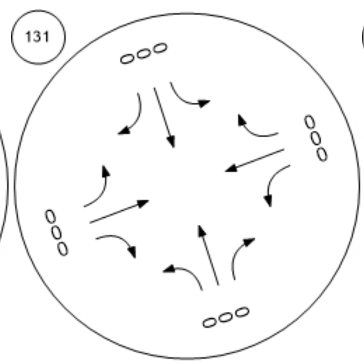
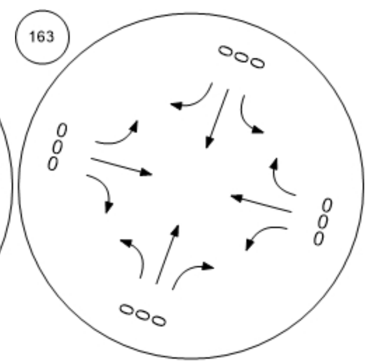

Willow Rd/Gilbert Ave

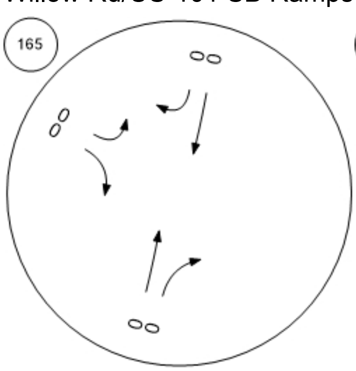
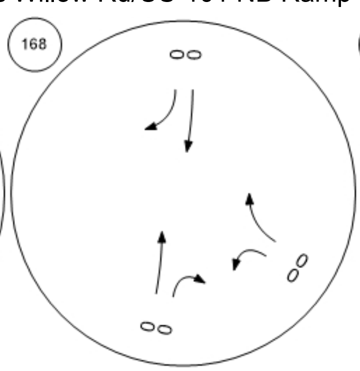
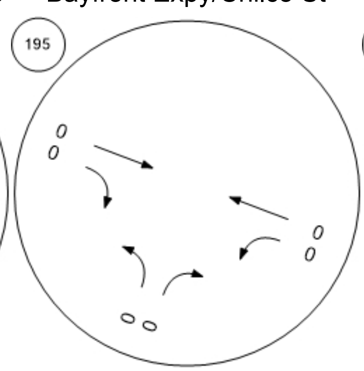
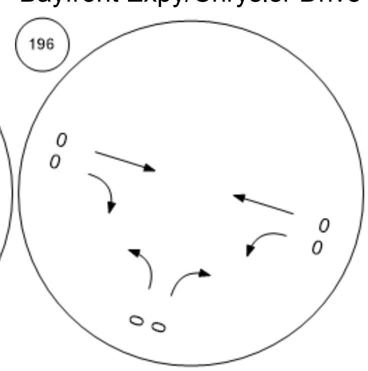


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume


| Middlefield Rd-Willow Rd | Marsh Road and US 101 NB | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd |
|---|---|---|---|
|   |   |   |   |

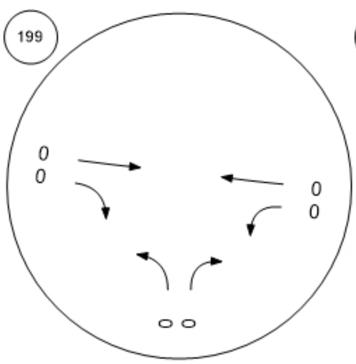
| Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive |
|---|---|---|---|
|   |   |   |   |

Generated with PTV VISTRO

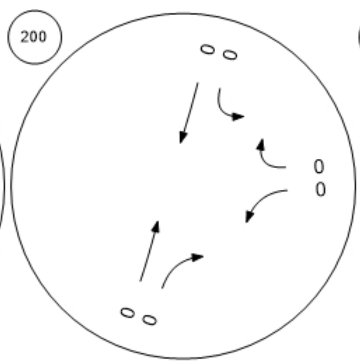
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

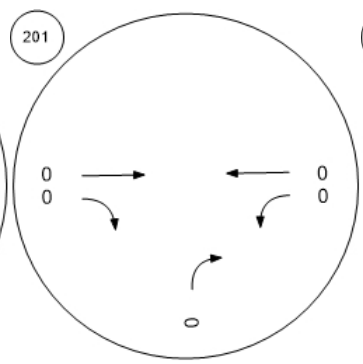

Bayfront Expwy/Bldg 21



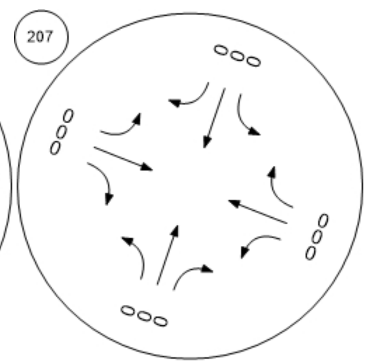

O'Brien Drive/Kavanaugh Dri



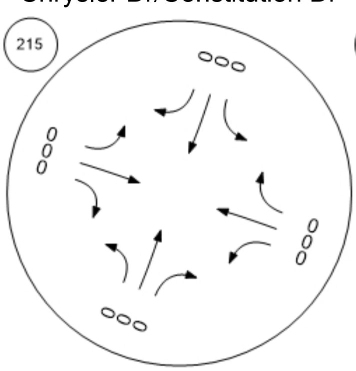

Bayfront Expwy/Bldg 20



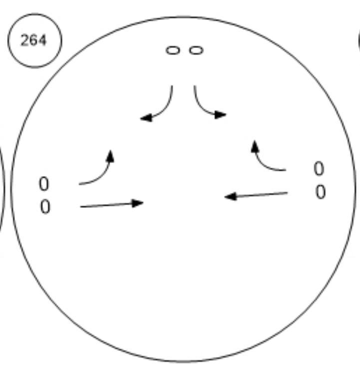

Chilco St/Constitution Dr



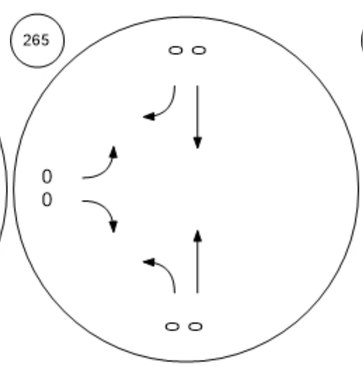

Chrysler Dr/Constitution Dr



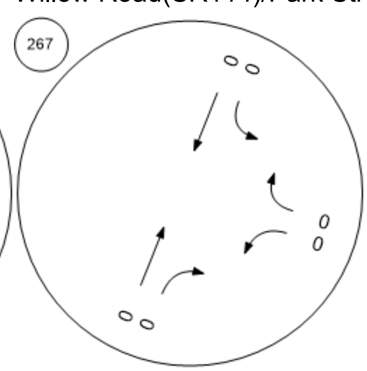

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

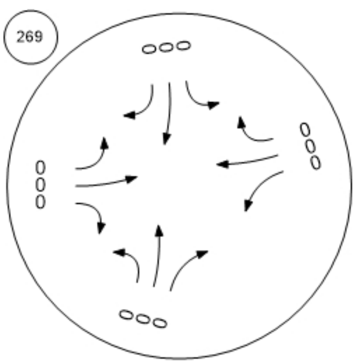


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume


O'Brien Drive/Loop Road



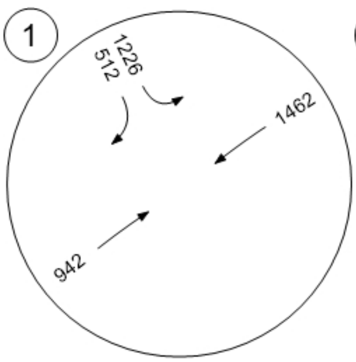
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

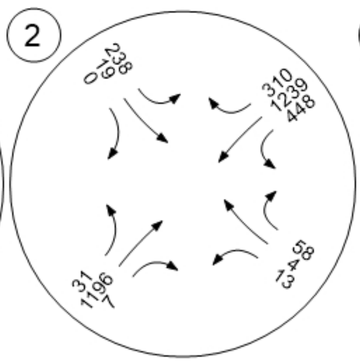

Marsh Rd (SR 84)/US 101 S

1



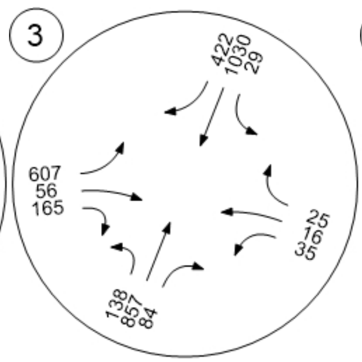

Marsh Rd/Rolison Rd-Scott D

2



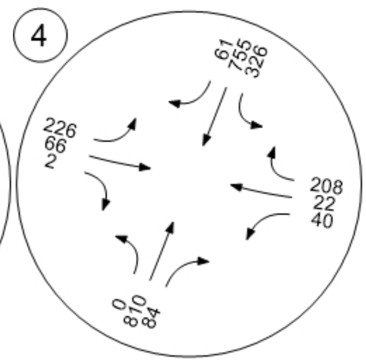

Marsh Rd/Florence St-Bohan

3



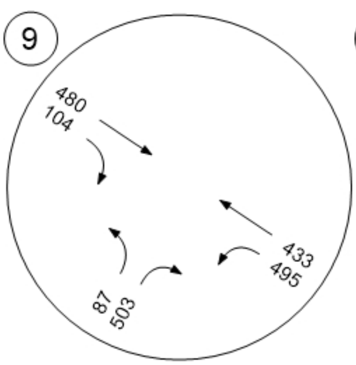

Marsh Rd/Bay Rd

4



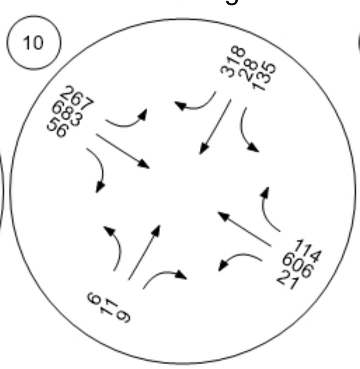

Middlefield Rd/Ravenswood

9



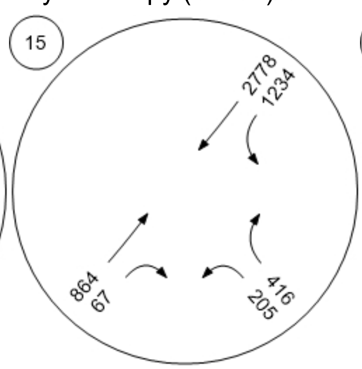

Middlefield Rd/Ringswood Av

10



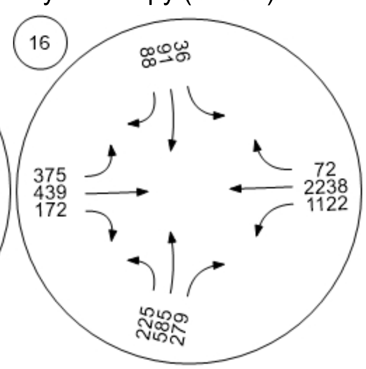

Bayfront Expy (SR 84)/Univer

15



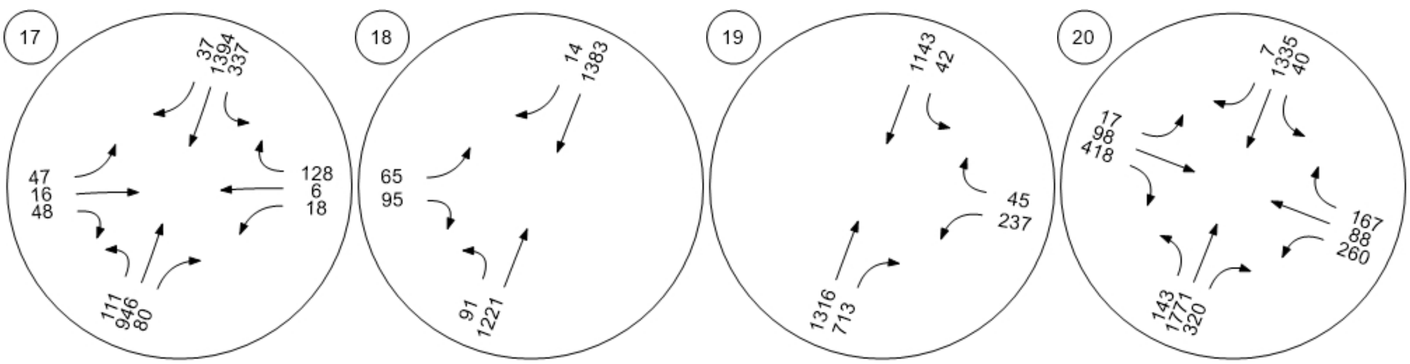

Bayfront Expy (SR 84)/Willow

16

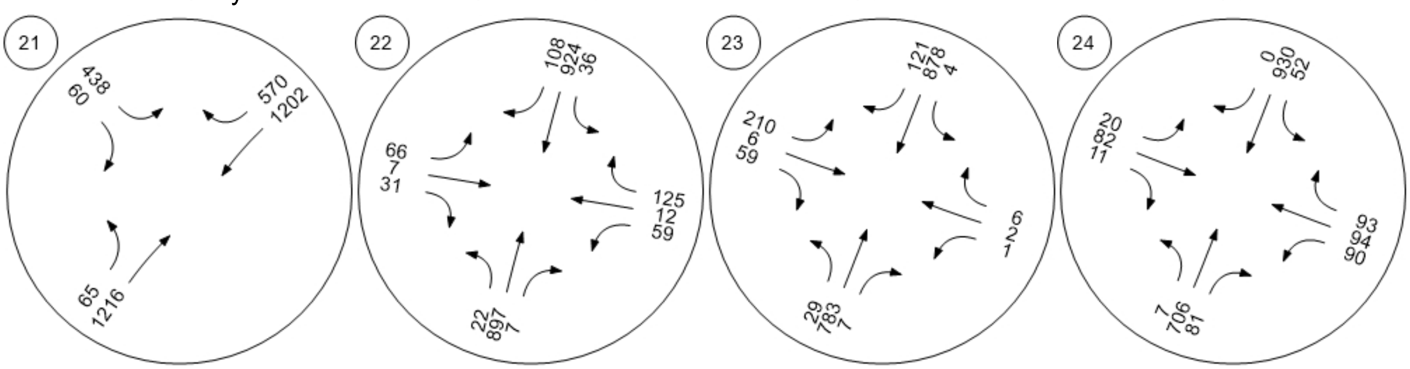


Traffic Volume - Future Total Volume


Willow Rd (SR 114)/Hamilton | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/O'Brien | Willow Rd (SR 114)/Newbrid




Willow Rd/Bay Rd | Willow Rd/Durham St-VA Me | Willow Rd/Coleman Ave | Willow Rd/Gilbert Ave

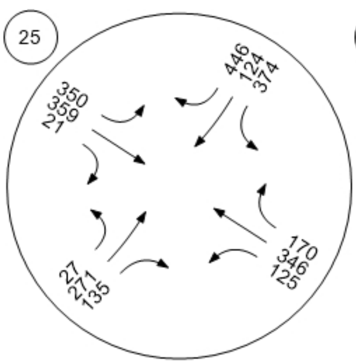


Generated with PTV VISTRO

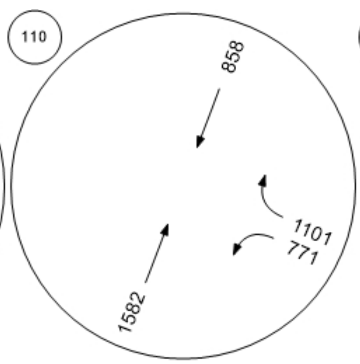
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

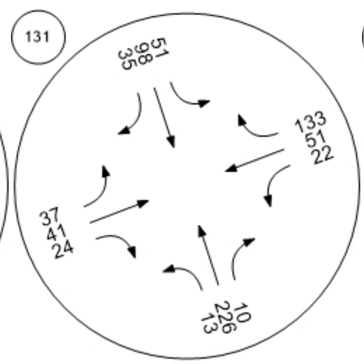

Middlefield Rd-Willow Rd



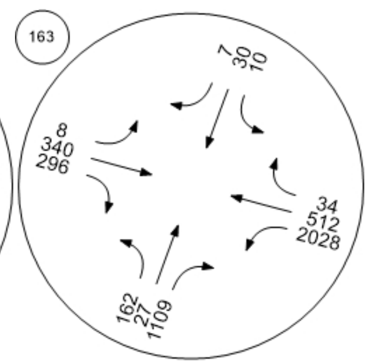

Marsh Road and US 101 NB



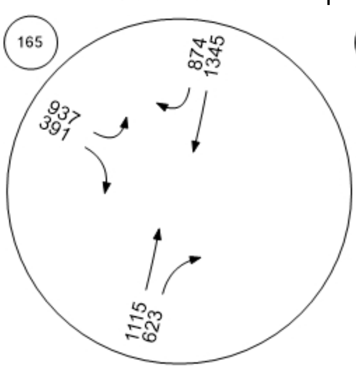

Chilco Street/Hamilton Avenu



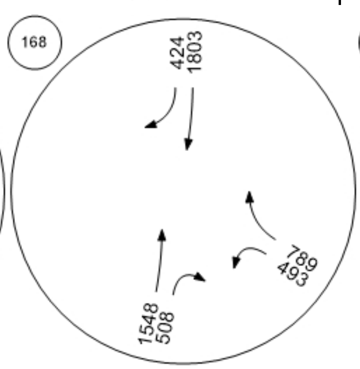

Bayfront Expy/Marsh Rd



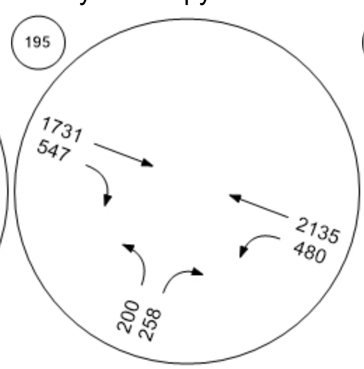

Willow Rd/US-101 SB Ramps



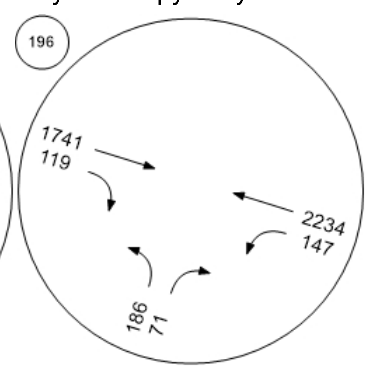

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

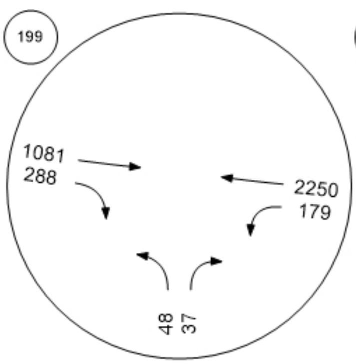


Generated with PTV VISTRO

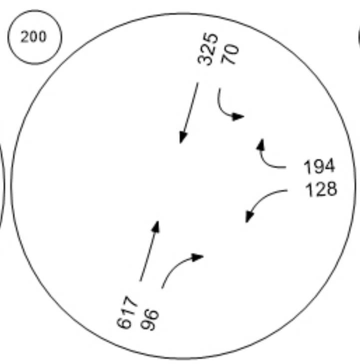
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

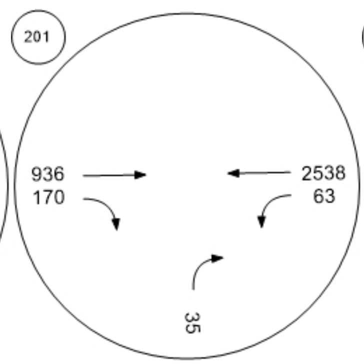

Bayfront Expwy/Bldg 21



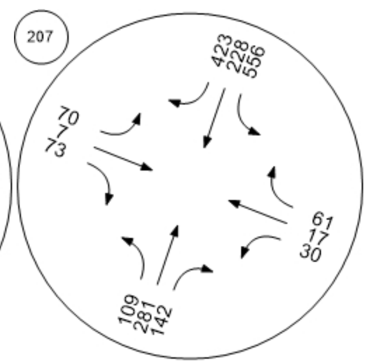

O'Brien Drive/Kavanaugh Dri



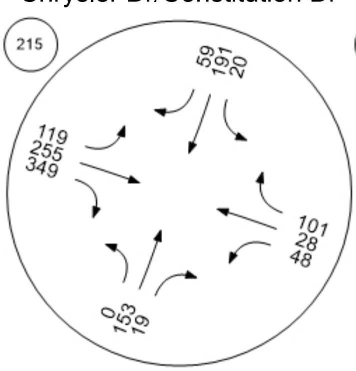

Bayfront Expwy/Bldg 20



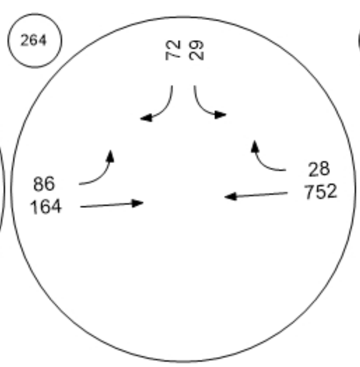

Chilco St/Constitution Dr



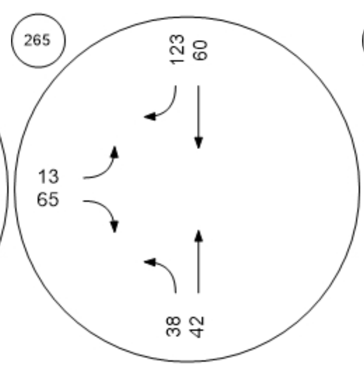

Chrysler Dr/Constitution Dr



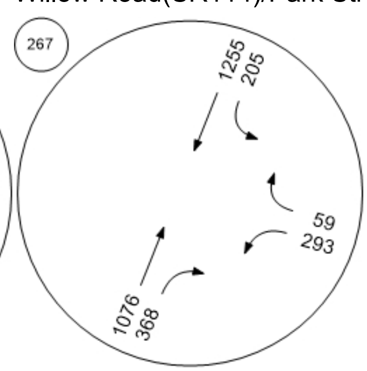

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

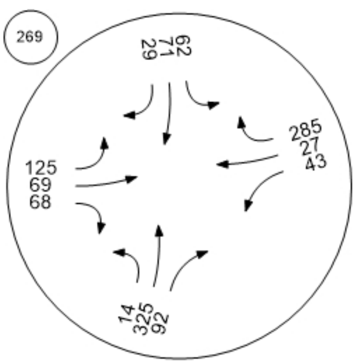


Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume


O'Brien Drive/Loop Road

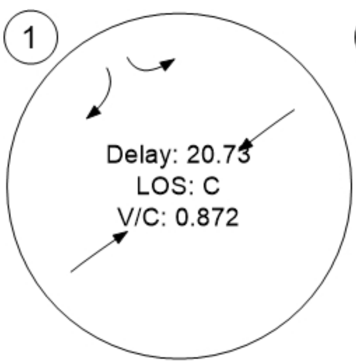


Generated with PTV VISTRO

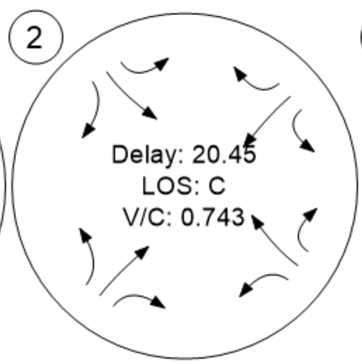
Version 2021 (SP 0-6)

## Traffic Conditions

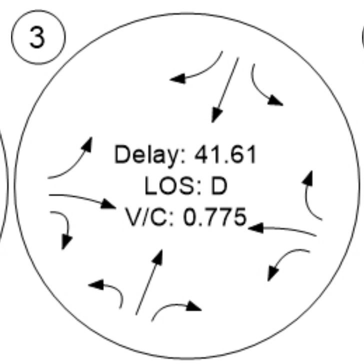

Marsh Rd (SR 84)/US 101 S



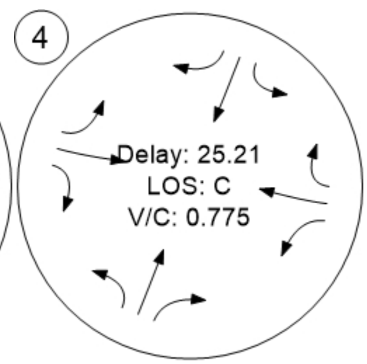

Marsh Rd/Rolison Rd-Scott D



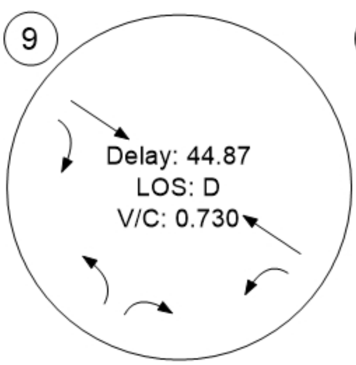

Marsh Rd/Florence St-Bohan



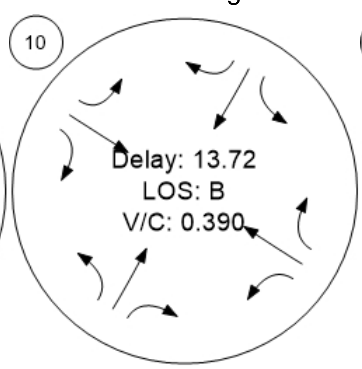

Marsh Rd/Bay Rd



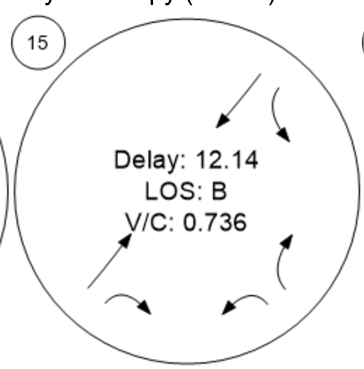

Middlefield Rd/Ravenswood



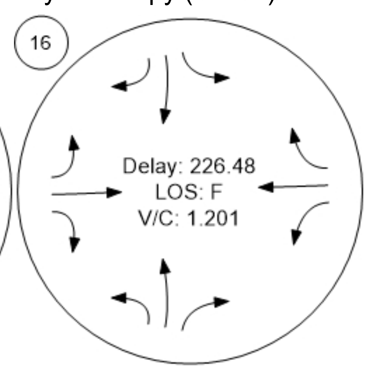

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer



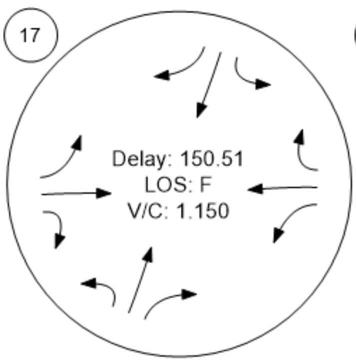

Bayfront Expy (SR 84)/Willow



## Traffic Conditions

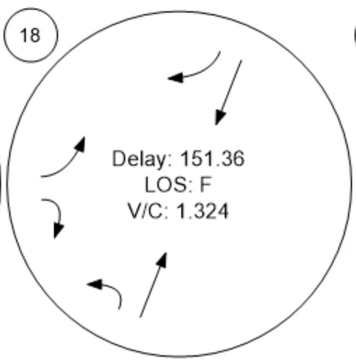

Willow Rd (SR 114)/Hamilton

17



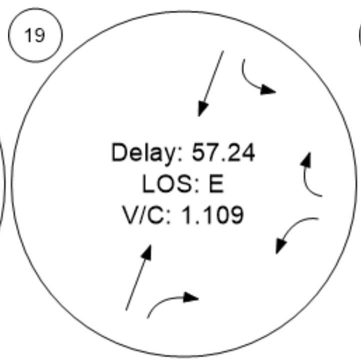

Willow Rd (SR 114)/Ivy Dr

18



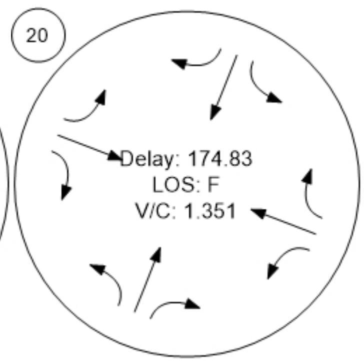

Willow Rd (SR 114)/O'Brien

19



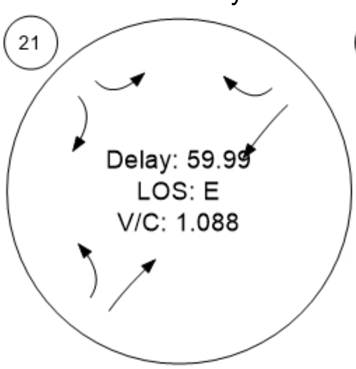

Willow Rd (SR 114)/Newbrid

20



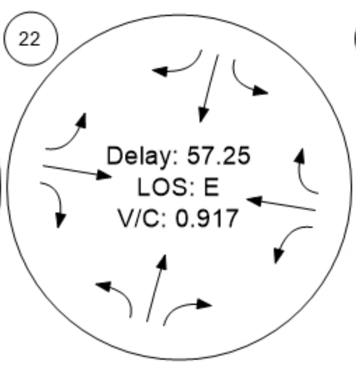

Willow Rd/Bay Rd

21



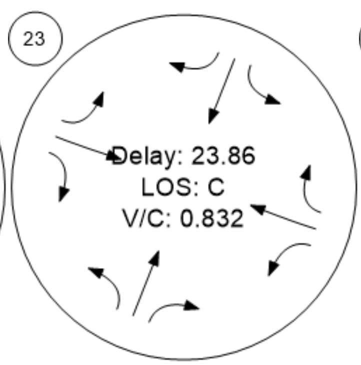

Willow Rd/Durham St-VA Me

22



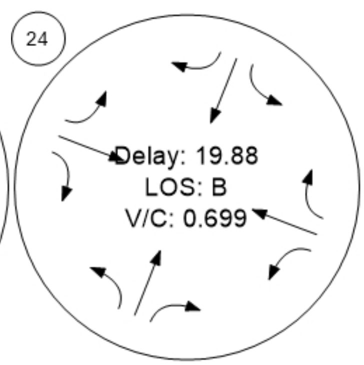

Willow Rd/Coleman Ave

23




Willow Rd/Gilbert Ave

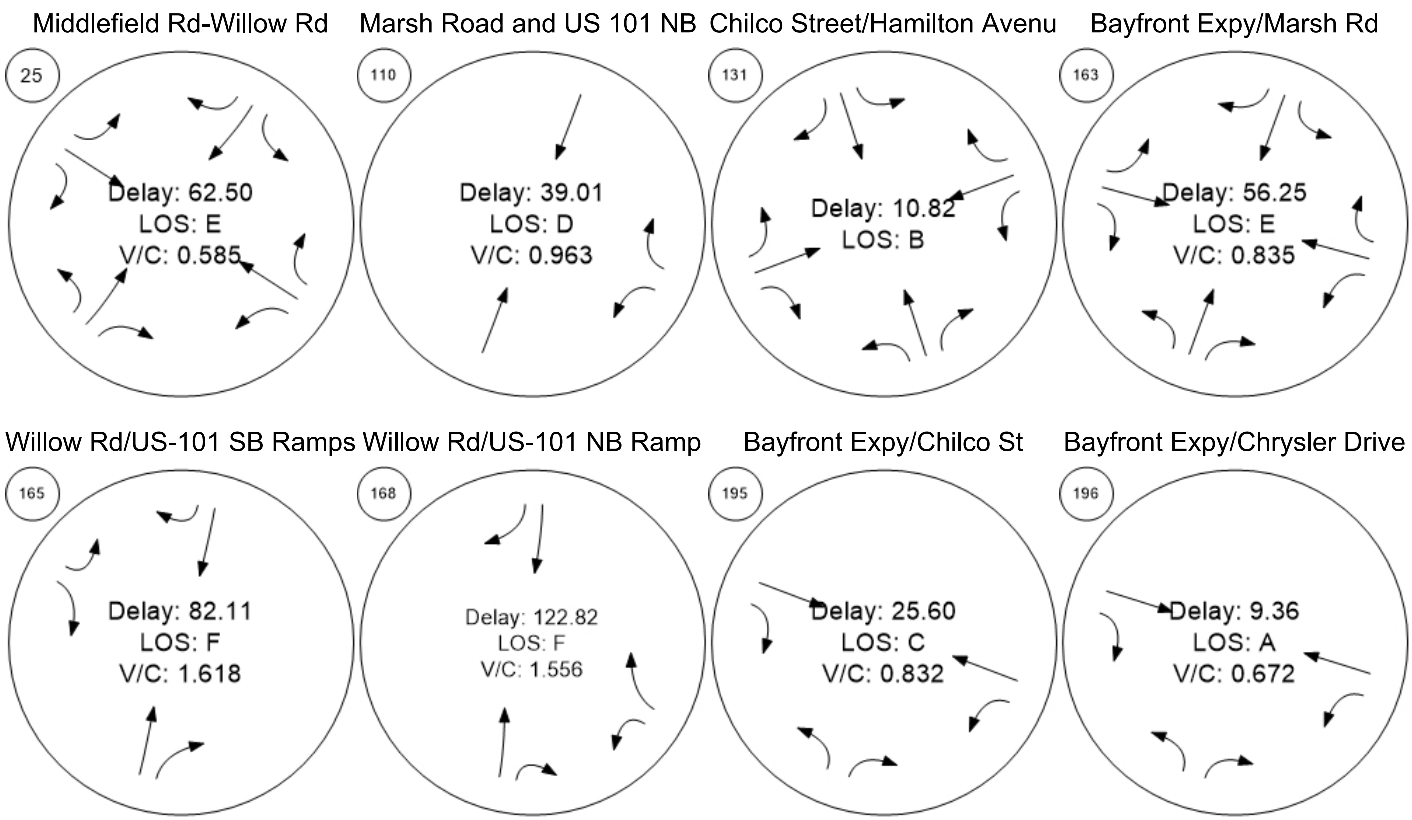
24



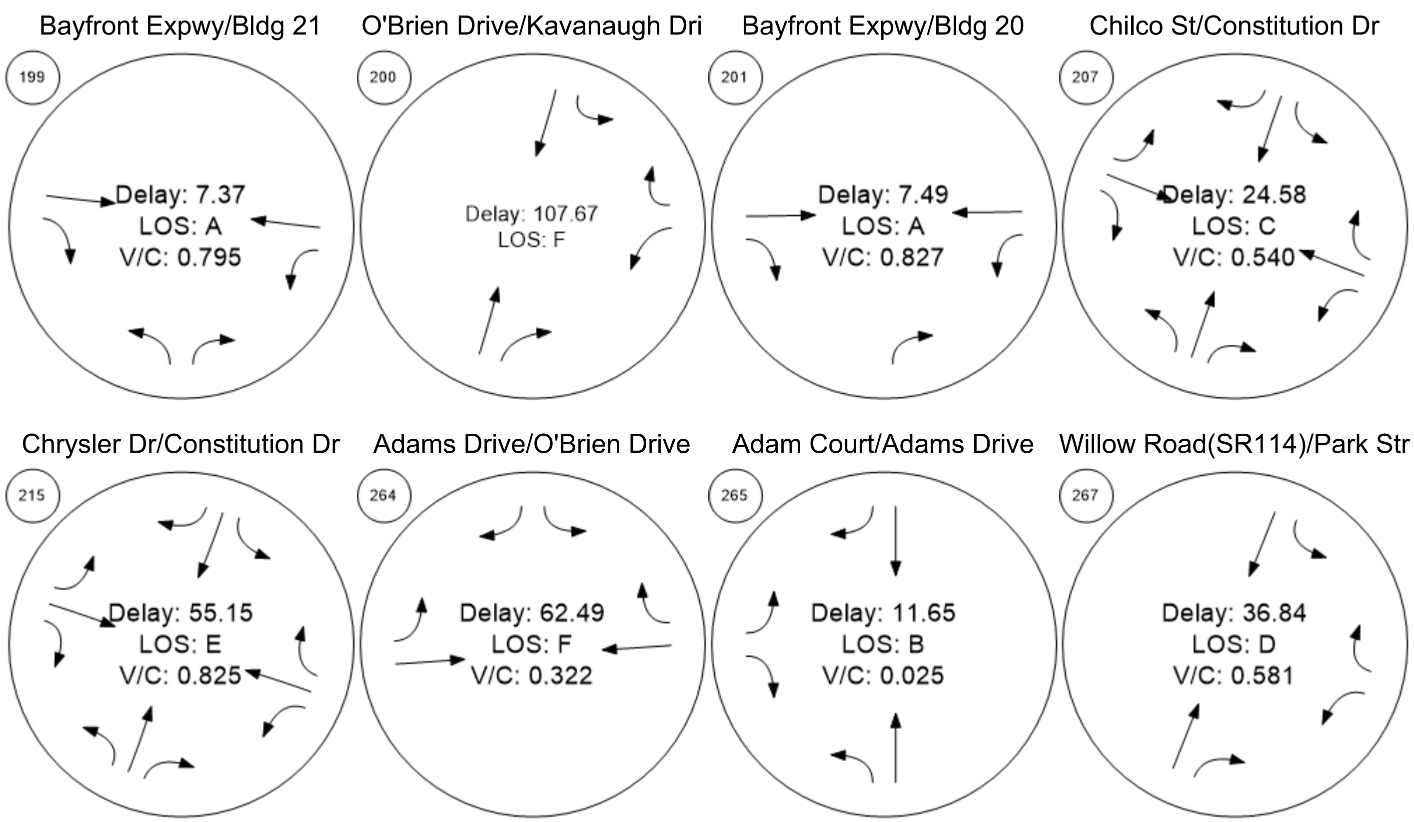
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions

Traffic Conditions

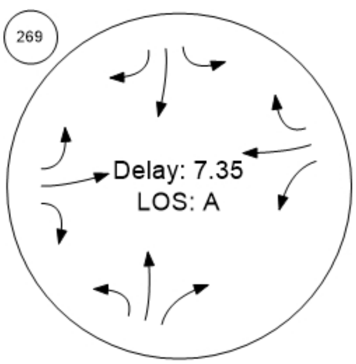



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions


O'Brien Drive/Loop Road

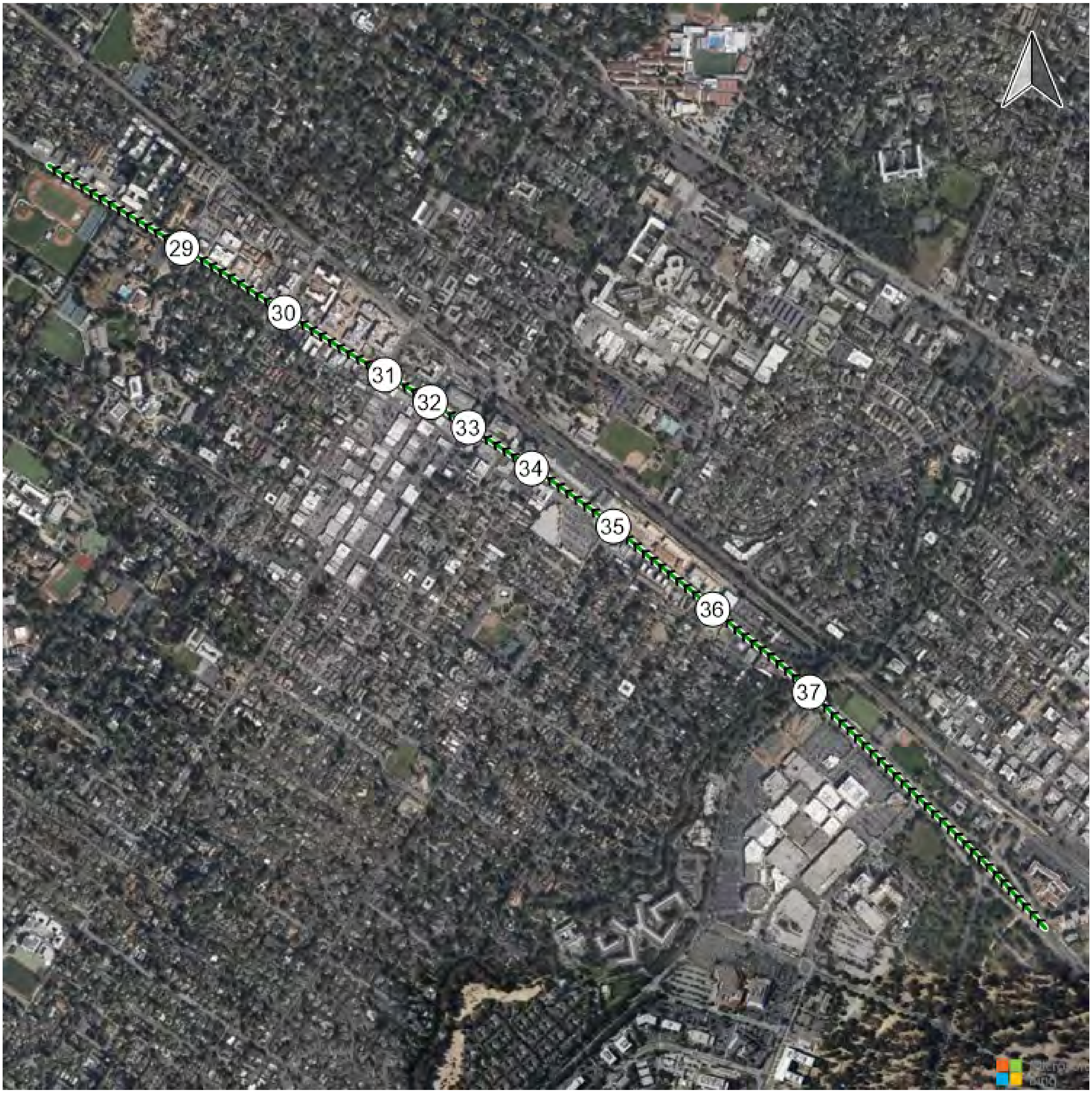


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 1: ECR NB



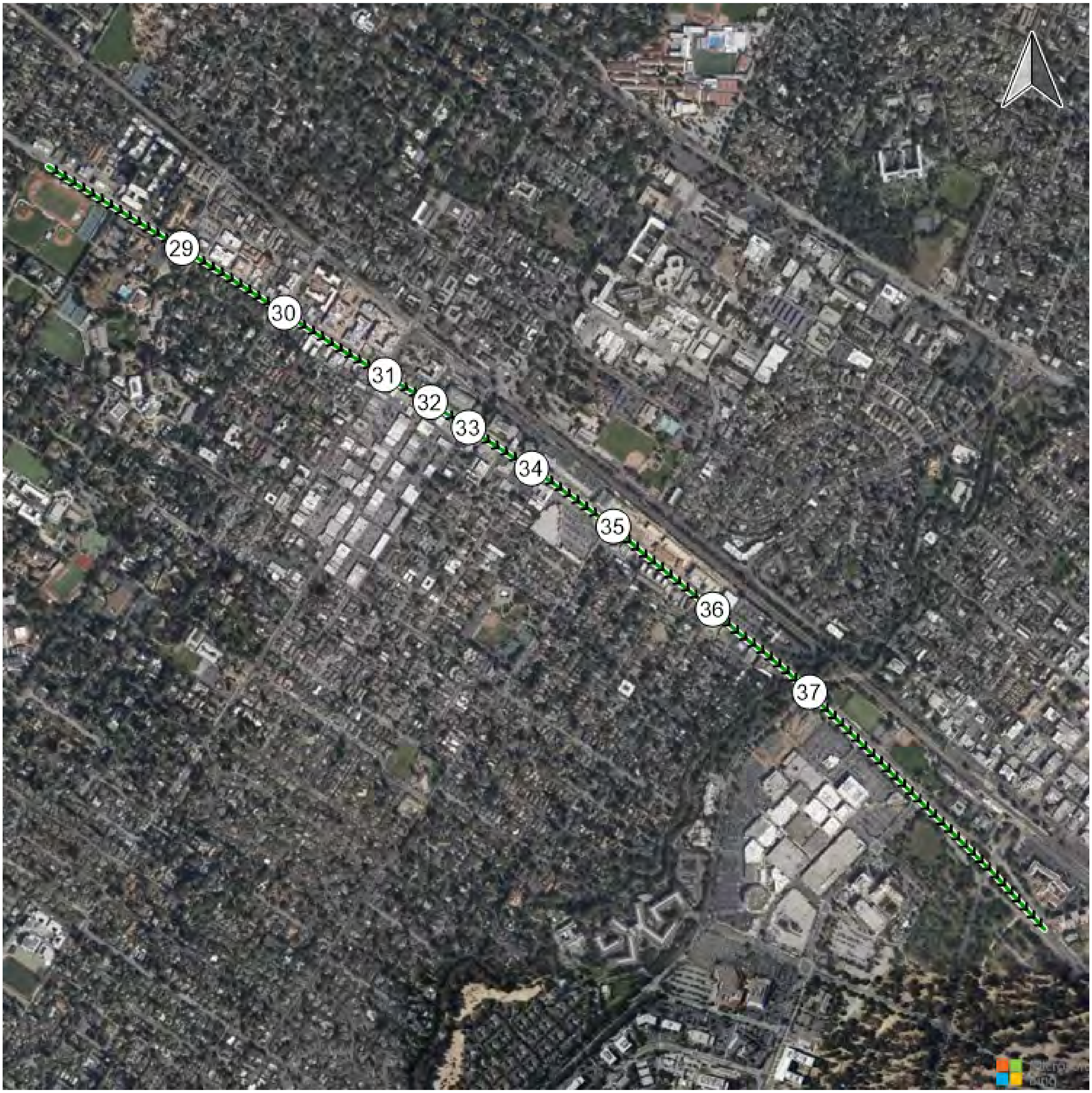
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



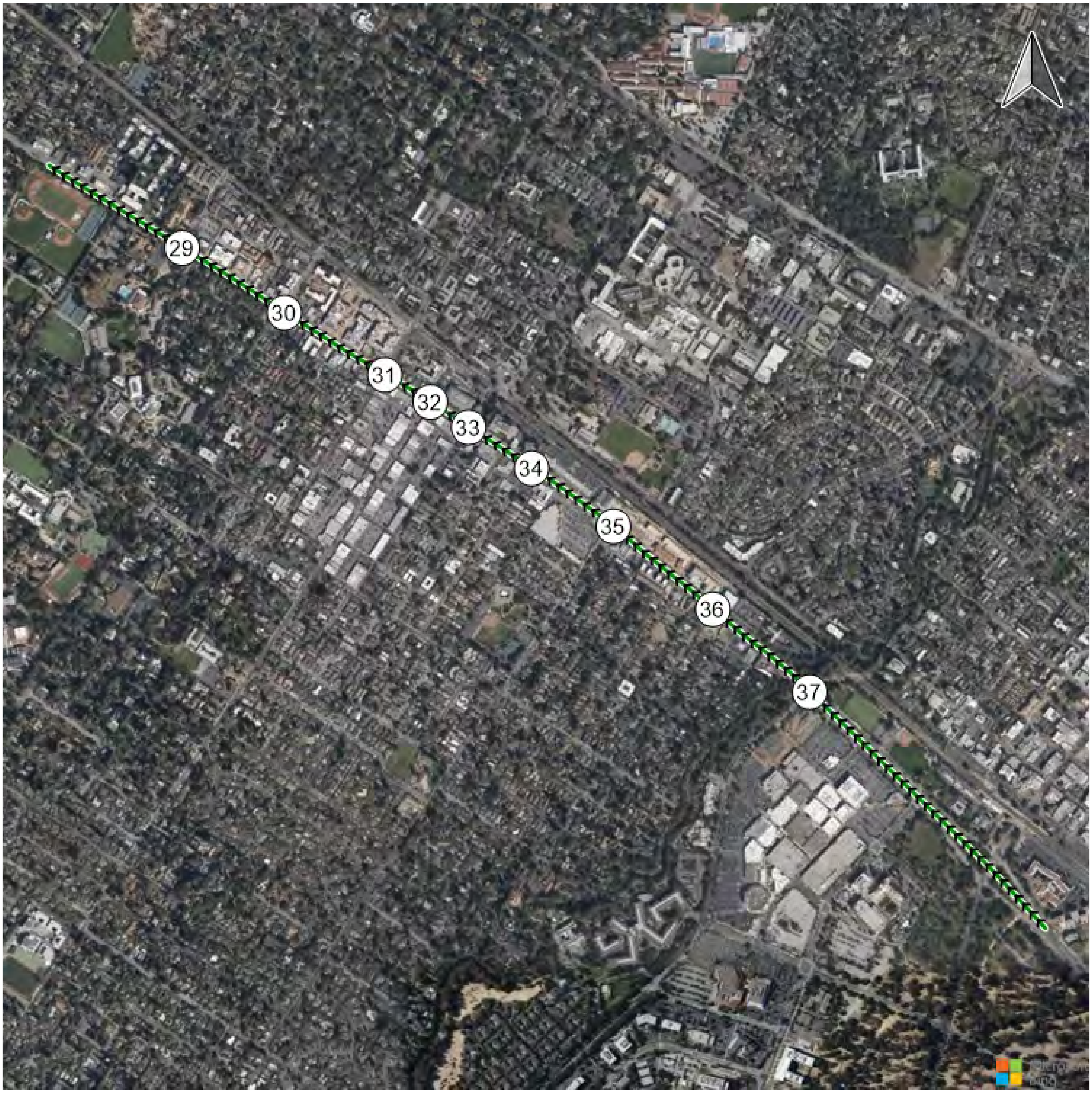
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



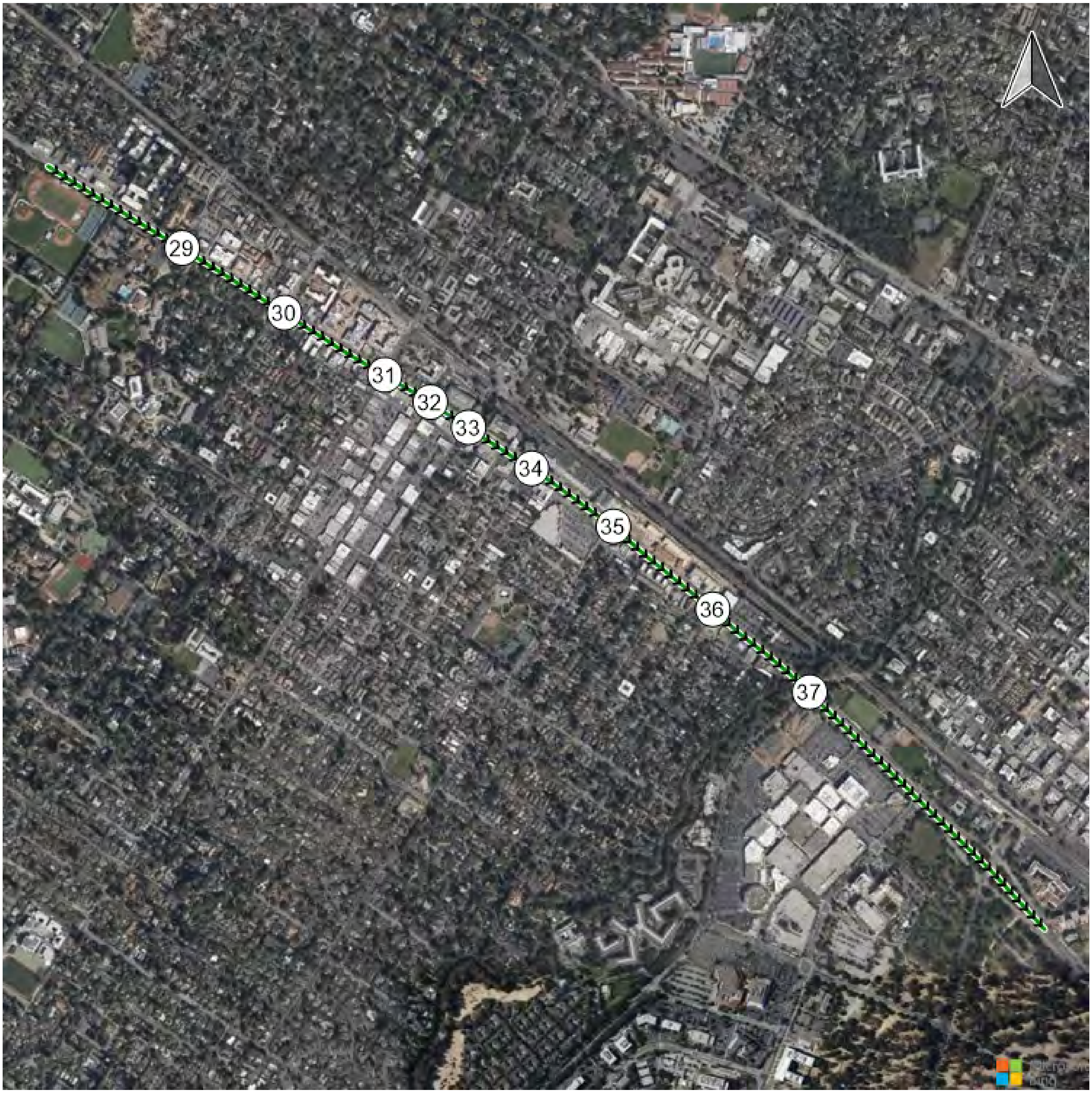
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Near-Term + P PM.pdf

Scenario 18 Near-Term PM (2025 vols)+Project

12/30/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.740 | 17.6 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.498 | 15.9 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.731 | 37.3 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.652 | 19.1 | B |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.402 | 17.9 | B |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.435 | 15.4 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Right | 1.083 | 108.7 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | SB Thru | 1.224 | 175.0 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Left | 1.673 | 404.6 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.239 | 116.6 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 1.390 | 185.0 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.283 | 151.3 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.378 | 201.3 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.231 | 197.2 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.650 | 10.8 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.535 | 12.4 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NWB Right | 0.617 | 34.7 | C |
| | | | HCM 6th | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.886 | 16.8 | B |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 1.004 | 38.0 | E |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | SB Right | 0.949 | 38.7 | D |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.692 | 96.0 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.120 | 148.9 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 0.987 | 35.9 | D |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.856 | 18.3 | B |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.826 | 15.0 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.206 | 73.7 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.768 | 9.4 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | EB Right | 0.783 | 54.3 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 0.549 | 30.4 | C |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 1.288 | 304.2 | F |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.065 | 11.9 | B |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.694 | 17.5 | B |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | SB Thru | | 9.2 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.740 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | ‖ | | ‖ | | ┓┓┏ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 959 | 1034 | 279 | 1263 | 349 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 959 | 1034 | 279 | 1263 | 349 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 245 | 264 | 70 | 322 | 89 |
| Total Analysis Volume [veh/h] | 0 | 979 | 1055 | 279 | 1289 | 356 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 43 | 41 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.51 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.30 | 0.38 | 0.22 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2139 | 1801 | 1396 | 658 |
| d1, Uniform Delay [s] | 11.44 | 13.74 | 22.43 | 17.93 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.09 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 1.40 | 1.20 | 0.57 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.46 | 0.59 | 0.92 | 0.54 |
| d, Delay for Lane Group [s/veh] | 12.15 | 15.14 | 23.63 | 18.50 |
| Lane Group LOS | B | B | C | B |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.89 | 6.22 | 10.83 | 4.78 |
| 50th-Percentile Queue Length [ft/ln] | 122.35 | 155.48 | 270.78 | 119.58 |
| 95th-Percentile Queue Length [veh/ln] | 8.52 | 10.31 | 16.23 | 8.37 |
| 95th-Percentile Queue Length [ft/ln] | 213.05 | 257.73 | 405.71 | 209.25 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.15 | 15.14 | 0.00 | 23.63 | 18.50 |
| Movement LOS | | B | B | | C | B |
| d_A, Approach Delay [s/veh] | 12.15 | | 15.14 | | 22.52 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 17.65 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.740 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.806 | 0.000 | 2.468 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.81 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.430 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.498 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1327 | 7 | 55 | 896 | 200 | 15 | 5 | 388 | 272 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 40 | 1327 | 7 | 55 | 896 | 200 | 15 | 5 | 62 | 272 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 346 | 2 | 14 | 233 | 52 | 4 | 1 | 16 | 71 | 2 | 1 |
| Total Analysis Volume [veh/h] | 42 | 1382 | 7 | 57 | 933 | 208 | 16 | 5 | 65 | 283 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 6 | 102 | 102 | 101 | 101 | 101 | 8 | 8 | 17 | 17 |
| g / C, Green / Cycle | 0.04 | 0.73 | 0.73 | 0.72 | 0.72 | 0.72 | 0.06 | 0.06 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.26 | 0.26 | 0.06 | 0.31 | 0.32 | 0.01 | 0.02 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 887 | 1877 | 1745 | 1830 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 79 | 2576 | 1349 | 663 | 1353 | 1258 | 105 | 162 | 214 | 203 |
| d1, Uniform Delay [s] | 65.38 | 7.08 | 7.08 | 7.23 | 7.94 | 7.98 | 62.86 | 63.60 | 59.17 | 59.17 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.09 | 0.38 | 0.73 | 0.02 | 1.02 | 1.12 | 0.68 | 1.19 | 3.09 | 3.26 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.53 | 0.35 | 0.35 | 0.09 | 0.43 | 0.44 | 0.20 | 0.40 | 0.70 | 0.70 |
| d, Delay for Lane Group [s/veh] | 69.46 | 7.46 | 7.81 | 7.25 | 8.95 | 9.10 | 63.54 | 64.79 | 62.27 | 62.44 |
| Lane Group LOS | E | A | A | A | A | A | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.55 | 4.76 | 5.12 | 0.25 | 7.00 | 6.65 | 0.74 | 1.16 | 5.37 | 5.10 |
| 50th-Percentile Queue Length [ft/ln] | 38.84 | 119.06 | 127.99 | 6.26 | 175.02 | 166.33 | 18.55 | 28.94 | 134.17 | 127.41 |
| 95th-Percentile Queue Length [veh/ln] | 2.80 | 8.34 | 8.83 | 0.45 | 11.34 | 10.88 | 1.34 | 2.08 | 9.17 | 8.80 |
| 95th-Percentile Queue Length [ft/ln] | 69.91 | 208.54 | 220.76 | 11.26 | 283.50 | 272.09 | 33.39 | 52.08 | 229.15 | 219.96 |

**Movement, Approach, & Intersection Results**

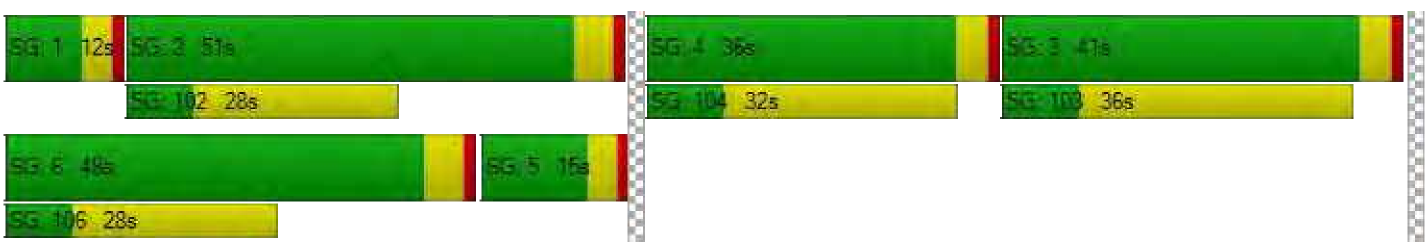
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 69.46 | 7.58 | 7.81 | 7.25 | 9.01 | 9.10 | 63.54 | 63.54 | 64.79 | 62.35 | 62.44 | 62.44 |
| Movement LOS | E | A | A | A | A | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 9.40 | | | 8.94 | | | 64.49 | | | 62.35 | | |
| Approach LOS | A | | | A | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 15.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.498 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.925 | 3.143 | 2.918 | 2.110 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.347 | 2.548 | 2.239 | 2.043 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 37.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.731 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 208 | 675 | 39 | 13 | 825 | 384 | 445 | 20 | 178 | 109 | 54 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 208 | 675 | 39 | 13 | 825 | 384 | 445 | 20 | 4 | 109 | 54 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 56 | 181 | 10 | 3 | 222 | 103 | 120 | 5 | 1 | 29 | 15 | 11 |
| Total Analysis Volume [veh/h] | 224 | 726 | 42 | 14 | 887 | 413 | 478 | 22 | 4 | 117 | 58 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 90 | 90 | 4 | 73 | 73 | 24 | 24 | 24 | 14 | 14 |
| g / C, Green / Cycle | 0.14 | 0.64 | 0.64 | 0.03 | 0.52 | 0.52 | 0.17 | 0.17 | 0.17 | 0.10 | 0.10 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.21 | 0.21 | 0.01 | 0.37 | 0.38 | 0.14 | 0.14 | 0.00 | 0.07 | 0.06 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1812 | 1714 | 1867 | 1638 | 1774 | 1817 | 1571 | 1751 | 1751 |
| c, Capacity [veh/h] | 252 | 1187 | 1161 | 45 | 979 | 859 | 307 | 315 | 272 | 179 | 179 |
| d1, Uniform Delay [s] | 58.85 | 11.41 | 11.41 | 66.82 | 24.88 | 25.36 | 55.48 | 55.48 | 47.87 | 60.32 | 59.74 |
| k, delay calibration | 0.48 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 33.18 | 0.73 | 0.75 | 1.45 | 4.09 | 5.15 | 3.68 | 3.60 | 0.02 | 2.96 | 2.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 0.33 | 0.33 | 0.31 | 0.70 | 0.72 | 0.80 | 0.80 | 0.01 | 0.65 | 0.56 |
| d, Delay for Lane Group [s/veh] | 92.03 | 12.14 | 12.17 | 68.27 | 28.97 | 30.51 | 59.16 | 59.07 | 47.89 | 63.28 | 61.79 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.07 | 5.58 | 5.48 | 0.51 | 17.66 | 16.52 | 8.76 | 8.97 | 0.12 | 4.18 | 3.55 |
| 50th-Percentile Queue Length [ft/ln] | 251.72 | 139.44 | 137.01 | 12.71 | 441.53 | 412.92 | 219.06 | 224.22 | 2.98 | 104.62 | 88.84 |
| 95th-Percentile Queue Length [veh/ln] | 15.27 | 9.45 | 9.32 | 0.91 | 24.55 | 23.18 | 13.62 | 13.88 | 0.21 | 7.53 | 6.40 |
| 95th-Percentile Queue Length [ft/ln] | 381.82 | 236.26 | 232.99 | 22.87 | 613.84 | 579.55 | 340.43 | 347.00 | 5.37 | 188.32 | 159.92 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 92.03 | 12.15 | 12.17 | 68.27 | 29.33 | 30.51 | 59.12 | 59.07 | 47.89 | 63.28 | 61.79 | 61.79 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 30.19 | | | 30.11 | | | 59.03 | | | 62.59 | | |
| Approach LOS | C | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 37.29 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.731 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.886 | 3.031 | 2.679 | 2.041 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.378 | 2.644 | 2.678 | 1.919 |
| Bicycle LOS | B | B | B | A |

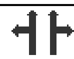
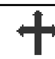
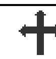
## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.652 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 58 | 167 | 701 | 97 | 71 | 16 | 2 | 65 | 15 | 295 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 58 | 167 | 701 | 97 | 71 | 16 | 2 | 65 | 15 | 295 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 16 | 47 | 197 | 27 | 20 | 4 | 1 | 18 | 4 | 83 |
| Total Analysis Volume [veh/h] | 2 | 837 | 65 | 188 | 788 | 109 | 80 | 18 | 2 | 73 | 17 | 331 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 34 | 34 | 12 | 49 | 49 | 26 | 26 |
| g / C, Green / Cycle | 0.43 | 0.43 | 0.15 | 0.62 | 0.62 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.10 | 0.24 | 0.24 | 0.14 | 0.26 |
| s, saturation flow rate [veh/h] | 1863 | 1647 | 1795 | 1885 | 1793 | 713 | 1642 |
| c, Capacity [veh/h] | 840 | 702 | 273 | 1161 | 1104 | 314 | 589 |
| d1, Uniform Delay [s] | 17.73 | 17.76 | 32.18 | 7.81 | 7.83 | 21.25 | 24.16 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.50 | 0.50 | 0.23 | 0.33 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.81 | 3.84 | 3.09 | 1.01 | 1.07 | 1.24 | 4.86 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.61 | 0.69 | 0.39 | 0.40 | 0.32 | 0.71 |
| d, Delay for Lane Group [s/veh] | 20.54 | 21.61 | 35.27 | 8.81 | 8.90 | 22.49 | 29.02 |
| Lane Group LOS | C | C | D | A | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.86 | 6.26 | 3.54 | 3.60 | 3.48 | 1.57 | 7.55 |
| 50th-Percentile Queue Length [ft/ln] | 171.40 | 156.55 | 88.60 | 90.10 | 87.00 | 39.23 | 188.76 |
| 95th-Percentile Queue Length [veh/ln] | 11.15 | 10.37 | 6.38 | 6.49 | 6.26 | 2.82 | 12.06 |
| 95th-Percentile Queue Length [ft/ln] | 278.76 | 259.14 | 159.48 | 162.17 | 156.60 | 70.61 | 301.42 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.54 | 21.00 | 21.61 | 35.27 | 8.85 | 8.90 | 22.49 | 22.49 | 22.49 | 29.02 | 29.02 | 29.02 |
| Movement LOS | C | C | C | D | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 21.04 | | | 13.43 | | | 22.49 | | | 29.02 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 19.15 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.652 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.79 | 29.79 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.938 | 1.804 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 597 | 1072 | 682 | 682 |
| d_b, Bicycle Delay [s] | 19.71 | 8.63 | 17.43 | 17.40 |
| I_b,int, Bicycle LOS Score for Intersection | 2.305 | 2.455 | 1.725 | 2.254 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.402 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 525 | 424 | 577 | 445 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 424 | 577 | 445 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 109 | 149 | 115 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 437 | 595 | 459 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 79 | 79 | 79 | 79 | 79 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 23 | 60 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.29 | 0.76 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.24 | 0.31 | 0.31 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1803 |
| c, Capacity [veh/h] | 273 | 243 | 529 | 1444 | 857 |
| d1, Uniform Delay [s] | 30.79 | 0.00 | 25.96 | 3.23 | 15.86 |
| k, delay calibration | 0.08 | 0.08 | 0.15 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.13 | 0.00 | 4.52 | 0.19 | 3.98 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 0.83 | 0.41 | 0.66 |
| d, Delay for Lane Group [s/veh] | 31.92 | 0.00 | 30.48 | 3.42 | 19.84 |
| Lane Group LOS | C | A | C | A | B |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.49 | 0.00 | 7.80 | 1.87 | 7.86 |
| 50th-Percentile Queue Length [ft/ln] | 62.21 | 0.00 | 195.07 | 46.87 | 196.39 |
| 95th-Percentile Queue Length [veh/ln] | 4.48 | 0.00 | 12.38 | 3.37 | 12.45 |
| 95th-Percentile Queue Length [ft/ln] | 111.98 | 0.00 | 309.60 | 84.36 | 311.30 |

**Movement, Approach, & Intersection Results**

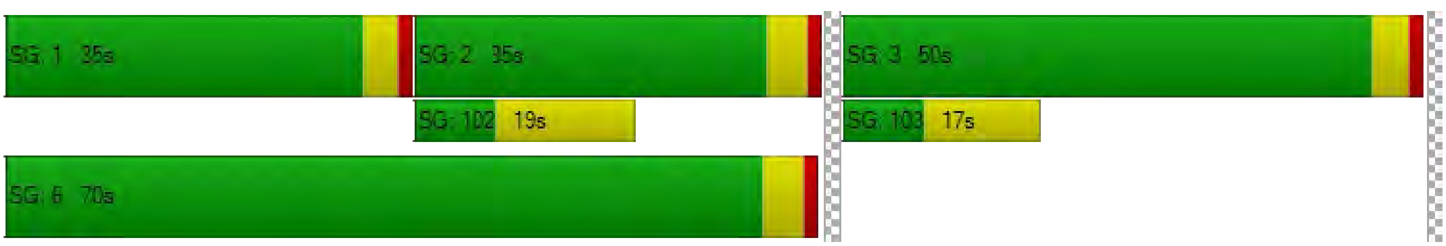
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.92 | 0.00 | 30.48 | 3.42 | 19.84 | 19.84 |
| Movement LOS | C | A | C | A | B | B |
| d_A, Approach Delay [s/veh] | 31.92 | | 14.88 | | 19.84 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 17.87 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 2.402 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.24 | 29.24 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.903 | 2.832 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1160 | 1657 | 770 |
| d_b, Bicycle Delay [s] | 7.00 | 1.18 | 14.99 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.262 | 2.494 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.435 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 70 | 0 | 227 | 2 | 696 | 112 | 315 | 636 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 70 | 0 | 219 | 2 | 696 | 55 | 315 | 636 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 18 | 0 | 58 | 1 | 183 | 14 | 83 | 167 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 74 | 0 | 231 | 2 | 733 | 58 | 332 | 669 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 80 | 80 | 91 | 87 | 87 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.18 | 0.78 | 0.67 | 0.67 | 0.76 | 0.72 | 0.72 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.08 | 0.15 | 0.00 | 0.21 | 0.04 | 0.39 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 1419 | 1711 | 978 | 1525 | 805 | 3569 | 1563 | 862 | 1873 | 1871 |
| c, Capacity [veh/h] | 164 | 316 | 241 | 282 | 665 | 2375 | 1040 | 677 | 1355 | 1353 |
| d1, Uniform Delay [s] | 52.88 | 41.53 | 47.49 | 46.67 | 3.75 | 8.45 | 6.97 | 5.20 | 5.60 | 5.60 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.12 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.64 | 0.32 | 0.68 | 6.37 | 0.00 | 0.34 | 0.10 | 2.53 | 0.44 | 0.44 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.22 | 0.22 | 0.31 | 0.82 | 0.00 | 0.31 | 0.06 | 0.49 | 0.25 | 0.25 |
| d, Delay for Lane Group [s/veh] | 53.52 | 41.85 | 48.18 | 53.04 | 3.75 | 8.79 | 7.07 | 7.72 | 6.03 | 6.04 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | No | Yes | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.08 | 1.78 | 2.08 | 7.07 | 0.01 | 3.81 | 0.51 | 2.47 | 2.65 | 2.65 |
| 50th-Percentile Queue Length [ft/ln] | 27.01 | 44.51 | 51.95 | 176.65 | 0.25 | 95.31 | 12.81 | 61.68 | 66.36 | 66.30 |
| 95th-Percentile Queue Length [veh/ln] | 1.94 | 3.20 | 3.74 | 11.43 | 0.02 | 6.86 | 0.92 | 4.44 | 4.78 | 4.77 |
| 95th-Percentile Queue Length [ft/ln] | 48.61 | 80.12 | 93.50 | 285.64 | 0.45 | 171.55 | 23.05 | 111.03 | 119.45 | 119.34 |

**Movement, Approach, & Intersection Results**

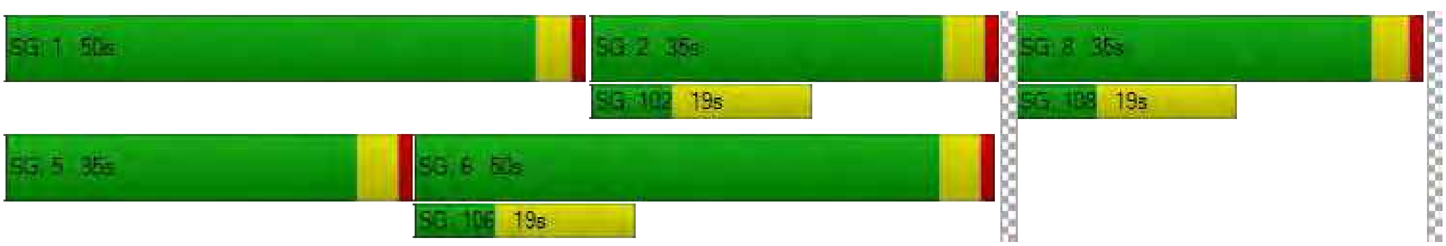
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 53.52 | 41.85 | 41.85 | 48.18 | 48.18 | 53.04 | 3.75 | 8.79 | 7.07 | 7.72 | 6.04 | 6.04 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 45.89 | | | 51.86 | | | 8.65 | | | 6.59 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 15.45 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.435 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.980 | 2.536 | 2.961 | 2.822 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.076 | 2.261 | 2.387 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
### Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 108.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.083 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3481 | 20 | 359 | 970 | 72 | 1814 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3481 | 20 | 359 | 970 | 72 | 1814 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 888 | 5 | 92 | 247 | 18 | 463 |
| Total Analysis Volume [veh/h] | 3552 | 20 | 366 | 990 | 73 | 1851 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 153 | 153 | 153 | 153 | 153 | 153 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 34 | 126 | 15 | 53 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.22 | 0.82 | 0.10 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.70 | 0.01 | 0.11 | 0.20 | 0.02 | 0.44 |
| s, saturation flow rate [veh/h] | 5077 | 1399 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2992 | 824 | 757 | 4139 | 321 | 1477 |
| d1, Uniform Delay [s] | 31.38 | 13.07 | 51.55 | 2.93 | 63.53 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 85.28 | 0.01 | 0.18 | 0.04 | 0.13 | 114.40 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.19 | 0.02 | 0.48 | 0.24 | 0.23 | 1.25 |
| d, Delay for Lane Group [s/veh] | 116.65 | 13.09 | 51.73 | 2.96 | 63.67 | 164.15 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 56.14 | 0.28 | 5.95 | 1.42 | 1.32 | 34.19 |
| 50th-Percentile Queue Length [ft/ln] | 1403.48 | 6.88 | 148.73 | 35.53 | 32.95 | 854.65 |
| 95th-Percentile Queue Length [veh/ln] | 78.38 | 0.50 | 9.95 | 2.56 | 2.37 | 50.25 |
| 95th-Percentile Queue Length [ft/ln] | 1959.53 | 12.38 | 248.73 | 63.95 | 59.30 | 1256.36 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

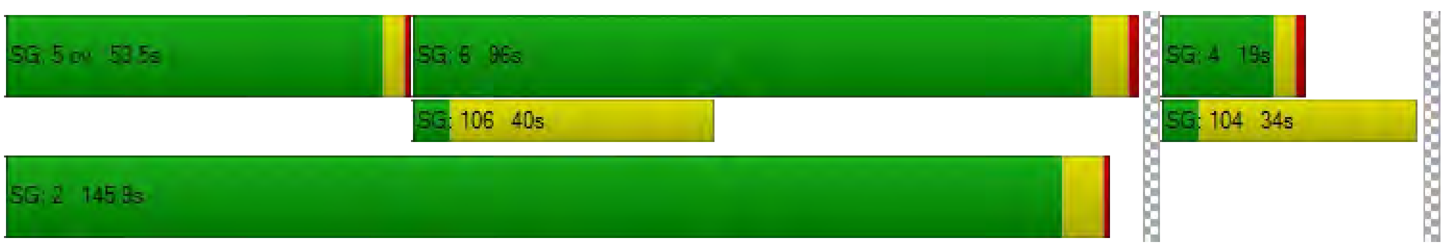
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 116.65 | 13.09 | 51.73 | 2.96 | 63.67 | 164.15 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 116.07 | | 16.13 | | 160.34 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 108.72 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.083 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 67.62 | 0.00 | 67.62 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.804 | 0.000 | 3.080 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 550 | 576 | 196 |
| d_b, Bicycle Delay [s] | 40.13 | 38.71 | 62.09 |
| I_b,int, Bicycle LOS Score for Intersection | 3.524 | 2.305 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 175.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.224 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 189 | 101 | 1112 | 159 | 315 | 133 | 131 | 1972 | 223 | 559 | 811 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 189 | 101 | 1112 | 159 | 315 | 63 | 131 | 1972 | 178 | 559 | 811 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 49 | 26 | 287 | 41 | 81 | 16 | 34 | 508 | 46 | 144 | 209 | 9 |
| Total Analysis Volume [veh/h] | 195 | 104 | 1146 | 164 | 325 | 65 | 135 | 2033 | 184 | 576 | 836 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 14 | 13 | 39 | 9 | 10 | 10 | 66 | 40 | 40 | 66 | 56 | 56 |
| g / C, Green / Cycle | 0.13 | 0.13 | 0.38 | 0.09 | 0.09 | 0.09 | 0.64 | 0.38 | 0.38 | 0.64 | 0.54 | 0.54 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.07 | 0.28 | 0.09 | 0.20 | 0.04 | 0.14 | 0.66 | 0.21 | 0.39 | 0.17 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4142 | 1748 | 1606 | 1455 | 994 | 3084 | 889 | 1475 | 4959 | 1615 |
| c, Capacity [veh/h] | 230 | 186 | 1566 | 151 | 152 | 137 | 645 | 1186 | 342 | 925 | 2662 | 867 |
| d1, Uniform Delay [s] | 44.23 | 42.80 | 27.73 | 47.58 | 47.16 | 44.53 | 8.02 | 32.06 | 24.89 | 23.80 | 13.44 | 11.41 |
| k, delay calibration | 0.11 | 0.11 | 0.15 | 0.35 | 0.43 | 0.11 | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.44 | 2.61 | 0.93 | 85.92 | 533.97 | 2.52 | 0.16 | 322.50 | 1.32 | 0.69 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.56 | 0.73 | 1.09 | 2.15 | 0.47 | 0.21 | 1.71 | 0.54 | 0.62 | 0.31 | 0.04 |
| d, Delay for Lane Group [s/veh] | 52.66 | 45.41 | 28.66 | 133.50 | 581.13 | 47.05 | 8.18 | 354.56 | 26.21 | 24.49 | 13.51 | 11.43 |
| Lane Group LOS | D | D | C | F | F | D | A | F | C | C | B | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.32 | 1.29 | 7.84 | 7.57 | 13.22 | 1.70 | 0.57 | 44.97 | 3.58 | 2.72 | 3.54 | 0.37 |
| 50th-Percentile Queue Length [ft/ln] | 132.98 | 32.35 | 196.06 | 189.21 | 330.53 | 42.60 | 14.37 | 1124.36 | 89.60 | 68.01 | 88.38 | 9.23 |
| 95th-Percentile Queue Length [veh/ln] | 9.10 | 2.33 | 12.44 | 12.44 | 22.88 | 3.07 | 1.03 | 72.83 | 6.45 | 4.90 | 6.36 | 0.66 |
| 95th-Percentile Queue Length [ft/ln] | 227.54 | 58.23 | 310.88 | 310.99 | 571.88 | 76.68 | 25.86 | 1820.81 | 161.27 | 122.42 | 159.09 | 16.61 |

**Movement, Approach, & Intersection Results**

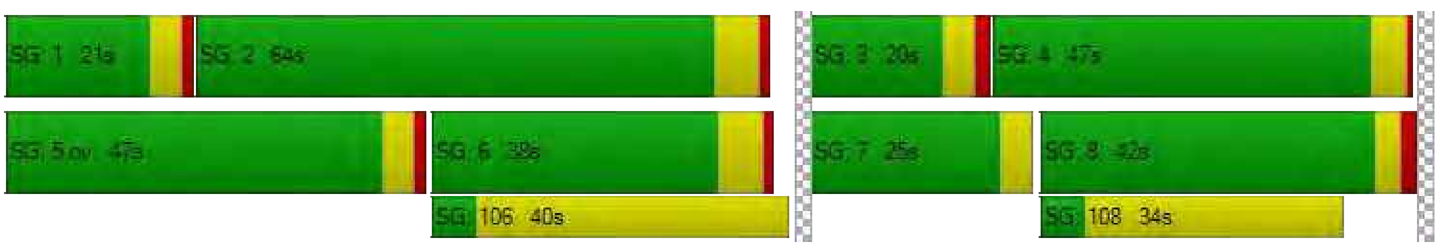
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.66 | 45.41 | 28.66 | 133.50 | 581.13 | 47.05 | 8.18 | 354.56 | 26.21 | 24.49 | 13.51 | 11.43 |
| Movement LOS | D | D | C | F | F | D | A | F | C | C | B | B |
| d_A, Approach Delay [s/veh] | 33.10 | | | 385.96 | | | 308.99 | | | 17.83 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 174.95 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.224 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 43.42 | 0.00 | 43.42 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.461 | 0.000 | 3.235 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 819 | 721 | 615 | 1115 |
| d_b, Bicycle Delay [s] | 18.16 | 21.32 | 24.95 | 10.19 |
| I_b,int, Bicycle LOS Score for Intersection | 2.752 | 2.074 | 2.878 | 2.355 |
| Bicycle LOS | C | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 404.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.673 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 44 | 1292 | 23 | 284 | 946 | 54 | 94 | 9 | 35 | 75 | 16 | 334 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 44 | 1292 | 23 | 284 | 946 | 54 | 94 | 9 | 35 | 75 | 16 | 334 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 367 | 7 | 81 | 269 | 15 | 27 | 3 | 10 | 21 | 5 | 95 |
| Total Analysis Volume [veh/h] | 50 | 1468 | 26 | 323 | 1075 | 61 | 107 | 10 | 40 | 85 | 18 | 380 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 8 | 67 | 66 | 7 | 66 | 67 | 66 | 66 | 66 | 66 | 66 | 66 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 70 | 63 | 63 | 70 | 63 | 63 | 63 | 63 | 63 | 63 |
| g / C, Green / Cycle | 0.50 | 0.45 | 0.45 | 0.50 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.91 | 0.91 | 0.45 | 0.69 | 0.70 | 0.11 | 0.09 | 0.06 | 0.61 |
| s, saturation flow rate [veh/h] | 592 | 826 | 820 | 711 | 826 | 804 | 997 | 573 | 1351 | 656 |
| c, Capacity [veh/h] | 150 | 373 | 370 | 133 | 371 | 361 | 51 | 256 | 549 | 295 |
| d1, Uniform Delay [s] | 32.86 | 38.42 | 38.42 | 43.11 | 38.57 | 38.57 | 70.00 | 23.41 | 28.81 | 38.58 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.89 | 462.89 | 465.96 | 665.96 | 256.70 | 266.06 | 500.39 | 0.14 | 0.13 | 178.62 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.33 | 2.01 | 2.01 | 2.43 | 1.54 | 1.56 | 2.08 | 0.20 | 0.15 | 1.35 |
| d, Delay for Lane Group [s/veh] | 38.75 | 501.31 | 504.38 | 709.07 | 295.26 | 304.63 | 570.39 | 23.55 | 28.94 | 217.20 |
| Lane Group LOS | D | F | F | F | F | F | F | C | C | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.07 | 60.18 | 60.06 | 13.50 | 38.97 | 38.85 | 9.01 | 1.04 | 1.79 | 24.65 |
| 50th-Percentile Queue Length [ft/ln] | 26.82 | 1504.56 | 1501.39 | 337.50 | 974.20 | 971.22 | 225.30 | 26.00 | 44.65 | 616.15 |
| 95th-Percentile Queue Length [veh/ln] | 1.93 | 99.99 | 99.85 | 24.30 | 62.57 | 62.67 | 16.22 | 1.87 | 3.21 | 39.24 |
| 95th-Percentile Queue Length [ft/ln] | 48.28 | 2499.87 | 2496.33 | 607.49 | 1564.22 | 1566.73 | 405.53 | 46.80 | 80.37 | 980.88 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

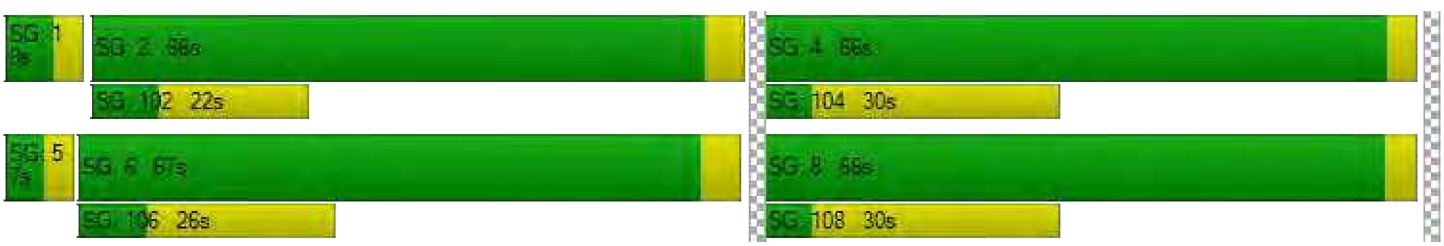
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 38.75 | 502.82 | 504.38 | 709.07 | 299.65 | 304.63 | 570.39 | 23.55 | 23.55 | 28.94 | 217.20 | 217.20 |
| Movement LOS | D | F | F | F | F | F | F | C | C | C | F | F |
| d_A, Approach Delay [s/veh] | 487.81 | | | 390.50 | | | 396.24 | | | 184.07 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 404.62 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.673 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 61.29 | 61.29 | 59.43 | 59.43 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.245 | 3.244 | 2.072 | 2.678 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 900 | 886 | 897 | 900 |
| d_b, Bicycle Delay [s] | 21.19 | 21.93 | 21.36 | 21.33 |
| I_b,int, Bicycle LOS Score for Intersection | 2.833 | 2.763 | 1.819 | 2.357 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 116.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.239 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 83 | 945 | 1389 | 51 | 71 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 83 | 945 | 1389 | 51 | 71 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 254 | 373 | 14 | 19 | 31 |
| Total Analysis Volume [veh/h] | 89 | 1016 | 1494 | 55 | 76 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 11 | 103 | 90 | 90 | 20 | 20 |
| g / C, Green / Cycle | 0.08 | 0.79 | 0.69 | 0.69 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.07 | 0.64 | 0.93 | 0.95 | 0.07 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 819 | 1021 | 897 |
| c, Capacity [veh/h] | 103 | 1251 | 574 | 565 | 155 | 136 |
| d1, Uniform Delay [s] | 58.97 | 7.75 | 20.12 | 20.12 | 50.41 | 53.87 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.50 | 0.04 | 0.13 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.04 | 5.81 | 168.97 | 177.75 | 0.89 | 20.71 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.81 | 1.35 | 1.37 | 0.49 | 0.90 |
| d, Delay for Lane Group [s/veh] | 67.01 | 13.56 | 189.09 | 197.87 | 51.30 | 74.57 |
| Lane Group LOS | E | B | F | F | D | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.08 | 6.88 | 41.47 | 42.24 | 2.31 | 4.72 |
| 50th-Percentile Queue Length [ft/ln] | 77.09 | 172.05 | 1036.70 | 1056.01 | 57.82 | 117.95 |
| 95th-Percentile Queue Length [veh/ln] | 5.55 | 11.18 | 64.52 | 66.11 | 4.16 | 8.28 |
| 95th-Percentile Queue Length [ft/ln] | 138.77 | 279.61 | 1612.88 | 1652.76 | 104.07 | 207.01 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 67.01 | 13.56 | 193.32 | 197.87 | 51.30 | 74.57 |
| Movement LOS | E | B | F | F | D | E |
| d_A, Approach Delay [s/veh] | 17.87 | | 193.48 | | 65.68 | |
| Approach LOS | B | | F | | E | |
| d_I, Intersection Delay [s/veh] | 116.55 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.239 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.026 | 3.008 | 2.069 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.471 | 2.838 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 185.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.390 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1110 | 414 | 57 | 1102 | 274 | 45 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1110 | 414 | 57 | 1102 | 274 | 45 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 298 | 111 | 15 | 296 | 74 | 12 |
| Total Analysis Volume [veh/h] | 1194 | 445 | 61 | 1185 | 295 | 48 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.92 | 0.82 | 0.09 | 0.92 | 0.27 | 0.28 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 601 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 105 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 197.76 | 142.36 | 43.45 | 99.15 | 291.72 | 296.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.42 | 1.27 | 0.97 | 1.20 | 1.56 | 1.57 |
| d, Delay for Lane Group [s/veh] | 220.59 | 164.03 | 101.91 | 114.15 | 345.28 | 349.74 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 34.19 | 22.69 | 2.73 | 24.31 | 12.92 | 12.11 |
| 50th-Percentile Queue Length [ft/ln] | 854.67 | 567.36 | 68.17 | 607.86 | 322.92 | 302.78 |
| 95th-Percentile Queue Length [veh/ln] | 55.22 | 36.06 | 4.91 | 37.33 | 22.13 | 20.95 |
| 95th-Percentile Queue Length [ft/ln] | 1380.55 | 901.51 | 122.71 | 933.35 | 553.32 | 523.64 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 220.59 | 164.03 | 101.91 | 114.15 | 347.07 | 349.74 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 205.23 | | 113.55 | | 347.43 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 184.95 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.390 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.234 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 2.912 | 2.588 | 2.126 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 151.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.283 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 198 | 261 | 255 | 70 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 396 | 80 | 21 | 350 | 7 | 7 | 50 | 54 | 72 | 70 | 19 |
| Total Analysis Volume [veh/h] | 295 | 1585 | 321 | 86 | 1401 | 29 | 30 | 201 | 218 | 287 | 280 | 77 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 62 | 62 | 8 | 57 | 57 | 29 | 29 | 29 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.48 | 0.48 | 0.06 | 0.44 | 0.44 | 0.22 | 0.22 | 0.22 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.51 | 0.53 | 0.09 | 0.51 | 0.51 | 0.02 | 0.21 | 0.14 | 0.08 | 0.21 | 0.05 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1193 | 952 | 1853 | 960 | 1810 | 965 | 1538 | 3409 | 1303 | 1414 |
| c, Capacity [veh/h] | 127 | 1194 | 574 | 59 | 820 | 425 | 399 | 213 | 339 | 414 | 158 | 172 |
| d1, Uniform Delay [s] | 58.48 | 33.72 | 33.72 | 60.98 | 36.22 | 36.22 | 40.18 | 49.90 | 45.70 | 54.78 | 57.10 | 52.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.18 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 615.74 | 46.94 | 66.30 | 221.06 | 80.25 | 91.55 | 0.03 | 25.96 | 0.76 | 0.78 | 370.87 | 0.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 2.32 | 1.07 | 1.10 | 1.46 | 1.15 | 1.15 | 0.08 | 0.95 | 0.64 | 0.69 | 1.77 | 0.45 |
| d, Delay for Lane Group [s/veh] | 674.22 | 80.66 | 100.02 | 282.04 | 116.47 | 127.77 | 40.21 | 75.86 | 46.47 | 55.56 | 427.97 | 53.39 |
| Lane Group LOS | F | F | F | F | F | F | D | E | D | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 25.92 | 25.52 | 27.63 | 5.57 | 22.02 | 24.16 | 0.77 | 7.95 | 6.44 | 4.56 | 21.49 | 2.36 |
| 50th-Percentile Queue Length [ft/ln] | 648.06 | 638.12 | 690.82 | 139.19 | 550.46 | 603.97 | 19.35 | 198.68 | 161.08 | 114.00 | 537.17 | 59.09 |
| 95th-Percentile Queue Length [veh/ln] | 41.88 | 35.58 | 38.80 | 10.02 | 32.61 | 35.46 | 1.39 | 12.57 | 10.61 | 8.06 | 34.79 | 4.25 |
| 95th-Percentile Queue Length [ft/ln] | 1046.89 | 889.44 | 970.06 | 250.54 | 815.19 | 886.39 | 34.83 | 314.27 | 265.15 | 201.55 | 869.67 | 106.36 |

**Movement, Approach, & Intersection Results**

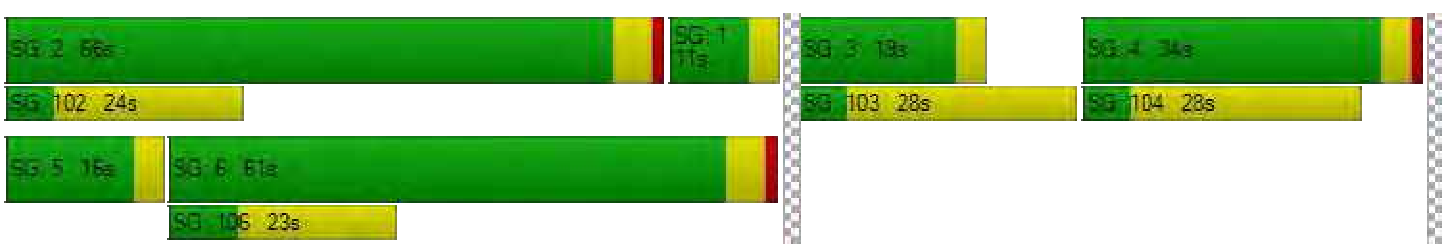
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 674.22 | 84.42 | 100.02 | 282.04 | 120.18 | 127.77 | 40.21 | 75.86 | 46.47 | 55.56 | 427.97 | 53.39 |
| Movement LOS | F | F | F | F | F | F | D | E | D | E | F | D |
| d_A, Approach Delay [s/veh] | | 165.75 | | | 129.51 | | | 59.21 | | | 217.22 | |
| Approach LOS | | F | | | F | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 151.27 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.283 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.408 | 2.990 | 2.697 | 2.747 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 939 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.53 | 50.13 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 2.393 | 2.589 | 2.696 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 201.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.378 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 1349 | 716 | 190 | 301 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 20 | 1349 | 716 | 0 | 301 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 348 | 185 | 0 | 78 | 0 |
| Total Analysis Volume [veh/h] | 21 | 1391 | 738 | 0 | 310 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 2 | 41 | 36 | 36 | 31 | 31 |
| g / C, Green / Cycle | 0.02 | 0.50 | 0.44 | 0.44 | 0.38 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.83 | 0.44 | 0.00 | 0.36 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1615 | 850 | 1596 |
| c, Capacity [veh/h] | 34 | 839 | 738 | 707 | 325 | 610 |
| d1, Uniform Delay [s] | 40.01 | 20.56 | 23.09 | 0.00 | 24.67 | 0.00 |
| k, delay calibration | 0.04 | 0.40 | 0.15 | 0.15 | 0.30 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.35 | 300.75 | 18.53 | 0.00 | 28.80 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.61 | 1.66 | 1.00 | 0.00 | 0.95 | 0.00 |
| d, Delay for Lane Group [s/veh] | 46.36 | 321.32 | 41.62 | 0.00 | 53.47 | 0.00 |
| Lane Group LOS | D | F | F | A | D | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.47 | 42.17 | 8.26 | 0.00 | 8.07 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 11.87 | 1054.18 | 206.47 | 0.00 | 201.76 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 0.85 | 69.41 | 12.98 | 0.00 | 12.73 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 21.37 | 1735.28 | 324.42 | 0.00 | 318.23 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 46.36 | 321.32 | 41.62 | 0.00 | 53.47 | 0.00 |
| Movement LOS | D | F | F | A | D | A |
| d_A, Approach Delay [s/veh] | 317.23 | | 41.62 | | 53.47 | |
| Approach LOS | F | | D | | D | |
| d_I, Intersection Delay [s/veh] | 201.31 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.378 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 30.78 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.197 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 877 | 877 | 877 |
| d_b, Bicycle Delay [s] | 13.01 | 12.98 | 12.96 |
| I_b,int, Bicycle LOS Score for Intersection | 2.725 | 2.352 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 197.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.231 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1046 | 4 | 29 | 537 | 18 | 133 | 2 | 31 | 21 | 7 | 33 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1046 | 4 | 29 | 537 | 18 | 133 | 2 | 13 | 21 | 7 | 33 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 291 | 1 | 8 | 149 | 5 | 37 | 1 | 4 | 6 | 2 | 9 |
| Total Analysis Volume [veh/h] | 10 | 1162 | 4 | 32 | 597 | 20 | 148 | 2 | 14 | 23 | 8 | 37 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 | 147 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 3 | 102 | 11 | 11 | 11 | 15 | 15 |
| g / C, Green / Cycle | 0.01 | 0.68 | 0.68 | 0.02 | 0.69 | 0.07 | 0.07 | 0.07 | 0.10 | 0.10 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.91 | 0.91 | 0.02 | 1.04 | 0.04 | 0.04 | 0.03 | 0.01 | 0.08 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1812 | 441 | 1810 | 555 |
| c, Capacity [veh/h] | 10 | 468 | 401 | 43 | 412 | 128 | 133 | 32 | 182 | 56 |
| d1, Uniform Delay [s] | 72.78 | 23.52 | 23.52 | 71.36 | 22.49 | 65.90 | 65.90 | 65.01 | 60.24 | 64.72 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 116.32 | 167.66 | 170.00 | 22.86 | 236.51 | 4.01 | 3.87 | 8.87 | 0.31 | 22.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.95 | 1.34 | 1.34 | 0.75 | 1.50 | 0.57 | 0.57 | 0.43 | 0.13 | 0.81 |
| d, Delay for Lane Group [s/veh] | 189.10 | 191.17 | 193.52 | 94.21 | 259.00 | 69.91 | 69.77 | 73.88 | 60.55 | 87.68 |
| Lane Group LOS | F | F | F | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.72 | 36.98 | 31.90 | 1.48 | 40.25 | 2.90 | 3.00 | 0.60 | 0.81 | 2.02 |
| 50th-Percentile Queue Length [ft/ln] | 17.99 | 924.40 | 797.57 | 37.05 | 1006.34 | 72.48 | 74.95 | 14.91 | 20.22 | 50.59 |
| 95th-Percentile Queue Length [veh/ln] | 1.30 | 57.85 | 50.58 | 2.67 | 65.87 | 5.22 | 5.40 | 1.07 | 1.46 | 3.64 |
| 95th-Percentile Queue Length [ft/ln] | 32.39 | 1446.14 | 1264.44 | 66.70 | 1646.65 | 130.46 | 134.91 | 26.84 | 36.40 | 91.06 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 189.10 | 192.25 | 193.52 | 94.21 | 259.00 | 259.00 | 69.84 | 69.77 | 73.88 | 60.55 | 87.68 | 87.68 |
| Movement LOS | F | F | F | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 192.23 | | | 250.88 | | | 70.18 | | | 78.50 | | |
| Approach LOS | F | | | F | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 197.24 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.231 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 62.86 | 62.86 | 62.86 | 62.86 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.526 | 2.747 | 2.198 | 1.992 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 272 | 272 | 408 | 408 |
| d_b, Bicycle Delay [s] | 54.89 | 55.05 | 46.53 | 46.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.530 | 2.630 | 1.860 | 1.672 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.650 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 14 | 693 | 5 | 2 | 702 | 100 | 107 | 2 | 37 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 693 | 5 | 2 | 702 | 100 | 107 | 2 | 37 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 190 | 1 | 1 | 193 | 27 | 29 | 1 | 10 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 15 | 762 | 5 | 2 | 771 | 110 | 118 | 2 | 41 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 76 | 76 | 76 | 76 | 16 | 16 |
| g / C, Green / Cycle | 0.76 | 0.76 | 0.76 | 0.76 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.41 | 0.00 | 0.49 | 0.11 | 0.02 |
| s, saturation flow rate [veh/h] | 640 | 1851 | 712 | 1796 | 1409 | 1512 |
| c, Capacity [veh/h] | 391 | 1402 | 471 | 1361 | 288 | 300 |
| d1, Uniform Delay [s] | 12.89 | 5.01 | 9.68 | 5.76 | 39.36 | 35.79 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.18 | 1.54 | 0.02 | 2.39 | 1.69 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.04 | 0.55 | 0.00 | 0.65 | 0.56 | 0.09 |
| d, Delay for Lane Group [s/veh] | 13.08 | 6.55 | 9.70 | 8.15 | 41.05 | 35.91 |
| Lane Group LOS | B | A | A | A | D | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.19 | 5.92 | 0.02 | 7.53 | 3.83 | 0.58 |
| 50th-Percentile Queue Length [ft/ln] | 4.83 | 147.91 | 0.52 | 188.33 | 95.82 | 14.44 |
| 95th-Percentile Queue Length [veh/ln] | 0.35 | 9.91 | 0.04 | 12.03 | 6.90 | 1.04 |
| 95th-Percentile Queue Length [ft/ln] | 8.69 | 247.64 | 0.94 | 300.86 | 172.48 | 25.99 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.08 | 6.55 | 6.55 | 9.70 | 8.15 | 8.15 | 41.05 | 41.05 | 41.05 | 35.91 | 35.91 | 35.91 |
| Movement LOS | B | A | A | A | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 6.68 | | | 8.16 | | | 41.05 | | | 35.91 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 10.79 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.650 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.59 | 39.59 | 39.59 | 39.59 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.404 | 2.688 | 1.882 | 1.737 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.85 | 4.84 | 29.77 | 29.77 |
| I_b,int, Bicycle LOS Score for Intersection | 2.850 | 3.017 | 1.825 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.535 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 91 | 54 | 681 | 10 | 25 | 88 | 5 | 80 | 51 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 91 | 54 | 681 | 10 | 25 | 88 | 5 | 80 | 51 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 24 | 14 | 177 | 3 | 7 | 23 | 1 | 21 | 13 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 95 | 56 | 709 | 10 | 26 | 92 | 5 | 83 | 53 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 76 | 76 | 76 | 76 | 16 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.76 | 0.76 | 0.76 | 0.76 | 0.16 | 0.16 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.43 | 0.08 | 0.39 | 0.02 | 0.05 | 0.06 | 0.07 |
| s, saturation flow rate [veh/h] | 745 | 1807 | 705 | 1854 | 1260 | 1849 | 1313 | 1677 |
| c, Capacity [veh/h] | 512 | 1371 | 469 | 1407 | 167 | 294 | 190 | 267 |
| d1, Uniform Delay [s] | 8.38 | 5.11 | 10.38 | 4.75 | 43.63 | 37.29 | 44.22 | 37.89 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 1.71 | 0.52 | 1.33 | 0.43 | 0.65 | 1.58 | 1.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.57 | 0.12 | 0.51 | 0.16 | 0.33 | 0.44 | 0.42 |
| d, Delay for Lane Group [s/veh] | 8.40 | 6.81 | 10.90 | 6.08 | 44.06 | 37.94 | 45.80 | 38.96 |
| Lane Group LOS | A | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 6.20 | 0.65 | 5.29 | 0.63 | 2.17 | 2.09 | 2.58 |
| 50th-Percentile Queue Length [ft/ln] | 0.73 | 154.89 | 16.15 | 132.20 | 15.76 | 54.24 | 52.16 | 64.61 |
| 95th-Percentile Queue Length [veh/ln] | 0.05 | 10.28 | 1.16 | 9.06 | 1.14 | 3.91 | 3.76 | 4.65 |
| 95th-Percentile Queue Length [ft/ln] | 1.31 | 256.95 | 29.07 | 226.48 | 28.38 | 97.64 | 93.89 | 116.29 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.40 | 6.81 | 6.81 | 10.90 | 6.08 | 6.08 | 44.06 | 37.94 | 37.94 | 45.80 | 38.96 | 38.96 |
| Movement LOS | A | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 6.82 | | | 6.43 | | | 39.24 | | | 41.85 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 12.45 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.535 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.490 | 2.487 | 2.000 | 2.144 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.848 | 2.838 | 1.763 | 1.883 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.617 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 240 | 245 | 372 | 112 | 294 | 123 | 439 | 189 | 277 | 502 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 240 | 125 | 372 | 112 | 0 | 123 | 439 | 189 | 277 | 502 | 15 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 63 | 33 | 98 | 29 | 0 | 32 | 116 | 50 | 73 | 132 | 4 |
| Total Analysis Volume [veh/h] | 32 | 253 | 132 | 392 | 118 | 0 | 129 | 462 | 199 | 292 | 528 | 16 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

### Phasing & Timing

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 17 | 17 | 17 | 17 | 17 | 17 | 15 | 15 | 15 | 15 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.18 | 0.18 | 0.18 | 0.18 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.13 | 0.09 | 0.14 | 0.14 | 0.00 | 0.07 | 0.12 | 0.12 | 0.13 | 0.16 | 0.16 | 0.16 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1454 | 1785 | 1850 | 1584 | 1794 | 1892 | 1887 | 1541 | 1718 | 1893 | 1703 |
| c, Capacity [veh/h] | 356 | 377 | 291 | 354 | 367 | 314 | 317 | 334 | 333 | 272 | 364 | 401 | 361 |
| d1, Uniform Delay [s] | 28.10 | 31.88 | 30.05 | 32.24 | 32.24 | 0.00 | 31.49 | 33.32 | 33.32 | 33.35 | 31.78 | 31.77 | 31.80 |
| k, delay calibration | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 2.37 | 1.11 | 2.61 | 2.52 | 0.00 | 0.84 | 2.62 | 2.63 | 3.58 | 3.00 | 2.72 | 3.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.67 | 0.45 | 0.71 | 0.71 | 0.00 | 0.41 | 0.70 | 0.70 | 0.72 | 0.74 | 0.74 | 0.75 |
| d, Delay for Lane Group [s/veh] | 28.21 | 34.25 | 31.16 | 34.85 | 34.76 | 0.00 | 32.33 | 35.94 | 35.95 | 36.93 | 34.78 | 34.49 | 34.88 |
| Lane Group LOS | C | C | C | C | C | A | C | D | D | D | C | C | C |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.54 | 4.99 | 2.42 | 5.06 | 5.23 | 0.00 | 2.41 | 4.69 | 4.68 | 4.02 | 5.41 | 5.92 | 5.39 |
| 50th-Percentile Queue Length [ft/ln] | 13.48 | 124.68 | 60.51 | 126.49 | 130.81 | 0.00 | 60.13 | 117.3 | 117.1 | 100.5 | 135.19 | 148.04 | 134.80 |
| 95th-Percentile Queue Length [veh/ln] | 0.97 | 8.65 | 4.36 | 8.75 | 8.98 | 0.00 | 4.33 | 8.25 | 8.23 | 7.24 | 9.22 | 9.91 | 9.20 |
| 95th-Percentile Queue Length [ft/ln] | 24.26 | 216.24 | 108.91 | 218.71 | 224.60 | 0.00 | 108.2 | 206.1 | 205.8 | 181.0 | 230.54 | 247.81 | 230.00 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 28.21 | 34.25 | 31.16 | 34.82 | 34.76 | 0.00 | 32.33 | 35.94 | 36.93 | 34.76 | 34.68 | 34.88 |
| Movement LOS | C | C | C | C | C | A | C | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | | 32.81 | | | 34.80 | | | 35.60 | | | 34.71 | |
| Approach LOS | | C | | | C | | | D | | | C | |
| d_I, Intersection Delay [s/veh] | | | | | | 34.69 | | | | | | |
| Intersection LOS | | | | | | C | | | | | | |
| Intersection V/C | | | | | | 0.617 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.80 | 31.80 | 31.80 | 31.80 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.493 | 4.247 | 4.353 | 2.750 |
| Crosswalk LOS | B | D | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 668 | 961 | 635 | 798 |
| d_b, Bicycle Delay [s] | 19.54 | 11.70 | 20.04 | 15.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.446 | 4.051 | 3.036 | 2.249 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.886 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1855 | 0 | 0 | 1120 | 570 | 696 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1855 | 0 | 0 | 1120 | 570 | 696 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 468 | 0 | 0 | 283 | 144 | 176 |
| Total Analysis Volume [veh/h] | 1874 | 0 | 0 | 1131 | 576 | 703 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 51 | 51 | 25 | 25 |
| g / C, Green / Cycle | 0.63 | 0.63 | 0.31 | 0.31 |
| (v / s)_i Volume / Saturation Flow Rate | 0.54 | 0.32 | 0.17 | 0.27 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2217 | 2243 | 1041 | 798 |
| d1, Uniform Delay [s] | 11.48 | 7.82 | 23.00 | 26.19 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.18 | 0.81 | 0.17 | 1.30 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.50 | 0.55 | 0.88 |
| d, Delay for Lane Group [s/veh] | 15.66 | 8.64 | 23.17 | 27.50 |
| Lane Group LOS | B | A | C | C |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 11.87 | 4.61 | 4.35 | 6.15 |
| 50th-Percentile Queue Length [ft/ln] | 296.69 | 115.13 | 108.67 | 153.80 |
| 95th-Percentile Queue Length [veh/ln] | 17.52 | 8.12 | 7.77 | 10.22 |
| 95th-Percentile Queue Length [ft/ln] | 437.93 | 203.12 | 194.15 | 255.50 |

**Movement, Approach, & Intersection Results**

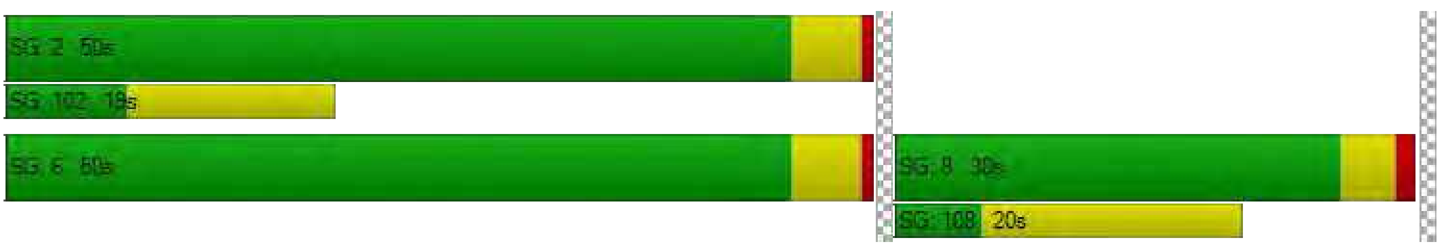
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.66 | 0.00 | 0.00 | 8.64 | 23.17 | 27.50 |
| Movement LOS | B | | | A | C | C |
| d_A, Approach Delay [s/veh] | 15.66 | | 8.64 | | 25.55 | |
| Approach LOS | B | | A | | C | |
| d_I, Intersection Delay [s/veh] | 16.76 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.886 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.031 | 2.436 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.47 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 3.106 | 2.493 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 38.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.004 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 61 | 5 | 20 | 135 | 10 | 8 | 35 | 7 | 2 | 4 | 17 |
| Total Analysis Volume [veh/h] | 26 | 243 | 19 | 80 | 541 | 39 | 33 | 140 | 26 | 8 | 17 | 66 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 594 | 660 | 531 | 530 |
| Degree of Utilization, x | 0.48 | 1.00 | 0.37 | 0.17 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 2.64 | 15.90 | 1.73 | 0.61 |
| 95th-Percentile Queue Length [ft] | 65.99 | 397.48 | 43.19 | 15.37 |
| Approach Delay [s/veh] | 14.62 | 59.14 | 13.79 | 11.19 |
| Approach LOS | B | F | B | B |
| Intersection Delay [s/veh] | 37.97 | | | |
| Intersection LOS | E | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 38.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.949 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 47 | 10 | 459 | 3 | 8 | 1 | 2 | 159 | 54 | 579 | 124 | 4 |
| Total Analysis Volume [veh/h] | 186 | 42 | 1834 | 13 | 32 | 5 | 9 | 634 | 217 | 2318 | 497 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 33 | 123 | 10 | 10 | 31 | 31 | 31 | 76 | 76 |
| g / C, Green / Cycle | 0.21 | 0.77 | 0.06 | 0.06 | 0.19 | 0.19 | 0.19 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.44 | 0.02 | 0.01 | 0.18 | 0.18 | 0.14 | 0.45 | 0.31 |
| s, saturation flow rate [veh/h] | 1826 | 4190 | 1707 | 1588 | 1891 | 1724 | 1553 | 5150 | 1674 |
| c, Capacity [veh/h] | 381 | 3131 | 137 | 97 | 368 | 335 | 302 | 2449 | 796 |
| d1, Uniform Delay [s] | 57.20 | 9.09 | 71.59 | 71.56 | 63.12 | 63.12 | 60.11 | 40.02 | 31.71 |
| k, delay calibration | 0.18 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.48 | 0.81 | 0.27 | 0.45 | 3.79 | 4.13 | 1.20 | 9.36 | 3.98 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.60 | 0.59 | 0.20 | 0.23 | 0.91 | 0.91 | 0.72 | 0.95 | 0.64 |
| d, Delay for Lane Group [s/veh] | 59.69 | 9.90 | 71.86 | 72.01 | 66.91 | 67.25 | 61.31 | 49.38 | 35.68 |
| Lane Group LOS | E | A | E | E | E | E | E | D | D |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.68 | 9.31 | 1.10 | 0.89 | 13.86 | 12.66 | 8.37 | 30.79 | 15.93 |
| 50th-Percentile Queue Length [ft/ln] | 216.95 | 232.85 | 27.52 | 22.30 | 346.38 | 316.40 | 209.34 | 769.75 | 398.25 |
| 95th-Percentile Queue Length [veh/ln] | 13.51 | 14.32 | 1.98 | 1.61 | 19.96 | 18.49 | 13.12 | 39.89 | 22.48 |
| 95th-Percentile Queue Length [ft/ln] | 337.72 | 357.98 | 49.54 | 40.15 | 498.99 | 462.26 | 327.98 | 997.25 | 561.90 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 59.69 | 59.69 | 9.90 | 71.86 | 71.94 | 72.01 | 66.91 | 67.07 | 61.31 | 49.38 | 35.68 | 35.68 |
| Movement LOS | E | E | A | E | E | E | E | E | E | D | D | D |
| d_A, Approach Delay [s/veh] | 15.40 | | | 71.92 | | | 65.62 | | | 46.90 | | |
| Approach LOS | B | | | E | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 38.70 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.949 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.537 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 4.962 | 1.601 | 2.269 | 6.229 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 96.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.692 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 947 | 199 | 0 | 933 | 674 | 0 | 0 | 0 | 0 | 726 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 947 | 199 | 0 | 933 | 674 | 0 | 0 | 0 | 0 | 726 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 255 | 50 | 0 | 251 | 181 | 0 | 0 | 0 | 0 | 182 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1018 | 199 | 0 | 1003 | 725 | 0 | 0 | 0 | 0 | 726 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 0 | | | 0 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 10 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.20 | 1.05 | | 0.21 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2763 | 2719 | 376 | | 1256 | 454 |
| d1, Uniform Delay [s] | 10.44 | 10.44 | 17.69 | | 20.77 | 23.80 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.38 | 0.39 | 427.04 | | 0.42 | 4.91 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.37 | 0.37 | 1.93 | | 0.58 | 0.86 |
| d, Delay for Lane Group [s/veh] | 10.82 | 10.83 | 444.74 | | 21.20 | 28.71 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.19 | 3.14 | 50.43 | | 5.27 | 3.52 |
| 50th-Percentile Queue Length [ft/ln] | 79.67 | 78.56 | 1260.64 | | 131.81 | 87.94 |
| 95th-Percentile Queue Length [veh/ln] | 5.74 | 5.66 | 85.55 | | 9.04 | 6.33 |
| 95th-Percentile Queue Length [ft/ln] | 143.41 | 141.41 | 2138.67 | | 225.95 | 158.29 |

**Movement, Approach, & Intersection Results**

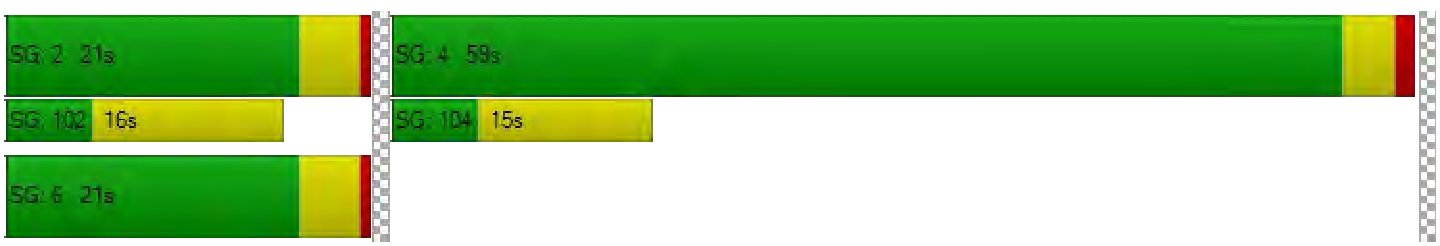
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 10.82 | 0.00 | 0.00 | 10.83 | 444.74 | 0.00 | 0.00 | 0.00 | 0.00 | 21.20 | 28.71 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | 10.82 | | | 192.88 | | | 0.00 | | | 23.83 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 96.02 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.692 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.925 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.120 | 2.510 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 148.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.120 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1244 | 423 | 0 | 1320 | 729 | 0 | 0 | 0 | 283 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1244 | 423 | 0 | 1320 | 729 | 0 | 0 | 0 | 283 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 317 | 108 | 0 | 337 | 182 | 0 | 0 | 0 | 71 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1269 | 432 | 0 | 1347 | 729 | 0 | 0 | 0 | 283 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.42 | 0.27 | 0.44 | | 0.08 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 916 | 474 | 916 | | 2107 | 1010 |
| d1, Uniform Delay [s] | 27.95 | 26.70 | 27.95 | | 6.96 | 14.76 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 180.19 | 24.27 | 217.68 | | 0.03 | 5.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.39 | 0.91 | 1.47 | | 0.13 | 0.94 |
| d, Delay for Lane Group [s/veh] | 208.14 | 50.98 | 245.64 | | 6.99 | 20.13 |
| Lane Group LOS | F | D | F | | A | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 20.81 | 10.66 | 23.99 | | 0.93 | 7.35 |
| 50th-Percentile Queue Length [ft/ln] | 520.19 | 266.56 | 599.70 | | 23.30 | 183.80 |
| 95th-Percentile Queue Length [veh/ln] | 33.37 | 16.02 | 38.66 | | 1.68 | 11.80 |
| 95th-Percentile Queue Length [ft/ln] | 834.15 | 400.44 | 966.56 | | 41.94 | 294.97 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

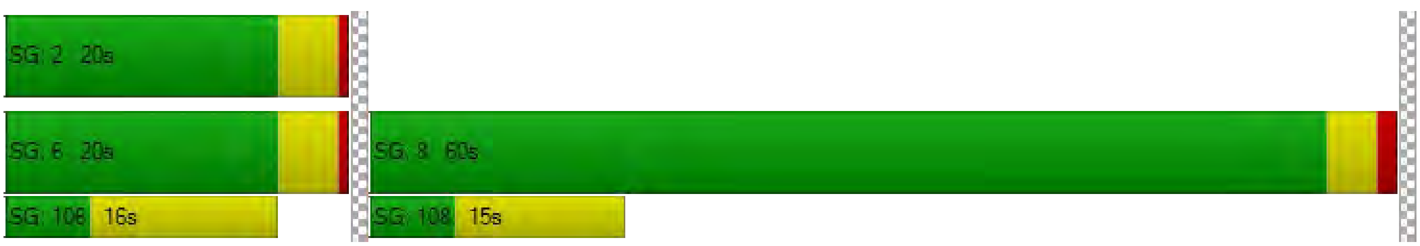
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 208.14 | 50.98 | 0.00 | 245.64 | 0.00 | 0.00 | 0.00 | 0.00 | 6.99 | 0.00 | 20.13 |
| Movement LOS | | F | D | | F | | | | | A | | C |
| d_A, Approach Delay [s/veh] | 168.23 | | | 245.64 | | | 0.00 | | | 17.12 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 148.94 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.120 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.087 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.495 | 2.300 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 35.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.987 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 572 | 428 | 2517 | 232 | 183 | 1513 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 572 | 428 | 2517 | 232 | 183 | 1513 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 154 | 115 | 677 | 62 | 49 | 407 |
| Total Analysis Volume [veh/h] | 615 | 460 | 2706 | 249 | 197 | 1627 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 92 | 92 | 92 | 92 | 92 | 92 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 62 | 62 |
| g / C, Green / Cycle | 0.22 | 0.22 | 0.54 | 0.54 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.30 | 0.54 | 0.16 | 0.61 | 0.33 |
| s, saturation flow rate [veh/h] | 3361 | 1544 | 5049 | 1579 | 323 | 4979 |
| c, Capacity [veh/h] | 730 | 335 | 2740 | 857 | 281 | 3363 |
| d1, Uniform Delay [s] | 34.56 | 35.87 | 20.76 | 11.41 | 25.64 | 7.21 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.04 | 185.63 | 2.79 | 0.07 | 13.58 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.84 | 1.37 | 0.99 | 0.29 | 0.70 | 0.48 |
| d, Delay for Lane Group [s/veh] | 35.60 | 221.50 | 23.55 | 11.48 | 39.22 | 7.25 |
| Lane Group LOS | D | F | C | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 6.56 | 24.57 | 17.83 | 2.61 | 2.29 | 4.38 |
| 50th-Percentile Queue Length [ft/ln] | 163.93 | 614.35 | 445.75 | 65.36 | 57.24 | 109.49 |
| 95th-Percentile Queue Length [veh/ln] | 10.76 | 37.98 | 24.75 | 4.71 | 4.12 | 7.81 |
| 95th-Percentile Queue Length [ft/ln] | 268.91 | 949.38 | 618.87 | 117.65 | 103.03 | 195.29 |

### Movement, Approach, & Intersection Results

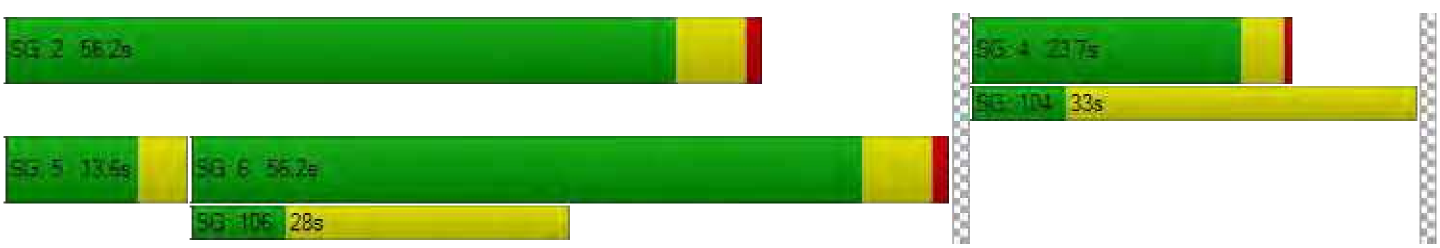
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.60 | 221.50 | 23.55 | 11.48 | 39.22 | 7.25 |
| Movement LOS | D | F | C | B | D | A |
| d_A, Approach Delay [s/veh] | 115.15 | | 22.54 | | 10.70 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 35.86 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.987 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 35.70 | 35.70 | 35.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.859 | 3.318 | 3.290 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 434 | 1086 | 1086 |
| d_b, Bicycle Delay [s] | 28.33 | 9.62 | 9.62 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.185 | 2.563 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.856 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 730 | 107 | 2591 | 53 | 57 | 1886 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 730 | 107 | 2591 | 53 | 57 | 1886 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 186 | 27 | 661 | 14 | 15 | 481 |
| Total Analysis Volume [veh/h] | 745 | 109 | 2644 | 54 | 58 | 1924 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 89 | 89 | 89 | 89 | 89 | 89 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 21 | 21 | 50 | 50 | 4 | 58 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.56 | 0.56 | 0.04 | 0.65 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.07 | 0.52 | 0.03 | 0.03 | 0.39 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 812 | 378 | 2812 | 891 | 79 | 3209 |
| d1, Uniform Delay [s] | 33.41 | 28.13 | 18.50 | 9.14 | 42.27 | 9.19 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.89 | 0.15 | 0.78 | 0.01 | 4.86 | 0.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.92 | 0.29 | 0.94 | 0.06 | 0.74 | 0.60 |
| d, Delay for Lane Group [s/veh] | 35.30 | 28.28 | 19.29 | 9.15 | 47.14 | 9.26 |
| Lane Group LOS | D | C | B | A | D | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.97 | 1.93 | 13.94 | 0.42 | 1.31 | 5.49 |
| 50th-Percentile Queue Length [ft/ln] | 199.24 | 48.17 | 348.48 | 10.46 | 32.87 | 137.28 |
| 95th-Percentile Queue Length [veh/ln] | 12.60 | 3.47 | 20.06 | 0.75 | 2.37 | 9.33 |
| 95th-Percentile Queue Length [ft/ln] | 314.99 | 86.71 | 501.55 | 18.83 | 59.17 | 233.36 |

**Movement, Approach, & Intersection Results**

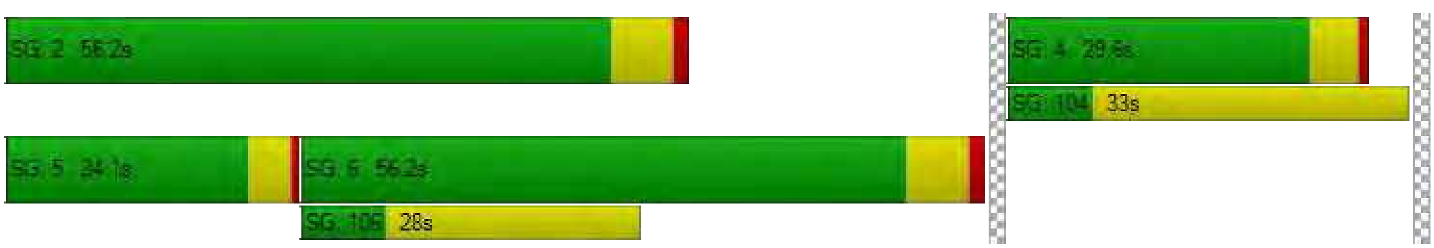
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.30 | 28.28 | 19.29 | 9.15 | 47.14 | 9.26 |
| Movement LOS | D | C | B | A | D | A |
| d_A, Approach Delay [s/veh] | 34.40 | | 19.08 | | 10.37 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 18.33 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.856 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.32 | 34.32 | 34.32 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.326 | 3.706 | 3.582 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 560 | 1120 | 1120 |
| d_b, Bicycle Delay [s] | 23.14 | 8.64 | 8.64 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.044 | 2.650 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# Intersection Level Of Service Report
## Intersection 199: Bafront Expwy/Bldg 21

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.826 |

### Intersection Setup

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 422 | 119 | 2224 | 43 | 35 | 1173 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 422 | 119 | 2224 | 43 | 35 | 1173 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 108 | 30 | 567 | 11 | 9 | 299 |
| Total Analysis Volume [veh/h] | 431 | 121 | 2269 | 44 | 36 | 1197 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 62 | 62 | 62 | 62 | 62 | 62 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 14 | 14 | 32 | 32 | 38 | 38 |
| g / C, Green / Cycle | 0.22 | 0.22 | 0.52 | 0.52 | 0.62 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.20 | 0.50 | 0.03 | 0.06 | 0.27 |
| s, saturation flow rate [veh/h] | 1438 | 1364 | 4507 | 1406 | 564 | 4470 |
| c, Capacity [veh/h] | 322 | 305 | 2347 | 732 | 425 | 2755 |
| d1, Uniform Delay [s] | 23.23 | 23.24 | 14.33 | 7.35 | 13.01 | 6.23 |
| k, delay calibration | 0.10 | 0.10 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.01 | 7.42 | 1.61 | 0.01 | 0.03 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.88 | 0.88 | 0.97 | 0.06 | 0.08 | 0.43 |
| d, Delay for Lane Group [s/veh] | 30.24 | 30.66 | 15.94 | 7.36 | 13.04 | 6.27 |
| Lane Group LOS | C | C | B | A | B | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.31 | 4.13 | 8.50 | 0.25 | 0.07 | 2.03 |
| 50th-Percentile Queue Length [ft/ln] | 107.77 | 103.20 | 212.57 | 6.14 | 1.74 | 50.79 |
| 95th-Percentile Queue Length [veh/ln] | 7.72 | 7.43 | 13.28 | 0.44 | 0.12 | 3.66 |
| 95th-Percentile Queue Length [ft/ln] | 192.89 | 185.76 | 332.12 | 11.06 | 3.12 | 91.42 |

**Movement, Approach, & Intersection Results**

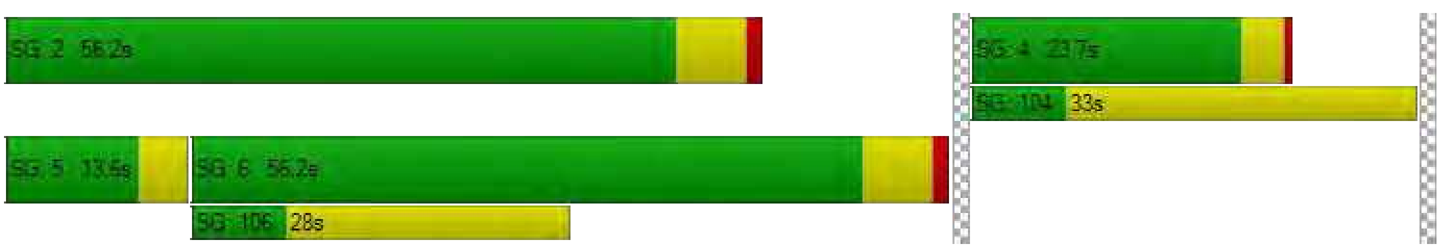
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.38 | 30.66 | 15.94 | 7.36 | 13.04 | 6.27 |
| Movement LOS | C | C | B | A | B | A |
| d_A, Approach Delay [s/veh] | 30.44 | | 15.78 | | 6.47 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 14.95 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.826 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 20.90 | 20.90 | 20.90 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.293 | 3.122 | 3.146 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 647 | 1617 | 1617 |
| d_b, Bicycle Delay [s] | 14.15 | 1.13 | 1.13 |
| I_b,int, Bicycle LOS Score for Intersection | 2.470 | 2.832 | 2.238 |
| Bicycle LOS | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 73.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.206 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 389 | 236 | 134 | 185 | 45 | 345 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 389 | 236 | 134 | 185 | 45 | 345 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 112 | 68 | 39 | 53 | 13 | 99 |
| Total Analysis Volume [veh/h] | 447 | 271 | 154 | 213 | 52 | 397 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 718 | 542 | 584 |
| Degree of Utilization, x | 1.21 | 0.68 | 0.77 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 25.79 | 5.09 | 7.06 |
| 95th-Percentile Queue Length [ft] | 644.69 | 127.37 | 176.45 |
| Approach Delay [s/veh] | 129.19 | 22.41 | 26.79 |
| Approach LOS | F | C | D |
| Intersection Delay [s/veh] | 73.67 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.768 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 130 | 2275 | 17 | 36 | 1241 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 130 | 2275 | 17 | 36 | 1241 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 36 | 625 | 5 | 10 | 341 |
| Total Analysis Volume [veh/h] | 0 | 143 | 2500 | 19 | 40 | 1364 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 77 | 77 | 77 | 77 | 77 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 10 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.13 | 0.65 | 0.65 | 0.74 | 0.74 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.55 | 0.01 | 0.18 | 0.31 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 225 | 4342 |
| c, Capacity [veh/h] | 166 | 2941 | 918 | 248 | 3196 |
| d1, Uniform Delay [s] | 32.51 | 10.48 | 4.75 | 14.85 | 3.90 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.91 | 0.28 | 0.00 | 0.11 | 0.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.85 | 0.02 | 0.16 | 0.43 |
| d, Delay for Lane Group [s/veh] | 37.42 | 10.76 | 4.75 | 14.97 | 3.93 |
| Lane Group LOS | D | B | A | B | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.74 | 8.53 | 0.09 | 0.12 | 1.82 |
| 50th-Percentile Queue Length [ft/ln] | 68.60 | 213.26 | 2.20 | 2.99 | 45.39 |
| 95th-Percentile Queue Length [veh/ln] | 4.94 | 13.32 | 0.16 | 0.22 | 3.27 |
| 95th-Percentile Queue Length [ft/ln] | 123.48 | 333.01 | 3.97 | 5.38 | 81.70 |

**Movement, Approach, & Intersection Results**

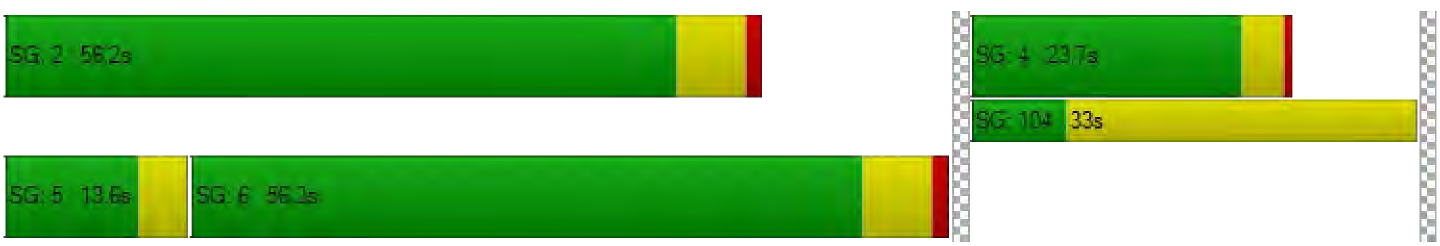
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 37.42 | 10.76 | 4.75 | 14.97 | 3.93 |
| Movement LOS | | D | B | A | B | A |
| d_A, Approach Delay [s/veh] | 37.42 | | 10.71 | | 4.25 | |
| Approach LOS | D | | B | | A | |
| d_I, Intersection Delay [s/veh] | 9.42 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.768 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.80 | 28.13 | 28.13 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.862 | 3.126 | 3.149 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 522 | 1304 | 1304 |
| d_b, Bicycle Delay [s] | 20.95 | 4.64 | 4.64 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.945 | 2.332 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 54.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.783 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 31 | 382 | 19 | 95 | 327 | 36 | 249 | 15 | 330 | 196 | 13 | 492 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 382 | 19 | 95 | 327 | 36 | 249 | 15 | 330 | 196 | 13 | 492 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 109 | 5 | 27 | 93 | 10 | 71 | 4 | 94 | 56 | 4 | 140 |
| Total Analysis Volume [veh/h] | 35 | 434 | 22 | 108 | 372 | 41 | 283 | 17 | 375 | 223 | 15 | 559 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 17 | 44 | 0 | 9 | 36 | 0 | 0 | 39 | 39 | 0 | 38 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 3 | 28 | 5 | 30 | 27 | 27 | 28 | 28 |
| g / C, Green / Cycle | 0.03 | 0.27 | 0.05 | 0.29 | 0.26 | 0.26 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.25 | 0.03 | 0.23 | 0.17 | 0.26 | 0.24 | 0.25 |
| s, saturation flow rate [veh/h] | 1767 | 1839 | 3431 | 1790 | 1771 | 1462 | 1685 | 1577 |
| c, Capacity [veh/h] | 54 | 490 | 173 | 512 | 461 | 380 | 454 | 424 |
| d1, Uniform Delay [s] | 49.84 | 37.22 | 48.40 | 34.46 | 34.27 | 37.34 | 36.61 | 36.91 |
| k, delay calibration | 0.11 | 0.35 | 0.11 | 0.30 | 0.15 | 0.37 | 0.33 | 0.35 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 12.05 | 20.70 | 3.63 | 8.16 | 2.12 | 36.40 | 16.76 | 21.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.64 | 0.93 | 0.62 | 0.81 | 0.65 | 0.99 | 0.90 | 0.92 |
| d, Delay for Lane Group [s/veh] | 61.90 | 57.92 | 52.03 | 42.62 | 36.39 | 73.75 | 53.38 | 58.11 |
| Lane Group LOS | E | E | D | D | D | E | D | E |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.08 | 13.90 | 1.45 | 10.67 | 6.93 | 12.92 | 11.86 | 11.93 |
| 50th-Percentile Queue Length [ft/ln] | 26.92 | 347.39 | 36.32 | 266.64 | 173.31 | 323.00 | 296.61 | 298.25 |
| 95th-Percentile Queue Length [veh/ln] | 1.94 | 20.01 | 2.61 | 16.02 | 11.25 | 18.81 | 17.51 | 17.59 |
| 95th-Percentile Queue Length [ft/ln] | 48.45 | 500.22 | 65.37 | 400.53 | 281.26 | 470.37 | 437.84 | 439.86 |

**Movement, Approach, & Intersection Results**

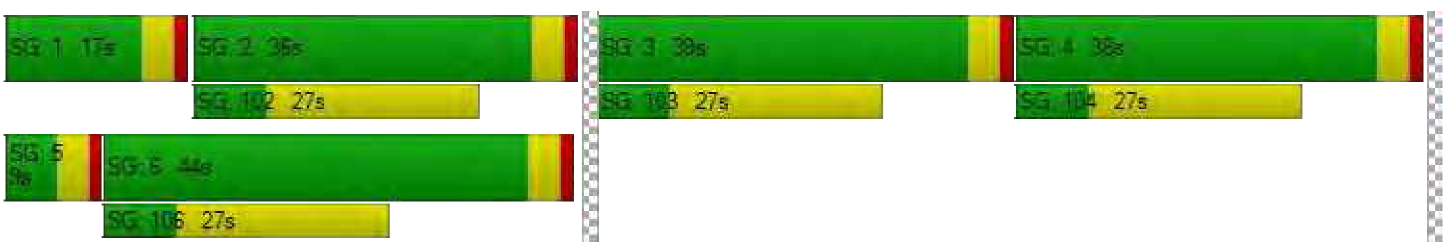
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 61.90 | 57.92 | 57.92 | 52.03 | 42.62 | 42.62 | 36.39 | 36.39 | 73.75 | 53.38 | 53.38 | 56.71 |
| Movement LOS | E | E | E | D | D | D | D | D | E | D | D | E |
| d_A, Approach Delay [s/veh] | 58.21 | | | 44.57 | | | 57.14 | | | 55.69 | | |
| Approach LOS | E | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 54.25 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.783 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.47 | 41.47 | 41.47 | 41.47 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.422 | 2.657 | 2.196 | 2.368 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 771 | 617 | 674 | 655 |
| d_b, Bicycle Delay [s] | 19.60 | 24.82 | 22.79 | 23.46 |
| I_b,int, Bicycle LOS Score for Intersection | 2.370 | 2.419 | 2.673 | 2.875 |
| Bicycle LOS | B | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 30.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.549 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 39 | 35 | 26 | 335 | 37 | 3 | 27 | 5 | 135 | 0 | 490 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 39 | 35 | 26 | 335 | 37 | 3 | 27 | 5 | 135 | 0 | 490 | 14 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 9 | 7 | 84 | 9 | 1 | 7 | 1 | 34 | 0 | 123 | 4 |
| Total Analysis Volume [veh/h] | 39 | 35 | 26 | 335 | 37 | 3 | 27 | 5 | 135 | 0 | 490 | 14 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 8 | | | 7 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 7 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 39 | 21 | 21 | 18 | 39 | 39 |
| g / C, Green / Cycle | 0.43 | 0.23 | 0.23 | 0.20 | 0.43 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.21 | 0.02 | 0.19 | 0.15 | 0.16 |
| s, saturation flow rate [veh/h] | 933 | 1609 | 1664 | 899 | 1710 | 1538 |
| c, Capacity [veh/h] | 457 | 378 | 391 | 181 | 776 | 662 |
| d1, Uniform Delay [s] | 16.43 | 33.33 | 27.05 | 35.30 | 17.31 | 17.33 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.13 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.10 | 7.04 | 0.11 | 19.07 | 1.20 | 1.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.22 | 0.89 | 0.10 | 0.92 | 0.34 | 0.36 |
|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 17.53 | 40.37 | 27.16 | 54.37 | 18.51 | 18.86 |
| Lane Group LOS | B | D | C | D | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.35 | 7.63 | 0.68 | 4.47 | 3.81 | 3.49 |
| 50th-Percentile Queue Length [ft/ln] | 33.68 | 190.67 | 16.99 | 111.78 | 95.28 | 87.28 |
| 95th-Percentile Queue Length [veh/ln] | 2.42 | 12.16 | 1.22 | 7.94 | 6.86 | 6.28 |
| 95th-Percentile Queue Length [ft/ln] | 60.62 | 303.90 | 30.58 | 198.47 | 171.50 | 157.10 |

**Movement, Approach, & Intersection Results**

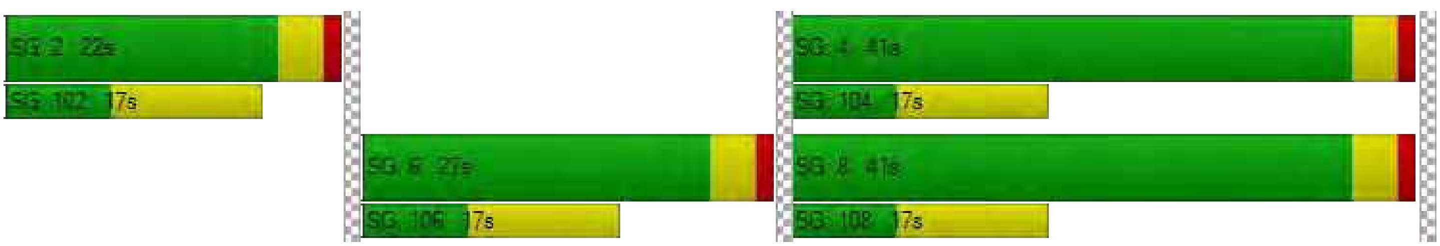
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.53 | 17.53 | 17.53 | 40.37 | 27.16 | 27.16 | 54.37 | 54.37 | 54.37 | 18.51 | 18.67 | 18.86 |
| Movement LOS | B | B | B | D | C | C | D | D | D | B | B | B |
| d_A, Approach Delay [s/veh] | 17.53 | | | 38.96 | | | 54.37 | | | 18.67 | | |
| Approach LOS | B | | | D | | | D | | | B | | |
| d_I, Intersection Delay [s/veh] | 30.42 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.549 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.72 | 34.72 | 34.72 | 34.72 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.284 | 2.072 | 1.895 | 2.125 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 821 | 511 | 400 | 821 |
| d_b, Bicycle Delay [s] | 15.64 | 24.98 | 28.85 | 15.64 |
| I_b,int, Bicycle LOS Score for Intersection | 1.725 | 2.178 | 1.835 | 1.975 |
| Bicycle LOS | A | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 304.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.288 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 73 | 63 | 226 | 726 | 153 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 73 | 63 | 226 | 726 | 153 | 15 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 19 | 68 | 219 | 46 | 5 |
| Total Analysis Volume [veh/h] | 88 | 76 | 272 | 875 | 184 | 18 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 1.29 | 0.09 | 0.20 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 304.25 | 255.84 | 8.34 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 11.15 | 11.15 | 0.75 | 0.75 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 278.69 | 278.69 | 18.84 | 18.84 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 281.82 | | 1.98 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 32.05 | | | | | |
| Intersection LOS | F | | | | | |

# Intersection Level Of Service Report
## Intersection 265: Adam Court/ Adams Drive

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.065 |

### Intersection Setup

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 209 | 35 | 15 | 31 | 48 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 209 | 35 | 15 | 31 | 48 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 65 | 11 | 5 | 10 | 15 |
| Total Analysis Volume [veh/h] | 37 | 258 | 43 | 19 | 38 | 59 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.07 | 0.06 |
| d_M, Delay for Movement [s/veh] | 7.45 | 0.00 | 0.00 | 0.00 | 11.87 | 9.38 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.08 | 0.08 | 0.00 | 0.00 | 0.43 | 0.43 |
| 95th-Percentile Queue Length [ft/ln] | 1.89 | 1.89 | 0.00 | 0.00 | 10.77 | 10.77 |
| d_A, Approach Delay [s/veh] | 0.93 | | 0.00 | | 10.35 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 2.82 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.694 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1188 | 338 | 150 | 906 | 521 | 199 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1188 | 338 | 150 | 906 | 521 | 199 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 297 | 85 | 38 | 227 | 130 | 50 |
| Total Analysis Volume [veh/h] | 1188 | 338 | 150 | 906 | 521 | 199 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 57 | 0 | 16 | 73 | 67 | 0 |
| Amber [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 74 | 0 | 13 | 87 | 53 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 68 | 68 | 68 | 68 | 68 | 68 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 34 | 34 | 5 | 43 | 18 | 18 |
| g / C, Green / Cycle | 0.50 | 0.50 | 0.07 | 0.63 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.41 | 0.44 | 0.04 | 0.25 | 0.21 | 0.21 |
| s, saturation flow rate [veh/h] | 1870 | 1734 | 3459 | 3560 | 1781 | 1667 |
| c, Capacity [veh/h] | 929 | 862 | 246 | 2231 | 457 | 428 |
| d1, Uniform Delay [s] | 14.63 | 15.46 | 30.86 | 6.40 | 23.86 | 23.95 |
| k, delay calibration | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.88 | 3.51 | 2.43 | 0.12 | 3.45 | 3.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.89 | 0.61 | 0.41 | 0.81 | 0.82 |
| d, Delay for Lane Group [s/veh] | 16.51 | 18.97 | 33.29 | 6.52 | 27.31 | 27.90 |
| Lane Group LOS | B | B | C | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.49 | 9.30 | 1.20 | 2.31 | 5.67 | 5.45 |
| 50th-Percentile Queue Length [ft/ln] | 212.19 | 232.44 | 30.07 | 57.86 | 141.66 | 136.31 |
| 95th-Percentile Queue Length [veh/ln] | 13.27 | 14.30 | 2.17 | 4.17 | 9.57 | 9.28 |
| 95th-Percentile Queue Length [ft/ln] | 331.64 | 357.46 | 54.13 | 104.16 | 239.26 | 232.04 |

**Movement, Approach, & Intersection Results**

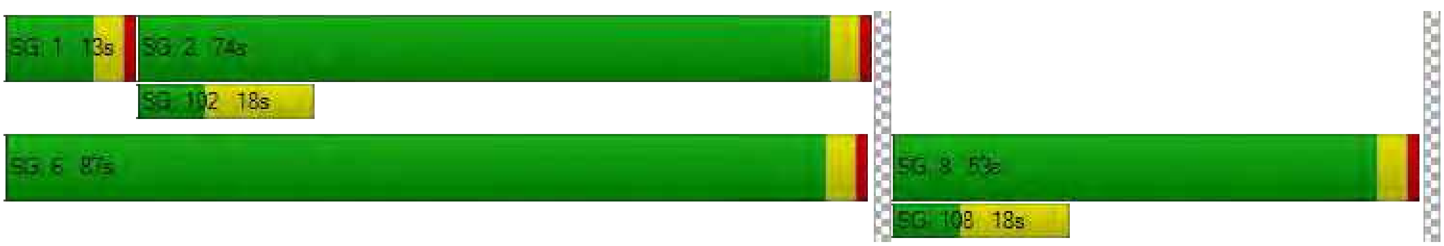
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.39 | 18.97 | 33.29 | 6.52 | 27.48 | 27.90 |
| Movement LOS | B | B | C | A | C | C |
| d_A, Approach Delay [s/veh] | 17.74 | | 10.32 | | 27.60 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 17.52 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.694 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 24.03 | 24.03 | 24.03 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.076 | 2.967 | 2.410 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 2050 | 2431 | 1435 |
| d_b, Bicycle Delay [s] | 0.02 | 1.58 | 2.72 |
| I_b,int, Bicycle LOS Score for Intersection | 2.819 | 2.431 | 2.748 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 9.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 23 | 9 | 67 | 77 | 30 | 10 | 14 | 26 | 14 | 22 | 20 |
| Total Analysis Volume [veh/h] | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 370 | | | 199 | | | 643 | | | 184 | | |
| Exiting Flow Rate [veh/h] | 475 | | | 214 | | | 262 | | | 365 | | |
| Demand Flow Rate [veh/h] | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 |
| Adjusted Demand Flow Rate [veh/h] | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 179 | 706 | 203 | 230 |
| Capacity of Entry and Bypass Lanes [veh/h] | 946 | 1127 | 717 | 1145 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 928 | 1105 | 703 | 1122 |
| X, volume / capacity | 0.19 | 0.63 | 0.28 | 0.20 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | B | A | A |
| 95th-Percentile Queue Length [veh] | 0.69 | 4.62 | 1.16 | 0.75 |
| 95th-Percentile Queue Length [ft] | 17.32 | 115.47 | 29.11 | 18.69 |
| Approach Delay [s/veh] | 5.73 | 11.69 | 8.55 | 5.01 |
| Approach LOS | A | B | A | A |
| Intersection Delay [s/veh] | 9.24 | | | |
| Intersection LOS | A | | | |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Near-Term + P PM.pdf

Scenario 18 Near-Term PM (2025 vols)+Project

12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 959 | 1034 | 1263 | 349 | 3605 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 40 | 1327 | 7 | 55 | 896 | 200 | 15 | 5 | 388 | 272 | 6 | 4 | 3215 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 208 | 675 | 39 | 13 | 825 | 384 | 445 | 20 | 178 | 109 | 54 | 40 | 2990 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 58 | 167 | 701 | 97 | 71 | 16 | 2 | 65 | 15 | 295 | 2234 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 525 | 424 | 577 | 445 | 104 | 2212 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 70 | 0 | 227 | 2 | 696 | 112 | 315 | 636 | 2 | 2158 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3481 | 20 | 359 | 970 | 72 | 1814 | 6716 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 189 | 101 | 1112 | 159 | 315 | 133 | 131 | 1972 | 223 | 559 | 811 | 34 | 5739 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 44 | 1292 | 23 | 284 | 946 | 54 | 94 | 9 | 35 | 75 | 16 | 334 | 3206 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 83 | 945 | 1389 | 51 | 71 | 114 | 2653 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1110 | 414 | 57 | 1102 | 274 | 45 | 3002 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 | 4595 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 20 | 1349 | 716 | 190 | 301 | 40 | 2616 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1046 | 4 | 29 | 537 | 18 | 133 | 2 | 31 | 21 | 7 | 33 | 1870 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 14 | 693 | 5 | 2 | 702 | 100 | 107 | 2 | 37 | 15 | 4 | 6 | 1687 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 91 | 54 | 681 | 10 | 25 | 88 | 5 | 80 | 51 | 58 | 1802 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 240 | 245 | 372 | 112 | 294 | 123 | 439 | 189 | 277 | 502 | 15 | 2838 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1855 | 1120 | 570 | 696 | 4241 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 | 1137 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 | 5570 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 947 | 199 | 933 | 674 | 726 | 352 | 3831 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1244 | 423 | 1320 | 729 | 283 | 859 | 4858 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 572 | 428 | 2517 | 232 | 183 | 1513 | 5445 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 730 | 107 | 2591 | 53 | 57 | 1886 | 5424 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 422 | 119 | 2224 | 43 | 35 | 1173 | 4016 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 389 | 236 | 134 | 185 | 45 | 345 | 1334 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 130 | 2275 | 17 | 36 | 1241 | 3699 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 31 | 382 | 19 | 95 | 327 | 36 | 249 | 15 | 330 | 196 | 13 | 492 | 2185 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 39 | 35 | 26 | 335 | 37 | 3 | 27 | 5 | 135 | 0 | 490 | 14 | 1146 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 73 | 63 | 226 | 726 | 153 | 15 | 1256 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 30 | 209 | 35 | 15 | 31 | 48 | 368 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1188 | 338 | 150 | 906 | 521 | 199 | 3302 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 | 1291 |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Near-Term + P PM.pdf

Scenario 18 Near-Term PM (2025 vols)+Project

12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 959 | 1034 | 1263 | 349 | 3605 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **959** | **1034** | **1263** | **349** | **3605** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 40 | 1327 | 7 | 55 | 896 | 200 | 15 | 5 | 388 | 272 | 6 | 4 | 3215 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1327** | **7** | **55** | **896** | **200** | **15** | **5** | **388** | **272** | **6** | **4** | **3215** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 208 | 675 | 39 | 13 | 825 | 384 | 445 | 20 | 178 | 109 | 54 | 40 | 2990 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **208** | **675** | **39** | **13** | **825** | **384** | **445** | **20** | **178** | **109** | **54** | **40** | **2990** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 58 | 167 | 701 | 97 | 71 | 16 | 2 | 65 | 15 | 295 | 2234 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **58** | **167** | **701** | **97** | **71** | **16** | **2** | **65** | **15** | **295** | **2234** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 525 | 424 | 577 | 445 | 104 | 2212 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **525** | **424** | **577** | **445** | **104** | **2212** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 70 | 0 | 227 | 2 | 696 | 112 | 315 | 636 | 2 | 2158 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **70** | **0** | **227** | **2** | **696** | **112** | **315** | **636** | **2** | **2158** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3481 | 20 | 359 | 970 | 72 | 1814 | 6716 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3481** | **20** | **359** | **970** | **72** | **1814** | **6716** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 189 | 101 | 1112 | 159 | 315 | 133 | 131 | 1972 | 223 | 559 | 811 | 34 | 5739 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **189** | **101** | **1112** | **159** | **315** | **133** | **131** | **1972** | **223** | **559** | **811** | **34** | **5739** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 44 | 1292 | 23 | 284 | 946 | 54 | 94 | 9 | 35 | 75 | 16 | 334 | 3206 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **44** | **1292** | **23** | **284** | **946** | **54** | **94** | **9** | **35** | **75** | **16** | **334** | **3206** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 83 | 945 | 1389 | 51 | 71 | 114 | 2653 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **83** | **945** | **1389** | **51** | **71** | **114** | **2653** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1110 | 414 | 57 | 1102 | 274 | 45 | 3002 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1110** | **414** | **57** | **1102** | **274** | **45** | **3002** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 | 4595 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1442** | **292** | **78** | **1275** | **26** | **27** | **183** | **373** | **261** | **255** | **115** | **4595** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 20 | 1349 | 716 | 190 | 301 | 40 | 2616 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **1349** | **716** | **190** | **301** | **40** | **2616** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1046 | 4 | 29 | 537 | 18 | 133 | 2 | 31 | 21 | 7 | 33 | 1870 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1046** | **4** | **29** | **537** | **18** | **133** | **2** | **31** | **21** | **7** | **33** | **1870** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 14 | 693 | 5 | 2 | 702 | 100 | 107 | 2 | 37 | 15 | 4 | 6 | 1687 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **14** | **693** | **5** | **2** | **702** | **100** | **107** | **2** | **37** | **15** | **4** | **6** | **1687** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 91 | 54 | 681 | 10 | 25 | 88 | 5 | 80 | 51 | 58 | 1802 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **91** | **54** | **681** | **10** | **25** | **88** | **5** | **80** | **51** | **58** | **1802** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 240 | 245 | 372 | 112 | 294 | 123 | 439 | 189 | 277 | 502 | 15 | 2838 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **240** | **245** | **372** | **112** | **294** | **123** | **439** | **189** | **277** | **502** | **15** | **2838** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1855 | 1120 | 570 | 696 | 4241 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1855** | **1120** | **570** | **696** | **4241** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 | 1137 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **225** | **18** | **74** | **500** | **36** | **29** | **124** | **23** | **7** | **16** | **61** | **1137** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 | 5570 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **40** | **1761** | **12** | **31** | **5** | **9** | **609** | **208** | **2225** | **477** | **14** | **5570** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 947 | 199 | 933 | 674 | 726 | 352 | 3831 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **947** | **199** | **933** | **674** | **726** | **352** | **3831** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1244 | 423 | 1320 | 729 | 283 | 859 | 4858 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1244** | **423** | **1320** | **729** | **283** | **859** | **4858** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 572 | 428 | 2517 | 232 | 183 | 1513 | 5445 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **572** | **428** | **2517** | **232** | **183** | **1513** | **5445** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 730 | 107 | 2591 | 53 | 57 | 1886 | 5424 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **730** | **107** | **2591** | **53** | **57** | **1886** | **5424** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 422 | 119 | 2224 | 43 | 35 | 1173 | 4016 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **422** | **119** | **2224** | **43** | **35** | **1173** | **4016** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 389 | 236 | 134 | 185 | 45 | 345 | 1334 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **389** | **236** | **134** | **185** | **45** | **345** | **1334** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 130 | 2275 | 17 | 36 | 1241 | 3699 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **130** | **2275** | **17** | **36** | **1241** | **3699** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 31 | 382 | 19 | 95 | 327 | 36 | 249 | 15 | 330 | 196 | 13 | 492 | 2185 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **31** | **382** | **19** | **95** | **327** | **36** | **249** | **15** | **330** | **196** | **13** | **492** | **2185** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 39 | 35 | 26 | 335 | 37 | 3 | 27 | 5 | 135 | 0 | 490 | 14 | 1146 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **39** | **35** | **26** | **335** | **37** | **3** | **27** | **5** | **135** | **0** | **490** | **14** | **1146** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 73 | 63 | 226 | 726 | 153 | 15 | 1256 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **73** | **63** | **226** | **726** | **153** | **15** | **1256** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 30 | 209 | 35 | 15 | 31 | 48 | 368 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **209** | **35** | **15** | **31** | **48** | **368** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1188 | 338 | 150 | 906 | 521 | 199 | 3302 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1188** | **338** | **150** | **906** | **521** | **199** | **3302** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 50 | 91 | 34 | 267 | 306 | 119 | 39 | 57 | 103 | 57 | 88 | 80 | 1291 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **50** | **91** | **34** | **267** | **306** | **119** | **39** | **57** | **103** | **57** | **88** | **80** | **1291** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 80% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 267 | 610 | 84 | 176 |
| 2 | 259 | 592 | 81 | 171 |
| 3 | 254 | 580 | 80 | 167 |
| 4 | 238 | 543 | 75 | 157 |
| 5 | 211 | 482 | 66 | 139 |
| 6 | 208 | 476 | 66 | 137 |
| 7 | 206 | 470 | 65 | 136 |
| 8 | 187 | 427 | 59 | 123 |
| 9 | 184 | 421 | 58 | 121 |
| 10 | 182 | 415 | 57 | 120 |
| 11 | 158 | 360 | 50 | 104 |
| 12 | 147 | 336 | 46 | 97 |
| 13 | 144 | 329 | 45 | 95 |
| 14 | 107 | 244 | 34 | 70 |
| 15 | 107 | 244 | 34 | 70 |
| 16 | 75 | 171 | 24 | 49 |
| 17 | 43 | 98 | 13 | 28 |
| 18 | 43 | 98 | 13 | 28 |
| 19 | 24 | 55 | 8 | 16 |
| 20 | 13 | 31 | 4 | 9 |
| 21 | 8 | 18 | 3 | 5 |
| 22 | 3 | 6 | 1 | 2 |
| 23 | 3 | 6 | 1 | 2 |
| 24 | 3 | 6 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 877 | 1 | 176 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 851 | 1 | 171 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 834 | 1 | 167 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 781 | 1 | 157 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 693 | 1 | 139 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 684 | 1 | 137 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 676 | 1 | 136 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 614 | 1 | 123 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 605 | 1 | 121 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 10 | 1 | 597 | 1 | 120 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 518 | 1 | 104 | No | No | No | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 483 | 1 | 97 | No | No | No | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 473 | 1 | 95 | No | No | No | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 351 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 351 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 246 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 141 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 141 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 79 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 44 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 26 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 10 | 10 | 13 | 4 | 9 | 10 | 13 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.2 | 13.8 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:15 | 0:40 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 84 | 176 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1137 | 1137 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 319 | 625 | 390 |
| 2 | 309 | 606 | 378 |
| 3 | 303 | 594 | 371 |
| 4 | 284 | 556 | 347 |
| 5 | 252 | 494 | 308 |
| 6 | 249 | 488 | 304 |
| 7 | 246 | 481 | 300 |
| 8 | 223 | 438 | 273 |
| 9 | 220 | 431 | 269 |
| 10 | 217 | 425 | 265 |
| 11 | 188 | 369 | 230 |
| 12 | 175 | 344 | 215 |
| 13 | 172 | 338 | 211 |
| 14 | 128 | 250 | 156 |
| 15 | 128 | 250 | 156 |
| 16 | 89 | 175 | 109 |
| 17 | 51 | 100 | 62 |
| 18 | 51 | 100 | 62 |
| 19 | 29 | 56 | 35 |
| 20 | 16 | 31 | 20 |
| 21 | 10 | 19 | 12 |
| 22 | 3 | 6 | 4 |
| 23 | 3 | 6 | 4 |
| 24 | 3 | 6 | 4 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 944 | 1 | 390 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 915 | 1 | 378 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 897 | 1 | 371 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 840 | 1 | 347 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 746 | 1 | 308 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 737 | 1 | 304 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 727 | 1 | 300 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 661 | 1 | 273 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 651 | 1 | 269 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 642 | 1 | 265 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 557 | 1 | 230 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 12 | 1 | 519 | 1 | 215 | Yes | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 510 | 1 | 211 | Yes | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 378 | 1 | 156 | No | No | Yes | Yes | No | No | No | No | No | No |
| 15 | 1 | 378 | 1 | 156 | No | No | Yes | Yes | No | No | No | No | No | No |
| 16 | 1 | 264 | 1 | 109 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 151 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 151 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 85 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 47 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 29 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 13 | 15 | 15 | 4 | 10 | 11 | 13 | 10 | 3 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 26.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 2:54 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 390 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1334 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 168 | 952 | 136 |
| 2 | 163 | 923 | 132 |
| 3 | 160 | 904 | 129 |
| 4 | 150 | 847 | 121 |
| 5 | 133 | 752 | 107 |
| 6 | 131 | 743 | 106 |
| 7 | 129 | 733 | 105 |
| 8 | 118 | 666 | 95 |
| 9 | 116 | 657 | 94 |
| 10 | 114 | 647 | 92 |
| 11 | 99 | 562 | 80 |
| 12 | 92 | 524 | 75 |
| 13 | 91 | 514 | 73 |
| 14 | 67 | 381 | 54 |
| 15 | 67 | 381 | 54 |
| 16 | 47 | 267 | 38 |
| 17 | 27 | 152 | 22 |
| 18 | 27 | 152 | 22 |
| 19 | 15 | 86 | 12 |
| 20 | 8 | 48 | 7 |
| 21 | 5 | 29 | 4 |
| 22 | 2 | 10 | 1 |
| 23 | 2 | 10 | 1 |
| 24 | 2 | 10 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1120 | 1 | 136 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1086 | 1 | 132 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1064 | 1 | 129 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 997 | 1 | 121 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 885 | 1 | 107 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 6 | 1 | 874 | 1 | 106 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 7 | 1 | 862 | 1 | 105 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 8 | 1 | 784 | 1 | 95 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 9 | 1 | 773 | 1 | 94 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 761 | 1 | 92 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 661 | 1 | 80 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 616 | 1 | 75 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 605 | 1 | 73 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 448 | 1 | 54 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 448 | 1 | 54 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 314 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 179 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 179 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 101 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 56 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 34 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 10 | 10 | 13 | 13 | 15 | 4 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 281.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 10:38 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 136 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1256 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| **Hour** | **Major Streets** | | **Minor Streets** |
|---|---|---|---|
| | S | N | W |
| 1 | 239 | 50 | 79 |
| 2 | 232 | 49 | 77 |
| 3 | 227 | 48 | 75 |
| 4 | 213 | 45 | 70 |
| 5 | 189 | 40 | 62 |
| 6 | 186 | 39 | 62 |
| 7 | 184 | 39 | 61 |
| 8 | 167 | 35 | 55 |
| 9 | 165 | 35 | 55 |
| 10 | 163 | 34 | 54 |
| 11 | 141 | 30 | 47 |
| 12 | 131 | 28 | 43 |
| 13 | 129 | 27 | 43 |
| 14 | 96 | 20 | 32 |
| 15 | 96 | 20 | 32 |
| 16 | 67 | 14 | 22 |
| 17 | 38 | 8 | 13 |
| 18 | 38 | 8 | 13 |
| 19 | 22 | 5 | 7 |
| 20 | 12 | 3 | 4 |
| 21 | 7 | 2 | 2 |
| 22 | 2 | 1 | 1 |
| 23 | 2 | 1 | 1 |
| 24 | 2 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 289 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 281 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 275 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 258 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 229 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 225 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 223 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 202 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 200 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 197 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 171 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 159 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 156 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 116 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 116 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 81 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 46 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 46 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 27 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 15 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 9 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 79 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 368 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

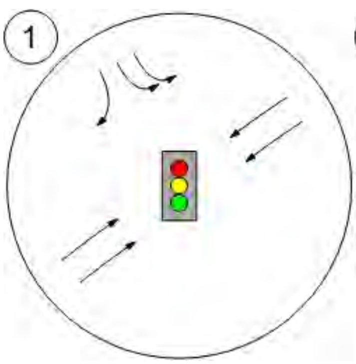
Study Intersections

Generated with PTV VISTRO

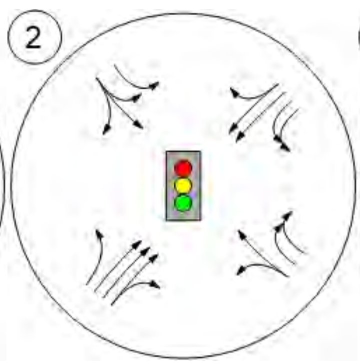
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

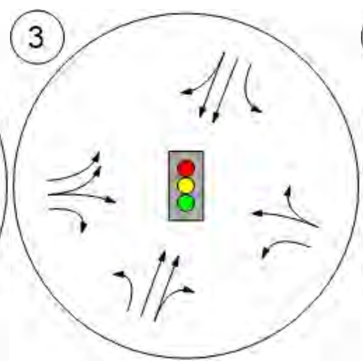

Marsh Rd (SR 84)/US 101 S



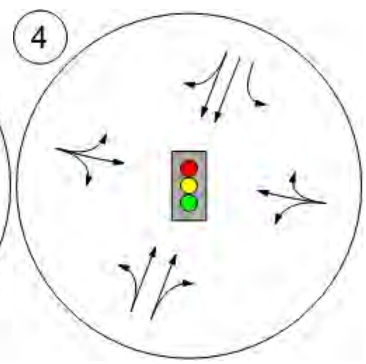

Marsh Rd/Rolison Rd-Scott D



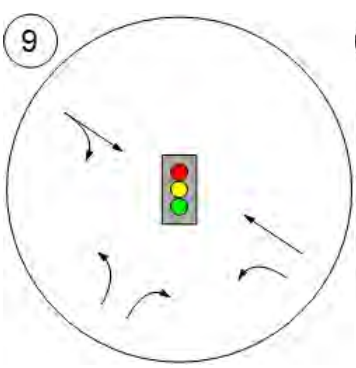

Marsh Rd/Florence St-Bohan



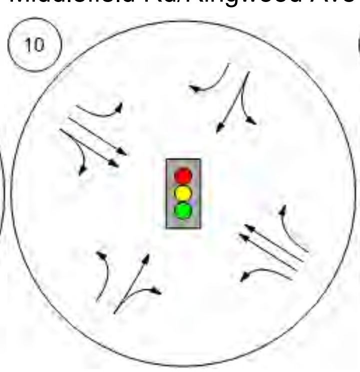

Marsh Rd/Bay Rd



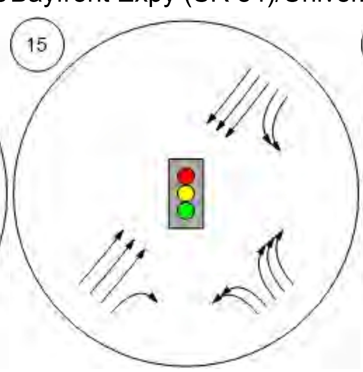

Middlefield Rd/Ravenswood



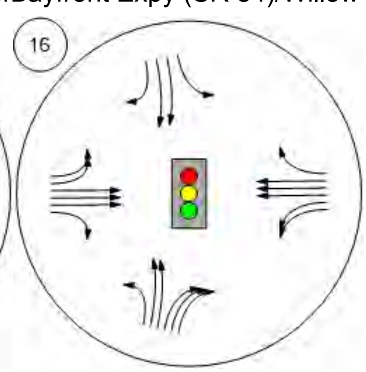

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer



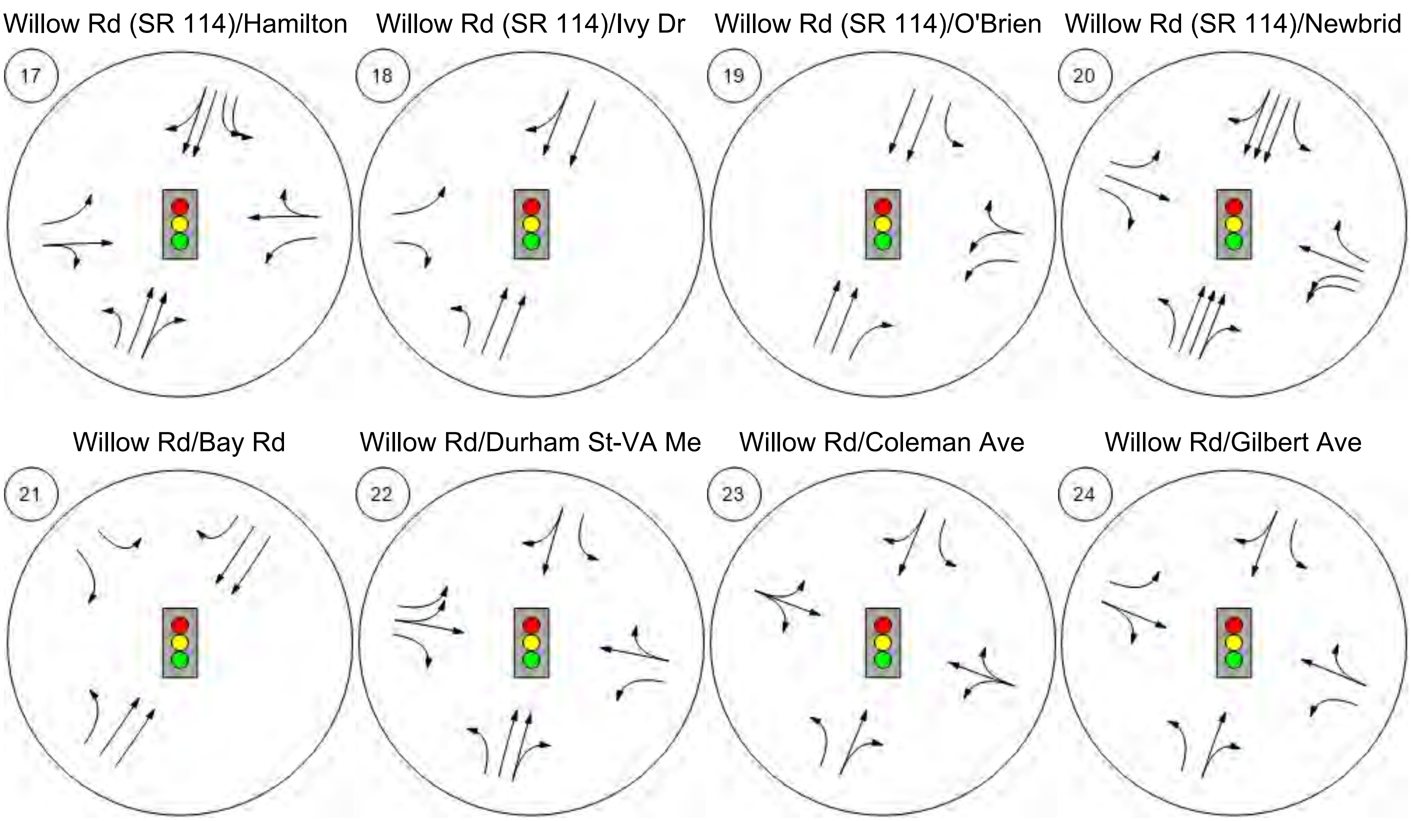

Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

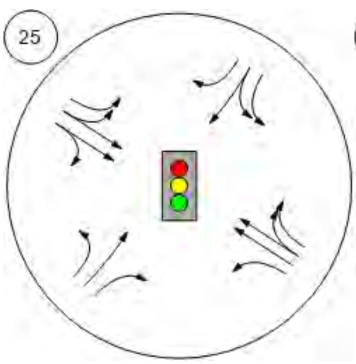



Generated with PTV VISTRO

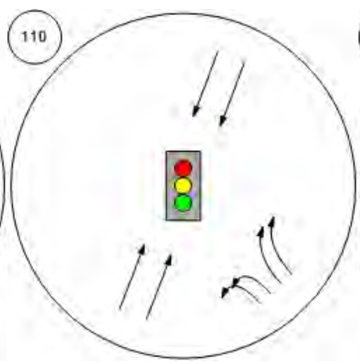
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

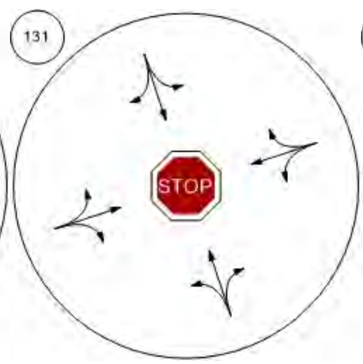

Middlefield Rd-Willow Rd



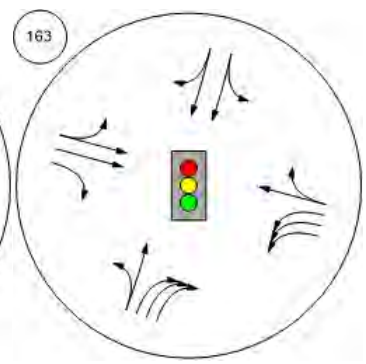

Marsh Road/101 NB Ramps



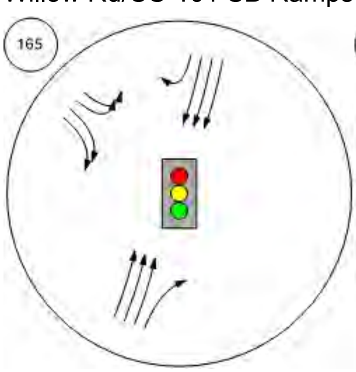

Chilco Street/Hamilton Avenu



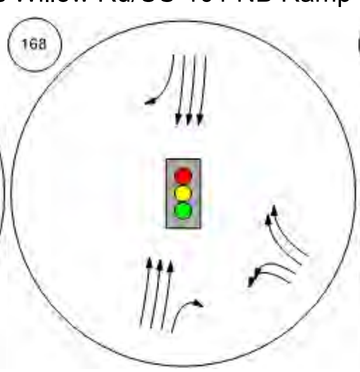

Bayfront Expy/Marsh Rd



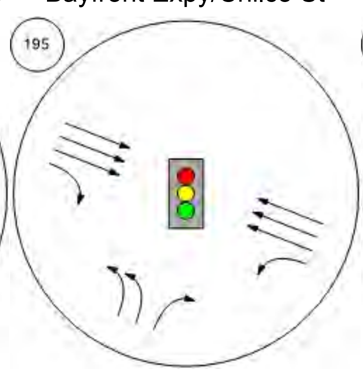

Willow Rd/US-101 SB Ramps



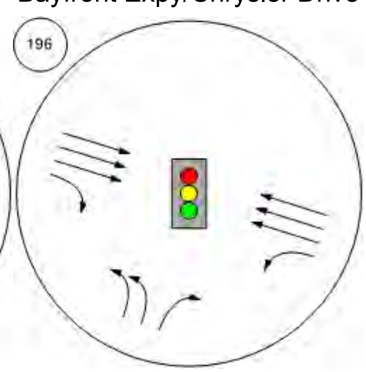

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St



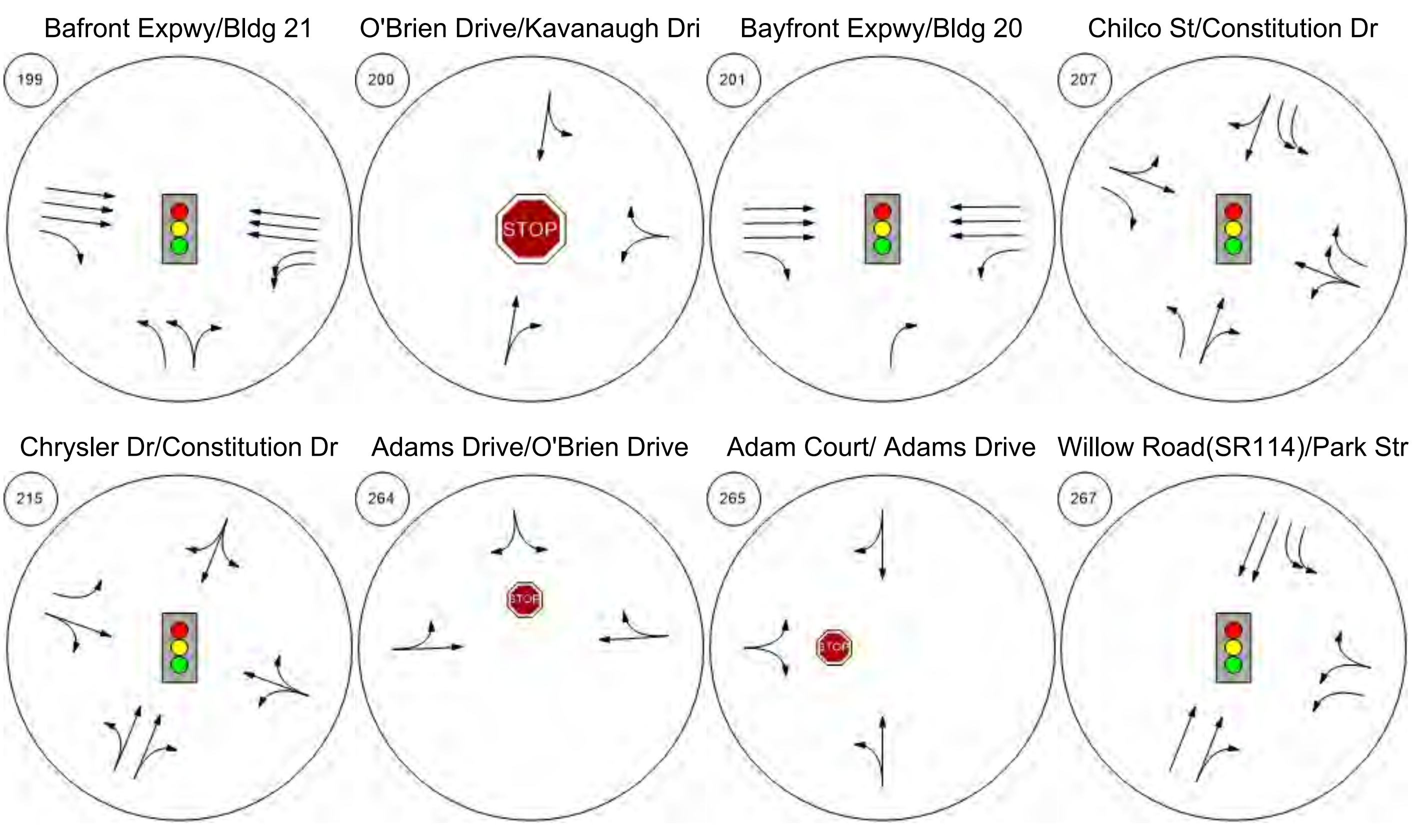

Bayfront Expy/Chrysler Drive



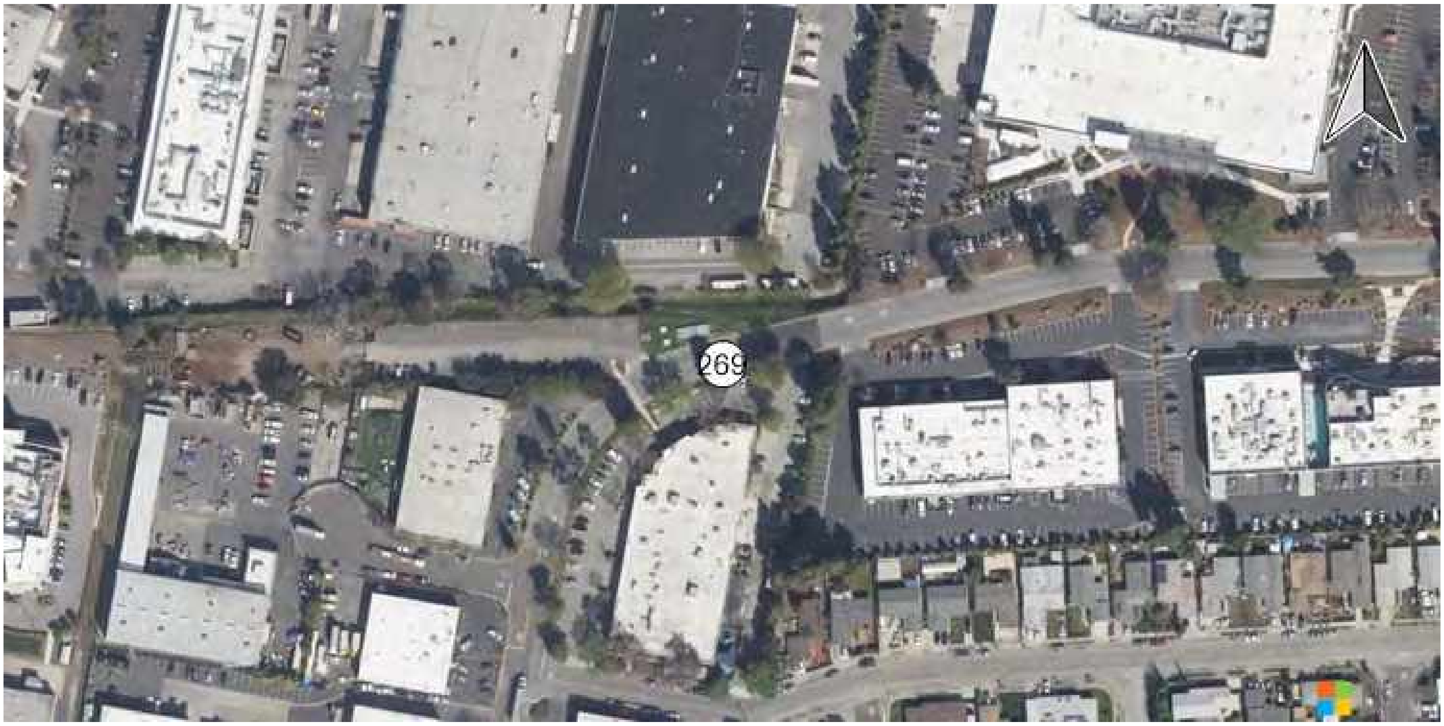
Generated with PTV VISTRO

Version 2021 (SP 0-6)

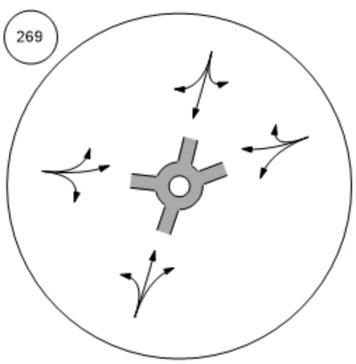
## Lane Configuration and Traffic Control

## Lane Configuration and Traffic Control




O'Brien Drive/Loop Road

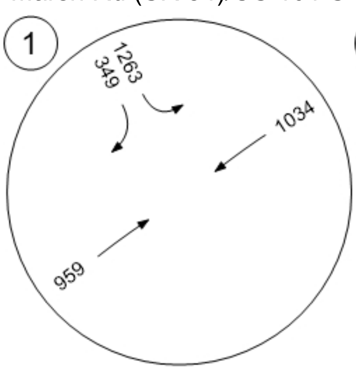


Generated with PTV VISTRO

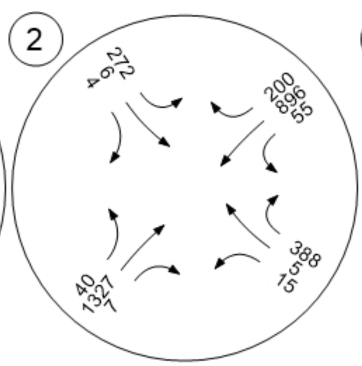
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

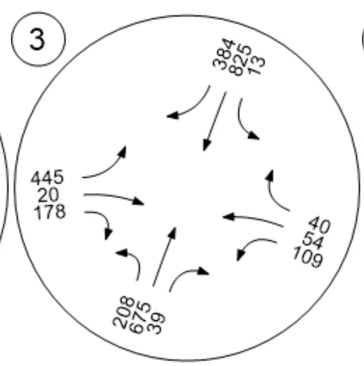

Marsh Rd (SR 84)/US 101 S



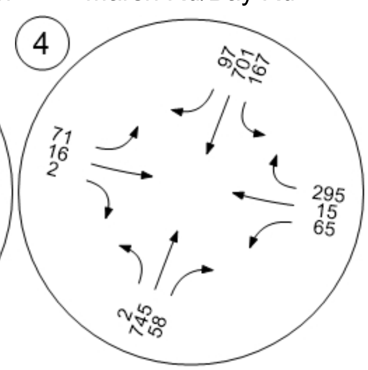

Marsh Rd/Rolison Rd-Scott D



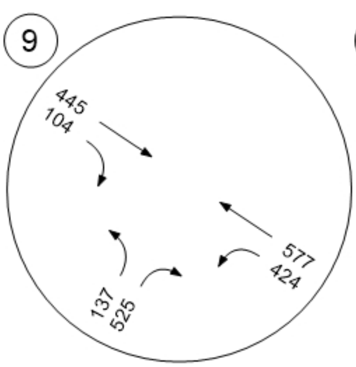

Marsh Rd/Florence St-Bohan



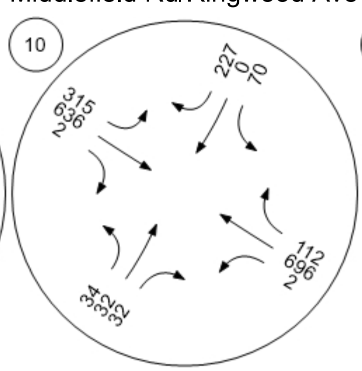

Marsh Rd/Bay Rd



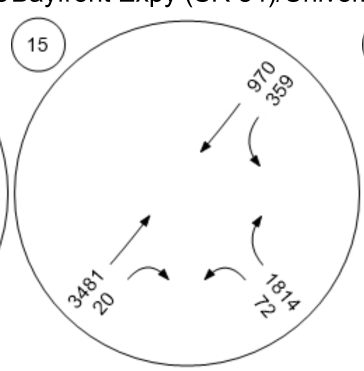

Middlefield Rd/Ravenswood



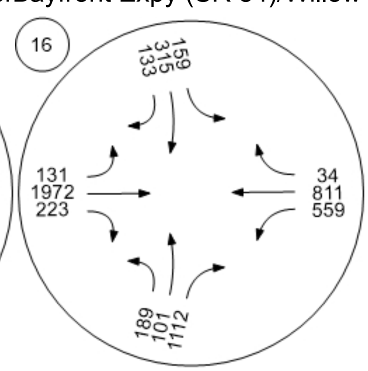

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer



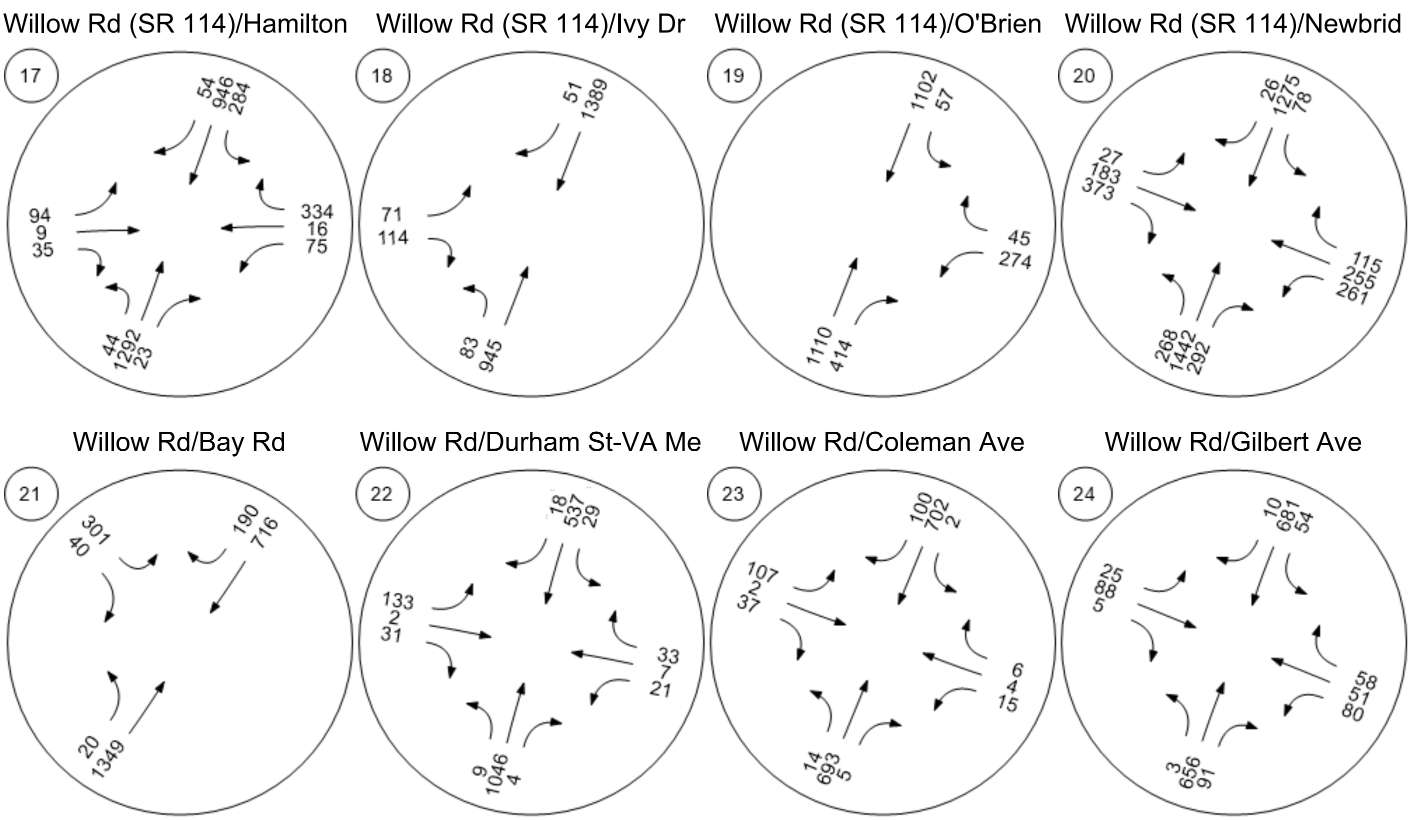

Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-6)

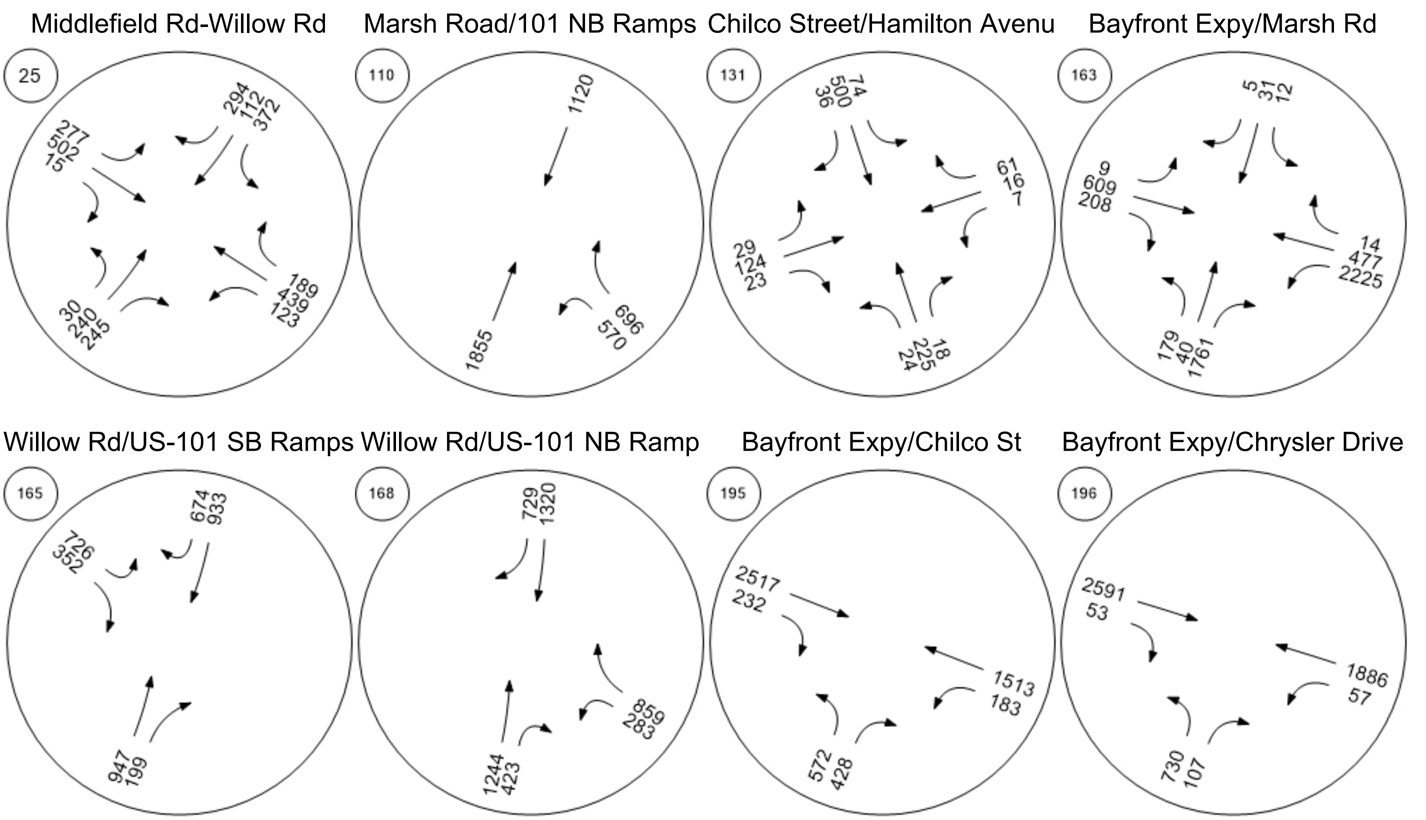
Traffic Volume - Base Volume

Generated with PTV VISTRO

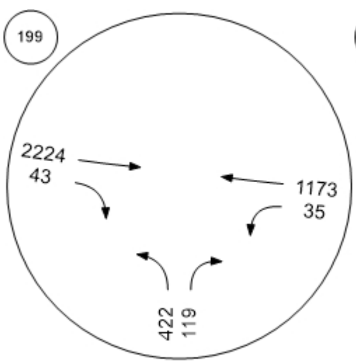
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

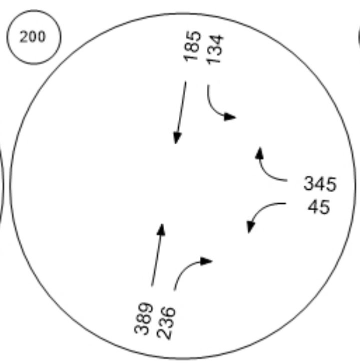



## Traffic Volume - Base Volume

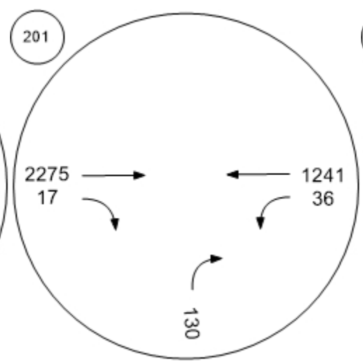

Bafront Expwy/Bldg 21



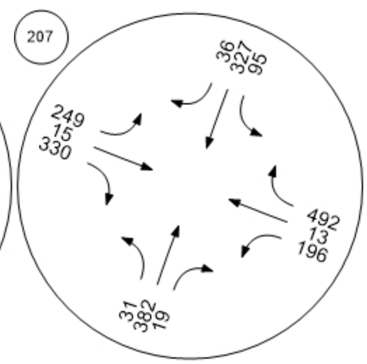

O'Brien Drive/Kavanaugh Dri



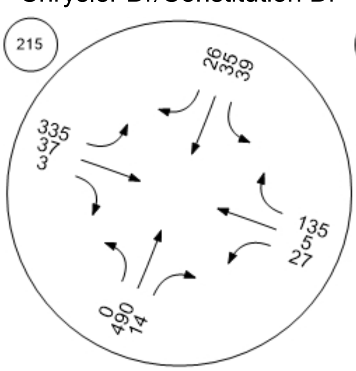

Bayfront Expwy/Bldg 20



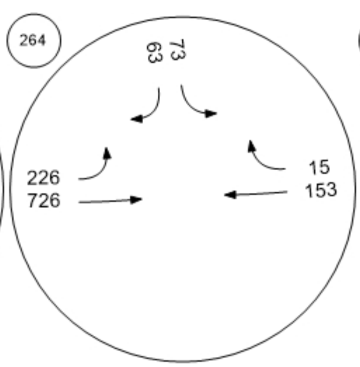

Chilco St/Constitution Dr



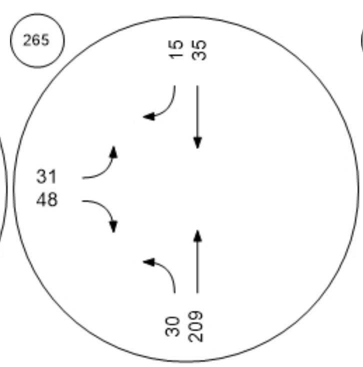

Chrysler Dr/Constitution Dr



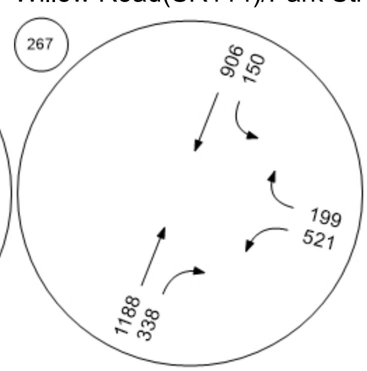

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



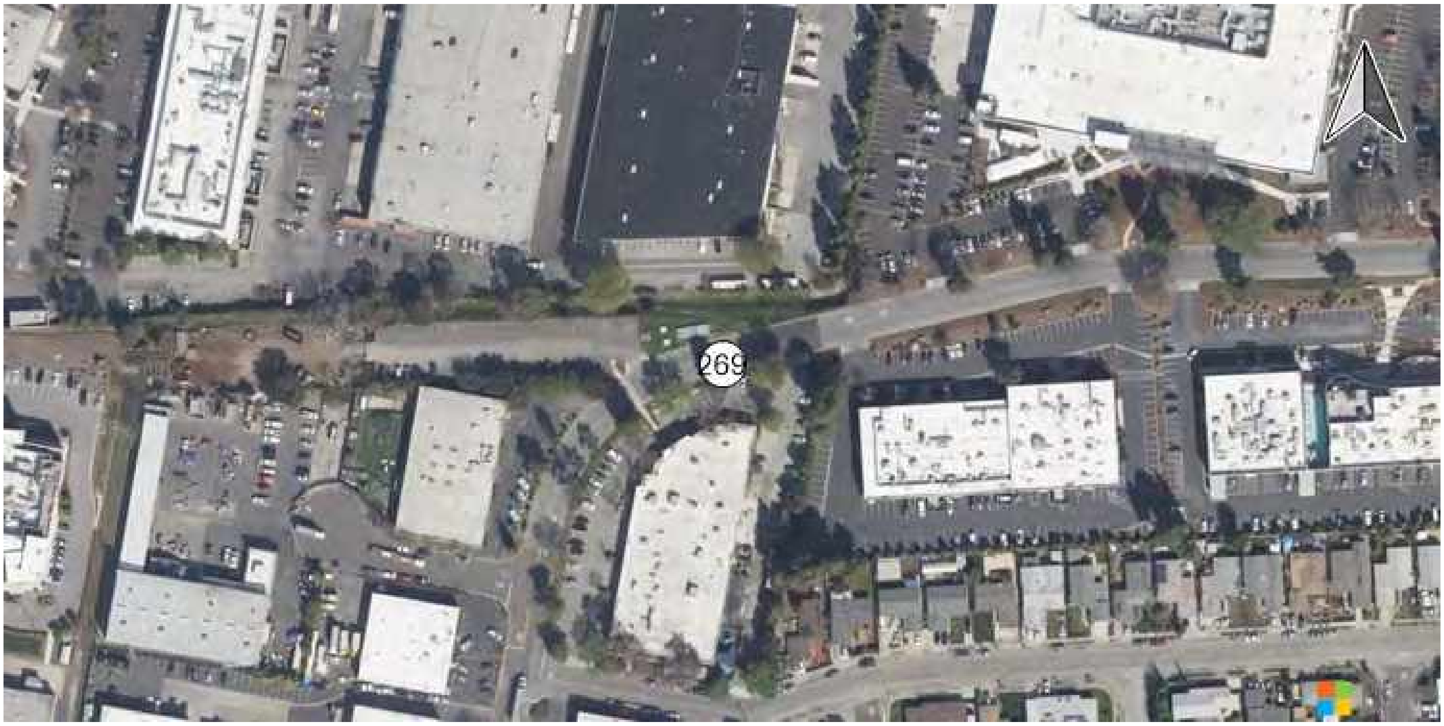

Willow Road(SR114)/Park Str



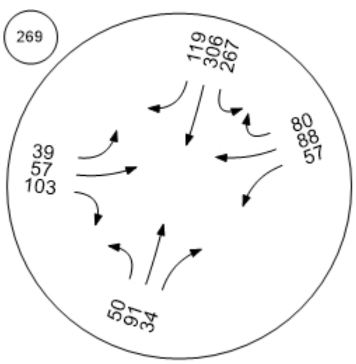
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Base Volume




O'Brien Drive/Loop Road

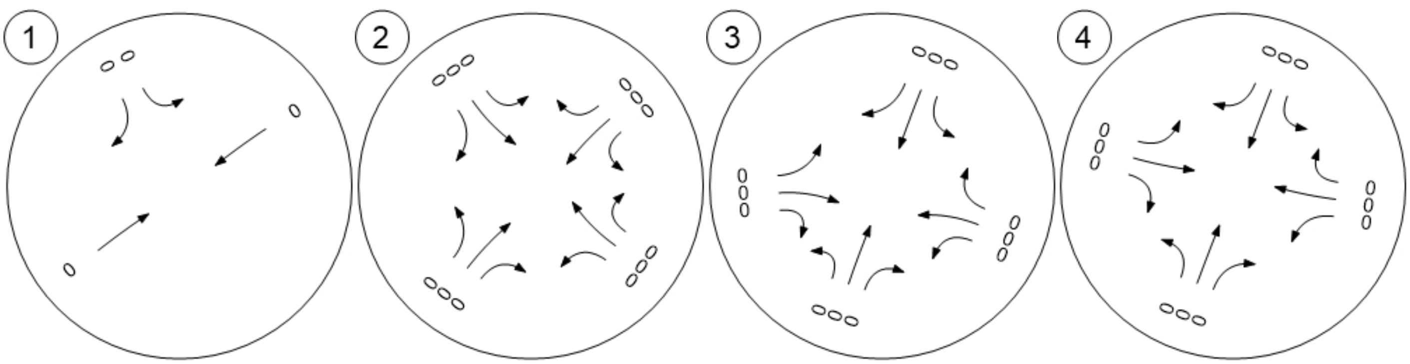


Generated with PTV VISTRO

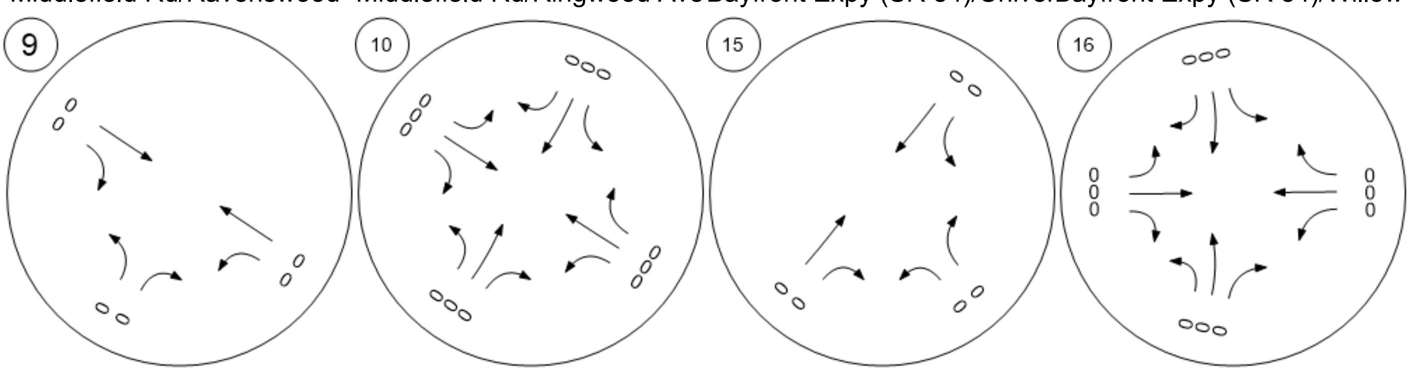
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

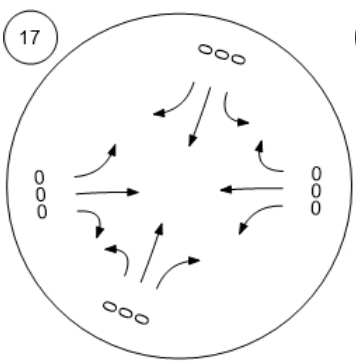


Generated with PTV VISTRO

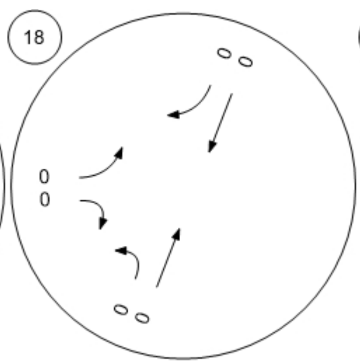
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

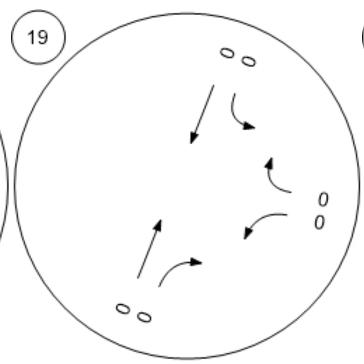

Willow Rd (SR 114)/Hamilton



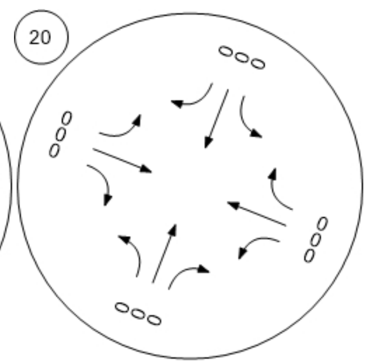
Willow Rd (SR 114)/Ivy Dr



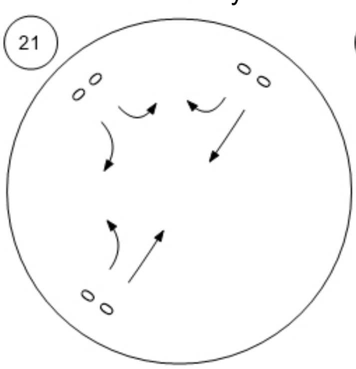
Willow Rd (SR 114)/O'Brien



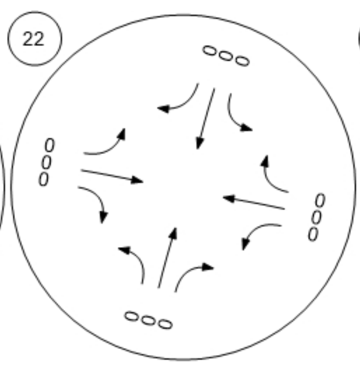
Willow Rd (SR 114)/Newbrid



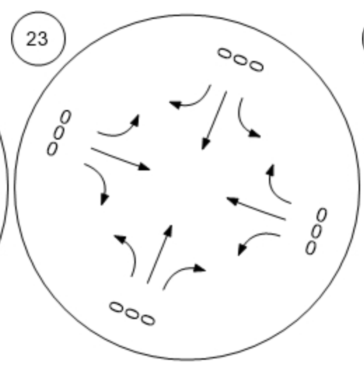
Willow Rd/Bay Rd



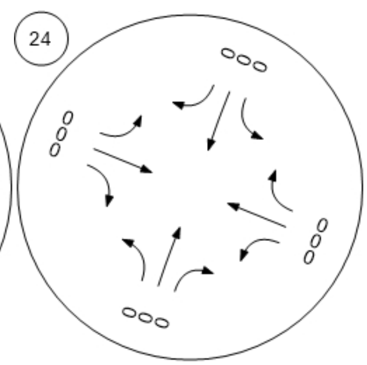
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

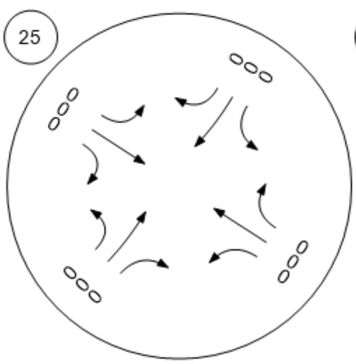


Willow Rd/Gilbert Ave

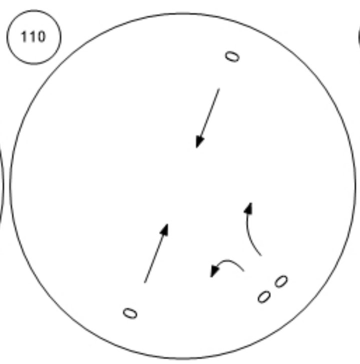


Traffic Volume - In-Process Volume

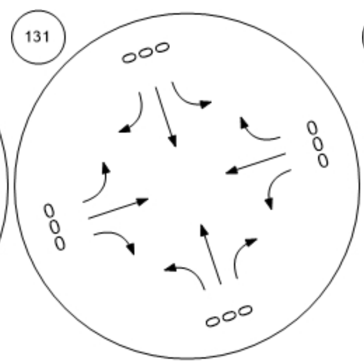

Middlefield Rd-Willow Rd



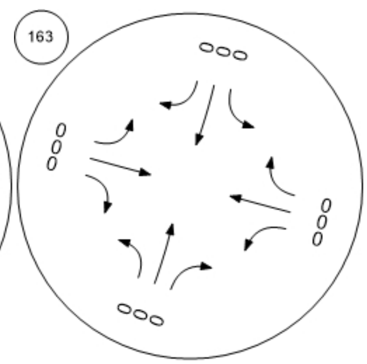

Marsh Road/101 NB Ramps



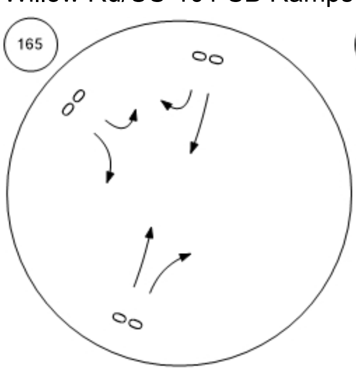

Chilco Street/Hamilton Avenu



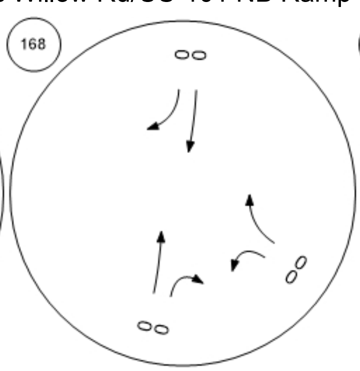

Bayfront Expy/Marsh Rd



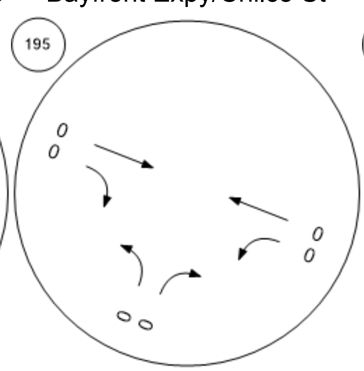

Willow Rd/US-101 SB Ramps



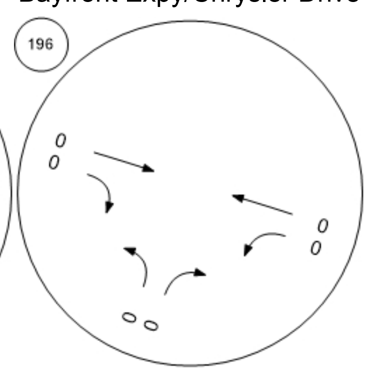

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

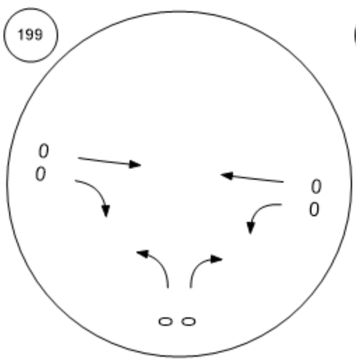


Generated with PTV VISTRO

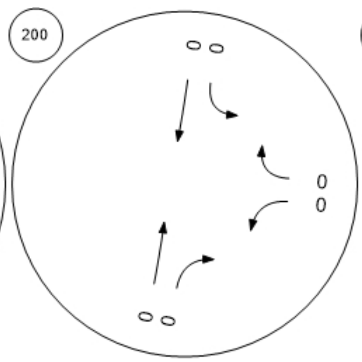
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

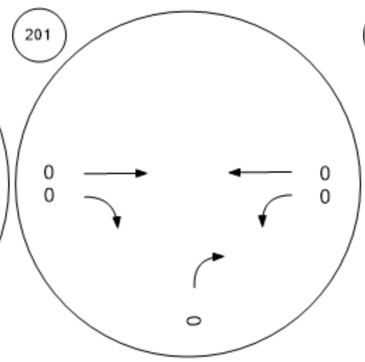

Bafront Expwy/Bldg 21



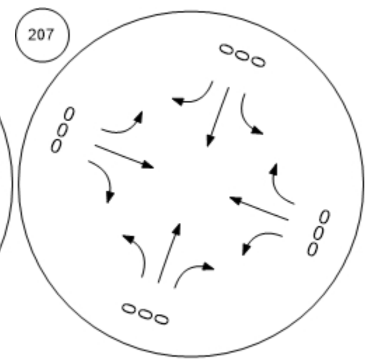

O'Brien Drive/Kavanaugh Dri



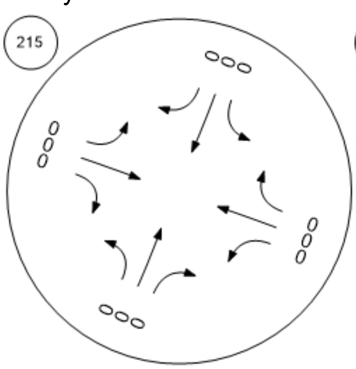

Bayfront Expwy/Bldg 20



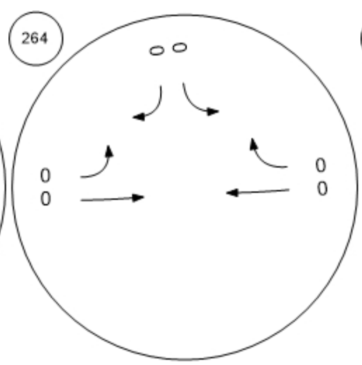

Chilco St/Constitution Dr



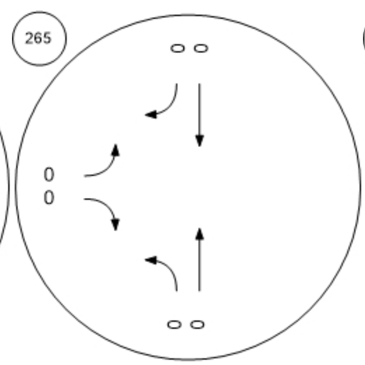

Chrysler Dr/Constitution Dr



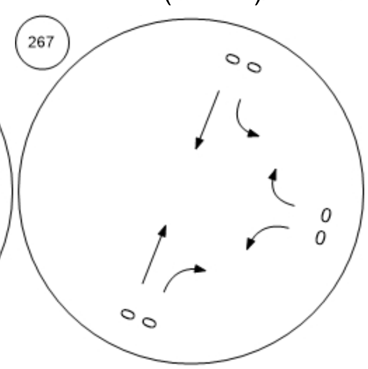

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



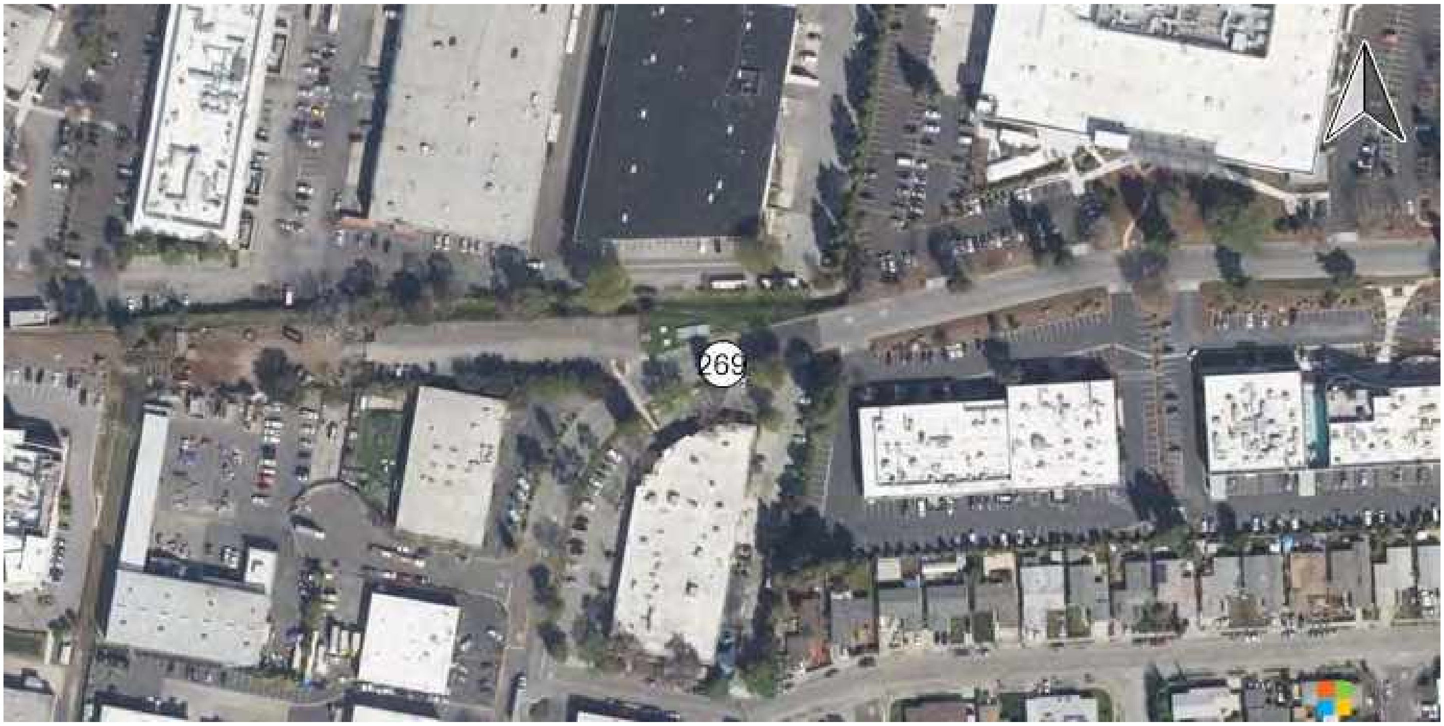

Willow Road(SR114)/Park Str



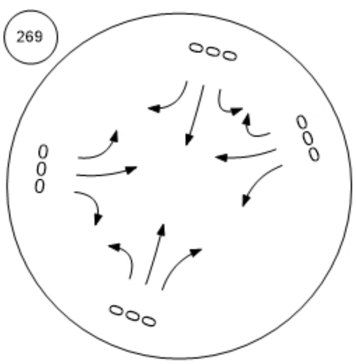
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume




O'Brien Drive/Loop Road

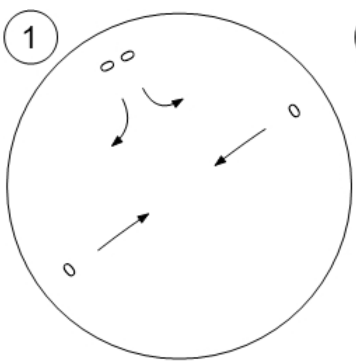


Generated with PTV VISTRO

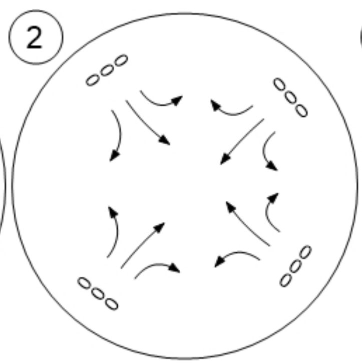
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

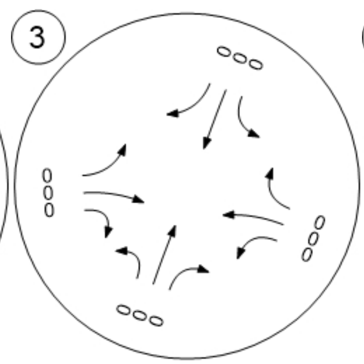

Marsh Rd (SR 84)/US 101 S



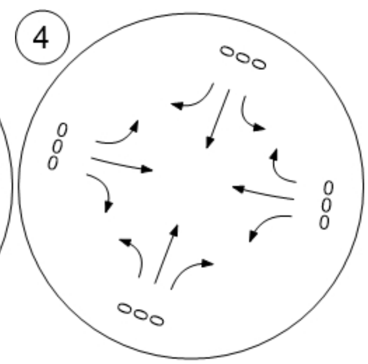

Marsh Rd/Rolison Rd-Scott D



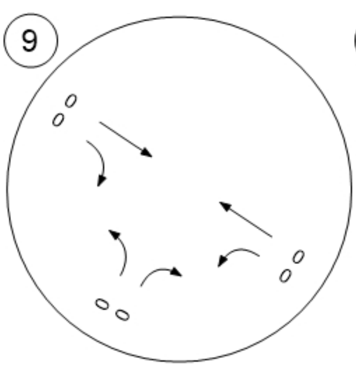

Marsh Rd/Florence St-Bohan



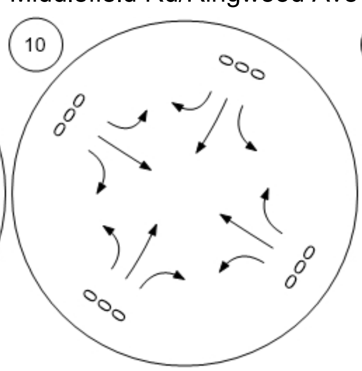

Marsh Rd/Bay Rd



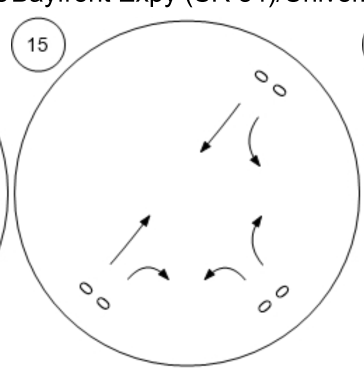

Middlefield Rd/Ravenswood



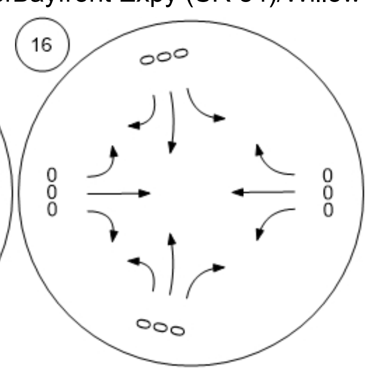

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

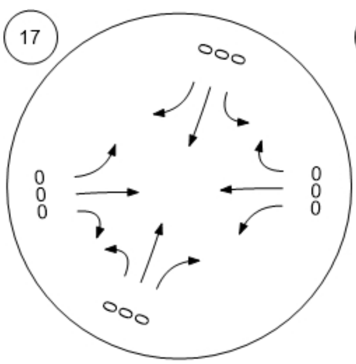


Generated with PTV VISTRO

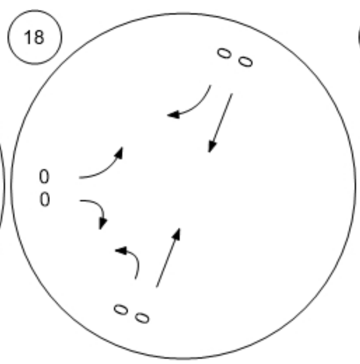
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

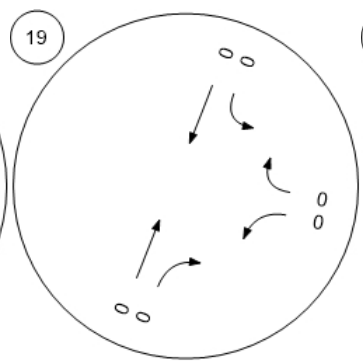

Willow Rd (SR 114)/Hamilton



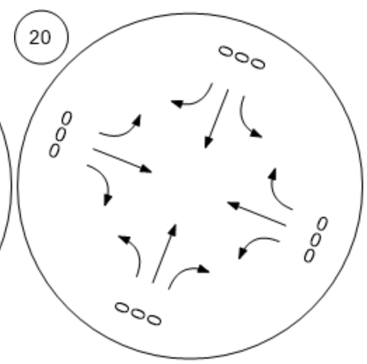

Willow Rd (SR 114)/Ivy Dr



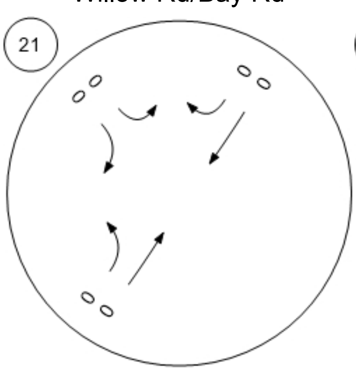

Willow Rd (SR 114)/O'Brien



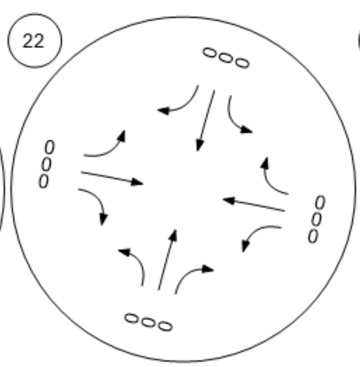

Willow Rd (SR 114)/Newbrid



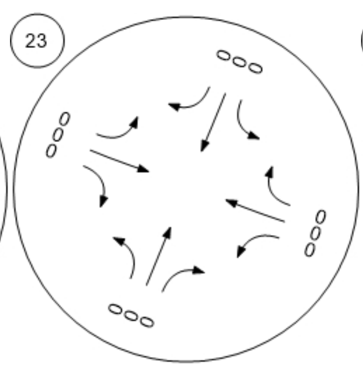

Willow Rd/Bay Rd



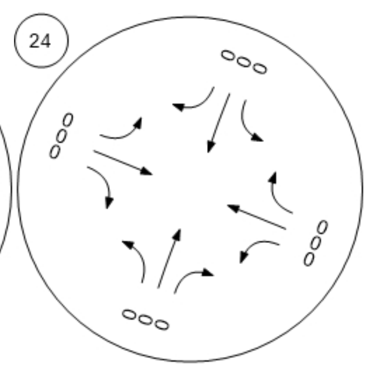

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

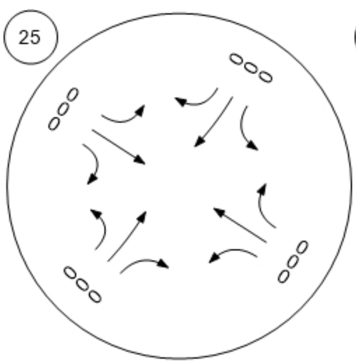


Generated with PTV VISTRO

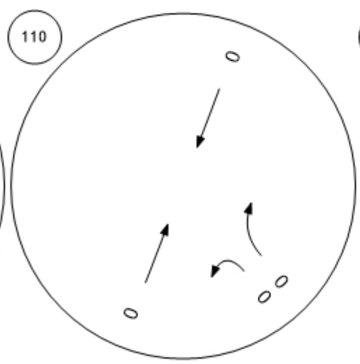
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

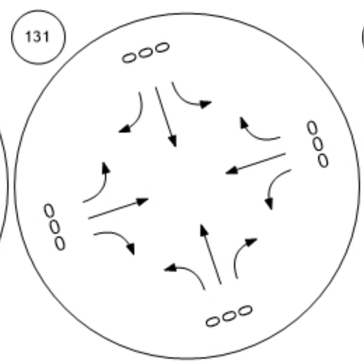

Middlefield Rd-Willow Rd



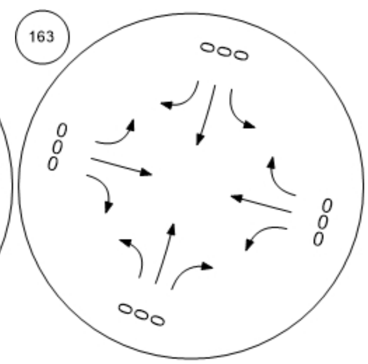

Marsh Road/101 NB Ramps



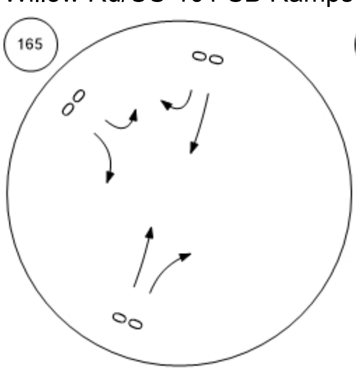

Chilco Street/Hamilton Avenu



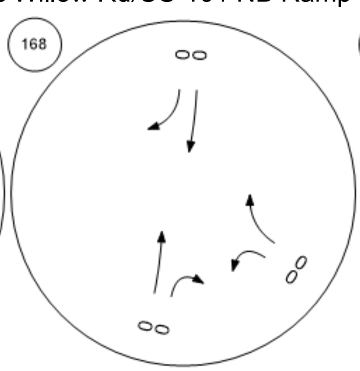

Bayfront Expy/Marsh Rd



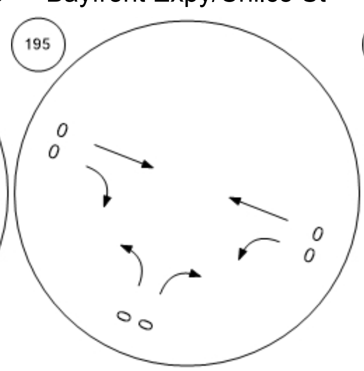

Willow Rd/US-101 SB Ramps



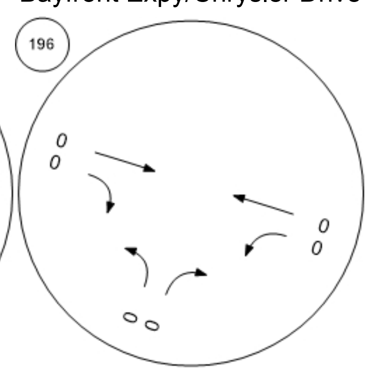

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

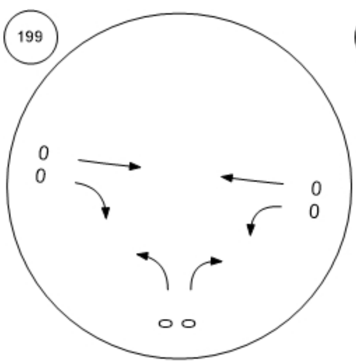


Generated with PTV VISTRO

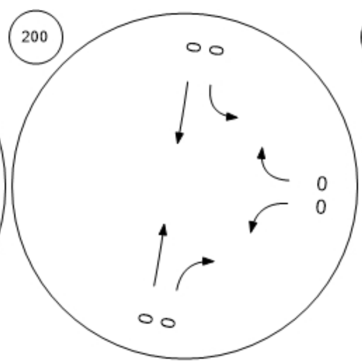
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

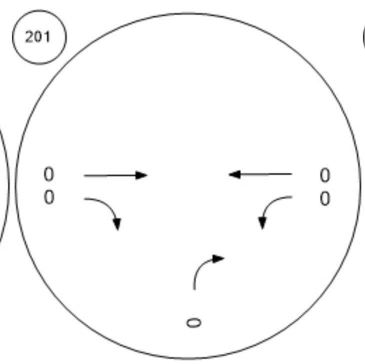

Bafront Expwy/Bldg 21



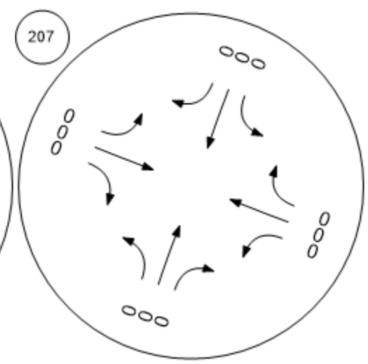

O'Brien Drive/Kavanaugh Dri



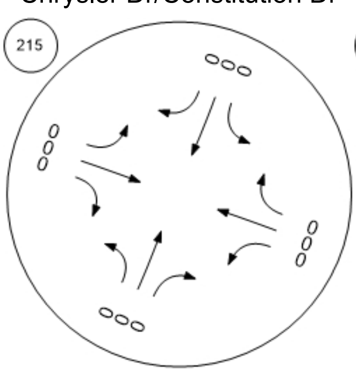

Bayfront Expwy/Bldg 20



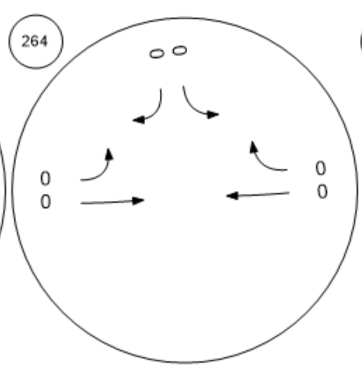

Chilco St/Constitution Dr



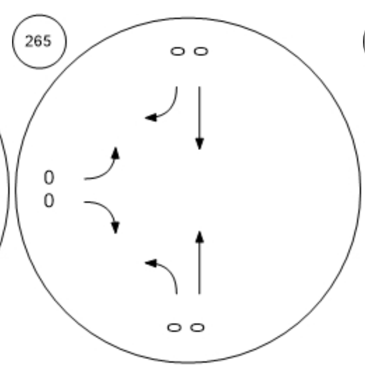

Chrysler Dr/Constitution Dr



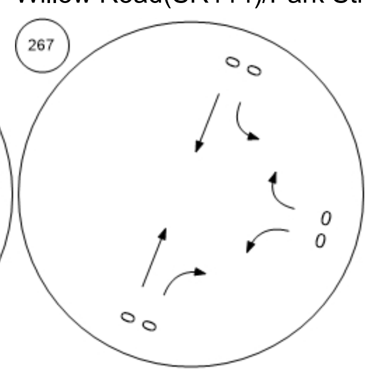

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



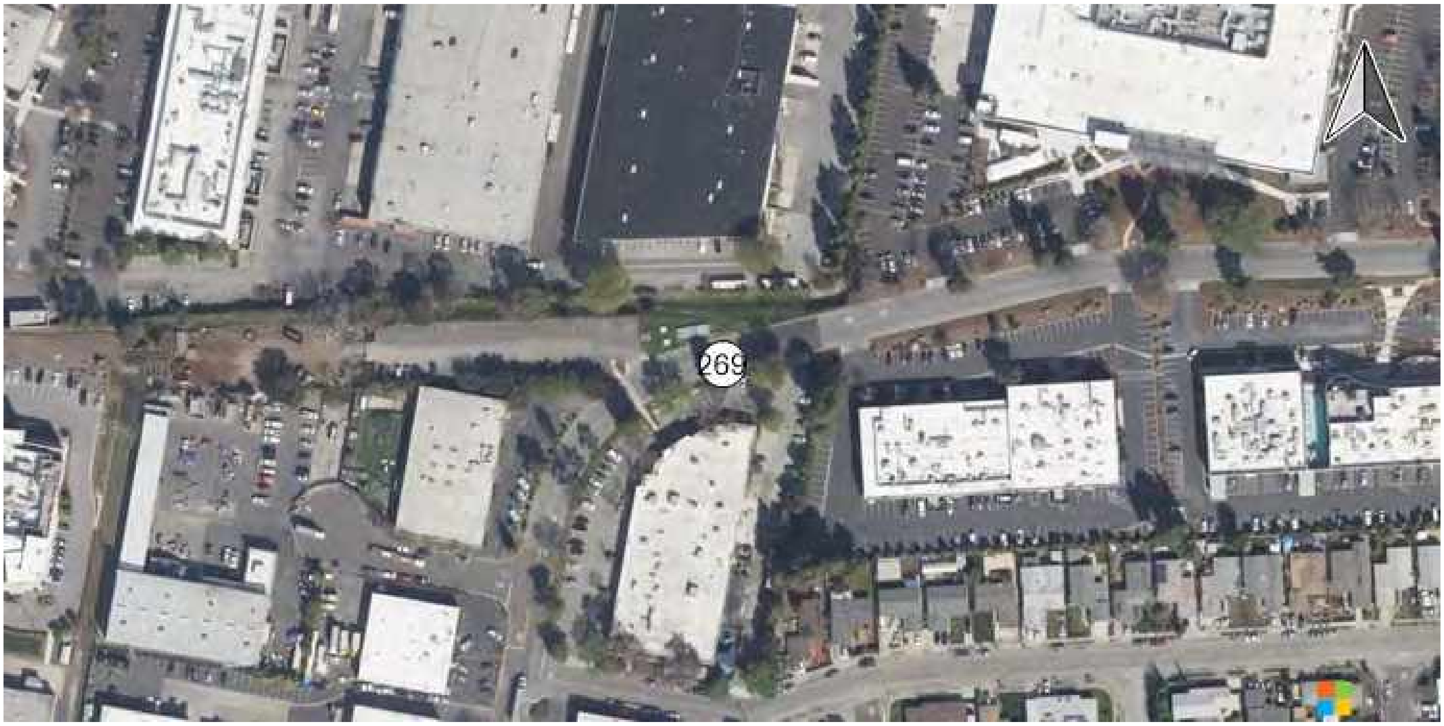

Willow Road(SR114)/Park Str



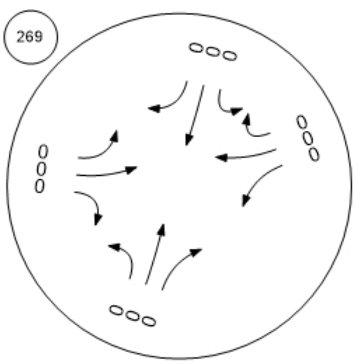
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips




O'Brien Drive/Loop Road

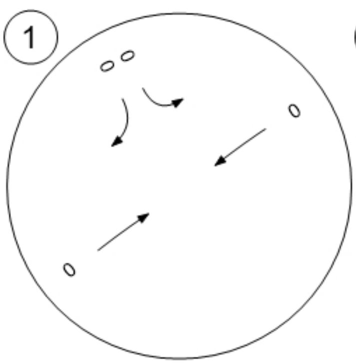


Generated with PTV VISTRO

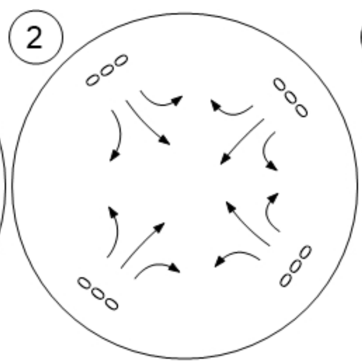
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

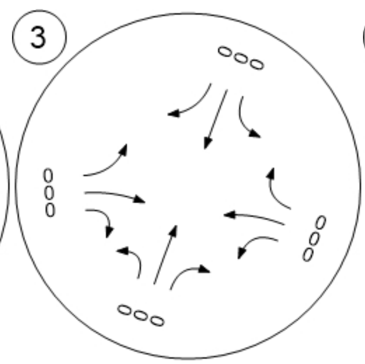

Marsh Rd (SR 84)/US 101 S



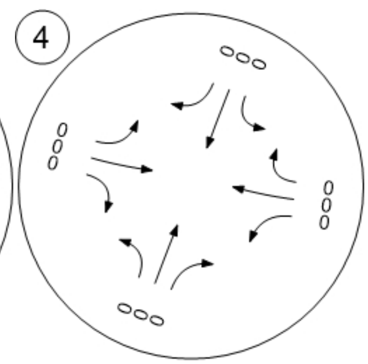

Marsh Rd/Rolison Rd-Scott D



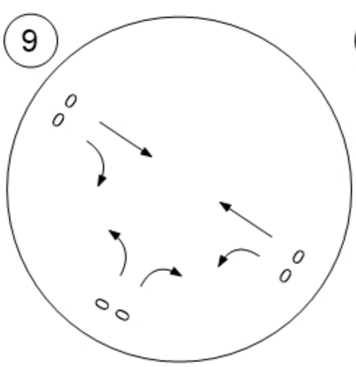

Marsh Rd/Florence St-Bohan



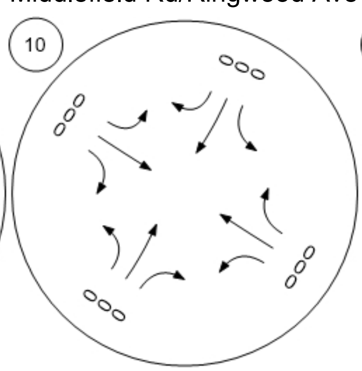

Marsh Rd/Bay Rd



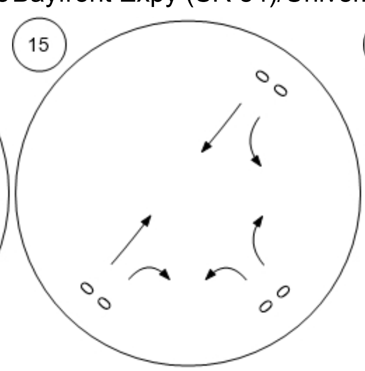

Middlefield Rd/Ravenswood



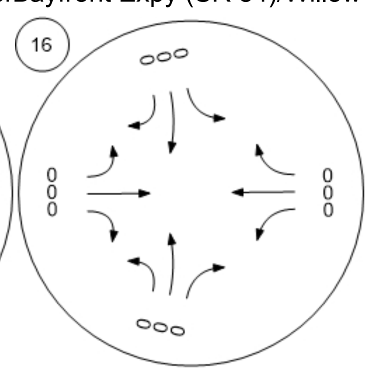

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

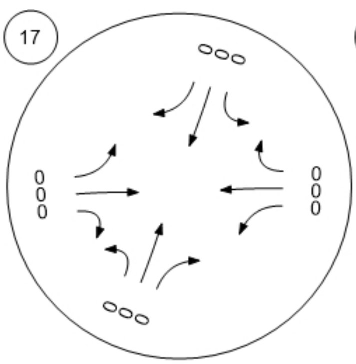


Generated with PTV VISTRO

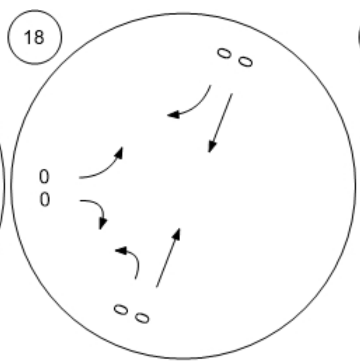
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

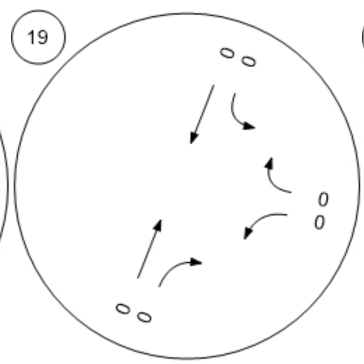

Willow Rd (SR 114)/Hamilton



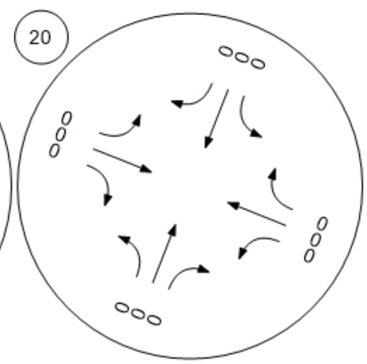

Willow Rd (SR 114)/Ivy Dr



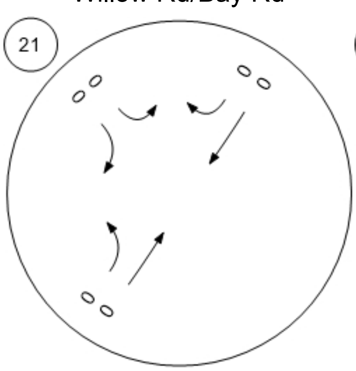

Willow Rd (SR 114)/O'Brien



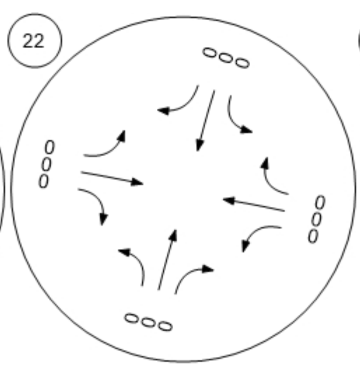

Willow Rd (SR 114)/Newbrid



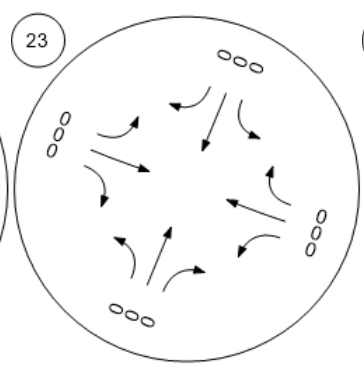

Willow Rd/Bay Rd



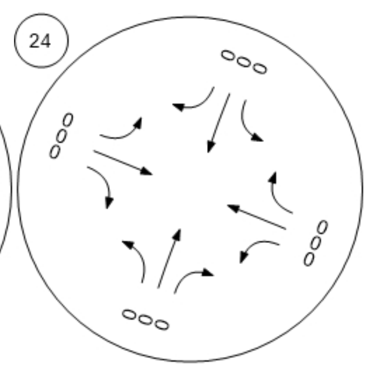

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

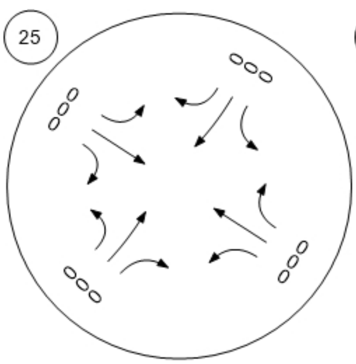


Generated with PTV VISTRO

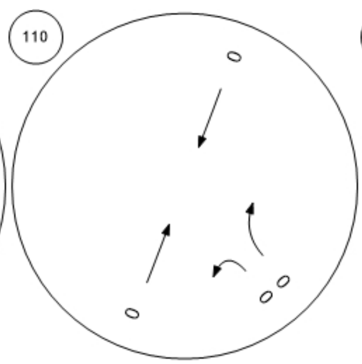
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

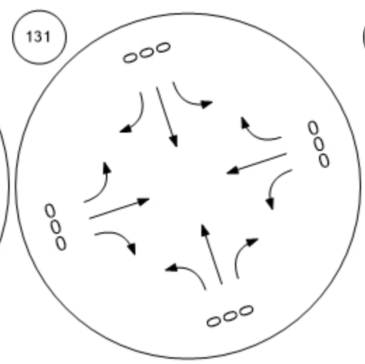

Middlefield Rd-Willow Rd



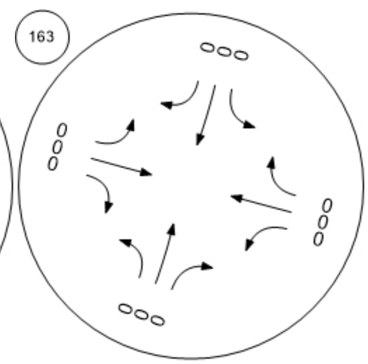

Marsh Road/101 NB Ramps



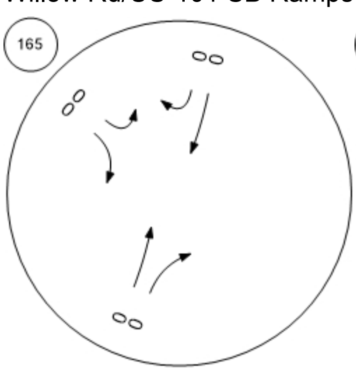

Chilco Street/Hamilton Avenu



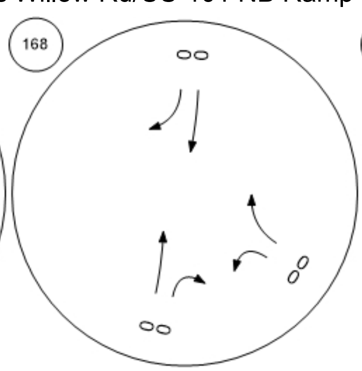

Bayfront Expy/Marsh Rd



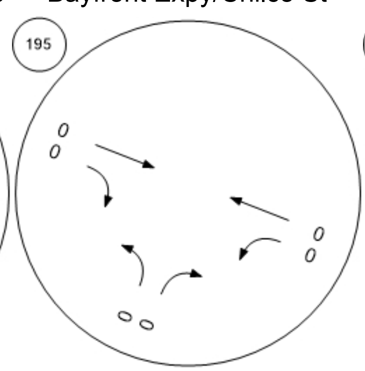

Willow Rd/US-101 SB Ramps



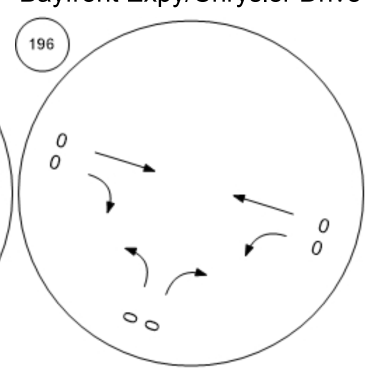

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

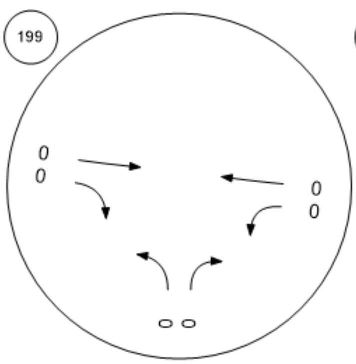



Bayfront Expy/Chrysler Drive

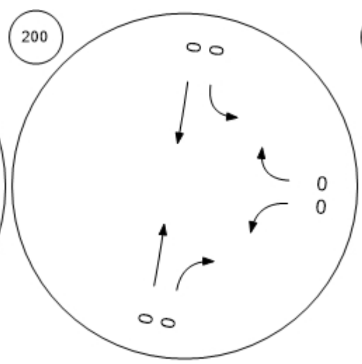


Traffic Volume - Other Volume

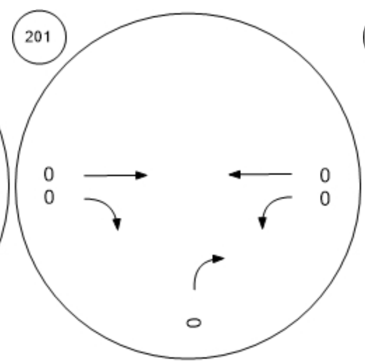

Bafront Expwy/Bldg 21



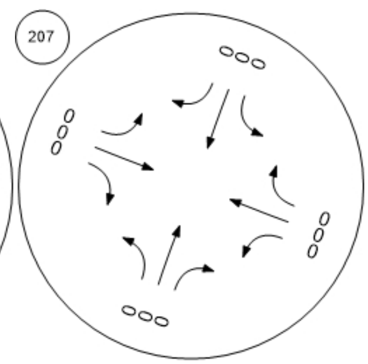

O'Brien Drive/Kavanaugh Dri



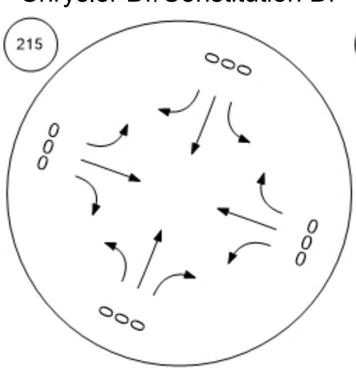

Bayfront Expwy/Bldg 20



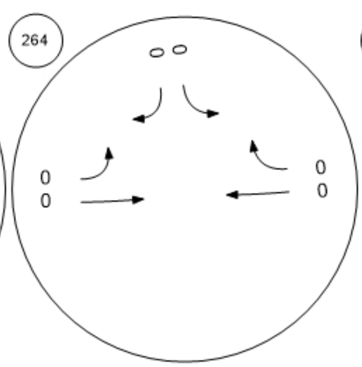

Chilco St/Constitution Dr



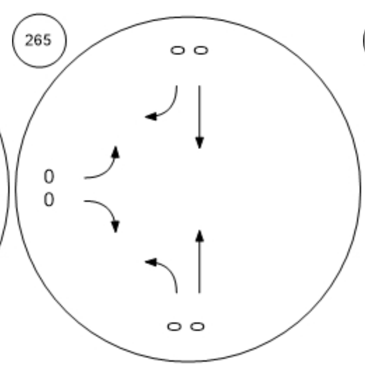

Chrysler Dr/Constitution Dr



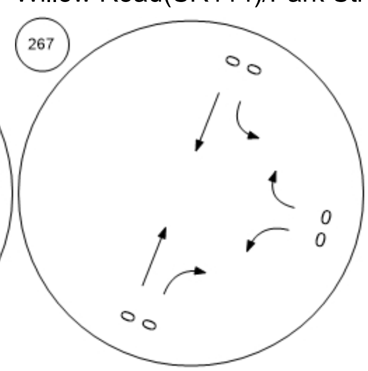

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



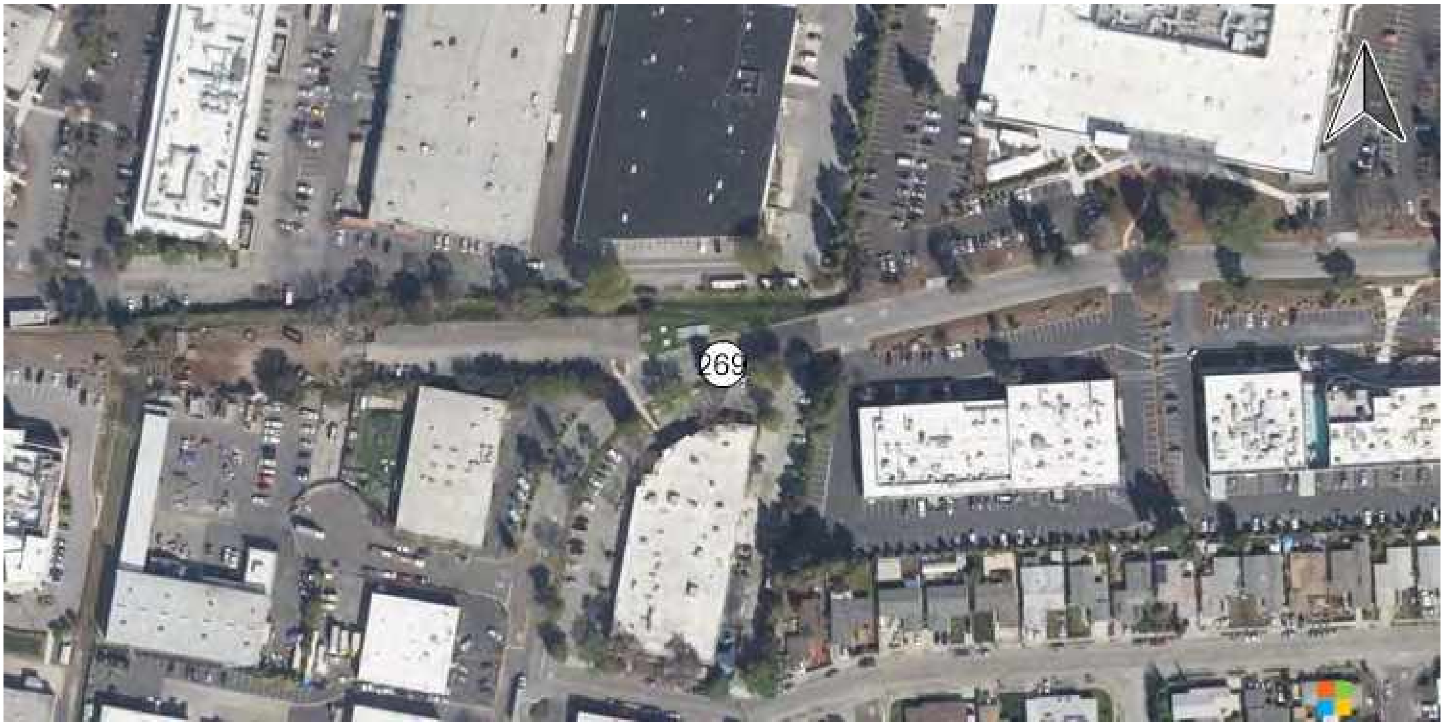

Willow Road(SR114)/Park Str



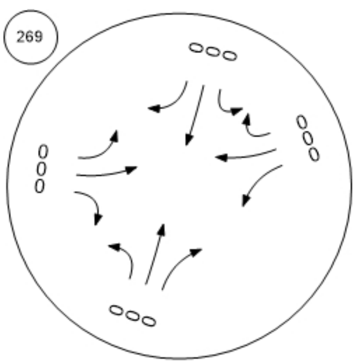
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume




O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-6)

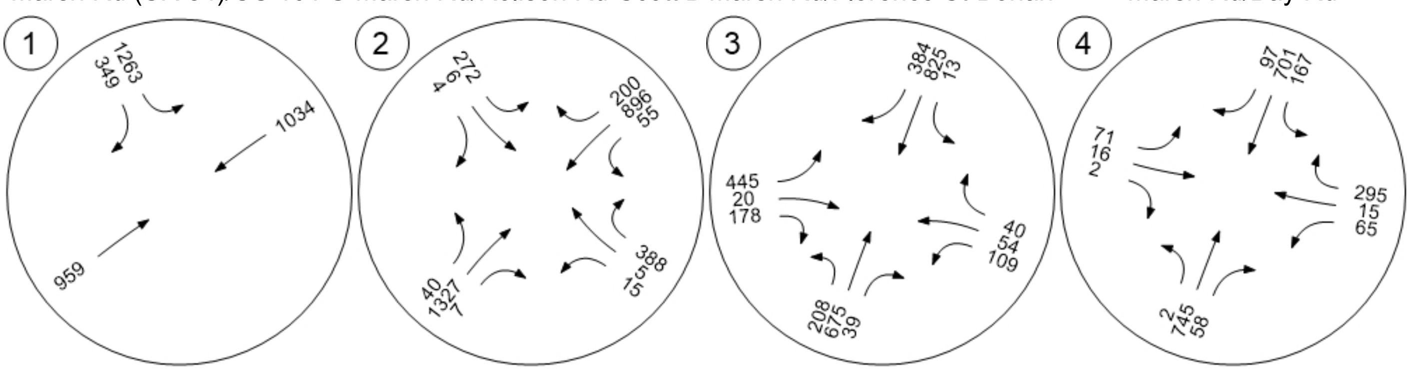
Traffic Volume - Future Total Volume


Marsh Rd (SR 84)/US 101 S

Marsh Rd/Rolison Rd-Scott D

Marsh Rd/Florence St-Bohan

Marsh Rd/Bay Rd

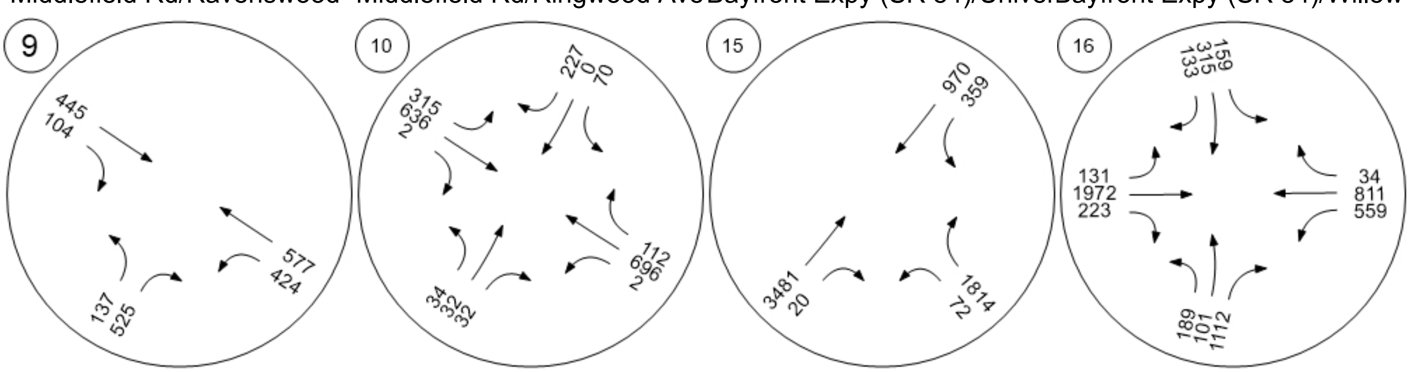



Middlefield Rd/Ravenswood

Middlefield Rd/Ringwood Ave

Bayfront Expy (SR 84)/Univer

Bayfront Expy (SR 84)/Willow

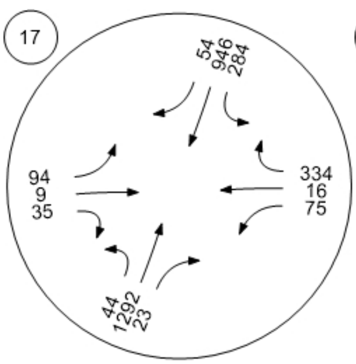


Generated with PTV VISTRO

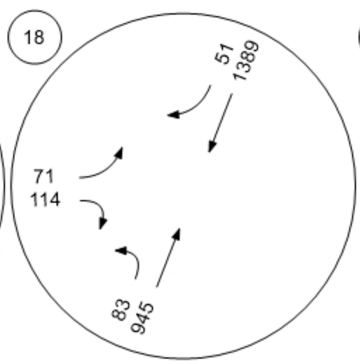
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

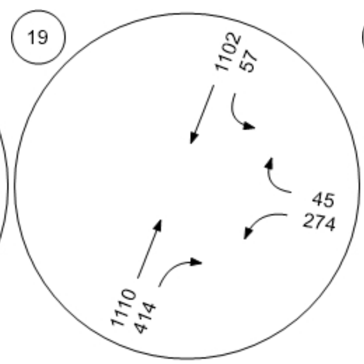

Willow Rd (SR 114)/Hamilton



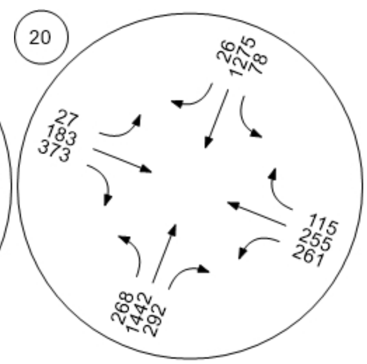

Willow Rd (SR 114)/Ivy Dr



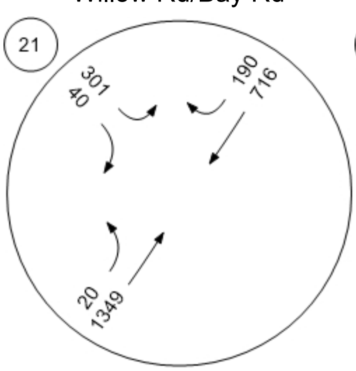

Willow Rd (SR 114)/O'Brien



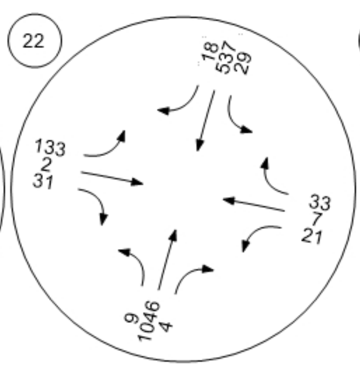

Willow Rd (SR 114)/Newbrid



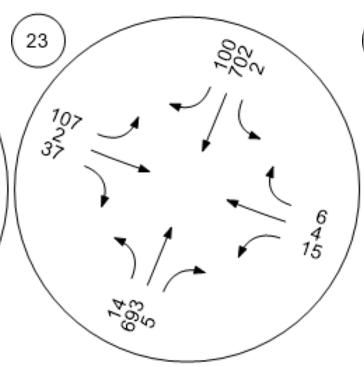

Willow Rd/Bay Rd



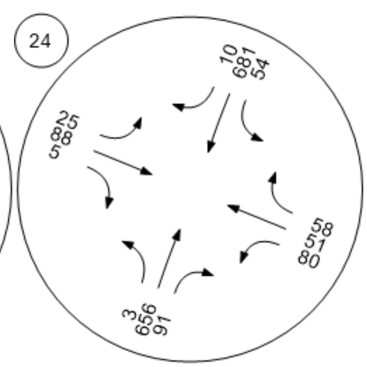

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

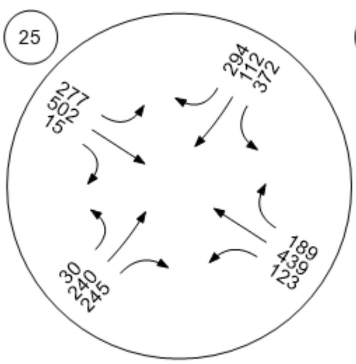


Generated with PTV VISTRO

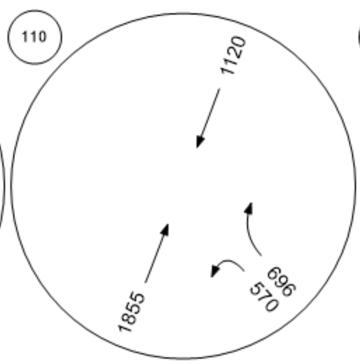
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

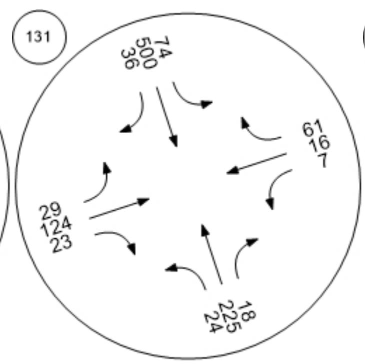

Middlefield Rd-Willow Rd



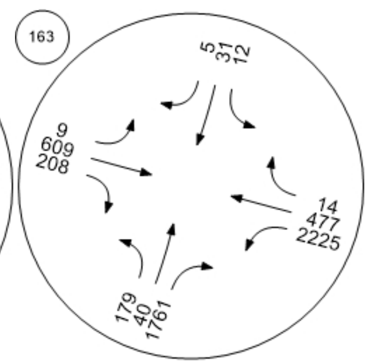

Marsh Road/101 NB Ramps



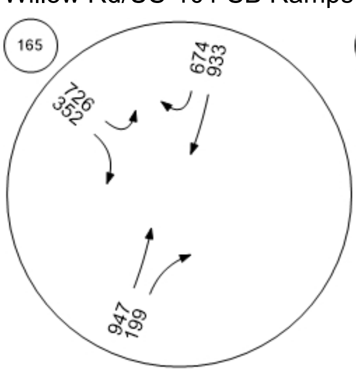

Chilco Street/Hamilton Avenu



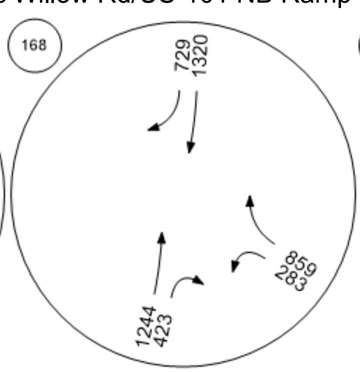

Bayfront Expy/Marsh Rd



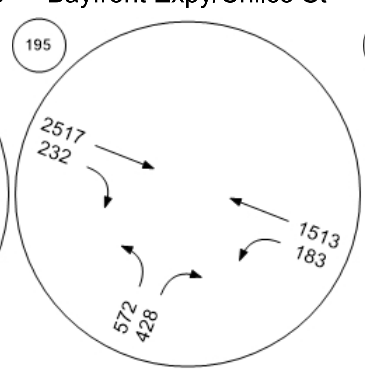

Willow Rd/US-101 SB Ramps



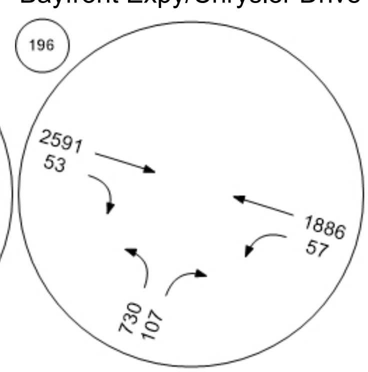

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St



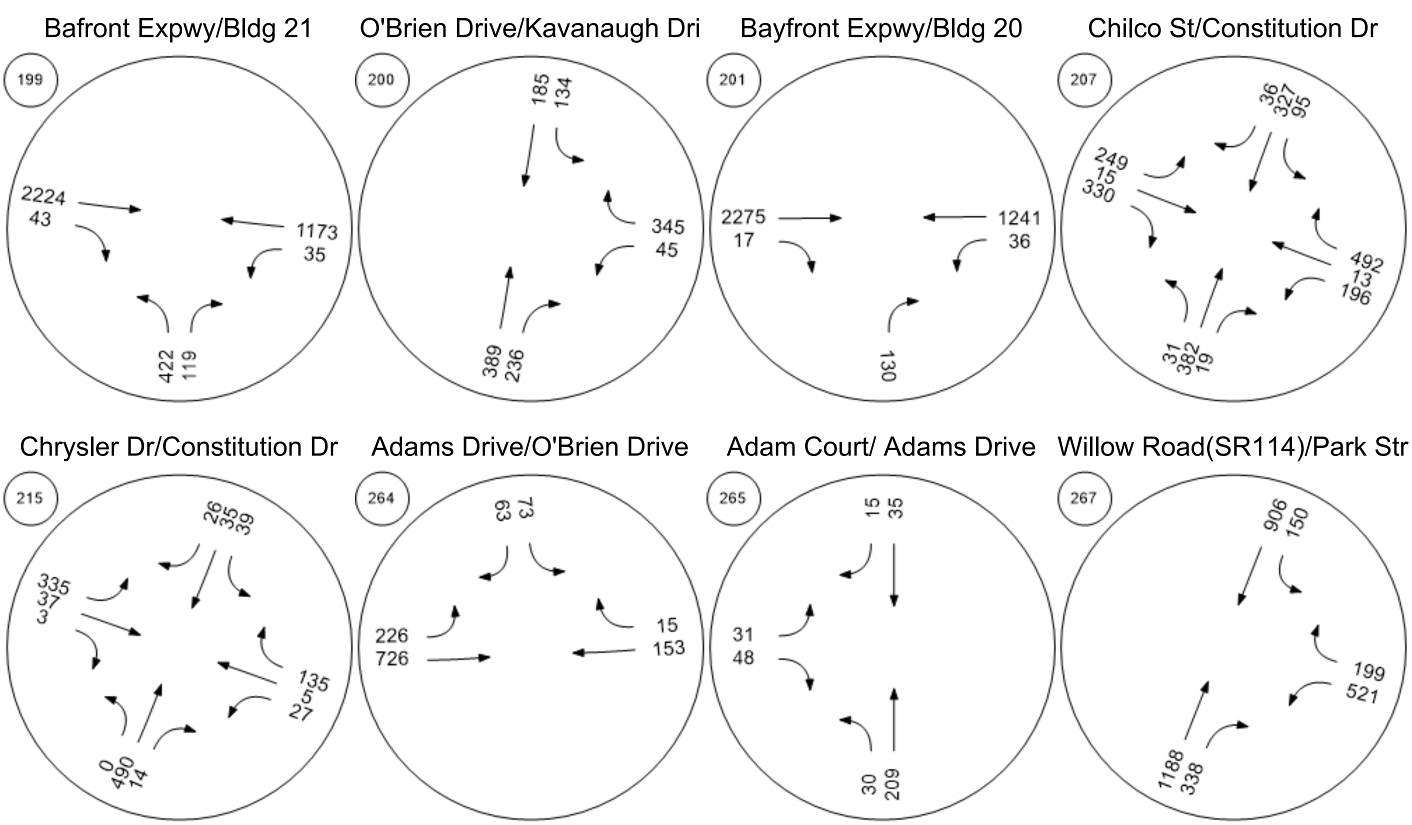

Bayfront Expy/Chrysler Drive



Generated with PTV VISTRO

Version 2021 (SP 0-6)

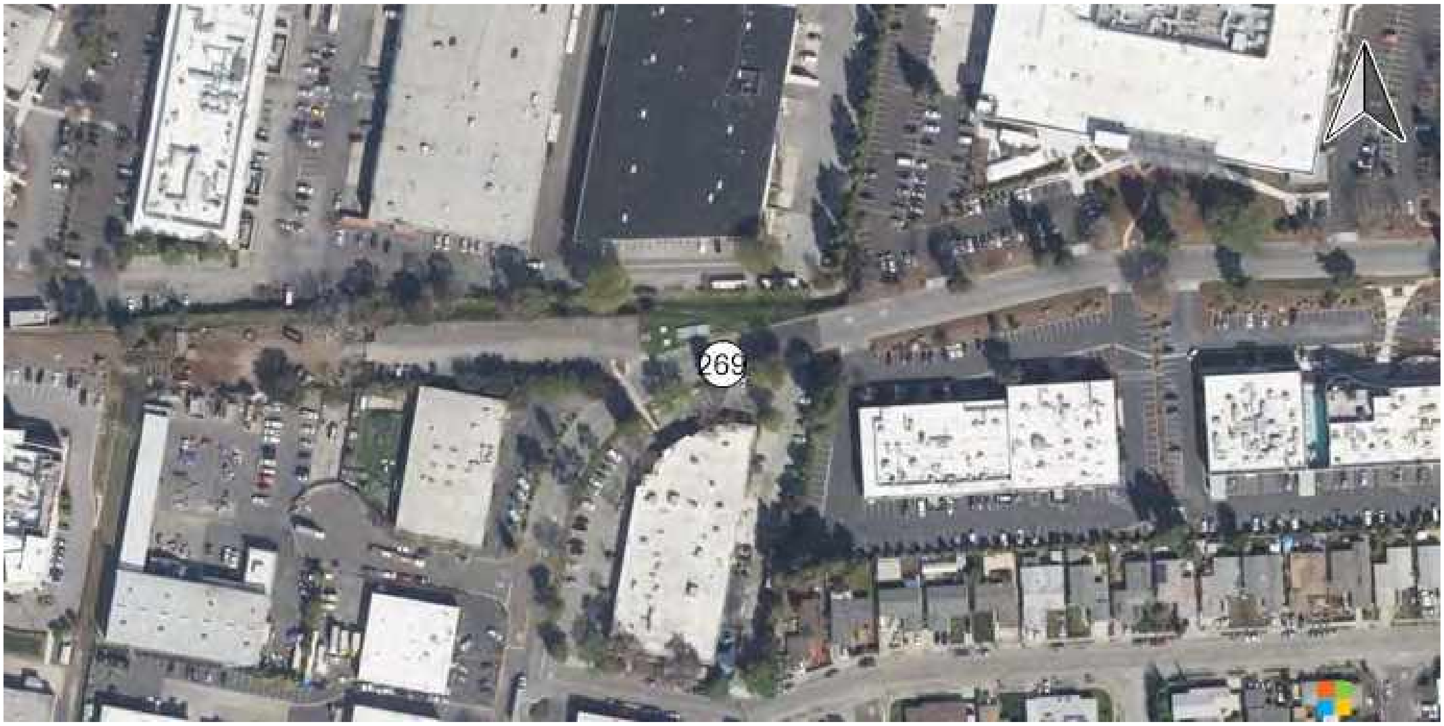
## Traffic Volume - Future Total Volume

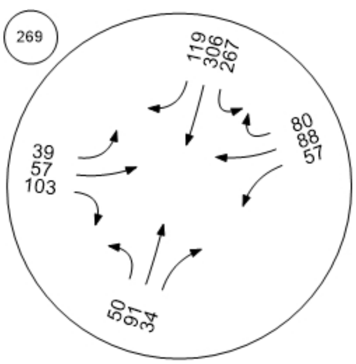
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume




O'Brien Drive/Loop Road

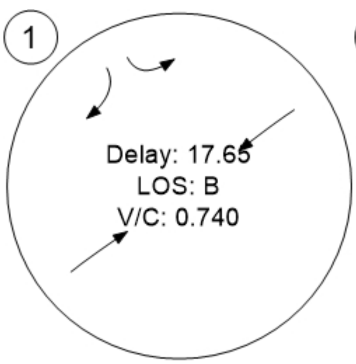


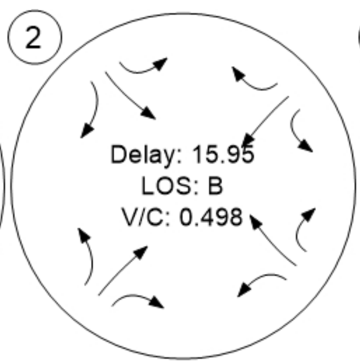
Generated with PTV VISTRO

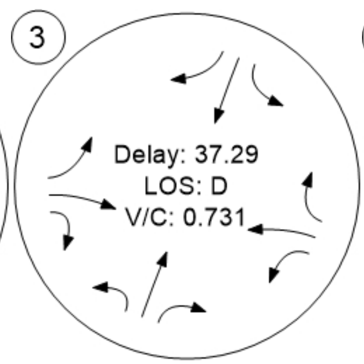
Version 2021 (SP 0-6)

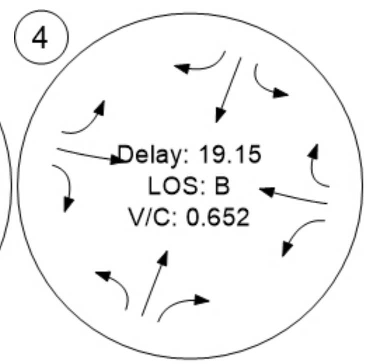
## Traffic Conditions


| Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd |
|---|---|---|---|

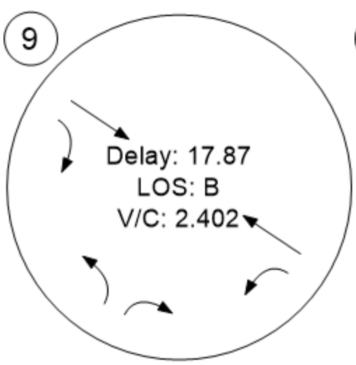


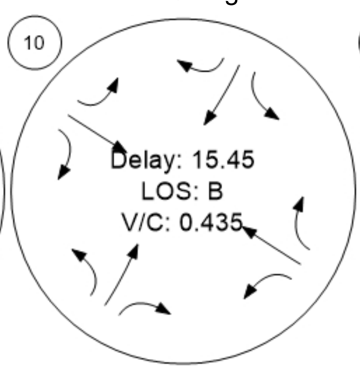



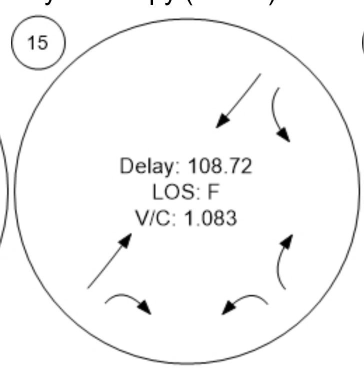



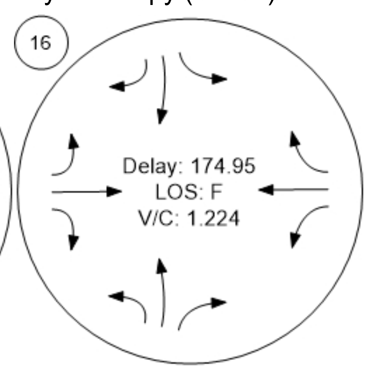




| Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow |
|---|---|---|---|



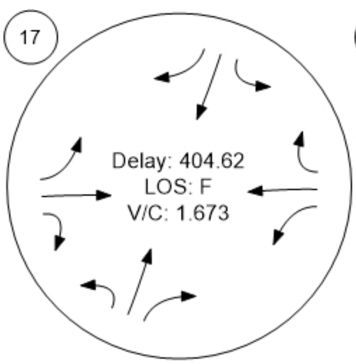



Generated with PTV VISTRO

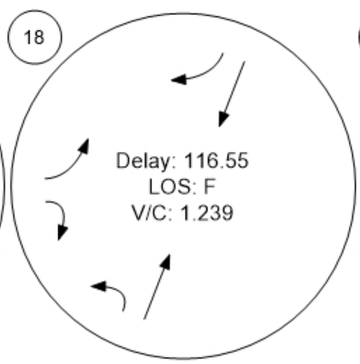
Version 2021 (SP 0-6)

Traffic Conditions

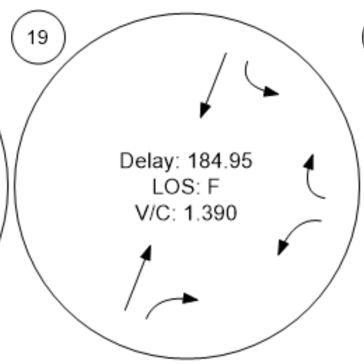

Willow Rd (SR 114)/Hamilton



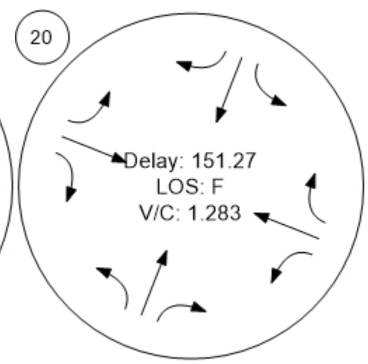

Willow Rd (SR 114)/Ivy Dr



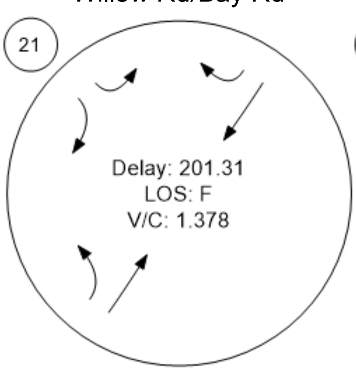

Willow Rd (SR 114)/O'Brien



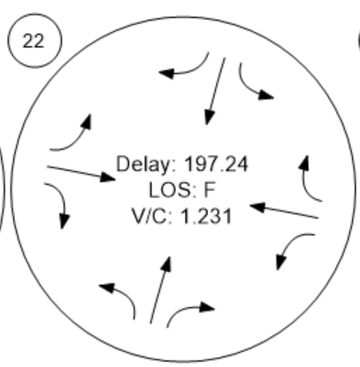

Willow Rd (SR 114)/Newbrid



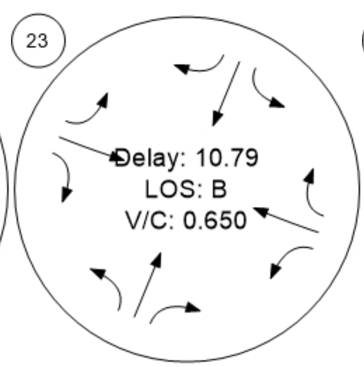

Willow Rd/Bay Rd



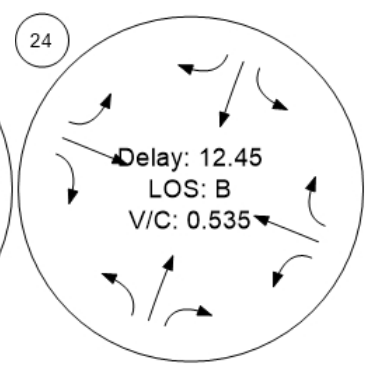

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

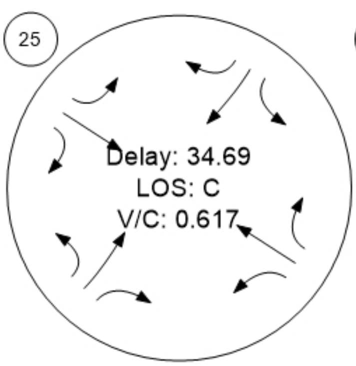


Generated with PTV VISTRO

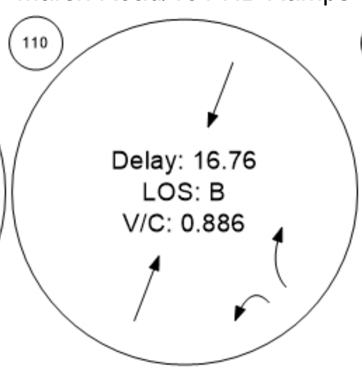
Version 2021 (SP 0-6)

## Traffic Conditions

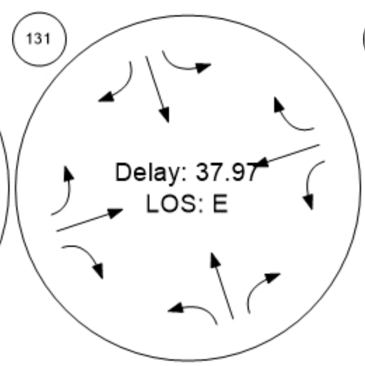

Middlefield Rd-Willow Rd



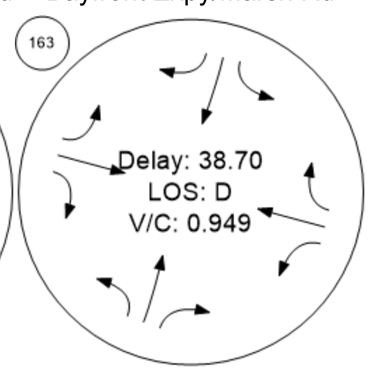

Marsh Road/101 NB Ramps



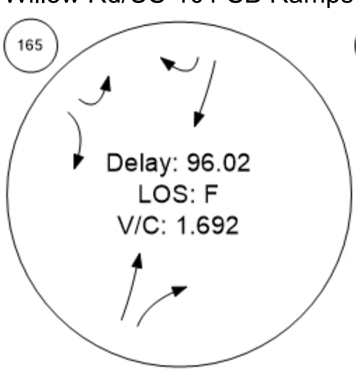

Chilco Street/Hamilton Avenu



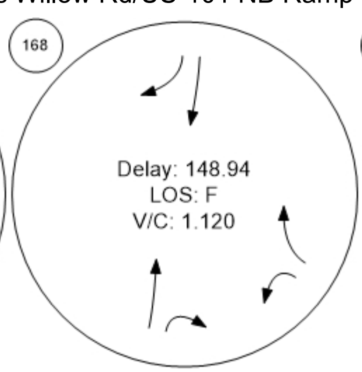

Bayfront Expy/Marsh Rd



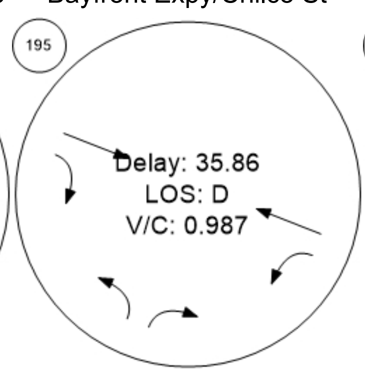

Willow Rd/US-101 SB Ramps



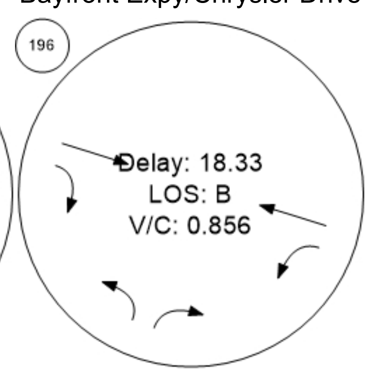

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

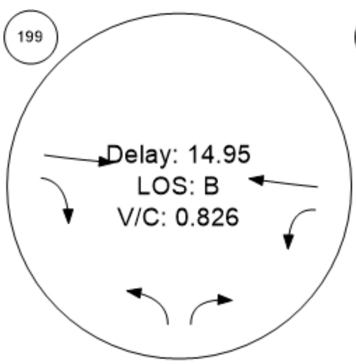


Generated with PTV VISTRO

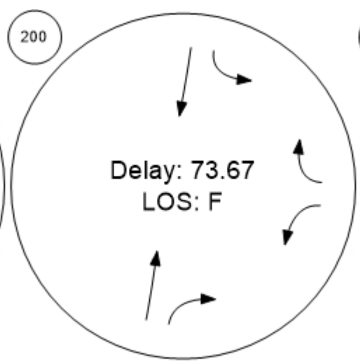
Version 2021 (SP 0-6)

## Traffic Conditions

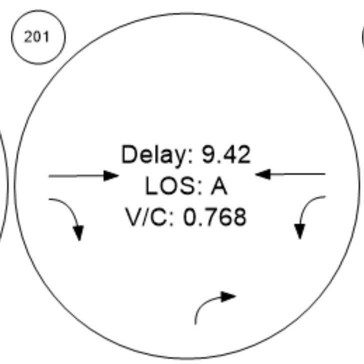

Bafront Expwy/Bldg 21



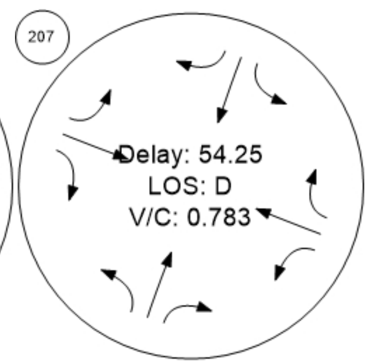

O'Brien Drive/Kavanaugh Dri



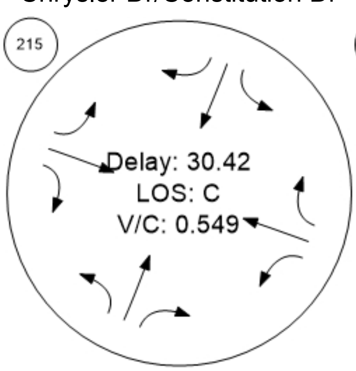

Bayfront Expwy/Bldg 20



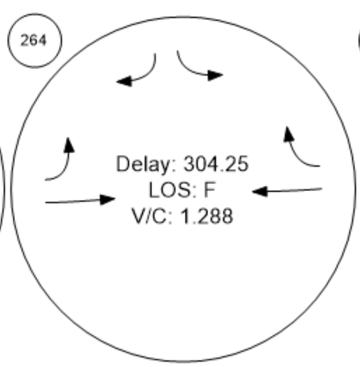

Chilco St/Constitution Dr



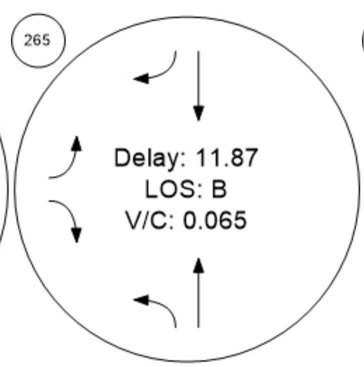

Chrysler Dr/Constitution Dr



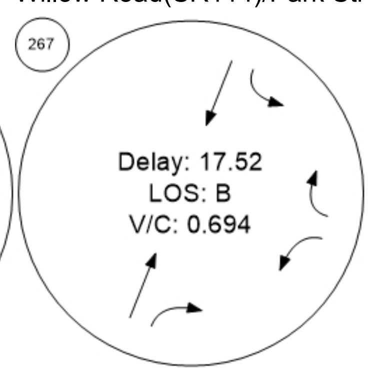

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



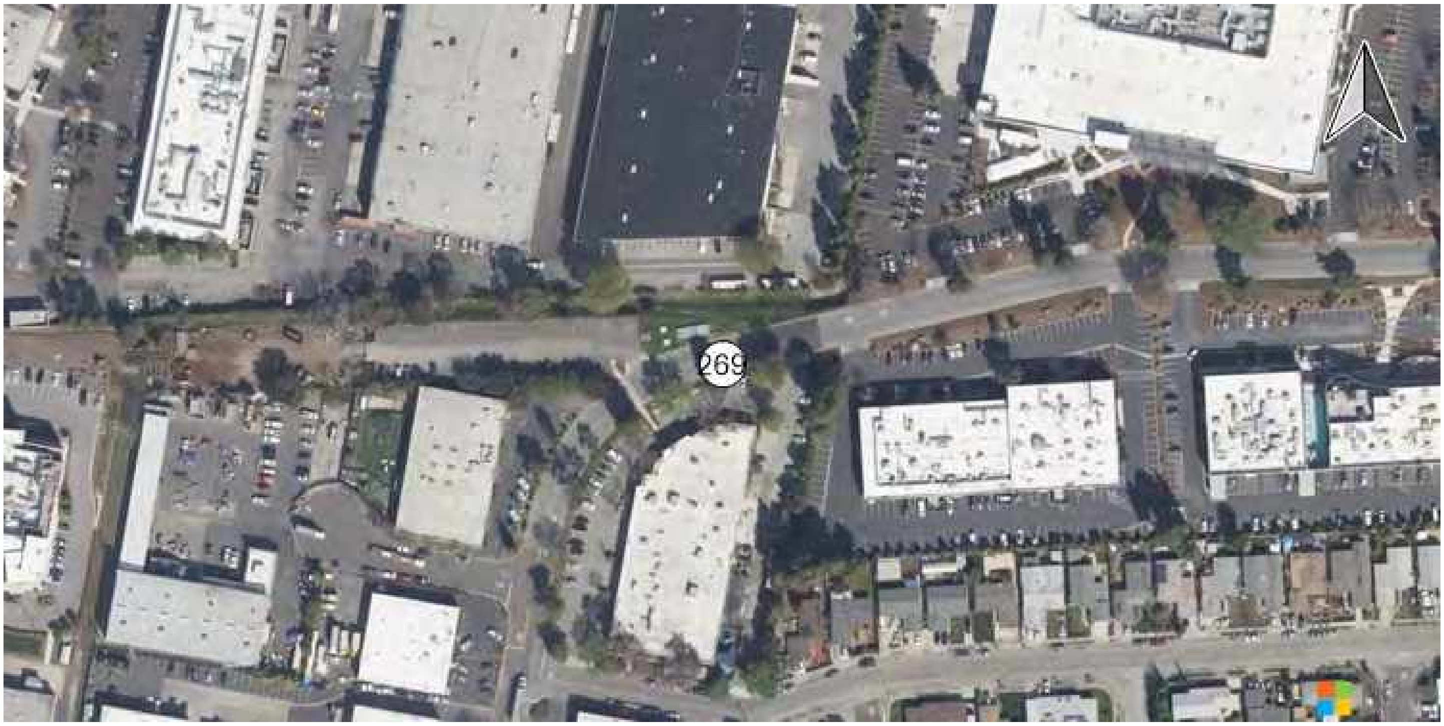

Willow Road(SR114)/Park Str



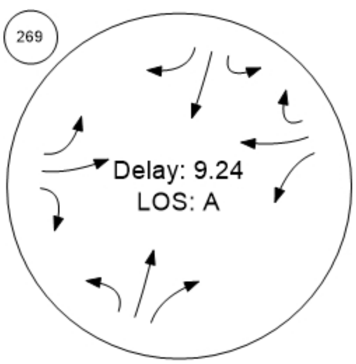
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions




O'Brien Drive/Loop Road

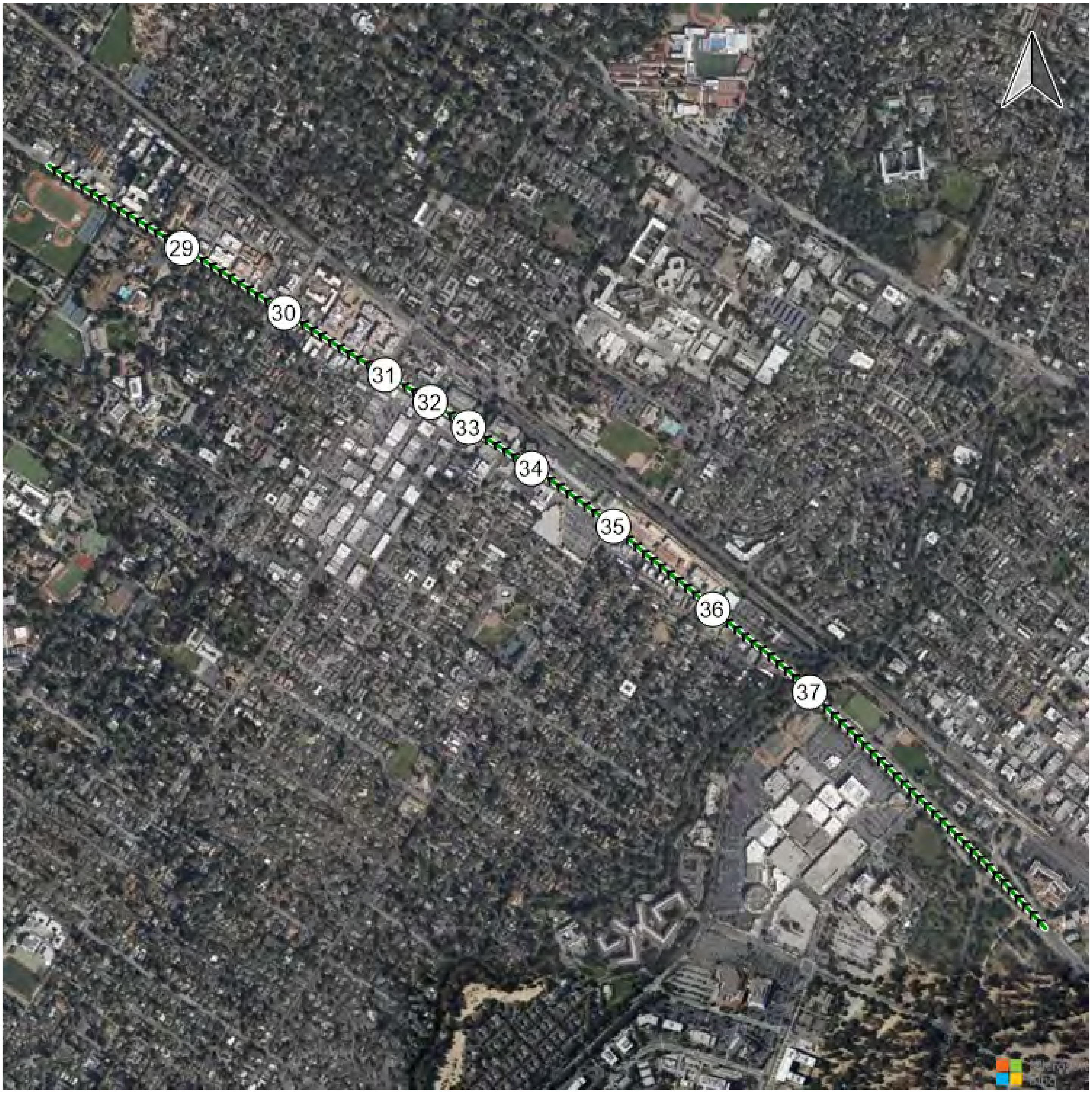


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

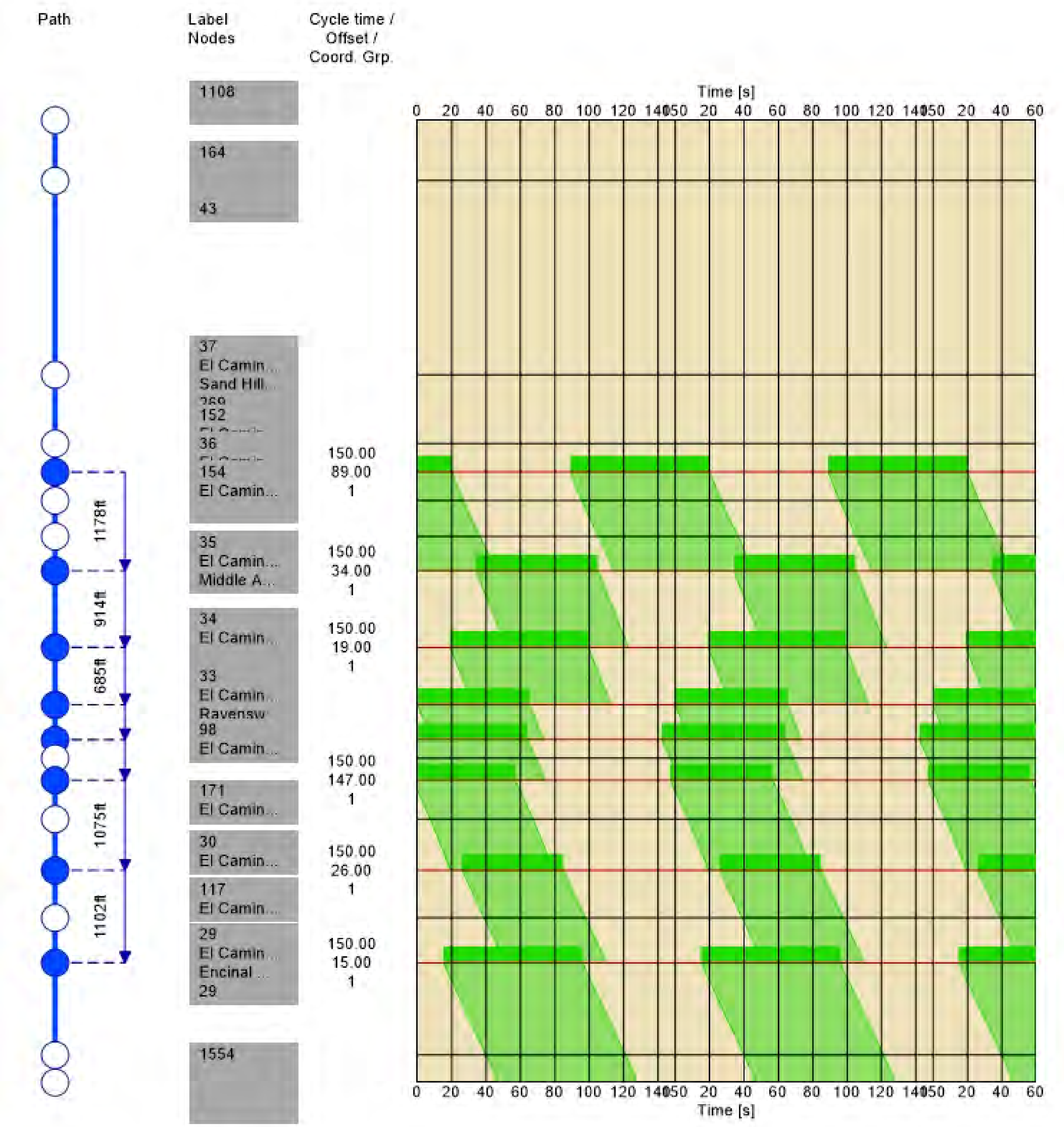
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Route 1: ECR NB

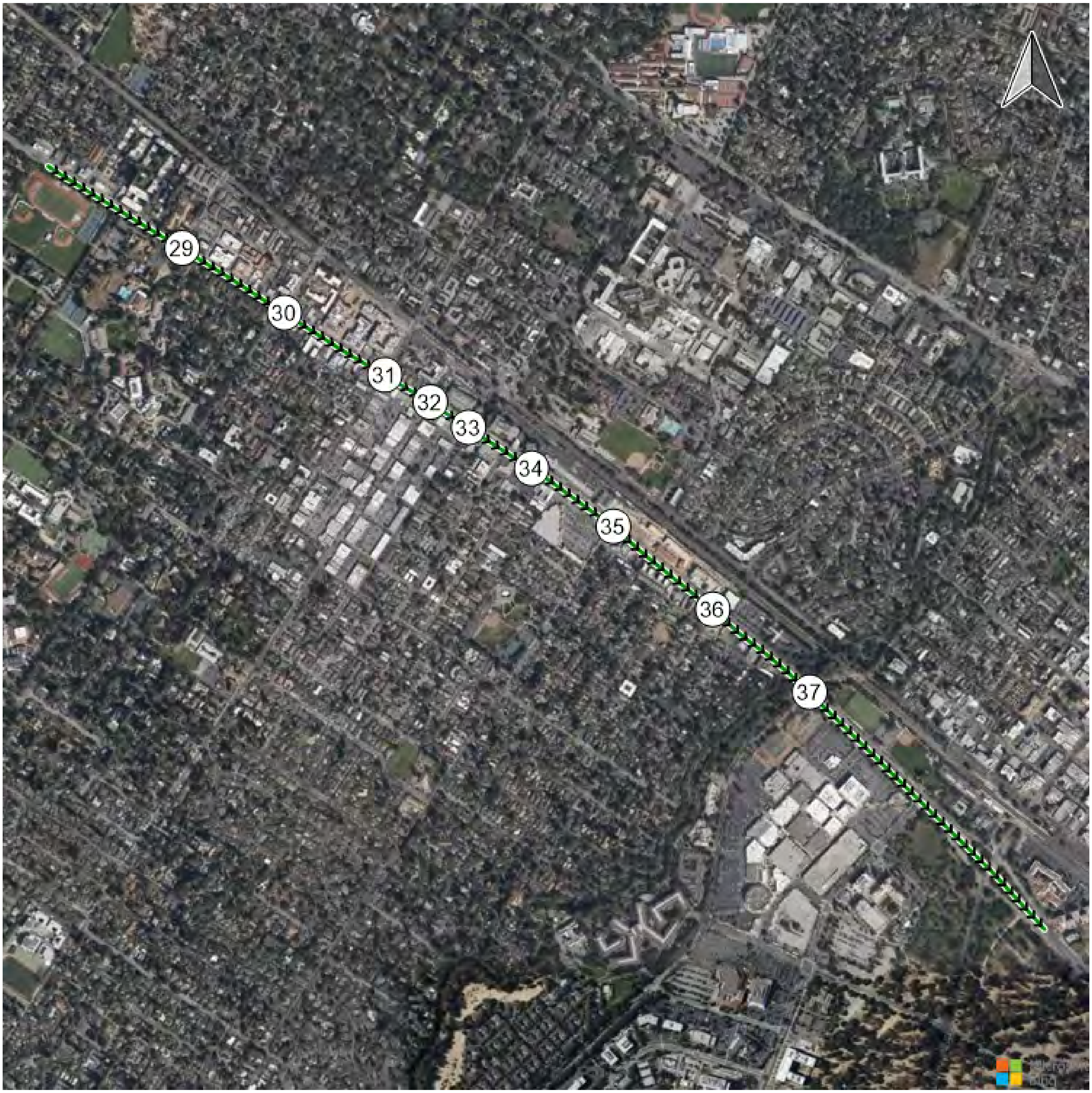


Generated with PTV VISTRO

Version 2021 (SP 0-6)

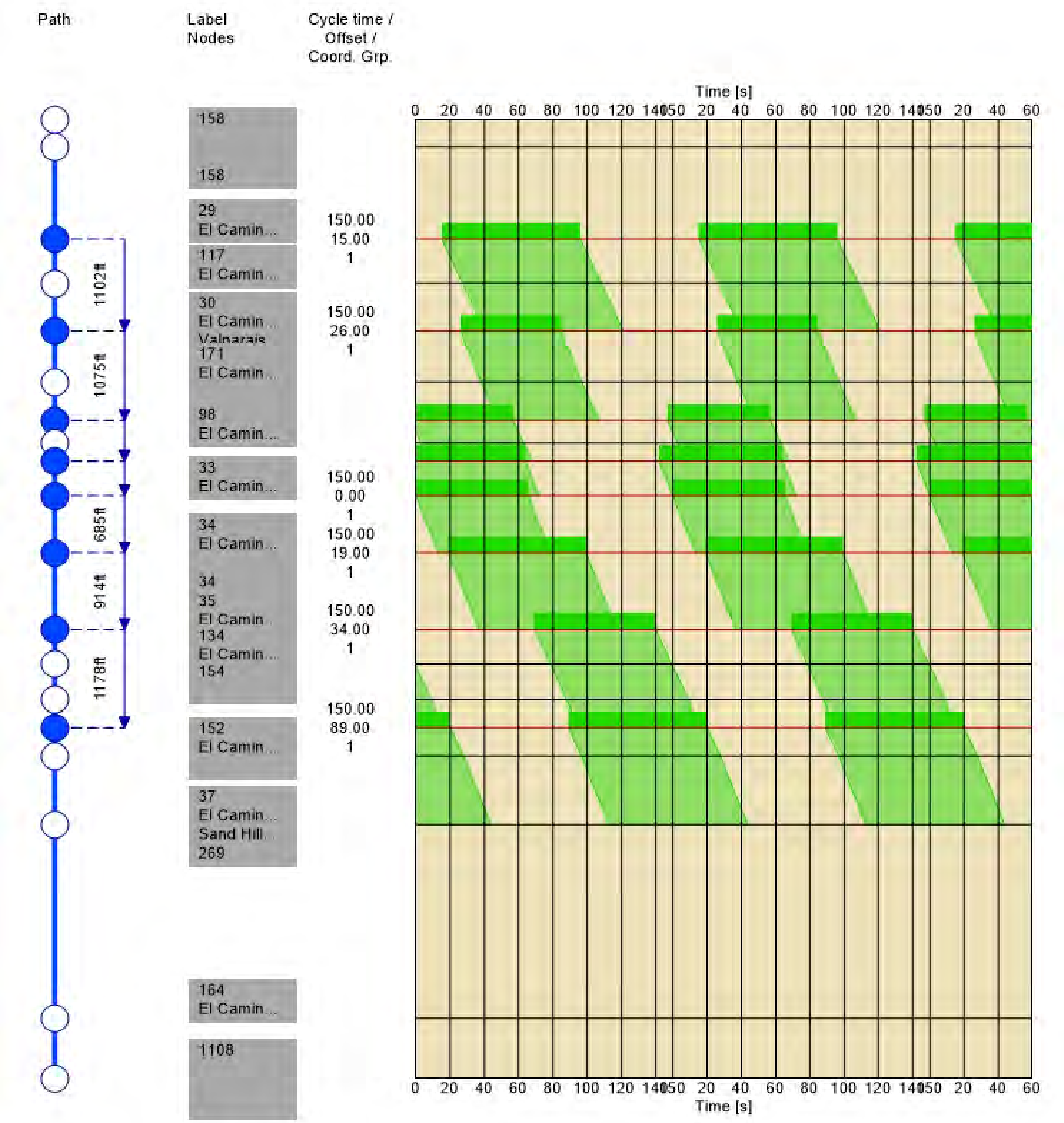
Time Space Diagram - Flowing Off

Route 2: ECR SB



Generated with PTV VISTRO
Version 2021 (SP 0-6)

## Route 2: ECR SB

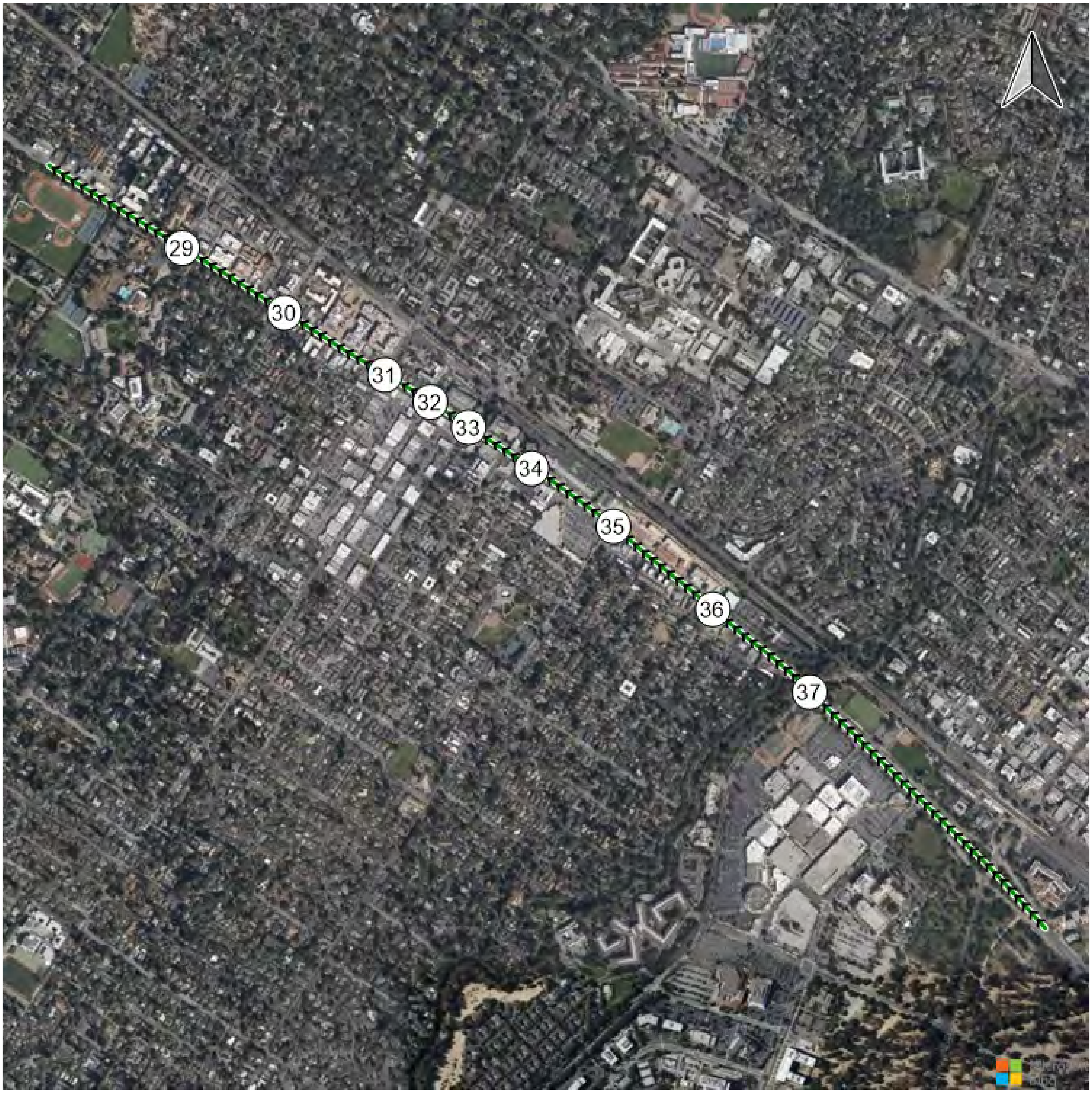


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

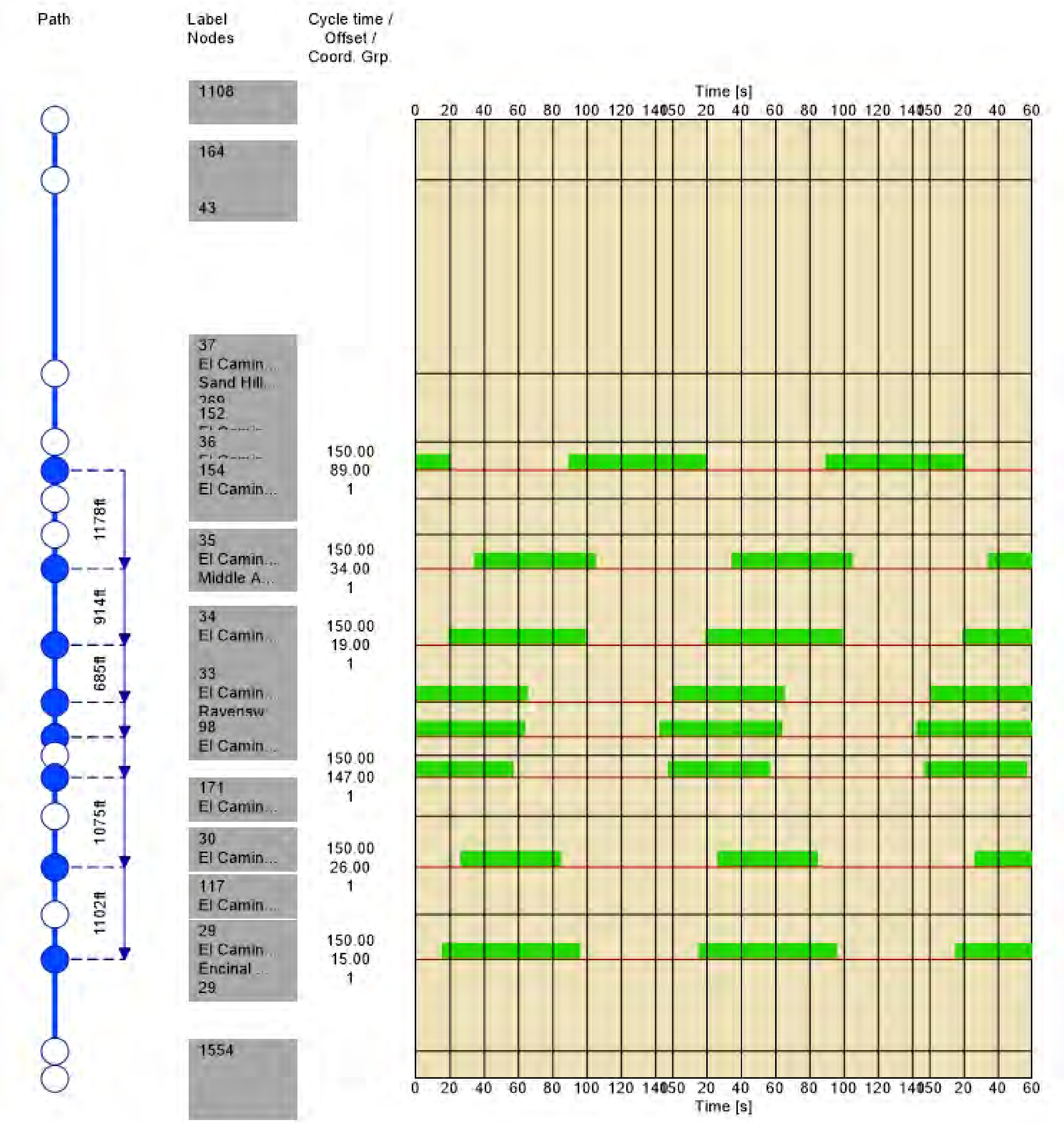
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Route 1: ECR NB

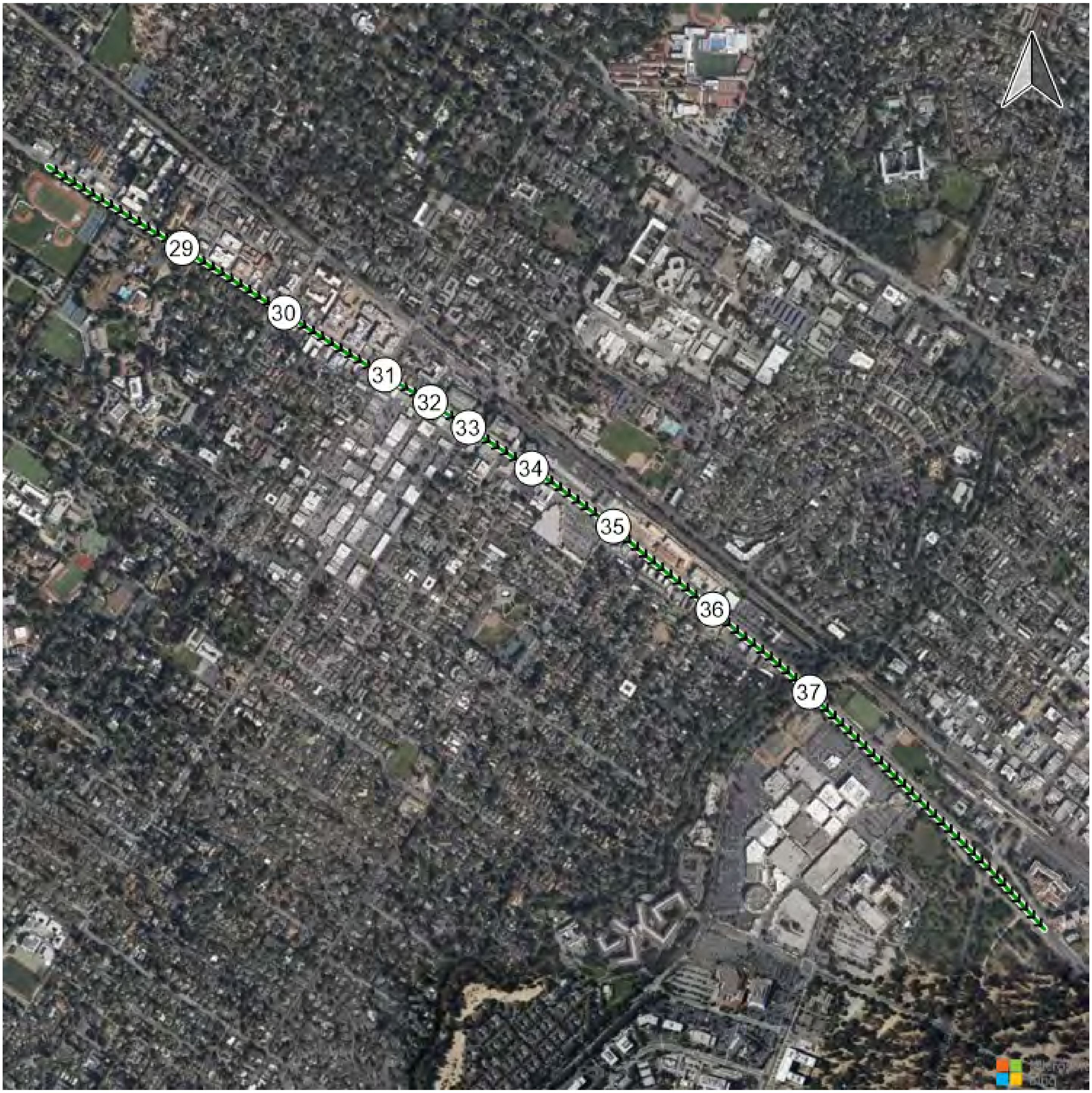


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

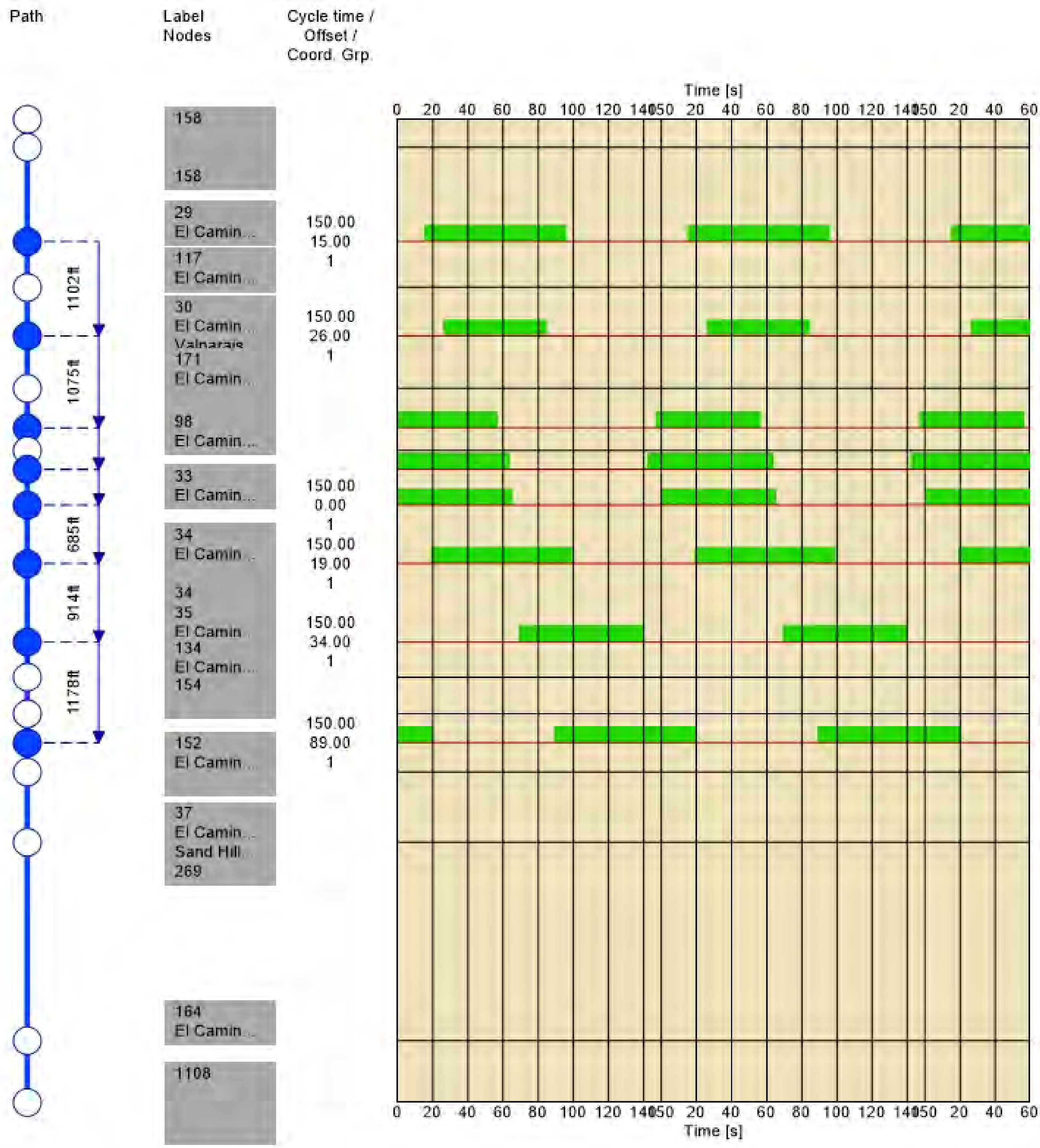
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Route 2: ECR SB



Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Near-Term + P AM_Imp.pdf

Scenario 23 Imp- Near-Term AM (2025 vols)+Project

10/14/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.317 | 194.8 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Left | 0.860 | 18.0 | B |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | NB Thru | 0.283 | 16.1 | B |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | EB Right | 0.814 | 50.2 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | SB Left | 0.587 | 18.0 | B |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | SB Right | 0.642 | 13.3 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 194.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.317 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 374 | 260 | 88 | 133 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 471 | 85 | 11 | 355 | 2 | 5 | 26 | 99 | 69 | 23 | 35 |
| Total Analysis Volume [veh/h] | 152 | 1884 | 340 | 43 | 1420 | 7 | 18 | 104 | 398 | 277 | 94 | 141 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 9 | 29 | 29 | 38 | 58 | 58 | 9 | 32 | 32 | 31 | 54 | 54 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 6 | 49 | 49 | 4 | 47 | 47 | 2 | 37 | 37 | 25 | 59 | 59 |
| g / C, Green / Cycle | 0.05 | 0.38 | 0.38 | 0.03 | 0.36 | 0.36 | 0.02 | 0.28 | 0.28 | 0.19 | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.43 | 0.45 | 0.02 | 0.63 | 0.63 | 0.01 | 0.07 | 0.30 | 0.18 | 0.12 | 0.20 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1655 | 1781 | 1491 | 781 | 1420 | 1577 | 1323 | 1536 | 800 | 698 |
| c, Capacity [veh/h] | 82 | 1303 | 624 | 55 | 540 | 283 | 26 | 447 | 375 | 297 | 360 | 314 |
| d1, Uniform Delay [s] | 62.00 | 40.48 | 40.48 | 62.54 | 41.46 | 41.46 | 63.44 | 35.76 | 46.03 | 51.62 | 22.26 | 24.41 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.11 | 0.04 | 0.17 | 0.04 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 386.30 | 71.51 | 100.27 | 8.43 | 338.28 | 345.36 | 27.63 | 0.10 | 45.40 | 5.72 | 0.38 | 1.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.85 | 1.14 | 1.19 | 0.78 | 1.73 | 1.74 | 0.69 | 0.23 | 1.06 | 0.93 | 0.26 | 0.45 |
| d, Delay for Lane Group [s/veh] | 448.30 | 111.99 | 140.74 | 70.97 | 379.74 | 386.82 | 91.07 | 35.86 | 91.42 | 57.35 | 22.65 | 25.41 |
| Lane Group LOS | F | F | F | E | F | F | F | D | F | E | C | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 11.50 | 33.05 | 36.64 | 1.55 | 34.01 | 36.18 | 0.79 | 2.57 | 16.56 | 4.67 | 1.84 | 3.05 |
| 50th-Percentile Queue Length [ft/ln] | 287.52 | 826.29 | 916.12 | 38.85 | 850.28 | 904.38 | 19.85 | 64.16 | 414.08 | 116.79 | 45.98 | 76.24 |
| 95th-Percentile Queue Length [veh/ln] | 19.36 | 46.35 | 52.20 | 2.80 | 56.21 | 59.48 | 1.43 | 4.62 | 24.11 | 8.22 | 3.31 | 5.49 |
| 95th-Percentile Queue Length [ft/ln] | 484.08 | 1158.83 | 1305.12 | 69.93 | 1405.24 | 1487.09 | 35.73 | 115.49 | 602.70 | 205.41 | 82.77 | 137.24 |

**Movement, Approach, & Intersection Results**

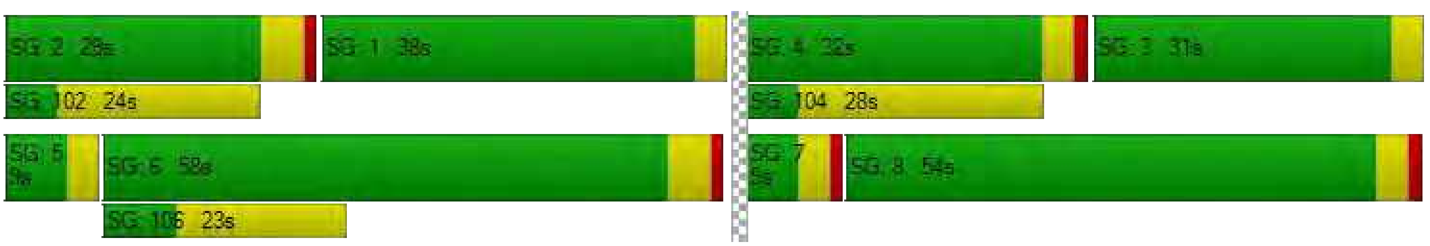
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 448.30 | 118.12 | 140.74 | 70.97 | 382.15 | 386.82 | 91.07 | 35.86 | 91.42 | 57.35 | 22.65 | 25.41 |
| Movement LOS | F | F | F | E | F | F | F | D | F | E | C | C |
| d_A, Approach Delay [s/veh] | 142.48 | | | 373.07 | | | 80.30 | | | 42.18 | | |
| Approach LOS | F | | | F | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 194.81 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.317 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 50.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 24.62 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.451 | 2.991 | 2.410 | 2.569 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 369 | 815 | 431 | 769 |
| d_b, Bicycle Delay [s] | 43.26 | 22.82 | 40.12 | 24.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.866 | 2.368 | 2.490 | 2.461 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.860 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1216 | 1202 | 570 | 438 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1216 | 1202 | 271 | 438 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 304 | 301 | 68 | 110 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1216 | 1202 | 271 | 438 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 71 | 71 | 71 | 71 | 71 | 71 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 4 | 42 | 34 | 34 | 19 | 19 |
| g / C, Green / Cycle | 0.06 | 0.59 | 0.48 | 0.48 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.46 | 0.43 | 0.22 | 0.24 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1230 | 1801 | 841 |
| c, Capacity [veh/h] | 75 | 1543 | 1341 | 595 | 491 | 229 |
| d1, Uniform Delay [s] | 33.13 | 11.11 | 16.65 | 12.01 | 24.74 | 0.00 |
| k, delay calibration | 0.04 | 0.15 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.91 | 1.32 | 3.34 | 0.78 | 2.31 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.79 | 0.90 | 0.46 | 0.89 | 0.00 |
| d, Delay for Lane Group [s/veh] | 44.04 | 12.43 | 19.99 | 12.79 | 27.04 | 0.00 |
| Lane Group LOS | D | B | B | B | C | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.29 | 6.14 | 8.06 | 2.55 | 3.45 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 32.37 | 153.51 | 201.61 | 63.75 | 86.34 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.33 | 10.20 | 12.72 | 4.59 | 6.22 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 58.27 | 255.11 | 318.04 | 114.74 | 155.41 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.04 | 12.43 | 19.99 | 12.79 | 27.04 | 0.00 |
| Movement LOS | D | B | B | B | C | A |
| d_A, Approach Delay [s/veh] | 14.03 | | 18.66 | | 27.04 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 17.95 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.860 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 25.17 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.508 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1019 | 1019 | 1019 |
| d_b, Bicycle Delay [s] | 8.50 | 8.50 | 8.50 |
| I_b,int, Bicycle LOS Score for Intersection | 2.616 | 3.022 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.283 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 59 | 3 | 16 | 31 | 11 | 12 | 13 | 8 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 236 | 10 | 64 | 123 | 44 | 47 | 52 | 31 | 24 | 56 | 146 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 4 | | | 5 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 5 | | | 4 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 41 | 41 | 41 | 41 |
| g / C, Green / Cycle | 0.46 | 0.46 | 0.46 | 0.46 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.15 | 0.09 | 0.14 |
| s, saturation flow rate [veh/h] | 1835 | 1592 | 1520 | 1634 |
| c, Capacity [veh/h] | 878 | 776 | 747 | 789 |
| d1, Uniform Delay [s] | 15.51 | 15.30 | 14.38 | 15.42 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.86 | 0.98 | 0.51 | 0.91 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.30 | 0.30 | 0.17 | 0.29 |
| d, Delay for Lane Group [s/veh] | 16.37 | 16.28 | 14.89 | 16.33 |
| Lane Group LOS | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.45 | 3.05 | 1.61 | 3.00 |
| 50th-Percentile Queue Length [ft/ln] | 86.32 | 76.36 | 40.22 | 75.07 |
| 95th-Percentile Queue Length [veh/ln] | 6.22 | 5.50 | 2.90 | 5.40 |
| 95th-Percentile Queue Length [ft/ln] | 155.38 | 137.45 | 72.39 | 135.12 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.37 | 16.37 | 16.37 | 16.28 | 16.28 | 16.28 | 14.89 | 14.89 | 14.89 | 16.33 | 16.33 | 16.33 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 16.37 | | | 16.28 | | | 14.89 | | | 16.33 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 16.11 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.283 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.964 | 2.105 | 1.855 | 1.979 |
| Crosswalk LOS | A | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 911 | 911 | 911 | 911 |
| d_b, Bicycle Delay [s] | 13.34 | 13.34 | 13.34 | 13.34 |
| I_b,int, Bicycle LOS Score for Intersection | 1.989 | 1.941 | 1.774 | 1.933 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 50.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.814 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 289 | 3 | 8 | 2 | 2 | 89 | 77 | 528 | 133 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1155 | 10 | 31 | 7 | 8 | 354 | 308 | 2113 | 533 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 25 | 96 | 29 | 29 | 27 | 27 | 27 | 69 | 69 |
| g / C, Green / Cycle | 0.16 | 0.60 | 0.18 | 0.18 | 0.17 | 0.17 | 0.17 | 0.43 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.28 | 0.01 | 0.01 | 0.15 | 0.15 | 0.16 | 0.42 | 0.32 |
| s, saturation flow rate [veh/h] | 1822 | 4110 | 1863 | 1610 | 1624 | 1353 | 1432 | 5075 | 1797 |
| c, Capacity [veh/h] | 286 | 2367 | 339 | 293 | 278 | 232 | 245 | 2182 | 773 |
| d1, Uniform Delay [s] | 63.75 | 19.94 | 54.27 | 54.31 | 64.47 | 64.77 | 64.63 | 44.53 | 38.01 |
| k, delay calibration | 0.23 | 0.50 | 0.04 | 0.04 | 0.12 | 0.13 | 0.14 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.24 | 0.72 | 0.03 | 0.04 | 8.50 | 12.61 | 16.14 | 13.12 | 6.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.69 | 0.49 | 0.07 | 0.08 | 0.86 | 0.89 | 0.92 | 0.97 | 0.74 |
| d, Delay for Lane Group [s/veh] | 69.99 | 20.66 | 54.31 | 54.35 | 72.97 | 77.38 | 80.77 | 57.65 | 44.16 |
| Lane Group LOS | E | C | D | D | E | E | F | E | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.14 | 8.68 | 0.86 | 0.78 | 10.21 | 9.03 | 10.07 | 29.72 | 19.95 |
| 50th-Percentile Queue Length [ft/ln] | 203.49 | 217.07 | 21.43 | 19.46 | 255.32 | 225.76 | 251.75 | 742.95 | 498.72 |
| 95th-Percentile Queue Length [veh/ln] | 12.82 | 13.52 | 1.54 | 1.40 | 15.45 | 13.96 | 15.27 | 38.66 | 27.27 |
| 95th-Percentile Queue Length [ft/ln] | 320.46 | 337.88 | 38.58 | 35.04 | 386.35 | 348.97 | 381.86 | 966.46 | 681.84 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 69.99 | 69.99 | 20.66 | 54.31 | 54.33 | 54.35 | 72.97 | 74.49 | 79.90 | 57.65 | 44.16 | 44.16 |
| Movement LOS | E | E | C | D | D | D | E | E | E | E | D | D |
| d_A, Approach Delay [s/veh] | 27.85 | | | 54.33 | | | 76.94 | | | 54.79 | | |
| Approach LOS | C | | | D | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 50.24 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.814 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.496 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.23 |
| I_b,int, Bicycle LOS Score for Intersection | 3.790 | 1.599 | 2.112 | 5.983 |
| Bicycle LOS | D | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.587 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 617 | 96 | 70 | 325 | 128 | 194 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 617 | 96 | 70 | 325 | 128 | 194 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 175 | 27 | 20 | 92 | 36 | 55 |
| Total Analysis Volume [veh/h] | 701 | 109 | 80 | 369 | 145 | 220 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 59 | 0 | 0 | 59 | 31 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 55 | 55 | 55 | 27 | 27 |
| g / C, Green / Cycle | 0.61 | 0.61 | 0.61 | 0.30 | 0.30 |
| (v / s)_i Volume / Saturation Flow Rate | 0.45 | 0.12 | 0.20 | 0.08 | 0.14 |
| s, saturation flow rate [veh/h] | 1812 | 668 | 1855 | 1767 | 1577 |
| c, Capacity [veh/h] | 1107 | 263 | 1134 | 530 | 473 |
| d1, Uniform Delay [s] | 12.31 | 26.91 | 8.50 | 24.02 | 25.63 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.28 | 2.96 | 0.76 | 1.27 | 3.26 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.73 | 0.30 | 0.33 | 0.27 | 0.47 |
| d, Delay for Lane Group [s/veh] | 16.58 | 29.86 | 9.26 | 25.30 | 28.89 |
| Lane Group LOS | B | C | A | C | C |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 11.33 | 1.60 | 3.39 | 2.50 | 4.17 |
| 50th-Percentile Queue Length [ft/ln] | 283.31 | 40.06 | 84.76 | 62.41 | 104.15 |
| 95th-Percentile Queue Length [veh/ln] | 16.85 | 2.88 | 6.10 | 4.49 | 7.50 |
| 95th-Percentile Queue Length [ft/ln] | 421.33 | 72.11 | 152.57 | 112.34 | 187.46 |

**Movement, Approach, & Intersection Results**

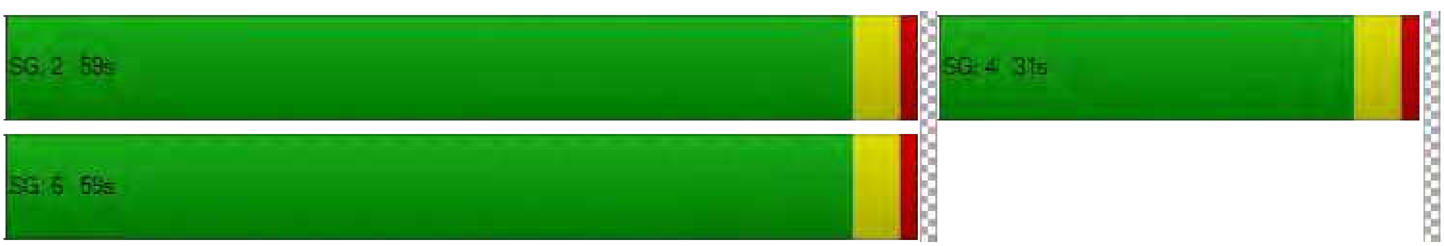
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.58 | 16.58 | 29.86 | 9.26 | 25.30 | 28.89 |
| Movement LOS | B | B | C | A | C | C |
| d_A, Approach Delay [s/veh] | 16.58 | | 12.93 | | 27.46 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 18.02 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.587 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1222 | 1222 | 600 |
| d_b, Bicycle Delay [s] | 6.81 | 6.81 | 22.05 |
| I_b,int, Bicycle LOS Score for Intersection | 2.896 | 2.300 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.642 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 72 | 86 | 164 | 752 | 28 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 72 | 86 | 164 | 752 | 28 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 23 | 28 | 53 | 244 | 9 |
| Total Analysis Volume [veh/h] | 38 | 94 | 112 | 213 | 977 | 36 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 19 | 0 | 0 | 71 | 71 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 15 | 67 | 67 | 67 |
| g / C, Green / Cycle | 0.17 | 0.74 | 0.74 | 0.74 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.21 | 0.12 | 0.56 |
| s, saturation flow rate [veh/h] | 1599 | 543 | 1823 | 1812 |
| c, Capacity [veh/h] | 267 | 296 | 1357 | 1349 |
| d1, Uniform Delay [s] | 34.06 | 20.53 | 3.33 | 6.66 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.44 | 3.65 | 0.25 | 3.89 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.38 | 0.16 | 0.75 |
| d, Delay for Lane Group [s/veh] | 40.50 | 24.19 | 3.57 | 10.55 |
| Lane Group LOS | D | C | A | B |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.06 | 2.02 | 0.94 | 9.51 |
| 50th-Percentile Queue Length [ft/ln] | 76.48 | 50.41 | 23.46 | 237.70 |
| 95th-Percentile Queue Length [veh/ln] | 5.51 | 3.63 | 1.69 | 14.56 |
| 95th-Percentile Queue Length [ft/ln] | 137.67 | 90.74 | 42.22 | 364.12 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 40.50 | 40.50 | 24.19 | 3.57 | 10.55 | 10.55 |
| Movement LOS | D | D | C | A | B | B |
| d_A, Approach Delay [s/veh] | 40.50 | | 10.68 | | 10.55 | |
| Approach LOS | D | | B | | B | |
| d_I, Intersection Delay [s/veh] | 13.27 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.642 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.012 | 2.395 | 2.333 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 333 | 1489 | 1489 |
| d_b, Bicycle Delay [s] | 31.25 | 2.94 | 2.94 |
| I_b,int, Bicycle LOS Score for Intersection | 1.777 | 2.096 | 3.231 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Near-Term + P AM_Imp.pdf

Scenario 23 Imp- Near-Term AM (2025 vols)+Project

10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 | 4664 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1216 | 1202 | 570 | 438 | 60 | 3551 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 | 741 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 | 4563 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 617 | 96 | 70 | 325 | 128 | 194 | 1430 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 29 | 72 | 86 | 164 | 752 | 28 | 1131 |

Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Near-Term + P AM_Imp.pdf

Scenario 23 Imp- Near-Term AM (2025 vols)+Project
10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1771 | 320 | 40 | 1335 | 7 | 17 | 98 | 418 | 260 | 88 | 167 | 4664 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1771** | **320** | **40** | **1335** | **7** | **17** | **98** | **418** | **260** | **88** | **167** | **4664** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1216 | 1202 | 570 | 438 | 60 | 3551 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1216** | **1202** | **570** | **438** | **60** | **3551** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 226 | 10 | 51 | 98 | 35 | 37 | 41 | 24 | 22 | 51 | 133 | 741 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **226** | **10** | **51** | **98** | **35** | **37** | **41** | **24** | **22** | **51** | **133** | **741** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1109 | 10 | 30 | 7 | 8 | 340 | 296 | 2028 | 512 | 34 | 4563 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1109** | **10** | **30** | **7** | **8** | **340** | **296** | **2028** | **512** | **34** | **4563** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 617 | 96 | 70 | 325 | 128 | 194 | 1430 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **617** | **96** | **70** | **325** | **128** | **194** | **1430** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 29 | 72 | 86 | 164 | 752 | 28 | 1131 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **72** | **86** | **164** | **752** | **28** | **1131** |

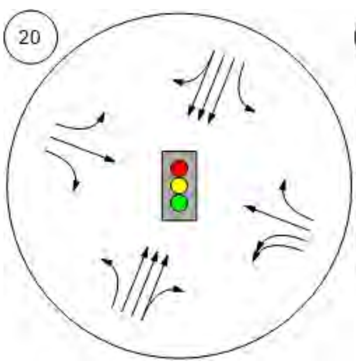
Study Intersections

Generated with PTV VISTRO

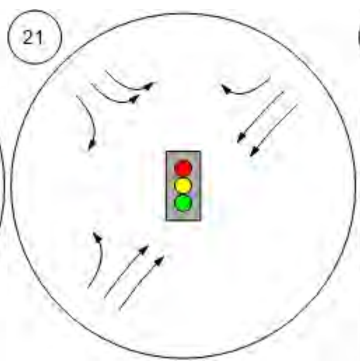
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

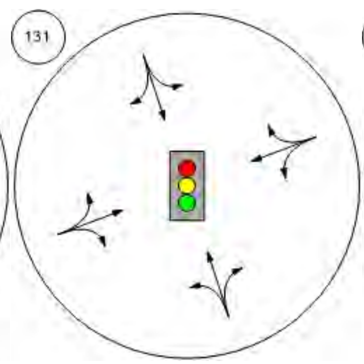

Willow Rd (SR 114)/Newbrid



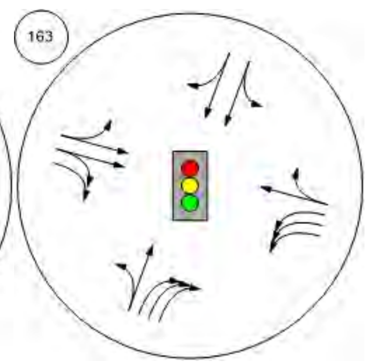

Willow Rd/Bay Rd



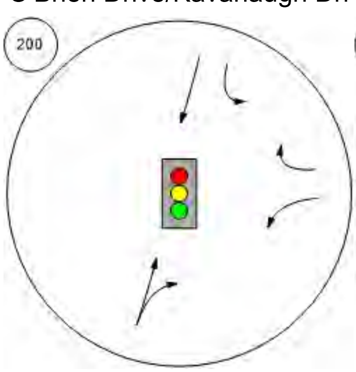

Chilco Street/Hamilton Avenu



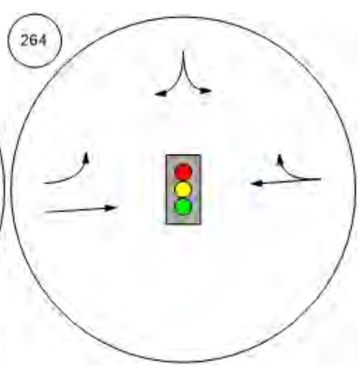

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri

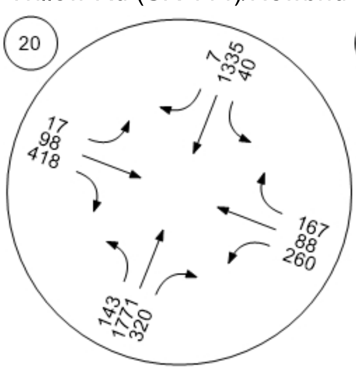



Adams Drive/O'Brien Drive

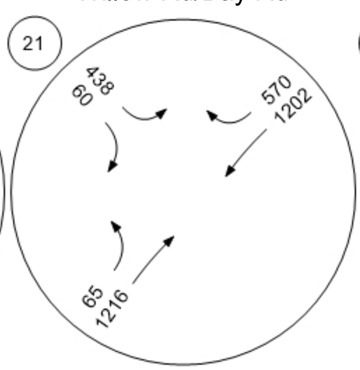


## Traffic Volume - Base Volume

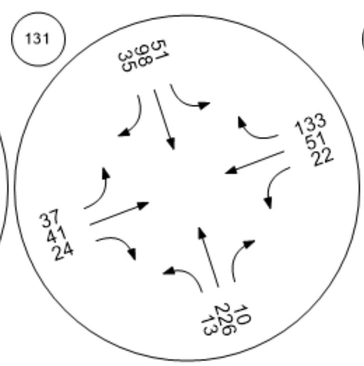

### Willow Rd (SR 114)/Newbrid



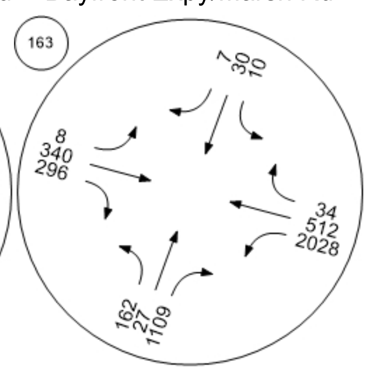

### Willow Rd/Bay Rd



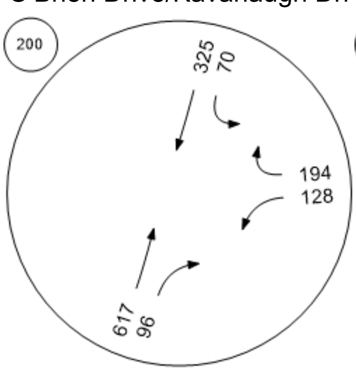

### Chilco Street/Hamilton Avenu



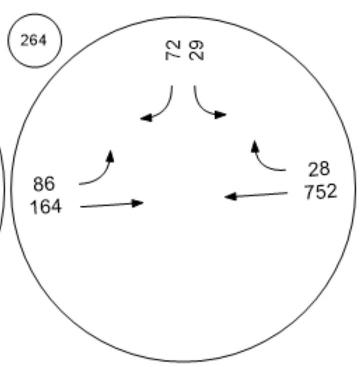

### Bayfront Expy/Marsh Rd




### O'Brien Drive/Kavanaugh Dri




### Adams Drive/O'Brien Drive

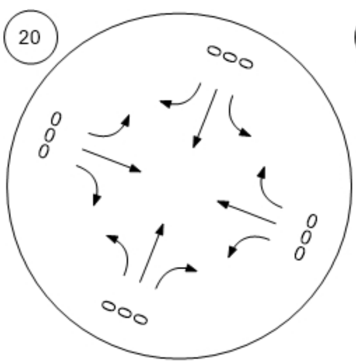


Generated with PTV VISTRO

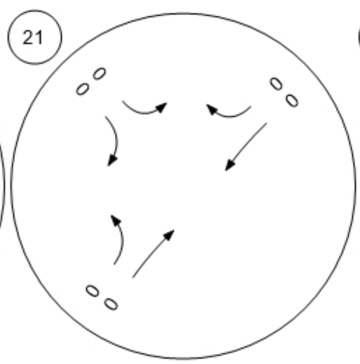
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

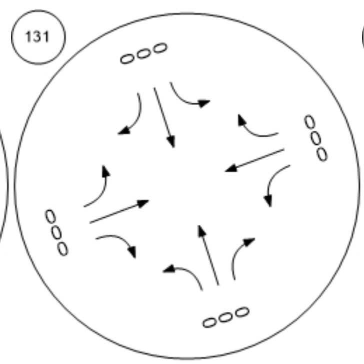

Willow Rd (SR 114)/Newbrid



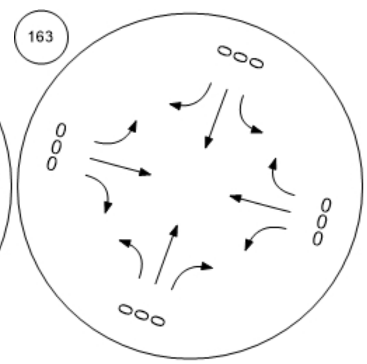

Willow Rd/Bay Rd



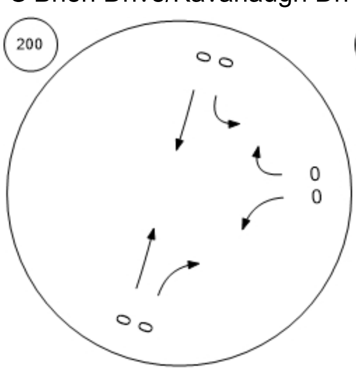

Chilco Street/Hamilton Avenu



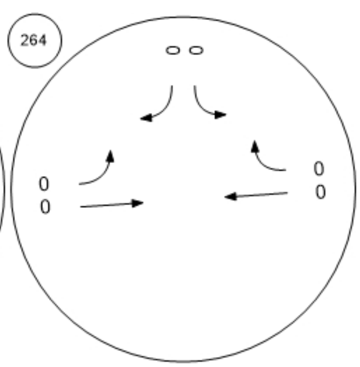

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

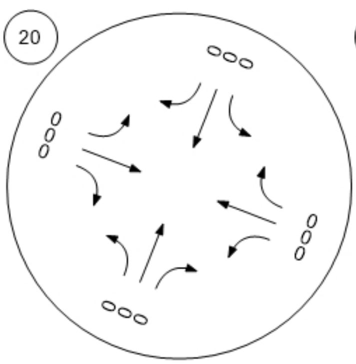


Generated with PTV VISTRO

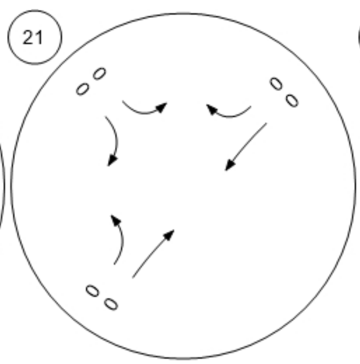
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

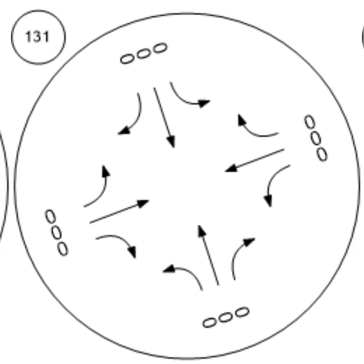

Willow Rd (SR 114)/Newbrid



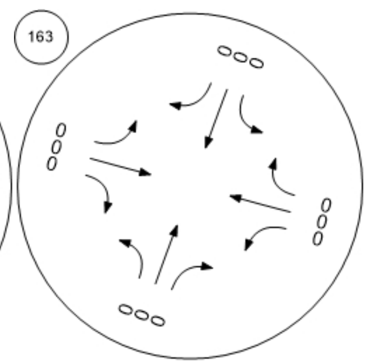

Willow Rd/Bay Rd



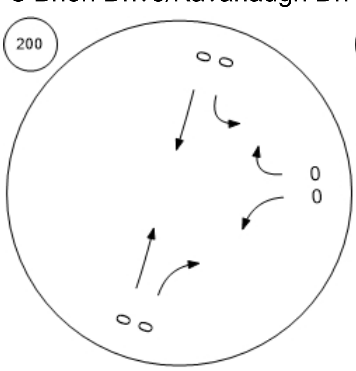

Chilco Street/Hamilton Avenu



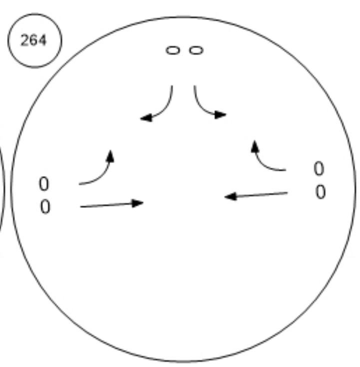

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

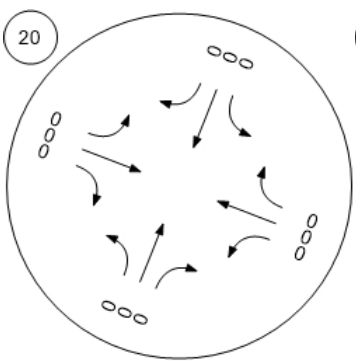


Generated with PTV VISTRO

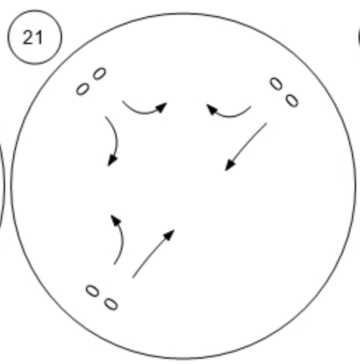
Version 2021 (SP 0-4)

# Traffic Volume - Other Volume

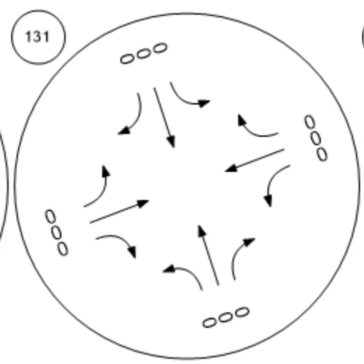

Willow Rd (SR 114)/Newbrid



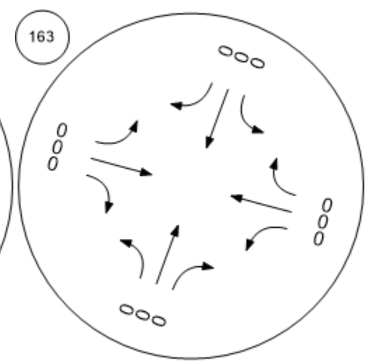

Willow Rd/Bay Rd



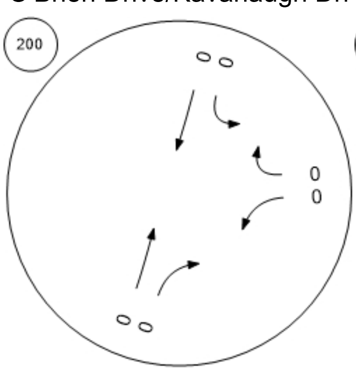

Chilco Street/Hamilton Avenu



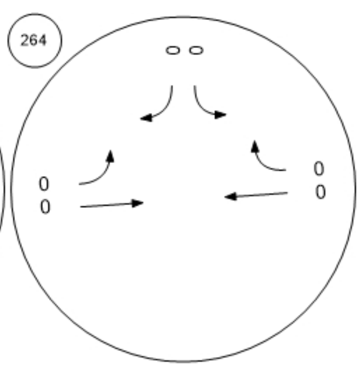

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

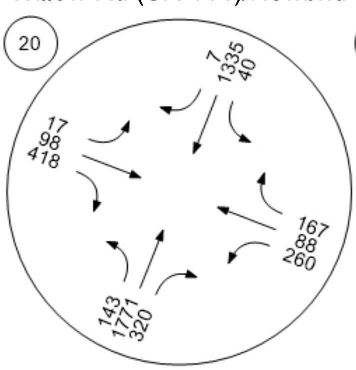


Generated with PTV VISTRO

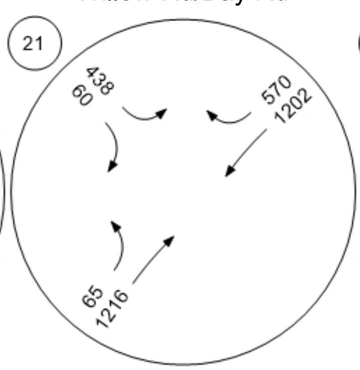
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

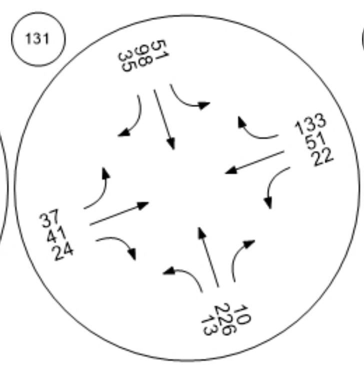

Willow Rd (SR 114)/Newbrid



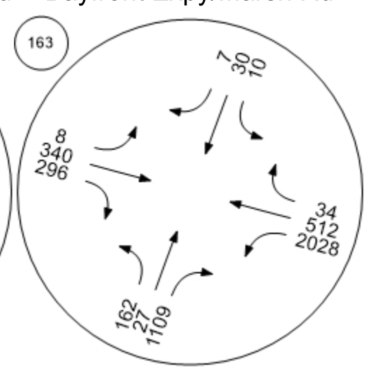

Willow Rd/Bay Rd



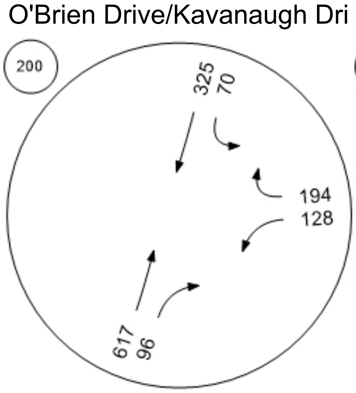

Chilco Street/Hamilton Avenu



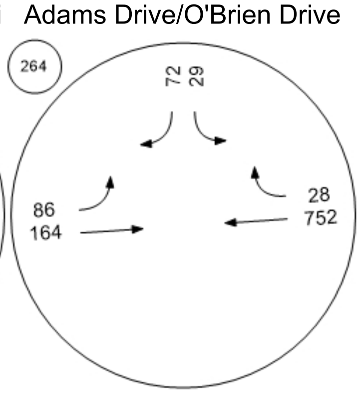

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri



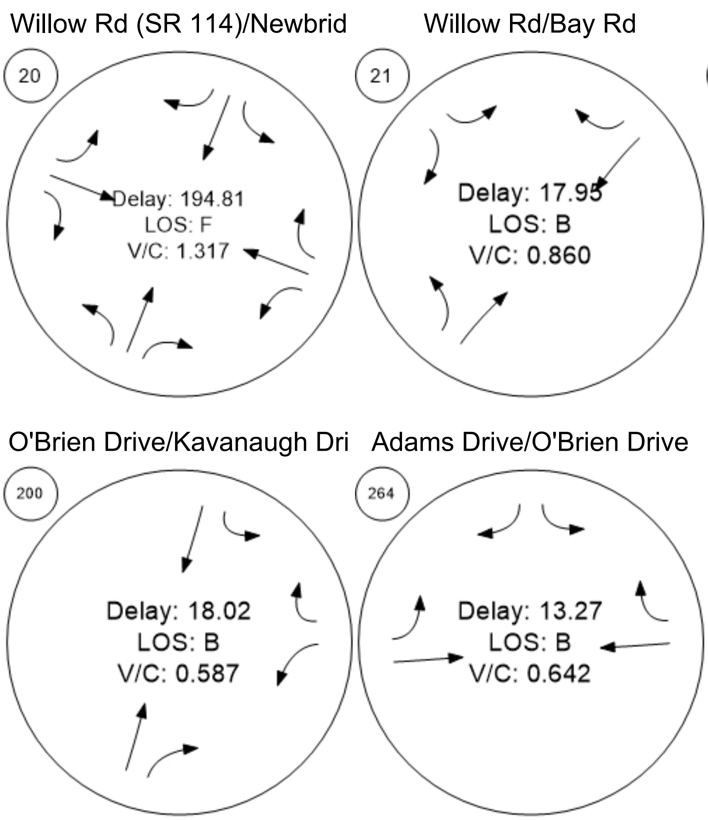

Adams Drive/O'Brien Drive



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions

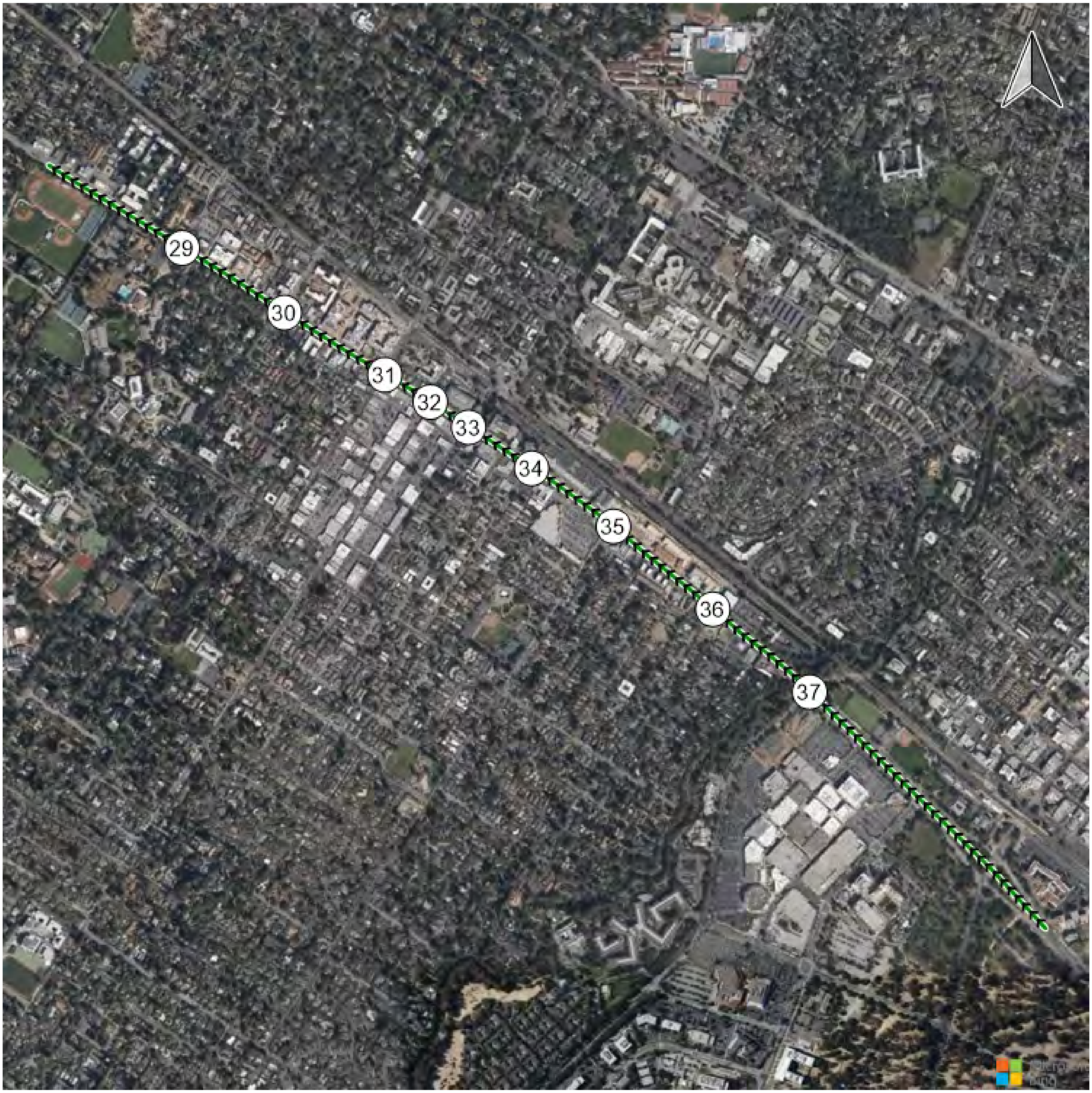



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



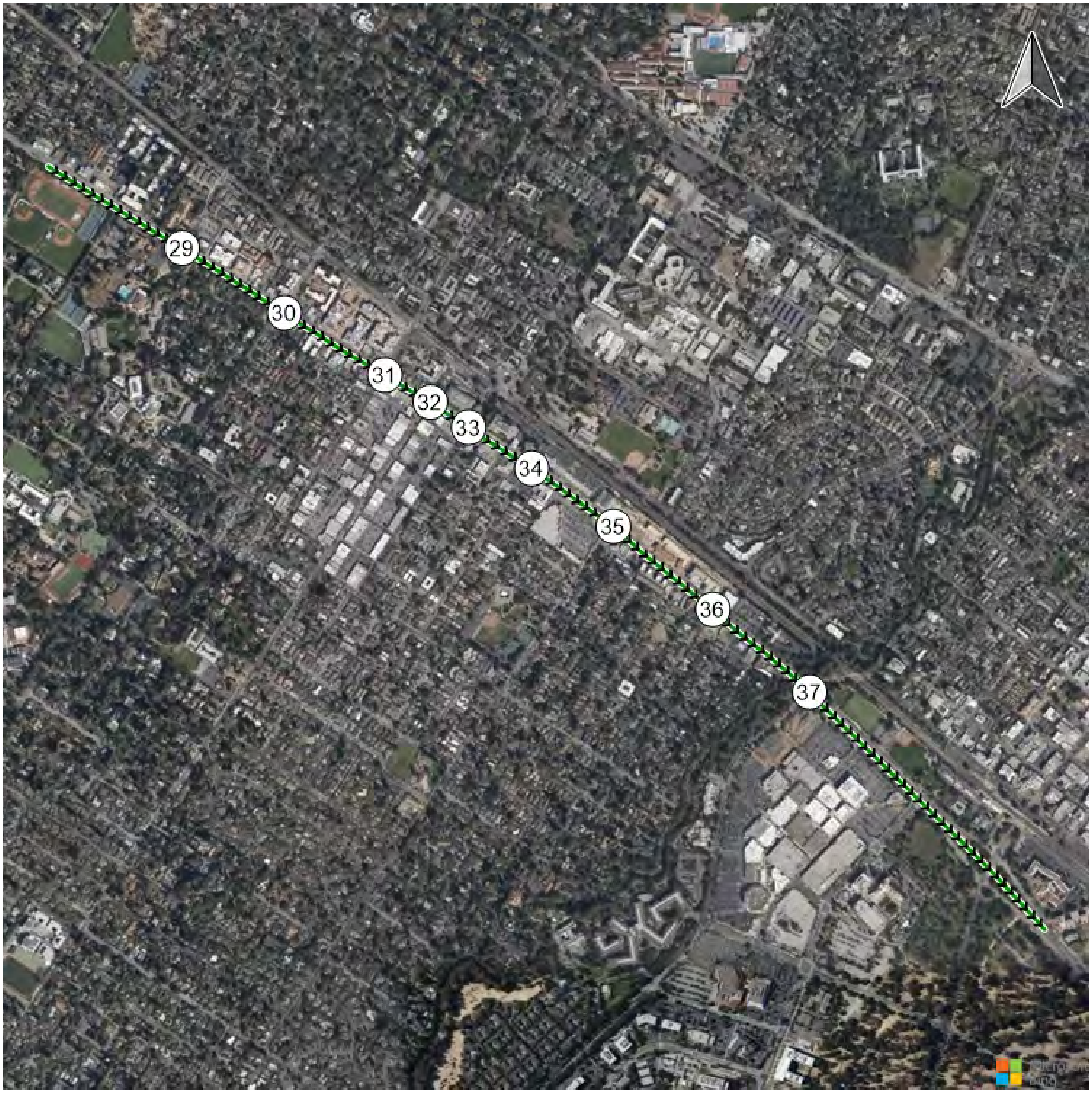
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



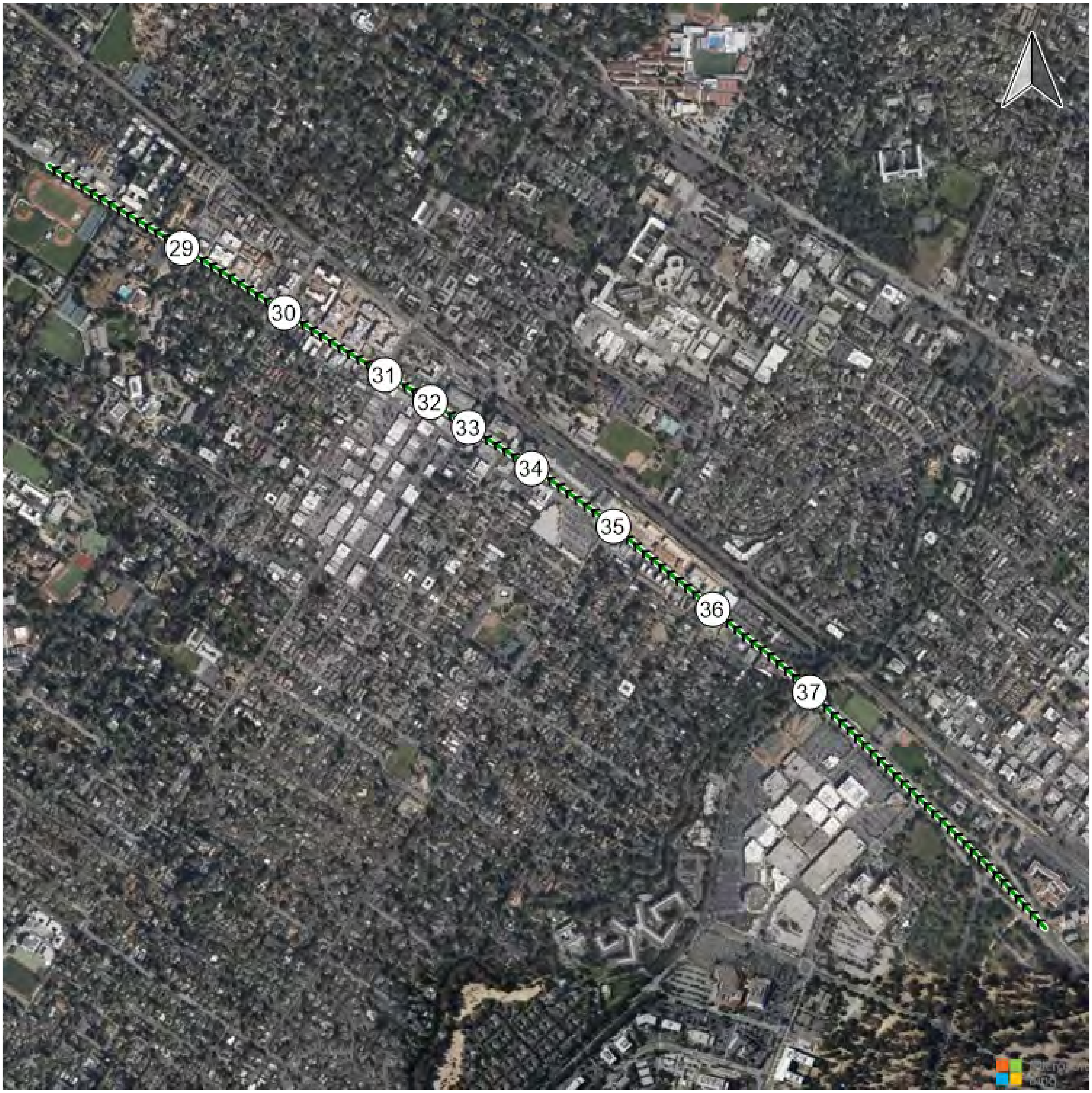
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



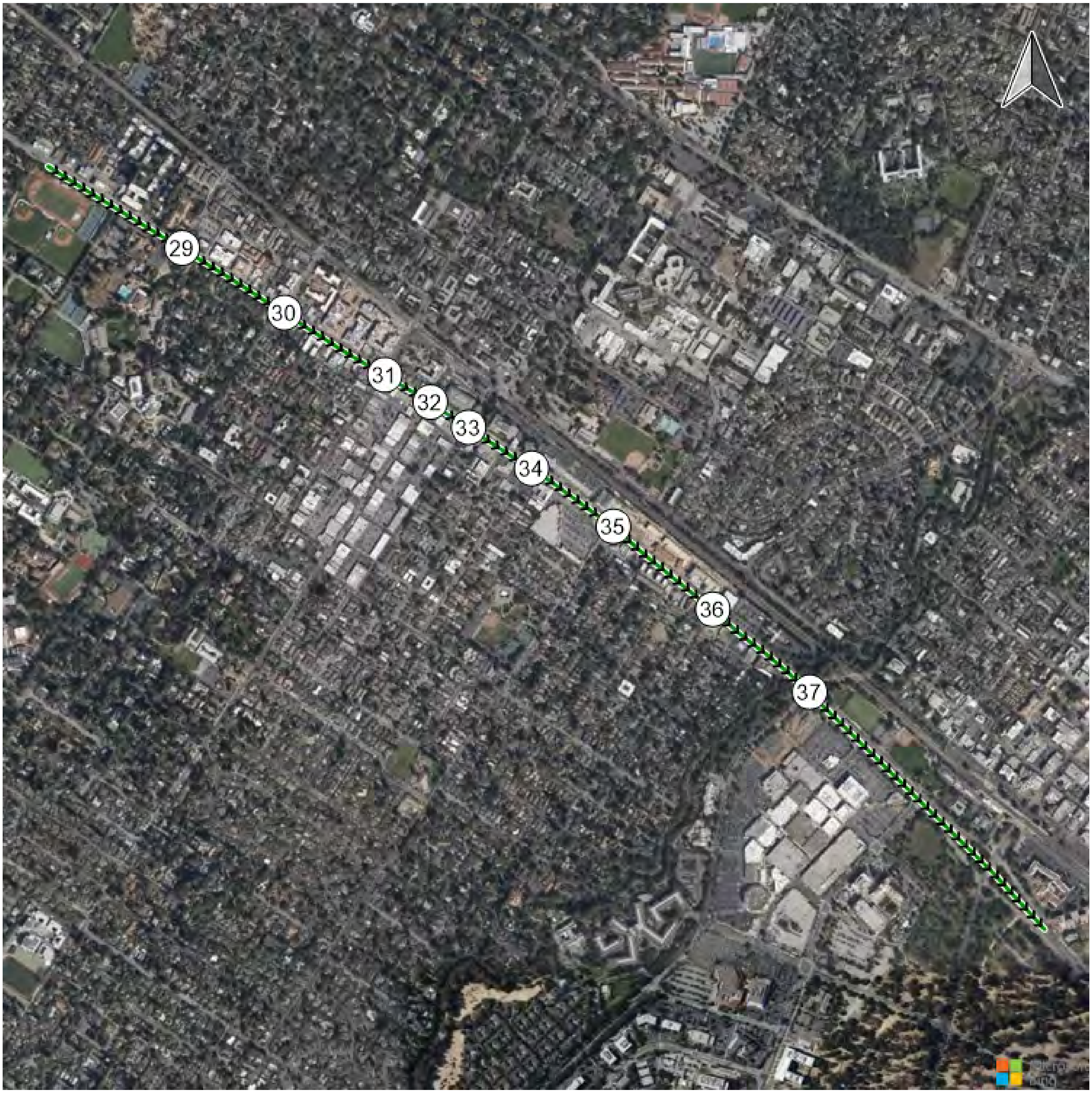
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Near-Term + P PM_Imp.pdf

Scenario 23 Imp-Near-Term PM (2025 vols)+Project

10/14/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | SB Right | 1.139 | 116.4 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.250 | 105.7 | F |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | SB Thru | 0.493 | 18.4 | B |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | SB Right | 0.964 | 38.9 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | WB Right | 0.674 | 24.3 | C |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | SB Left | 0.582 | 20.3 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 116.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.139 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 198 | 261 | 255 | 70 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 396 | 80 | 21 | 350 | 7 | 7 | 50 | 54 | 72 | 70 | 19 |
| Total Analysis Volume [veh/h] | 295 | 1585 | 321 | 86 | 1401 | 29 | 30 | 201 | 218 | 287 | 280 | 77 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 27 | 54 | 54 | 13 | 40 | 40 | 9 | 32 | 32 | 31 | 54 | 54 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 64 | 64 | 10 | 50 | 50 | 3 | 28 | 28 | 13 | 36 | 36 |
| g / C, Green / Cycle | 0.18 | 0.49 | 0.49 | 0.08 | 0.39 | 0.39 | 0.03 | 0.21 | 0.21 | 0.10 | 0.28 | 0.28 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.51 | 0.53 | 0.09 | 0.51 | 0.51 | 0.02 | 0.21 | 0.14 | 0.08 | 0.21 | 0.05 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1193 | 952 | 1853 | 960 | 1750 | 965 | 1537 | 3409 | 1303 | 1520 |
| c, Capacity [veh/h] | 235 | 1227 | 590 | 73 | 717 | 372 | 45 | 207 | 330 | 336 | 364 | 425 |
| d1, Uniform Delay [s] | 53.00 | 32.85 | 32.85 | 60.00 | 39.85 | 39.85 | 62.79 | 50.66 | 46.40 | 57.68 | 42.96 | 35.43 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.11 | 0.41 | 0.15 | 0.04 | 0.12 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 145.04 | 36.98 | 55.79 | 96.71 | 150.36 | 160.23 | 15.80 | 49.69 | 3.05 | 2.42 | 3.92 | 0.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.26 | 1.04 | 1.07 | 1.17 | 1.31 | 1.32 | 0.67 | 0.97 | 0.66 | 0.85 | 0.77 | 0.18 |
| d, Delay for Lane Group [s/veh] | 198.04 | 69.83 | 88.65 | 156.71 | 190.21 | 200.08 | 78.59 | 100.35 | 49.45 | 60.10 | 46.88 | 35.63 |
| Lane Group LOS | F | F | F | F | F | F | E | F | D | E | D | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 16.98 | 24.42 | 26.57 | 4.41 | 26.37 | 28.35 | 1.18 | 9.32 | 6.70 | 4.76 | 8.64 | 1.89 |
| 50th-Percentile Queue Length [ft/ln] | 424.59 | 610.50 | 664.19 | 110.18 | 659.37 | 708.81 | 29.58 | 233.08 | 167.55 | 119.06 | 215.98 | 47.34 |
| 95th-Percentile Queue Length [veh/ln] | 26.37 | 33.55 | 36.77 | 7.93 | 40.85 | 43.65 | 2.13 | 14.33 | 10.95 | 8.34 | 13.46 | 3.41 |
| 95th-Percentile Queue Length [ft/ln] | 659.36 | 838.77 | 919.32 | 198.33 | 1021.15 | 1091.18 | 53.24 | 358.26 | 273.69 | 208.53 | 336.49 | 85.21 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

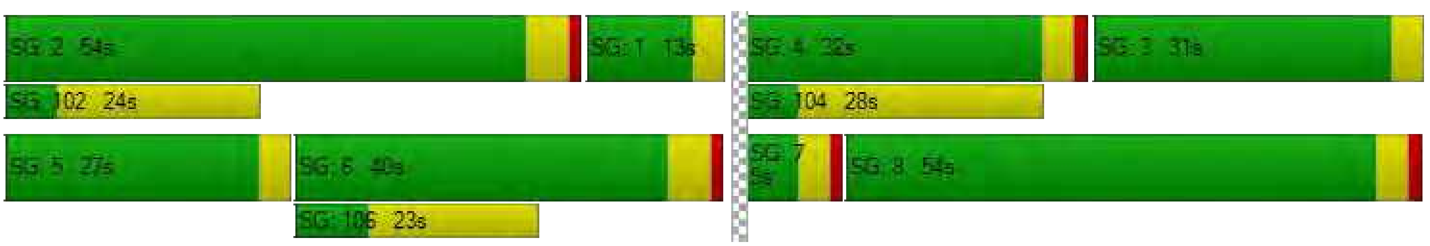
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 198.04 | 73.48 | 88.65 | 156.71 | 193.45 | 200.08 | 78.59 | 100.35 | 49.45 | 60.10 | 46.88 | 35.63 |
| Movement LOS | F | E | F | F | F | F | E | F | D | E | D | D |
| d_A, Approach Delay [s/veh] | 92.39 | | | 191.49 | | | 74.18 | | | 51.43 | | |
| Approach LOS | F | | | F | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 116.44 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.139 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 50.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 24.62 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.408 | 2.957 | 2.697 | 2.747 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 754 | 538 | 431 | 769 |
| d_b, Bicycle Delay [s] | 25.24 | 34.80 | 40.10 | 24.69 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 2.393 | 2.589 | 2.696 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 105.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.250 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 1349 | 716 | 190 | 301 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 20 | 1349 | 716 | 0 | 301 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 348 | 185 | 0 | 78 | 0 |
| Total Analysis Volume [veh/h] | 21 | 1391 | 738 | 0 | 310 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

### Phasing & Timing

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 59 | 59 | 59 | 59 | 59 | 59 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 1 | 36 | 31 | 31 | 13 | 13 |
| g / C, Green / Cycle | 0.02 | 0.61 | 0.53 | 0.53 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.83 | 0.44 | 0.00 | 0.19 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1615 | 1651 | 756 |
| c, Capacity [veh/h] | 37 | 1028 | 896 | 860 | 368 | 169 |
| d1, Uniform Delay [s] | 28.60 | 11.42 | 11.47 | 0.00 | 21.90 | 0.00 |
| k, delay calibration | 0.04 | 0.24 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.86 | 162.13 | 2.78 | 0.00 | 2.02 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.56 | 1.35 | 0.82 | 0.00 | 0.84 | 0.00 |
| d, Delay for Lane Group [s/veh] | 33.46 | 173.55 | 14.26 | 0.00 | 23.92 | 0.00 |
| Lane Group LOS | C | F | B | A | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.33 | 27.70 | 3.31 | 0.00 | 1.98 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 8.23 | 692.44 | 82.75 | 0.00 | 49.45 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 0.59 | 44.40 | 5.96 | 0.00 | 3.56 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 14.81 | 1109.96 | 148.96 | 0.00 | 89.01 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.46 | 173.55 | 14.26 | 0.00 | 23.92 | 0.00 |
| Movement LOS | C | F | B | A | C | A |
| d_A, Approach Delay [s/veh] | 171.47 | | 14.26 | | 23.92 | |
| Approach LOS | F | | B | | C | |
| d_I, Intersection Delay [s/veh] | 105.71 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.250 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 19.43 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.321 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1225 | 1225 | 1225 |
| d_b, Bicycle Delay [s] | 4.44 | 4.43 | 4.43 |
| I_b,int, Bicycle LOS Score for Intersection | 2.725 | 2.352 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.493 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 61 | 5 | 20 | 135 | 10 | 8 | 35 | 7 | 2 | 4 | 17 |
| Total Analysis Volume [veh/h] | 26 | 243 | 19 | 80 | 541 | 39 | 33 | 140 | 26 | 8 | 17 | 66 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 2 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 1 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 51 | 0 | 0 | 51 | 0 | 0 | 39 | 0 | 0 | 39 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 35 | 35 |
| g / C, Green / Cycle | 0.52 | 0.52 | 0.39 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.38 | 0.11 | 0.06 |
| s, saturation flow rate [veh/h] | 1733 | 1742 | 1741 | 1617 |
| c, Capacity [veh/h] | 948 | 955 | 724 | 672 |
| d1, Uniform Delay [s] | 12.17 | 16.21 | 18.86 | 17.79 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.83 | 4.10 | 0.94 | 0.42 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.30 | 0.69 | 0.27 | 0.14 |
| d, Delay for Lane Group [s/veh] | 12.99 | 20.31 | 19.80 | 18.20 |
| Lane Group LOS | B | C | B | B |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.31 | 10.57 | 3.01 | 1.27 |
| 50th-Percentile Queue Length [ft/ln] | 82.71 | 264.22 | 75.18 | 31.79 |
| 95th-Percentile Queue Length [veh/ln] | 5.96 | 15.90 | 5.41 | 2.29 |
| 95th-Percentile Queue Length [ft/ln] | 148.89 | 397.51 | 135.33 | 57.23 |

**Movement, Approach, & Intersection Results**

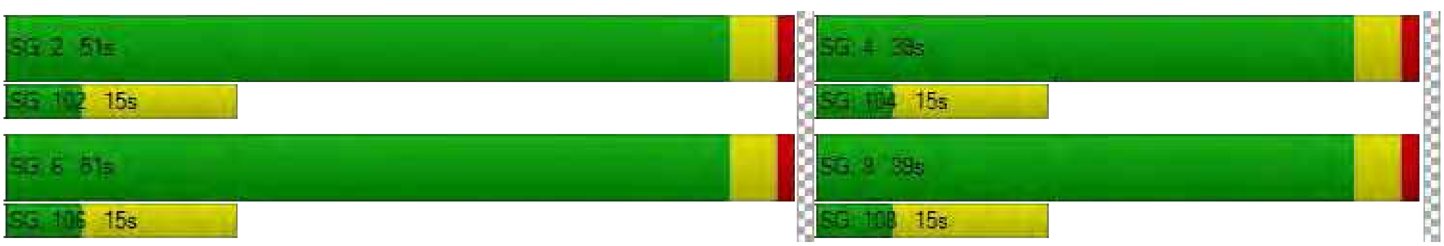
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 12.99 | 12.99 | 12.99 | 20.31 | 20.31 | 20.31 | 19.80 | 19.80 | 19.80 | 18.20 | 18.20 | 18.20 |
| Movement LOS | B | B | B | C | C | C | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 12.99 | | | 20.31 | | | 19.80 | | | 18.20 | | |
| Approach LOS | B | | | C | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 18.37 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.493 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.148 | 2.252 | 1.868 | 1.991 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1044 | 1044 | 778 | 778 |
| d_b, Bicycle Delay [s] | 10.27 | 10.27 | 16.81 | 16.81 |
| I_b,int, Bicycle LOS Score for Intersection | 2.035 | 2.649 | 1.888 | 1.710 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 38.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.964 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 47 | 10 | 459 | 3 | 8 | 1 | 2 | 159 | 54 | 579 | 124 | 4 |
| Total Analysis Volume [veh/h] | 186 | 42 | 1834 | 13 | 32 | 5 | 9 | 634 | 217 | 2318 | 497 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 32 | 121 | 10 | 10 | 33 | 33 | 33 | 76 | 76 |
| g / C, Green / Cycle | 0.20 | 0.76 | 0.06 | 0.06 | 0.21 | 0.21 | 0.21 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.44 | 0.02 | 0.01 | 0.17 | 0.19 | 0.14 | 0.45 | 0.31 |
| s, saturation flow rate [veh/h] | 1826 | 4190 | 1707 | 1588 | 1891 | 1724 | 1554 | 5150 | 1674 |
| c, Capacity [veh/h] | 360 | 3082 | 137 | 97 | 390 | 355 | 320 | 2449 | 796 |
| d1, Uniform Delay [s] | 58.88 | 9.94 | 71.59 | 71.56 | 60.40 | 62.38 | 58.40 | 40.02 | 31.71 |
| k, delay calibration | 0.22 | 0.50 | 0.04 | 0.04 | 0.04 | 0.08 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.66 | 0.85 | 0.27 | 0.45 | 1.47 | 8.09 | 0.94 | 9.36 | 3.98 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.59 | 0.20 | 0.23 | 0.80 | 0.93 | 0.68 | 0.95 | 0.64 |
| d, Delay for Lane Group [s/veh] | 62.54 | 10.79 | 71.86 | 72.01 | 61.87 | 70.47 | 59.34 | 49.38 | 35.69 |
| Lane Group LOS | E | B | E | E | E | E | E | D | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.91 | 9.88 | 1.10 | 0.89 | 12.29 | 14.05 | 8.23 | 30.79 | 15.93 |
| 50th-Percentile Queue Length [ft/ln] | 222.87 | 246.99 | 27.52 | 22.30 | 307.18 | 351.16 | 205.69 | 769.76 | 398.26 |
| 95th-Percentile Queue Length [veh/ln] | 13.81 | 15.03 | 1.98 | 1.61 | 18.04 | 20.19 | 12.93 | 39.89 | 22.48 |
| 95th-Percentile Queue Length [ft/ln] | 345.29 | 375.86 | 49.54 | 40.15 | 450.90 | 504.82 | 323.29 | 997.27 | 561.90 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.54 | 62.54 | 10.79 | 71.86 | 71.94 | 72.01 | 61.87 | 66.35 | 59.34 | 49.38 | 35.69 | 35.69 |
| Movement LOS | E | E | B | E | E | E | E | E | E | D | D | D |
| d_A, Approach Delay [s/veh] | 16.51 | | | 71.93 | | | 64.54 | | | 46.90 | | |
| Approach LOS | B | | | E | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 38.93 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.964 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.537 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 4.962 | 1.601 | 2.269 | 6.229 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.674 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 389 | 236 | 134 | 185 | 45 | 345 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 389 | 236 | 134 | 185 | 45 | 345 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 112 | 68 | 39 | 53 | 13 | 99 |
| Total Analysis Volume [veh/h] | 447 | 271 | 154 | 213 | 52 | 397 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 57 | 0 | 0 | 57 | 33 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 53 | 53 | 53 | 29 | 29 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.59 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.42 | 0.21 | 0.12 | 0.03 | 0.26 |
| s, saturation flow rate [veh/h] | 1714 | 717 | 1828 | 1741 | 1554 |
| c, Capacity [veh/h] | 1009 | 274 | 1076 | 561 | 501 |
| d1, Uniform Delay [s] | 13.09 | 30.52 | 8.61 | 21.31 | 27.77 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.26 | 8.12 | 0.41 | 0.33 | 12.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.56 | 0.20 | 0.09 | 0.79 |
| d, Delay for Lane Group [s/veh] | 17.35 | 38.64 | 9.02 | 21.64 | 39.95 |
| Lane Group LOS | B | D | A | C | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.33 | 3.63 | 1.91 | 0.80 | 9.19 |
| 50th-Percentile Queue Length [ft/ln] | 258.24 | 90.74 | 47.64 | 20.12 | 229.78 |
| 95th-Percentile Queue Length [veh/ln] | 15.60 | 6.53 | 3.43 | 1.45 | 14.16 |
| 95th-Percentile Queue Length [ft/ln] | 390.02 | 163.33 | 85.76 | 36.21 | 354.08 |

**Movement, Approach, & Intersection Results**

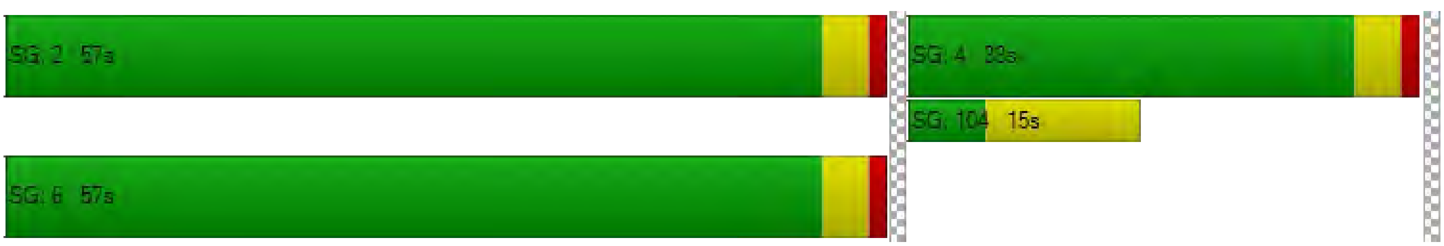
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.35 | 17.35 | 38.64 | 9.02 | 21.64 | 39.95 |
| Movement LOS | B | B | D | A | C | D |
| d_A, Approach Delay [s/veh] | 17.35 | | 21.45 | | 37.82 | |
| Approach LOS | B | | C | | D | |
| d_I, Intersection Delay [s/veh] | 24.32 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.674 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 36.45 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.335 | 0.000 |
| Crosswalk LOS | F | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1178 | 1178 | 644 |
| d_b, Bicycle Delay [s] | 7.61 | 7.61 | 20.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.744 | 2.165 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.582 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 73 | 63 | 226 | 726 | 153 | 15 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 73 | 63 | 226 | 726 | 153 | 15 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 19 | 68 | 219 | 46 | 5 |
| Total Analysis Volume [veh/h] | 88 | 76 | 272 | 875 | 184 | 18 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 34 | 0 | 0 | 56 | 56 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 52 | 52 | 52 |
| g / C, Green / Cycle | 0.33 | 0.58 | 0.58 | 0.58 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.24 | 0.48 | 0.11 |
| s, saturation flow rate [veh/h] | 1638 | 1146 | 1816 | 1788 |
| c, Capacity [veh/h] | 546 | 655 | 1049 | 1033 |
| d1, Uniform Delay [s] | 22.23 | 14.65 | 15.48 | 9.04 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.41 | 1.94 | 7.80 | 0.42 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.30 | 0.42 | 0.83 | 0.20 |
| d, Delay for Lane Group [s/veh] | 23.63 | 16.58 | 23.28 | 9.47 |
| Lane Group LOS | C | B | C | A |
| Critical Lane Group | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 3.77 | 15.23 | 1.87 |
| 50th-Percentile Queue Length [ft/ln] | 68.14 | 94.16 | 380.71 | 46.71 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 6.78 | 21.63 | 3.36 |
| 95th-Percentile Queue Length [ft/ln] | 122.65 | 169.48 | 540.70 | 84.08 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.63 | 23.63 | 16.58 | 23.28 | 9.47 | 9.47 |
| Movement LOS | C | C | B | C | A | A |
| d_A, Approach Delay [s/veh] | 23.63 | | 21.70 | | 9.47 | |
| Approach LOS | C | | C | | A | |
| d_I, Intersection Delay [s/veh] | 20.27 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.582 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.325 | 2.399 | 2.284 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 667 | 1156 | 1156 |
| d_b, Bicycle Delay [s] | 20.00 | 8.02 | 8.02 |
| I_b,int, Bicycle LOS Score for Intersection | 1.830 | 3.452 | 1.893 |
| Bicycle LOS | A | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Near-Term + P PM_Imp.pdf

Scenario 23 Imp-Near-Term PM (2025 vols)+Project

10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 | 4595 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 20 | 1349 | 716 | 190 | 301 | 40 | 2616 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 | 1137 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 | 5570 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 389 | 236 | 134 | 185 | 45 | 345 | 1334 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 73 | 63 | 226 | 726 | 153 | 15 | 1256 |

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro

Report File: \...\Near-Term + P PM_Imp.pdf

Scenario 23 Imp-Near-Term PM (2025 vols)+Project

10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1442 | 292 | 78 | 1275 | 26 | 27 | 183 | 373 | 261 | 255 | 115 | 4595 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1442** | **292** | **78** | **1275** | **26** | **27** | **183** | **373** | **261** | **255** | **115** | **4595** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 20 | 1349 | 716 | 190 | 301 | 40 | 2616 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **1349** | **716** | **190** | **301** | **40** | **2616** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 24 | 225 | 18 | 74 | 500 | 36 | 29 | 124 | 23 | 7 | 16 | 61 | 1137 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **225** | **18** | **74** | **500** | **36** | **29** | **124** | **23** | **7** | **16** | **61** | **1137** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 179 | 40 | 1761 | 12 | 31 | 5 | 9 | 609 | 208 | 2225 | 477 | 14 | 5570 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **40** | **1761** | **12** | **31** | **5** | **9** | **609** | **208** | **2225** | **477** | **14** | **5570** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 389 | 236 | 134 | 185 | 45 | 345 | 1334 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **389** | **236** | **134** | **185** | **45** | **345** | **1334** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 73 | 63 | 226 | 726 | 153 | 15 | 1256 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **73** | **63** | **226** | **726** | **153** | **15** | **1256** |

Generated with PTV VISTRO

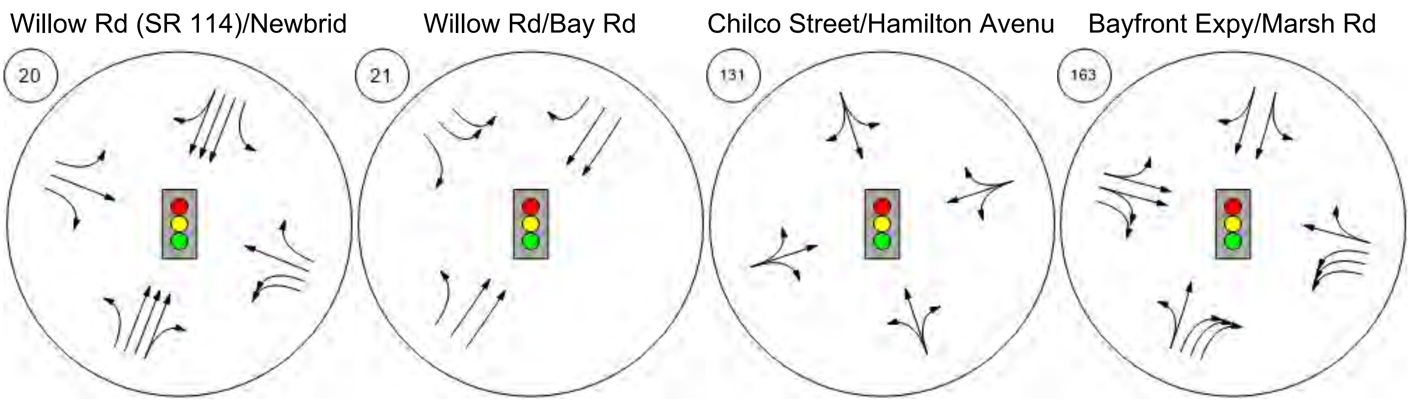
Version 2021 (SP 0-4)

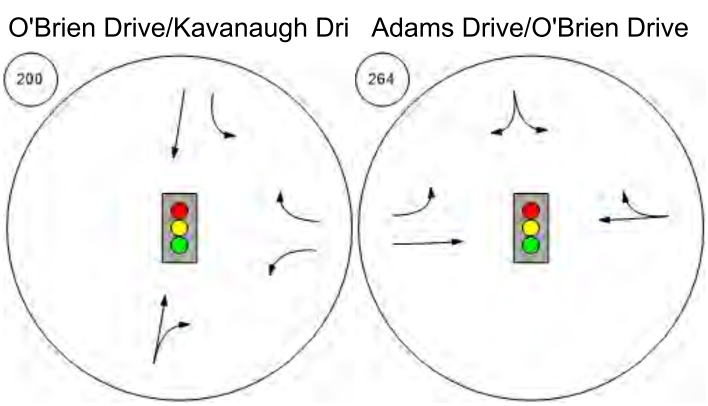
## Study Intersections

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

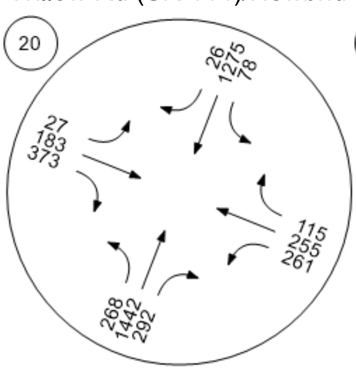



Generated with PTV VISTRO

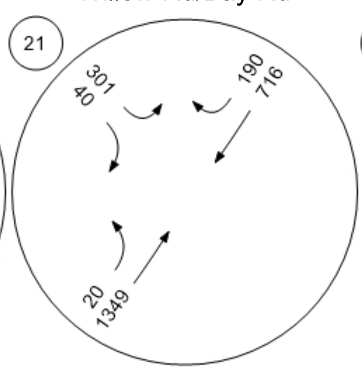
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

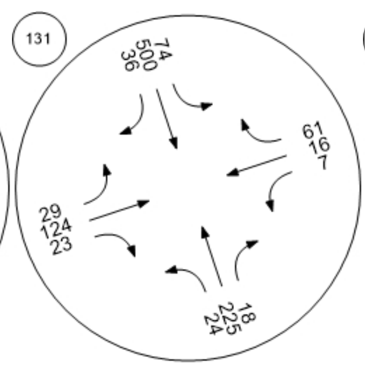

Willow Rd (SR 114)/Newbrid



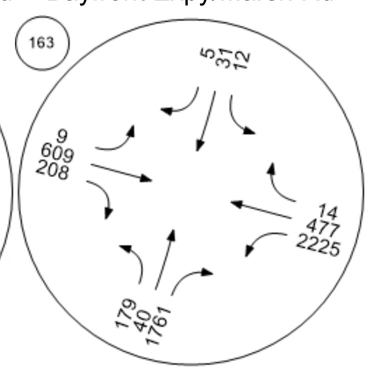

Willow Rd/Bay Rd



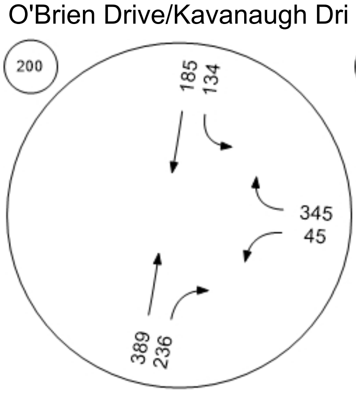

Chilco Street/Hamilton Avenu



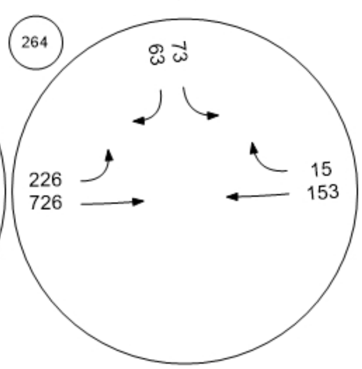

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

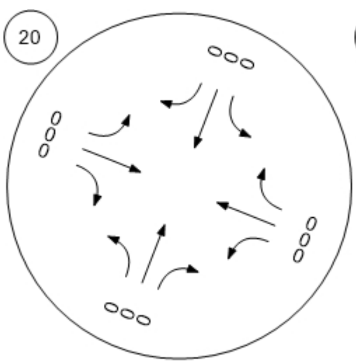


Generated with PTV VISTRO

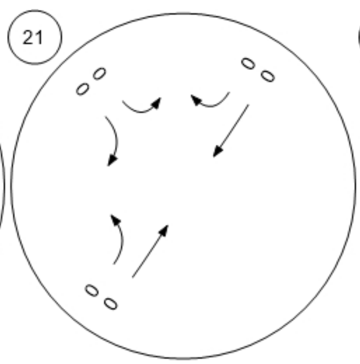
Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

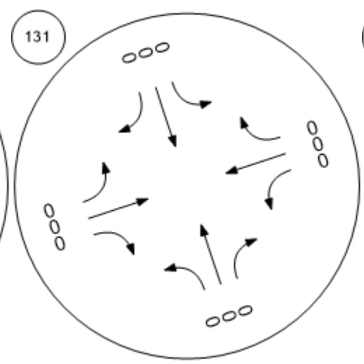

Willow Rd (SR 114)/Newbrid



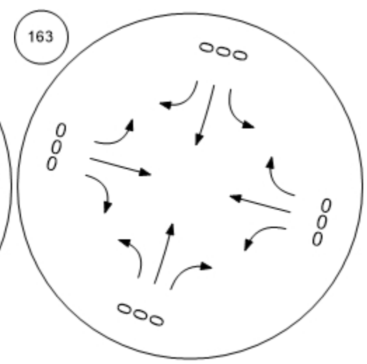

Willow Rd/Bay Rd



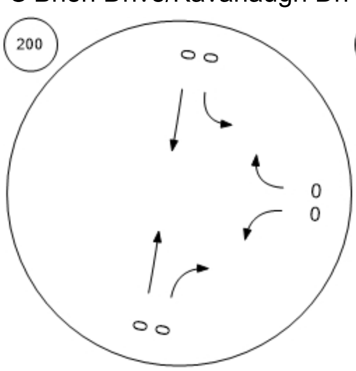

Chilco Street/Hamilton Avenu



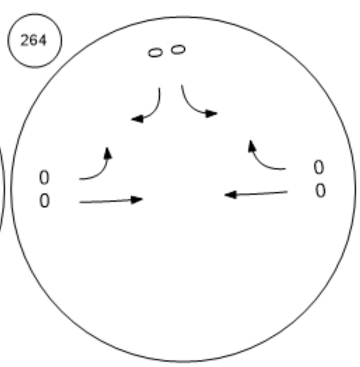

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

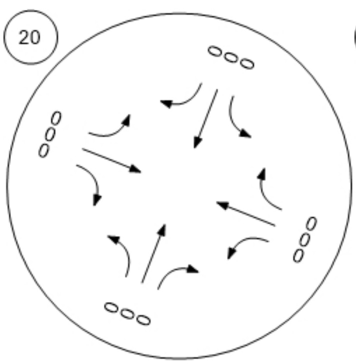


Generated with PTV VISTRO

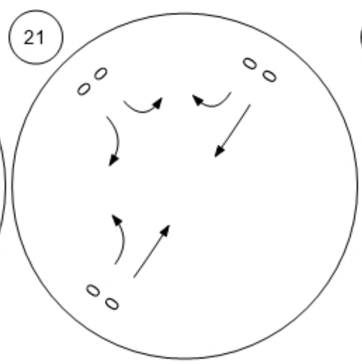
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

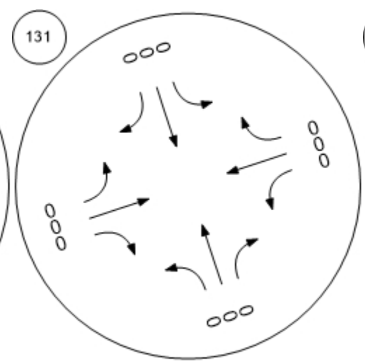

Willow Rd (SR 114)/Newbrid



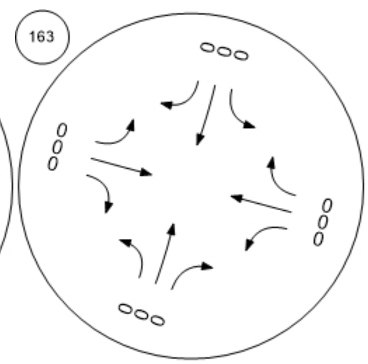

Willow Rd/Bay Rd



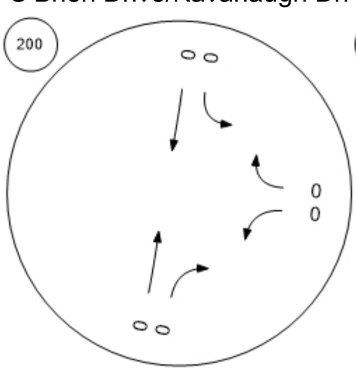

Chilco Street/Hamilton Avenu



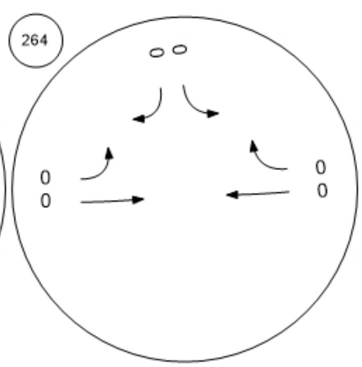

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

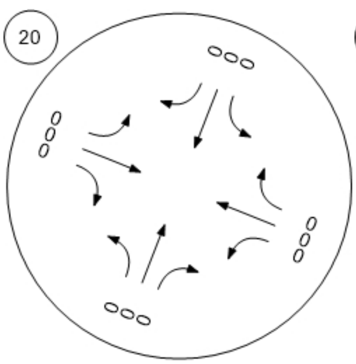


Generated with PTV VISTRO

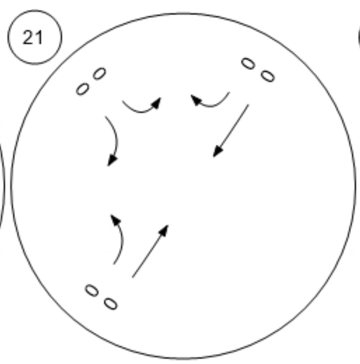
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

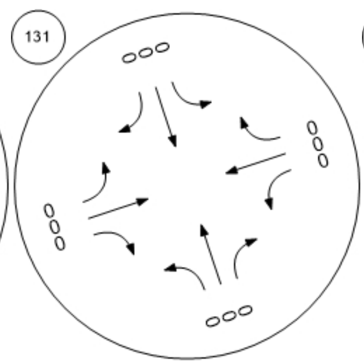

Willow Rd (SR 114)/Newbrid



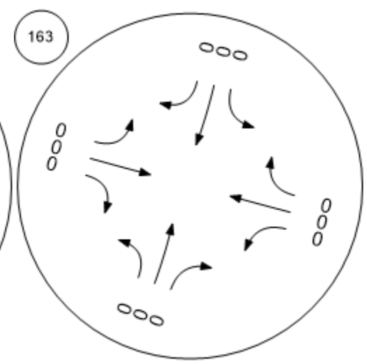

Willow Rd/Bay Rd



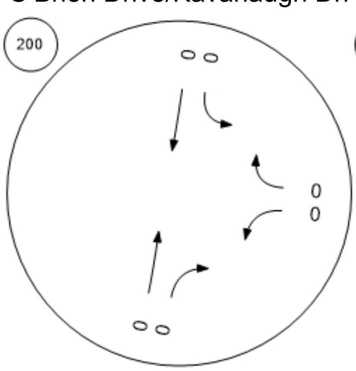

Chilco Street/Hamilton Avenu



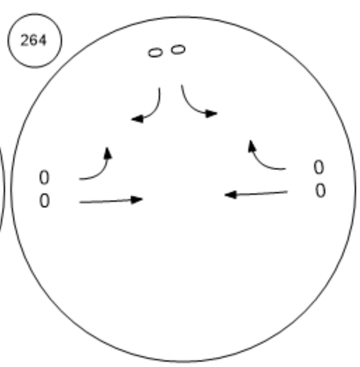

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri



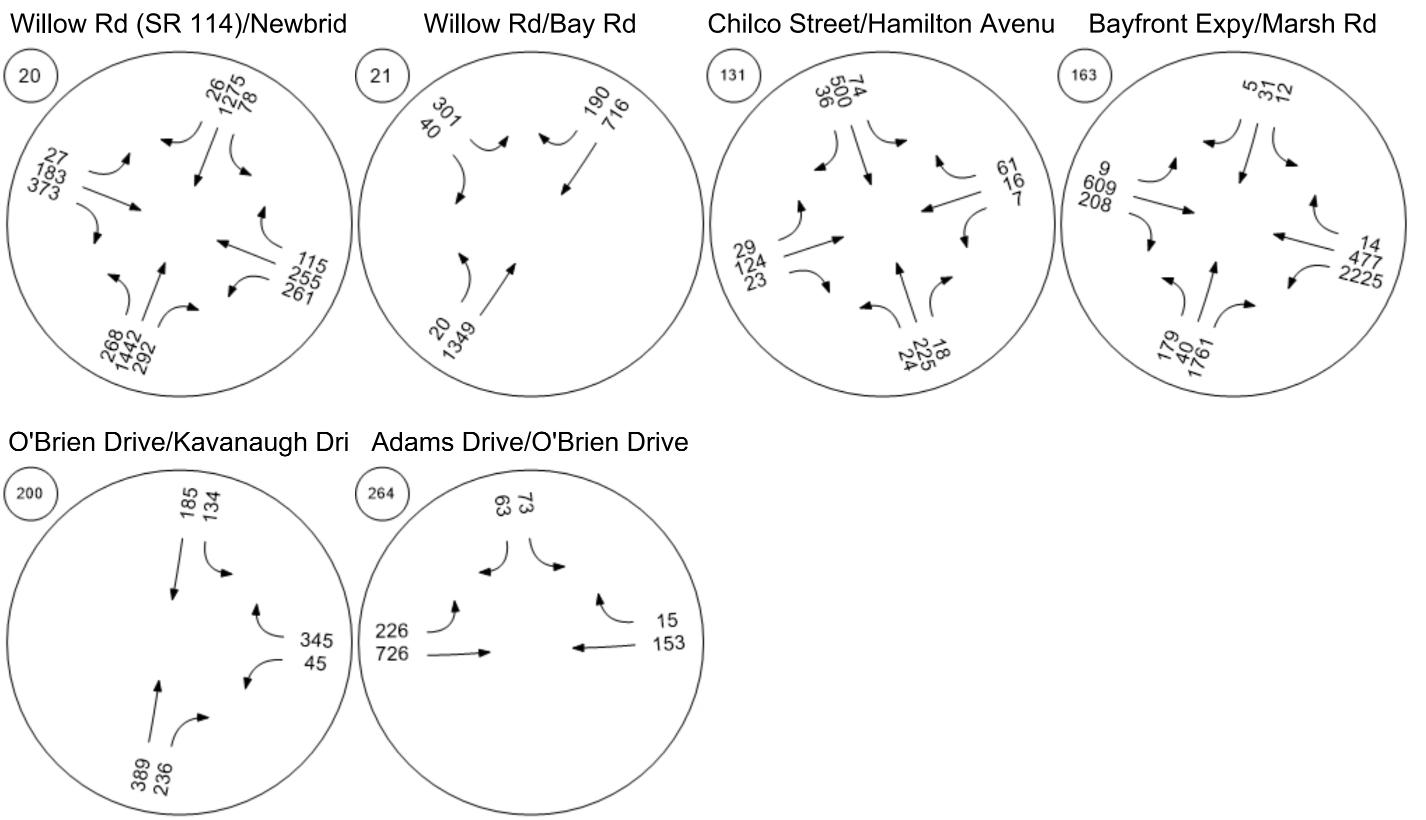

Adams Drive/O'Brien Drive



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

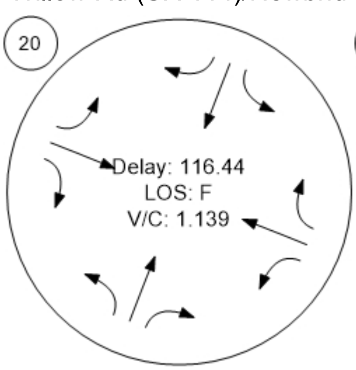



Generated with PTV VISTRO

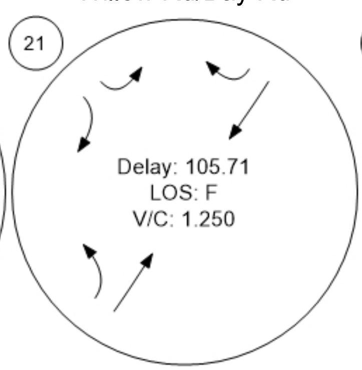
Version 2021 (SP 0-4)

Traffic Conditions

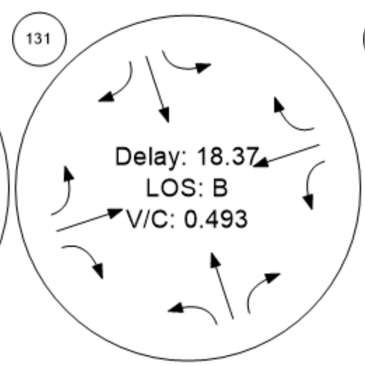

Willow Rd (SR 114)/Newbrid



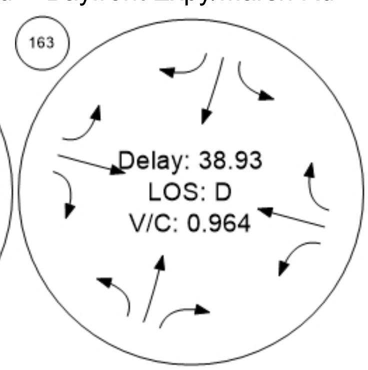

Willow Rd/Bay Rd



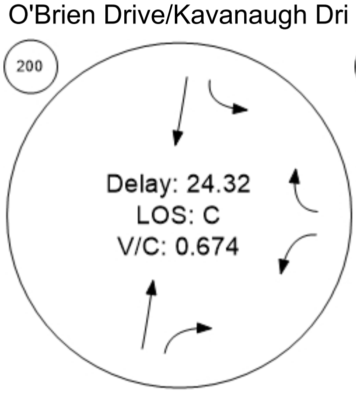

Chilco Street/Hamilton Avenu



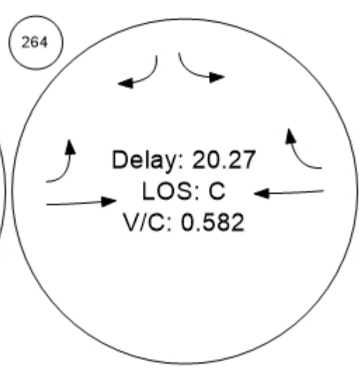

Bayfront Expy/Marsh Rd




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

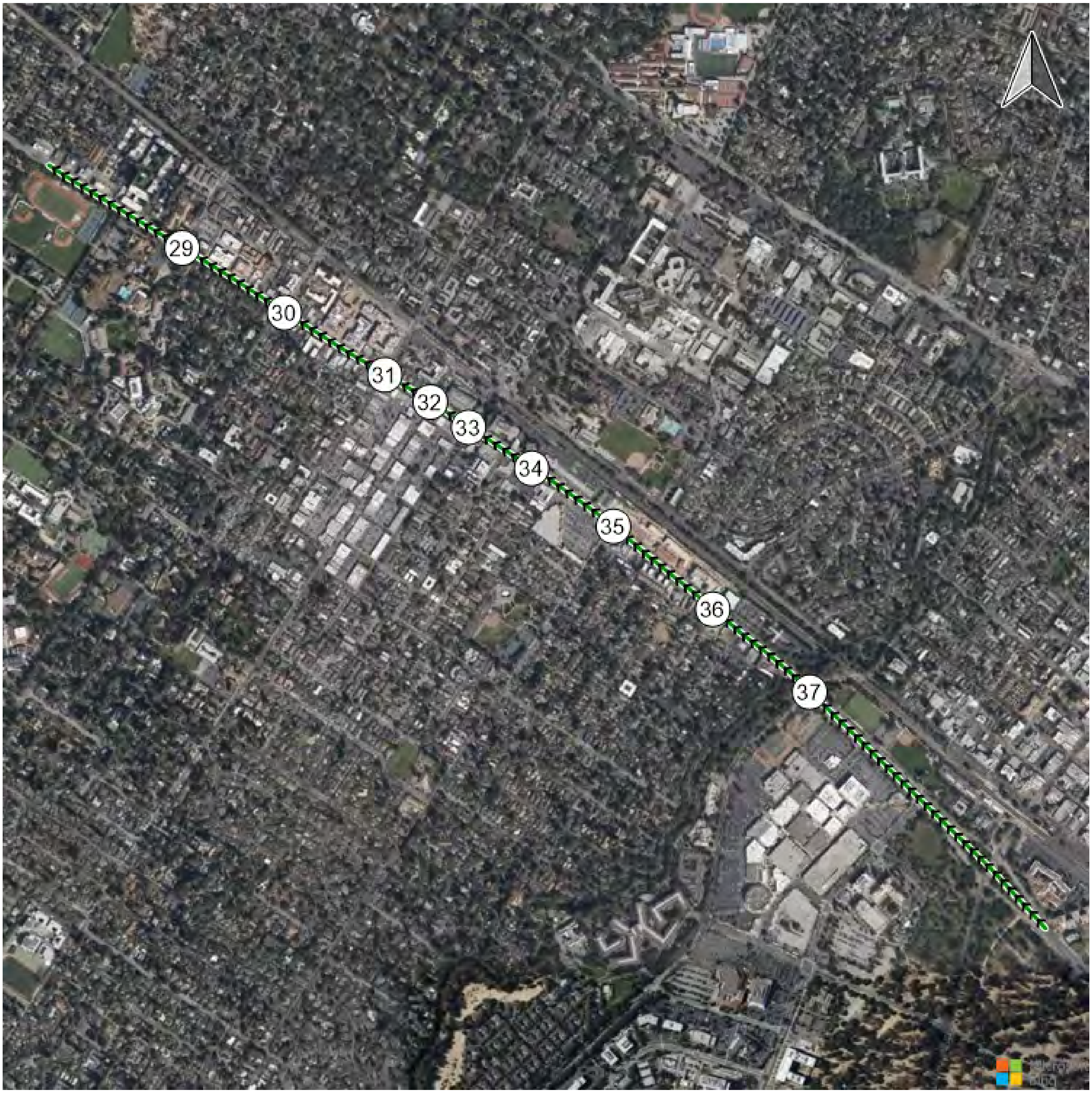


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

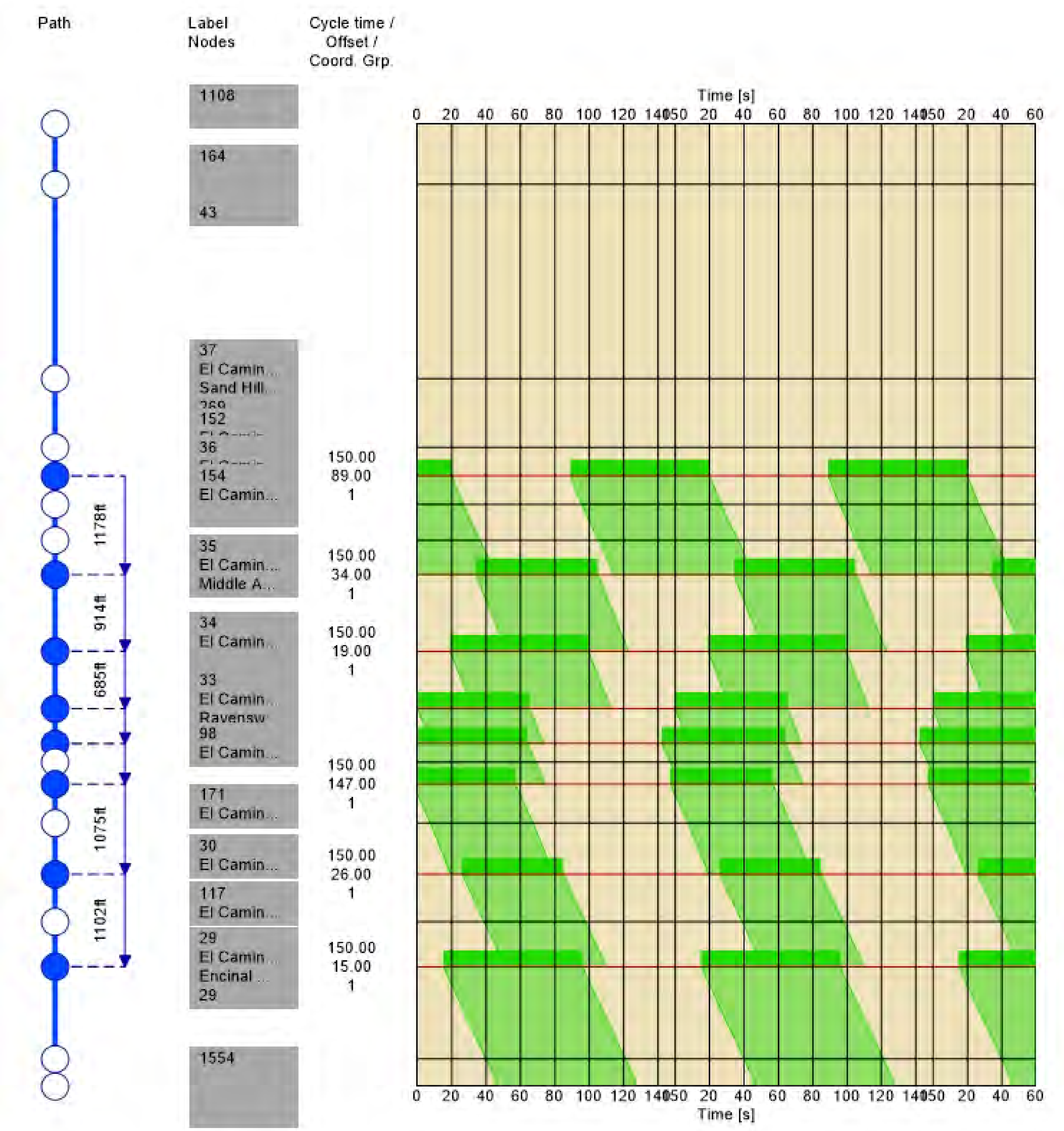
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Route 1: ECR NB

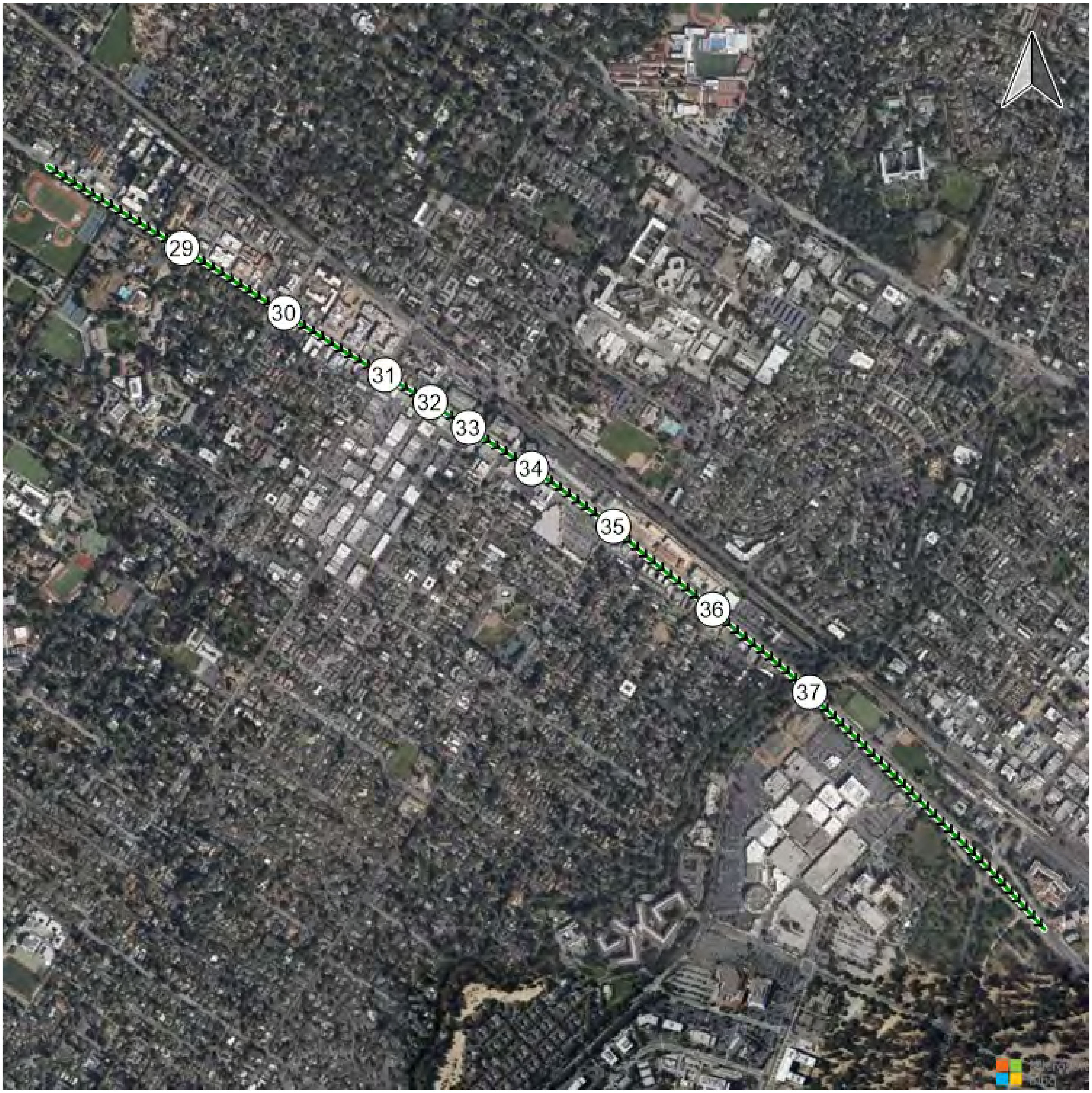


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

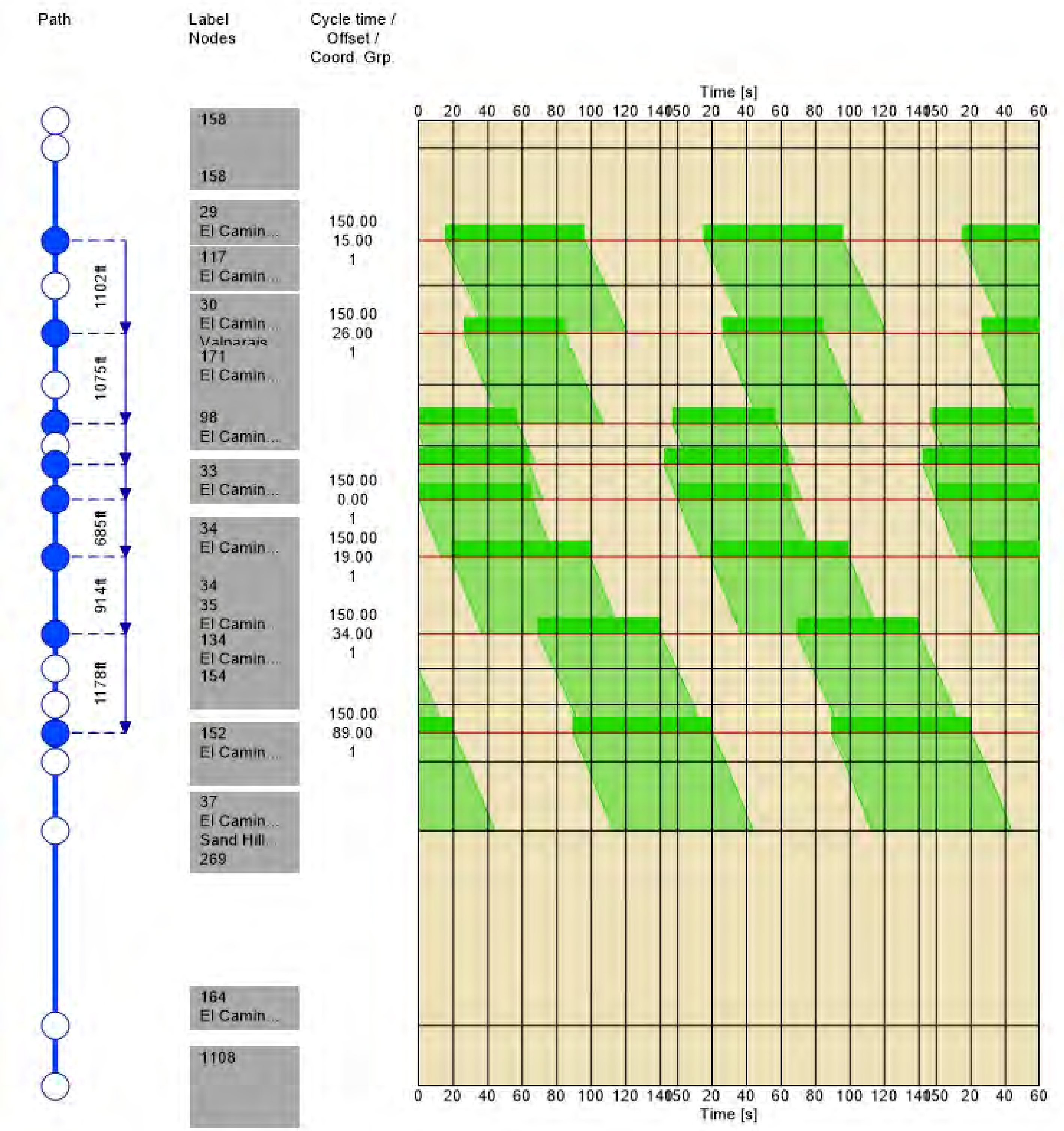
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Route 2: ECR SB

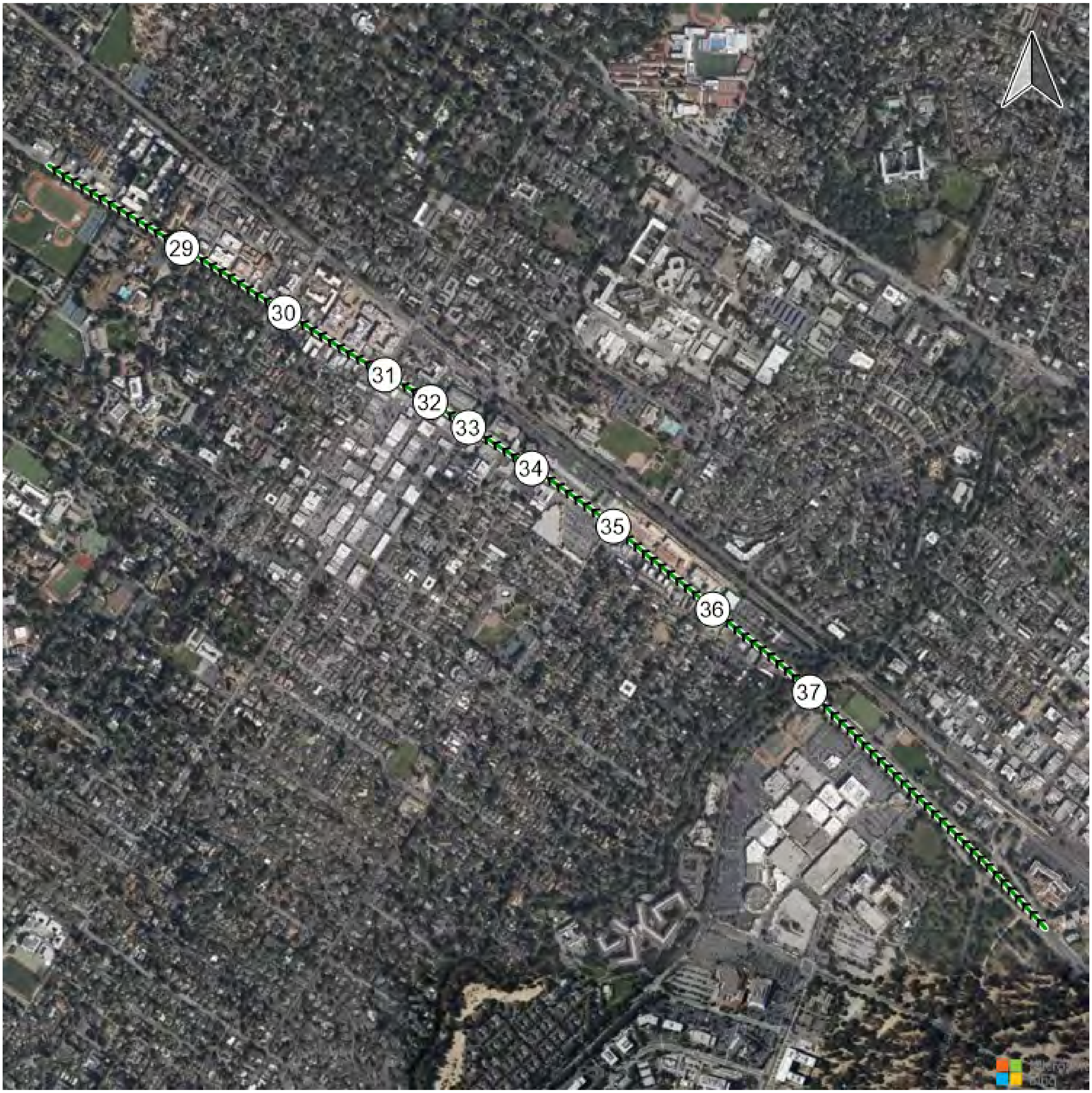


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

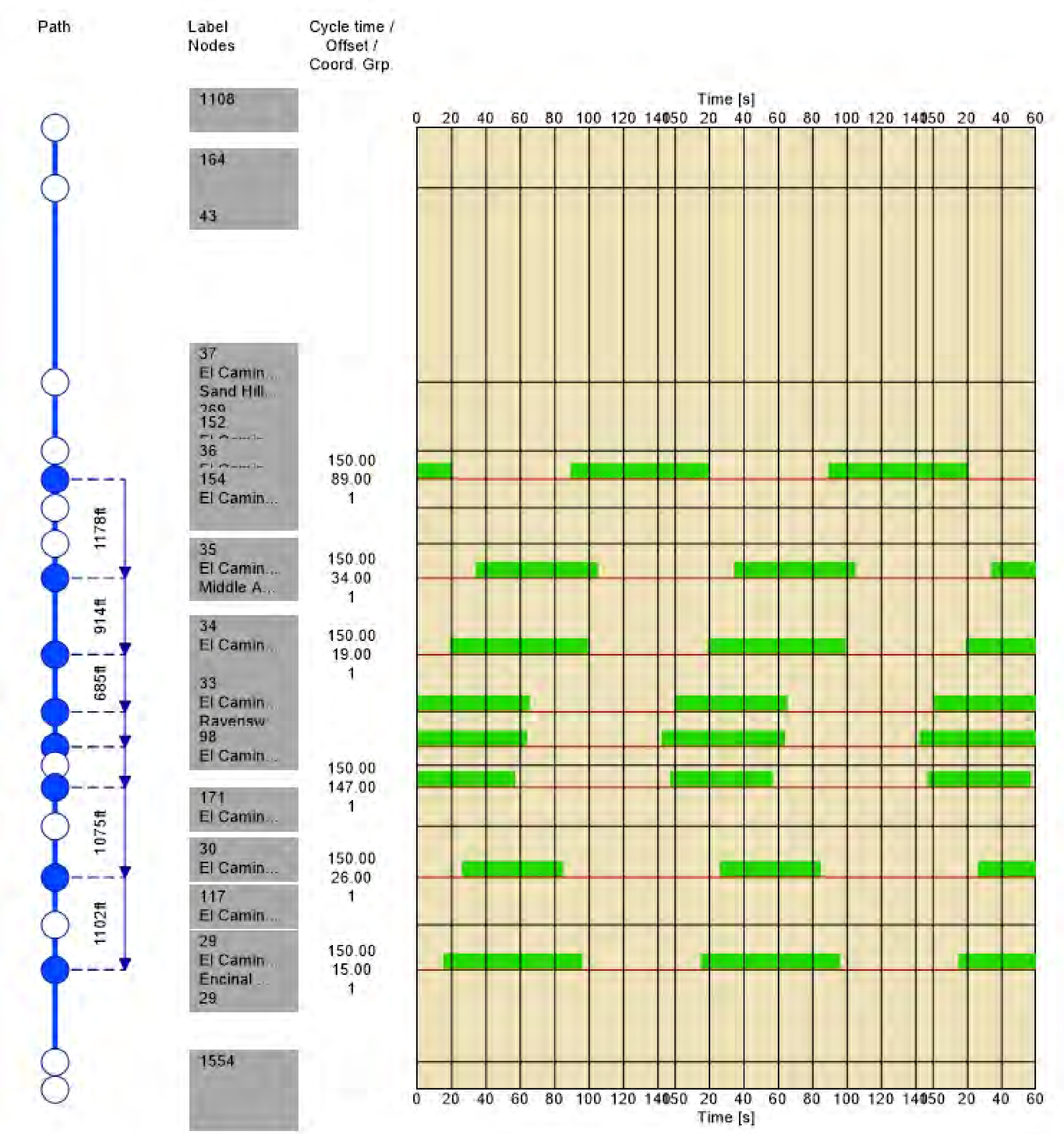
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 1: ECR NB

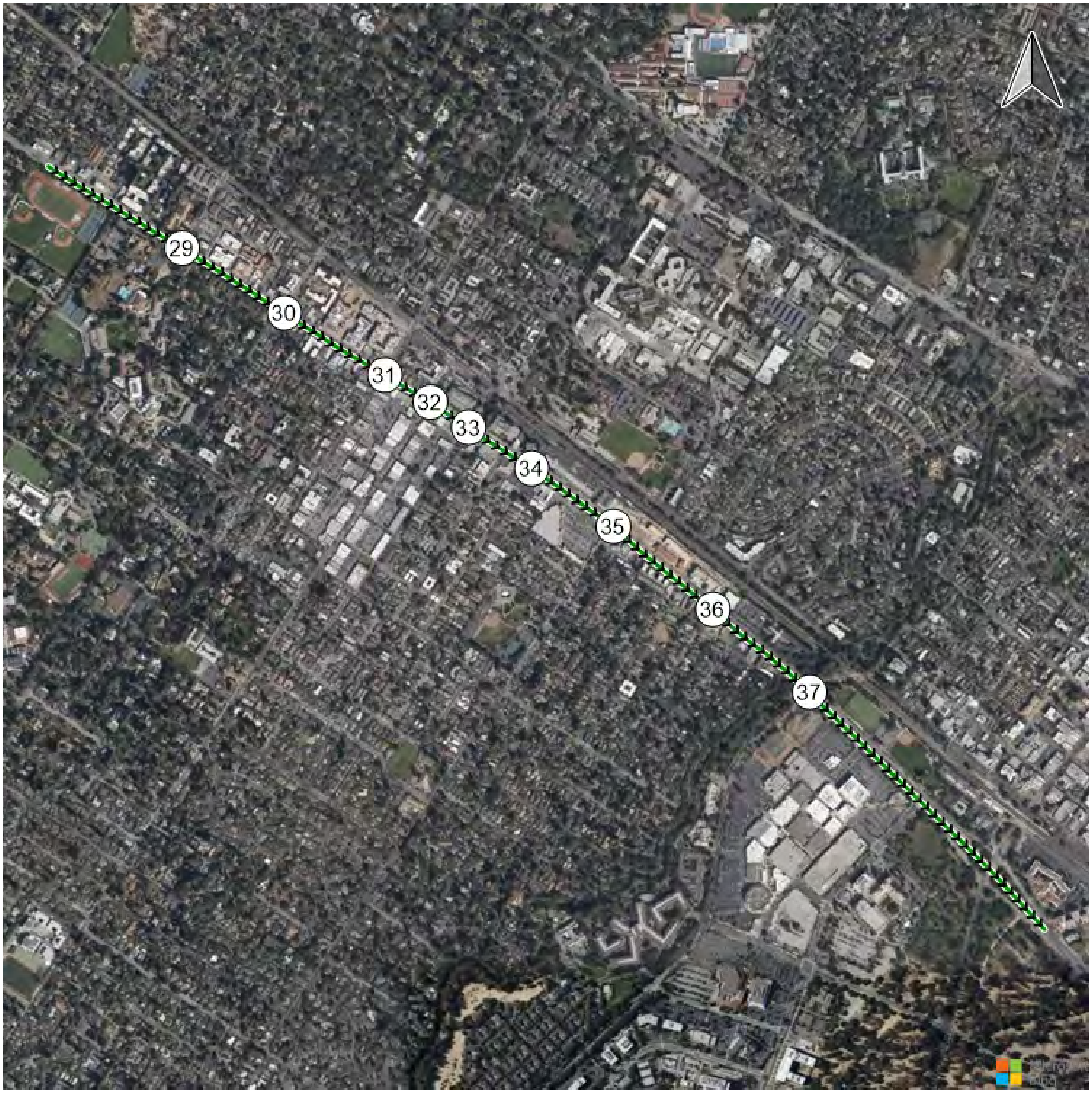


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

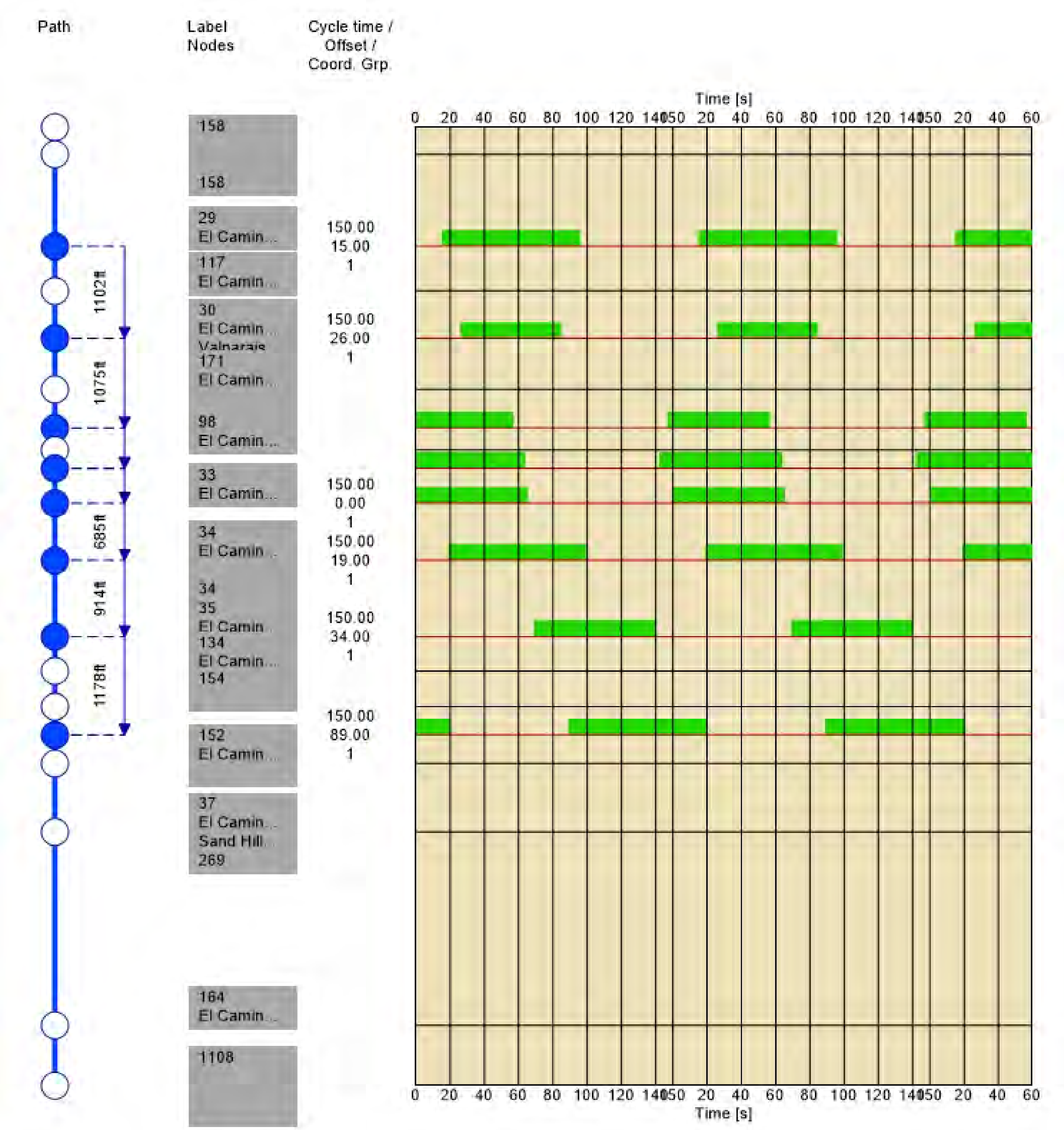
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 2: ECR SB



Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Cumulative AM.pdf

Scenario 19 Cumulative AM (2040 vols)
12/30/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.916 | 22.8 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | SEB Left | 0.849 | 31.9 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.837 | 58.0 | E |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | EB Left | 1.216 | 64.2 | E |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.757 | 49.7 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.407 | 13.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.802 | 14.8 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.307 | 260.1 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Thru | 1.794 | 451.7 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.444 | 205.6 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.259 | 106.6 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | WB Right | 1.533 | 206.3 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.152 | 77.5 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | WB Right | 1.137 | 128.6 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.940 | 34.9 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.709 | 24.4 | C |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.621 | 64.5 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 1.102 | 60.9 | E |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.875 | 24.5 | C |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.878 | 68.7 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.740 | 100.3 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.617 | 146.1 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.032 | 44.5 | D |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.713 | 13.1 | B |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.734 | 5.7 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.610 | 170.8 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.945 | 10.0 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Thru | 0.716 | 52.9 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | SB Thru | 1.661 | 359.1 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.497 | 62.4 | F |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.057 | 20.1 | C |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | | 0.000 | 0.0 | A |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Left | | 2.7 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.916 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1037 | 1481 | 217 | 1341 | 539 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1037 | 1481 | 217 | 1341 | 539 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 265 | 378 | 54 | 342 | 138 |
| Total Analysis Volume [veh/h] | 0 | 1058 | 1511 | 217 | 1368 | 550 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.43 | 0.41 | 0.35 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2121 | 1772 | 1394 | 650 |
| d1, Uniform Delay [s] | 11.98 | 17.23 | 23.13 | 21.15 |
| k, delay calibration | 0.50 | 0.50 | 0.05 | 0.38 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.84 | 5.44 | 4.17 | 10.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.85 | 0.98 | 0.85 |
| d, Delay for Lane Group [s/veh] | 12.82 | 22.67 | 27.30 | 31.38 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.50 | 11.80 | 12.49 | 10.44 |
| 50th-Percentile Queue Length [ft/ln] | 137.61 | 294.93 | 312.30 | 260.92 |
| 95th-Percentile Queue Length [veh/ln] | 9.35 | 17.43 | 18.29 | 15.73 |
| 95th-Percentile Queue Length [ft/ln] | 233.80 | 435.75 | 457.21 | 393.37 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.82 | 22.67 | 0.00 | 27.30 | 31.38 |
| Movement LOS | | B | C | | C | C |
| d_A, Approach Delay [s/veh] | 12.82 | | 22.67 | | 28.47 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 22.83 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.916 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.014 | 0.000 | 2.588 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.432 | 2.806 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.849 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 42 | 1324 | 7 | 448 | 1259 | 338 | 13 | 4 | 68 | 353 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 1324 | 7 | 448 | 1259 | 338 | 13 | 4 | 9 | 353 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 368 | 2 | 124 | 350 | 94 | 4 | 1 | 3 | 98 | 5 | 0 |
| Total Analysis Volume [veh/h] | 47 | 1471 | 8 | 498 | 1399 | 376 | 14 | 4 | 10 | 392 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 1 | | | 1 | | | 0 | | | 1 | |
| v_di, Inbound Pedestrian Volume crossing m | | 1 | | | 0 | | | 1 | | | 1 | |
| v_co, Outbound Pedestrian Volume crossing | | 1 | | | 0 | | | 1 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 1 | | | 0 | | | 1 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 0 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 96 | 96 | 112 | 102 | 102 | 7 | 7 | 35 | 35 |
| g / C, Green / Cycle | 0.05 | 0.60 | 0.60 | 0.70 | 0.64 | 0.64 | 0.04 | 0.04 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.27 | 0.27 | 0.49 | 0.48 | 0.52 | 0.01 | 0.00 | 0.22 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1016 | 1840 | 1712 | 1829 | 2555 | 1785 | 1900 |
| c, Capacity [veh/h] | 82 | 2122 | 1111 | 692 | 1177 | 1095 | 82 | 115 | 390 | 415 |
| d1, Uniform Delay [s] | 74.70 | 17.57 | 17.58 | 16.72 | 20.03 | 21.53 | 73.64 | 73.20 | 62.47 | 49.35 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.50 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.69 | 0.71 | 1.36 | 6.37 | 4.50 | 6.52 | 0.98 | 0.24 | 46.59 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.58 | 0.46 | 0.46 | 0.72 | 0.75 | 0.81 | 0.22 | 0.09 | 1.00 | 0.05 |
| d, Delay for Lane Group [s/veh] | 79.39 | 18.29 | 18.94 | 23.09 | 24.53 | 28.05 | 74.62 | 73.44 | 109.06 | 49.39 |
| Lane Group LOS | E | B | B | C | C | C | E | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.00 | 10.00 | 10.67 | 3.85 | 23.57 | 25.74 | 0.75 | 0.20 | 21.07 | 0.68 |
| 50th-Percentile Queue Length [ft/ln] | 50.05 | 249.89 | 266.77 | 96.27 | 589.22 | 643.38 | 18.64 | 5.09 | 526.70 | 17.12 |
| 95th-Percentile Queue Length [veh/ln] | 3.60 | 15.18 | 16.03 | 6.93 | 31.53 | 34.05 | 1.34 | 0.37 | 28.67 | 1.23 |
| 95th-Percentile Queue Length [ft/ln] | 90.09 | 379.51 | 400.70 | 173.28 | 788.27 | 851.37 | 33.55 | 9.16 | 716.67 | 30.82 |

**Movement, Approach, & Intersection Results**

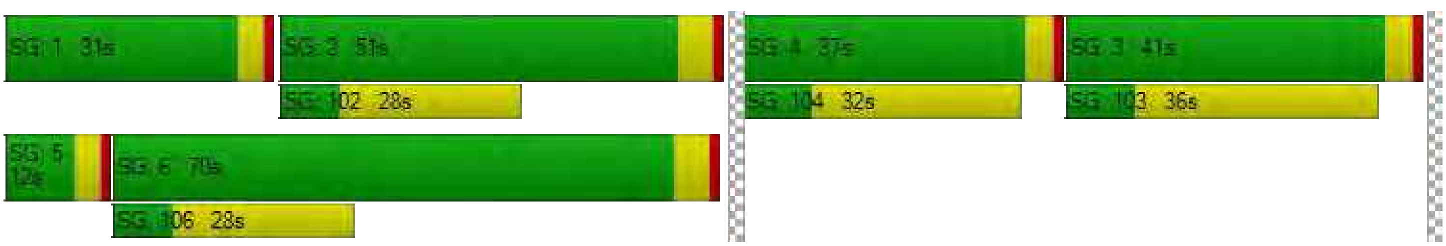
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.39 | 18.51 | 18.94 | 23.09 | 25.82 | 28.05 | 74.62 | 74.62 | 73.44 | 109.06 | 49.39 | 49.39 |
| Movement LOS | E | B | B | C | C | C | E | E | E | F | D | D |
| d_A, Approach Delay [s/veh] | 20.39 | | | 25.59 | | | 74.20 | | | 106.02 | | |
| Approach LOS | C | | | C | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 31.87 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.849 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.43 | 68.43 | 69.35 | 69.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.098 | 3.304 | 2.945 | 2.195 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.61 | 28.18 | 47.41 | 50.54 |
| I_b,int, Bicycle LOS Score for Intersection | 2.399 | 3.435 | 1.703 | 2.241 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 58.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.837 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 220 | 983 | 124 | 29 | 1031 | 413 | 622 | 76 | 230 | 39 | 21 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 220 | 983 | 124 | 29 | 1031 | 413 | 622 | 76 | 215 | 39 | 21 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 253 | 32 | 7 | 266 | 106 | 160 | 20 | 55 | 10 | 5 | 6 |
| Total Analysis Volume [veh/h] | 227 | 1013 | 128 | 30 | 1063 | 426 | 641 | 78 | 222 | 40 | 22 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 96 | 96 | 5 | 88 | 88 | 39 | 39 | 39 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.55 | 0.55 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.31 | 0.31 | 0.02 | 0.42 | 0.44 | 0.21 | 0.21 | 0.15 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1793 | 1704 | 1823 | 1650 | 1717 | 1706 | 1527 | 1439 | 1212 |
| c, Capacity [veh/h] | 142 | 1126 | 1076 | 58 | 1009 | 913 | 415 | 412 | 369 | 107 | 90 |
| d1, Uniform Delay [s] | 73.44 | 18.49 | 18.59 | 75.88 | 27.62 | 28.27 | 58.29 | 58.15 | 53.63 | 70.50 | 71.37 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.17 | 0.17 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 298.03 | 1.68 | 1.81 | 2.58 | 5.48 | 6.82 | 9.01 | 8.37 | 1.18 | 1.62 | 3.64 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.59 | 0.52 | 0.52 | 0.51 | 0.76 | 0.79 | 0.87 | 0.87 | 0.60 | 0.38 | 0.54 |
| d, Delay for Lane Group [s/veh] | 371.47 | 20.18 | 20.40 | 78.45 | 33.10 | 35.09 | 67.30 | 66.52 | 54.81 | 72.12 | 75.01 |
| Lane Group LOS | F | C | C | E | C | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 17.63 | 12.85 | 12.52 | 1.26 | 23.88 | 23.07 | 15.28 | 14.95 | 8.15 | 1.63 | 2.01 |
| 50th-Percentile Queue Length [ft/ln] | 440.67 | 321.16 | 313.08 | 31.42 | 597.08 | 576.79 | 382.05 | 373.77 | 203.81 | 40.77 | 50.34 |
| 95th-Percentile Queue Length [veh/ln] | 28.13 | 18.72 | 18.33 | 2.26 | 31.90 | 30.95 | 21.69 | 21.29 | 12.83 | 2.94 | 3.62 |
| 95th-Percentile Queue Length [ft/ln] | 703.25 | 468.11 | 458.17 | 56.56 | 797.45 | 773.72 | 542.33 | 532.30 | 320.87 | 73.39 | 90.62 |

**Movement, Approach, & Intersection Results**

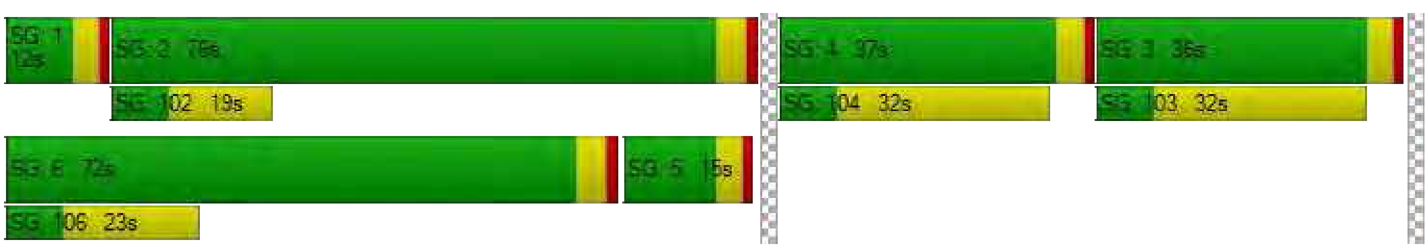
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 371.47 | 20.27 | 20.40 | 78.45 | 33.65 | 35.09 | 66.96 | 66.52 | 54.81 | 72.12 | 75.01 | 75.01 |
| Movement LOS | F | C | C | E | C | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 78.56 | | | 34.94 | | | 64.06 | | | 73.69 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 58.04 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.837 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.994 | 3.087 | 2.511 | 2.055 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.688 | 2.813 | 3.137 | 1.705 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 64.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.216 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 836 | 82 | 425 | 755 | 47 | 339 | 68 | 2 | 45 | 52 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 836 | 82 | 425 | 755 | 47 | 339 | 68 | 2 | 45 | 52 | 339 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 213 | 21 | 108 | 193 | 12 | 86 | 17 | 1 | 11 | 13 | 86 |
| Total Analysis Volume [veh/h] | 0 | 853 | 84 | 434 | 770 | 48 | 346 | 69 | 2 | 46 | 53 | 346 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 30 | 30 |
| g / C, Green / Cycle | 0.33 | 0.33 | 0.20 | 0.57 | 0.57 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.25 | 0.23 | 0.23 | 0.64 | 0.26 |
| s, saturation flow rate [veh/h] | 1882 | 1656 | 1708 | 1807 | 1763 | 655 | 1709 |
| c, Capacity [veh/h] | 669 | 549 | 343 | 1030 | 1005 | 326 | 686 |
| d1, Uniform Delay [s] | 24.38 | 24.39 | 32.07 | 9.62 | 9.64 | 31.08 | 21.80 |
| k, delay calibration | 0.50 | 0.50 | 0.23 | 0.50 | 0.50 | 0.50 | 0.34 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.38 | 11.55 | 129.85 | 1.16 | 1.21 | 146.83 | 3.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.74 | 0.80 | 1.26 | 0.40 | 0.40 | 1.28 | 0.65 |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 31.76 | 35.93 | 161.92 | 10.79 | 10.84 | 177.91 | 24.98 |
| Lane Group LOS | C | D | F | B | B | F | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.35 | 8.79 | 18.68 | 3.80 | 3.74 | 19.70 | 7.37 |
| 50th-Percentile Queue Length [ft/ln] | 233.73 | 219.65 | 467.07 | 94.97 | 93.56 | 492.50 | 184.32 |
| 95th-Percentile Queue Length [veh/ln] | 14.36 | 13.65 | 28.83 | 6.84 | 6.74 | 31.08 | 11.83 |
| 95th-Percentile Queue Length [ft/ln] | 359.10 | 341.18 | 720.64 | 170.94 | 168.42 | 777.07 | 295.65 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.76 | 33.50 | 35.93 | 161.92 | 10.81 | 10.84 | 177.91 | 177.91 | 177.91 | 24.98 | 24.98 | 24.98 |
| Movement LOS | C | C | D | F | B | B | F | F | F | C | C | C |
| d_A, Approach Delay [s/veh] | 33.71 | | | 63.20 | | | 177.91 | | | 24.98 | | |
| Approach LOS | C | | | E | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 64.25 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.216 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.82 | 29.82 | 29.82 | 19.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.689 | 3.422 | 1.919 | 2.195 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.73 | 8.70 | 17.50 | 17.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.333 | 2.593 | 2.248 | 2.294 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.757 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 569 | 520 | 508 | 501 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 520 | 508 | 501 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 138 | 135 | 133 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 553 | 540 | 533 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.31 | 0.29 | 0.36 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1779 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1005 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.30 | 17.79 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 84.97 | 0.61 | 3.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.14 | 0.35 | 0.64 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 25.56 | 2.07 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 639.03 | 51.64 | 308.77 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 36.59 | 3.72 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 914.81 | 92.96 | 452.86 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

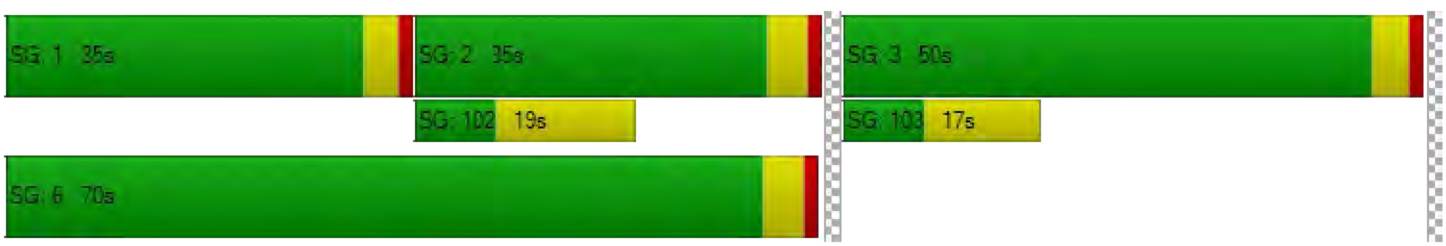
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 | 20.92 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 66.45 | | 20.92 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 49.70 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.757 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.948 | 2.892 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.363 | 2.622 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.407 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 684 | 206 | 288 | 747 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 122 | 21 | 684 | 110 | 288 | 747 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 32 | 6 | 182 | 29 | 77 | 199 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 130 | 22 | 728 | 117 | 306 | 795 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 80 | 80 | 91 | 85 | 85 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.19 | 0.78 | 0.67 | 0.67 | 0.76 | 0.71 | 0.71 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.09 | 0.03 | 0.21 | 0.08 | 0.36 | 0.24 | 0.24 |
| s, saturation flow rate [veh/h] | 1397 | 1736 | 1310 | 1477 | 706 | 3526 | 1474 | 845 | 1840 | 1779 |
| c, Capacity [veh/h] | 124 | 325 | 300 | 277 | 579 | 2343 | 979 | 665 | 1301 | 1258 |
| d1, Uniform Delay [s] | 54.82 | 40.13 | 46.92 | 43.22 | 4.12 | 8.51 | 7.28 | 5.14 | 6.73 | 6.75 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 0.08 | 1.54 | 1.18 | 0.03 | 0.35 | 0.25 | 2.28 | 0.69 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.07 | 0.56 | 0.47 | 0.04 | 0.31 | 0.12 | 0.46 | 0.33 | 0.34 |
| d, Delay for Lane Group [s/veh] | 54.97 | 40.22 | 48.46 | 44.40 | 4.14 | 8.86 | 7.53 | 7.42 | 7.42 | 7.48 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.56 | 4.82 | 3.52 | 0.11 | 3.81 | 1.08 | 2.26 | 4.01 | 3.93 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 13.93 | 120.50 | 88.10 | 2.87 | 95.15 | 27.09 | 56.55 | 100.19 | 98.34 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 1.00 | 8.42 | 6.34 | 0.21 | 6.85 | 1.95 | 4.07 | 7.21 | 7.08 |
| 95th-Percentile Queue Length [ft/ln] | 8.20 | 25.07 | 210.52 | 158.59 | 5.16 | 171.28 | 48.76 | 101.79 | 180.33 | 177.01 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.97 | 40.22 | 40.22 | 48.46 | 48.46 | 44.40 | 4.14 | 8.86 | 7.53 | 7.42 | 7.45 | 7.48 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 43.38 | | | 46.68 | | | 8.56 | | | 7.44 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.23 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.407 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.008 | 2.898 | 3.159 | 2.833 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.416 | 2.354 | 2.517 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.802 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 829 | 110 | 1297 | 2940 | 333 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 829 | 110 | 1297 | 2940 | 333 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 214 | 28 | 334 | 758 | 86 | 107 |
| Total Analysis Volume [veh/h] | 855 | 113 | 1337 | 3031 | 343 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 79 | 79 | 79 | 79 | 79 | 79 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 21 | 21 | 34 | 58 | 11 | 48 |
| g / C, Green / Cycle | 0.27 | 0.27 | 0.43 | 0.74 | 0.13 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.07 | 0.39 | 0.60 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1547 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1322 | 413 | 1483 | 3736 | 463 | 2551 |
| d1, Uniform Delay [s] | 25.54 | 22.77 | 20.97 | 6.65 | 32.74 | 6.59 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.65 | 0.43 | 0.87 | 0.54 | 0.89 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.65 | 0.27 | 0.90 | 0.81 | 0.74 | 0.17 |
| d, Delay for Lane Group [s/veh] | 26.19 | 23.20 | 21.84 | 7.18 | 33.62 | 6.60 |
| Lane Group LOS | C | C | C | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.20 | 1.51 | 9.39 | 4.36 | 3.06 | 0.86 |
| 50th-Percentile Queue Length [ft/ln] | 105.09 | 37.68 | 234.85 | 109.08 | 76.54 | 21.38 |
| 95th-Percentile Queue Length [veh/ln] | 7.57 | 2.71 | 14.42 | 7.79 | 5.51 | 1.54 |
| 95th-Percentile Queue Length [ft/ln] | 189.15 | 67.82 | 360.52 | 194.73 | 137.78 | 38.48 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

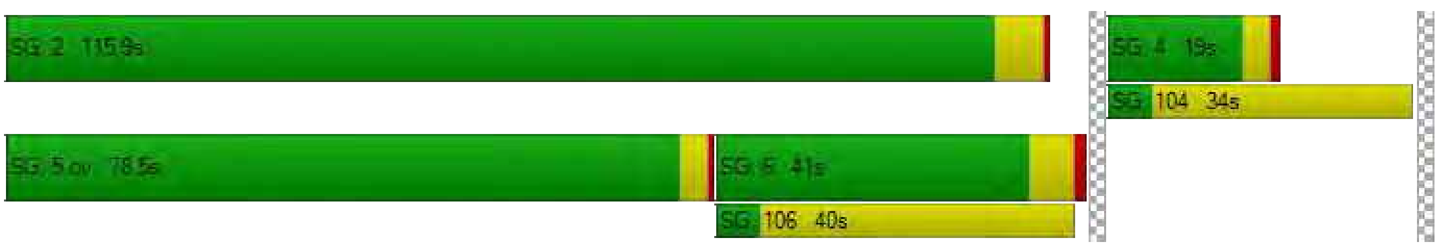
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 26.19 | 23.20 | 21.84 | 7.18 | 33.62 | 6.60 |
| Movement LOS | C | C | C | A | C | A |
| d_A, Approach Delay [s/veh] | 25.84 | | 11.67 | | 18.60 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 14.79 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.802 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 30.78 | 0.00 | 30.78 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.697 | 0.000 | 2.950 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 891 | 357 | 382 |
| d_b, Bicycle Delay [s] | 12.07 | 26.53 | 25.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.092 | 3.962 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 260.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.307 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 249 | 596 | 277 | 38 | 76 | 72 | 391 | 475 | 195 | 1133 | 2572 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 249 | 596 | 277 | 38 | 76 | 56 | 391 | 475 | 89 | 1133 | 2572 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 152 | 71 | 10 | 19 | 14 | 100 | 121 | 23 | 289 | 656 | 18 |
| Total Analysis Volume [veh/h] | 254 | 608 | 283 | 39 | 78 | 57 | 399 | 485 | 91 | 1156 | 2624 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 2 | | | 3 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 3 | | | 2 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 4 | | | 0 | | | 3 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 3 | | | 0 | | | 4 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 0 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.34 | 0.28 | 0.07 | 0.06 | 0.03 | 0.05 | 0.26 | 0.10 | 0.06 | 0.43 | 0.52 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 57.77 | 55.98 | 57.37 | 50.10 | 24.85 | 23.90 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.19 | 0.11 | 0.15 | 0.17 | 0.11 | 0.11 | 0.48 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 467.79 | 302.80 | 0.05 | 42.31 | 1.30 | 17.49 | 134.15 | 0.06 | 0.12 | 522.87 | 144.31 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.98 | 1.65 | 0.18 | 0.82 | 0.40 | 0.74 | 1.28 | 0.24 | 0.15 | 2.15 | 1.32 | 0.11 |
| d, Delay for Lane Group [s/veh] | 519.94 | 355.34 | 24.50 | 100.07 | 57.28 | 74.85 | 184.24 | 24.92 | 24.02 | 573.46 | 182.40 | 24.16 |
| Lane Group LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 20.65 | 21.26 | 1.81 | 1.81 | 1.24 | 2.18 | 10.71 | 3.24 | 1.77 | 47.53 | 46.68 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 516.15 | 531.54 | 45.13 | 45.24 | 31.12 | 54.61 | 267.84 | 81.07 | 44.21 | 1188.37 | 1166.96 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 34.82 | 34.60 | 3.25 | 3.26 | 2.24 | 3.93 | 17.92 | 5.84 | 3.18 | 75.77 | 68.84 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 870.62 | 865.09 | 81.24 | 81.43 | 56.02 | 98.31 | 448.00 | 145.93 | 79.58 | 1894.29 | 1720.97 | 63.56 |

**Movement, Approach, & Intersection Results**

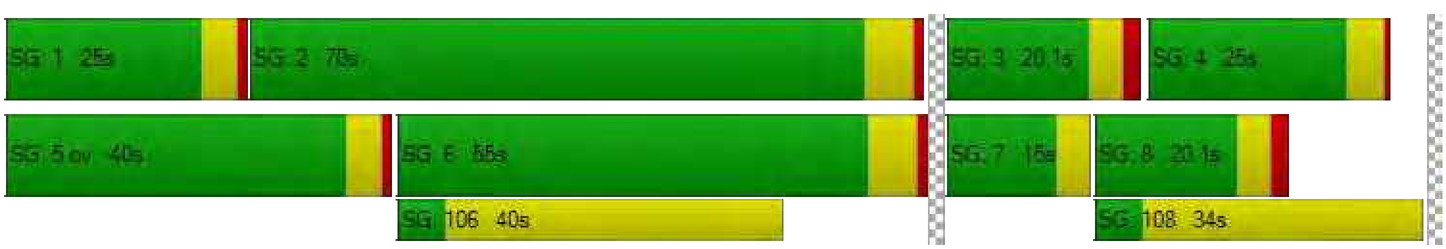
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 519.94 | 355.34 | 24.50 | 100.07 | 57.28 | 74.85 | 184.24 | 24.92 | 24.02 | 573.46 | 182.40 | 24.16 |
| Movement LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | | 310.08 | | | 72.63 | | | 90.03 | | | 296.73 | |
| Approach LOS | | F | | | E | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | 260.09 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.307 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.139 | 0.000 | 3.347 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.63 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.504 | 1.716 | 2.154 | 3.679 |
| Bicycle LOS | B | A | B | D |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 451.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.794 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 99 | 820 | 379 | 190 | 1297 | 48 | 47 | 56 | 48 | 56 | 431 | 373 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 99 | 820 | 379 | 190 | 1297 | 48 | 47 | 56 | 48 | 56 | 431 | 373 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 220 | 102 | 51 | 349 | 13 | 13 | 15 | 13 | 15 | 116 | 100 |
| Total Analysis Volume [veh/h] | 106 | 882 | 408 | 204 | 1395 | 52 | 51 | 60 | 52 | 60 | 463 | 401 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 78 | 78 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.60 | 0.60 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.83 | 0.87 | 0.42 | 0.78 | 0.79 | 0.44 | 1.01 |
| s, saturation flow rate [veh/h] | 416 | 808 | 711 | 484 | 934 | 916 | 369 | 916 |
| c, Capacity [veh/h] | 133 | 454 | 399 | 178 | 562 | 551 | 129 | 247 |
| d1, Uniform Delay [s] | 33.79 | 28.50 | 28.50 | 47.21 | 25.87 | 25.87 | 51.50 | 48.28 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 37.51 | 230.47 | 256.19 | 113.40 | 144.07 | 151.23 | 164.38 | 1240.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.80 | 1.49 | 1.54 | 1.15 | 1.29 | 1.31 | 1.26 | 3.74 |
| d, Delay for Lane Group [s/veh] | 71.30 | 258.96 | 284.69 | 160.61 | 169.94 | 177.09 | 215.88 | 1288.96 |
| Lane Group LOS | E | F | F | F | F | F | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.34 | 41.96 | 39.79 | 7.42 | 38.74 | 39.10 | 10.24 | 93.35 |
| 50th-Percentile Queue Length [ft/ln] | 58.42 | 1048.94 | 994.87 | 185.47 | 968.53 | 977.57 | 256.09 | 2333.70 |
| 95th-Percentile Queue Length [veh/ln] | 4.21 | 67.16 | 64.85 | 13.03 | 58.73 | 59.63 | 17.27 | 149.14 |
| 95th-Percentile Queue Length [ft/ln] | 105.16 | 1678.94 | 1621.26 | 325.78 | 1468.14 | 1490.70 | 431.69 | 3728.53 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 71.30 | 265.02 | 284.69 | 160.61 | 173.37 | 177.09 | 215.88 | 215.88 | 215.88 | 1288.96 | 1288.96 | 1288.96 |
| Movement LOS | E | F | F | F | F | F | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | | 256.06 | | | 171.91 | | | 215.88 | | | 1288.96 | |
| Approach LOS | | F | | | F | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 451.73 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.794 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 54.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.502 | 3.029 | 2.144 | 2.557 |
| Crosswalk LOS | D | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1123 | 1077 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.59 | 14.11 | 36.42 | 36.38 |
| I_b,int, Bicycle LOS Score for Intersection | 2.711 | 2.922 | 1.829 | 3.084 |
| Bicycle LOS | B | C | A | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 205.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.444 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 237 | 1304 | 1231 | 31 | 88 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 237 | 1304 | 1231 | 31 | 88 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 354 | 335 | 8 | 24 | 26 |
| Total Analysis Volume [veh/h] | 258 | 1417 | 1338 | 34 | 96 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 103 | 87 | 87 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.32 | 0.92 | 0.88 | 0.89 | 0.06 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 773 | 1745 | 779 |
| c, Capacity [veh/h] | 80 | 1230 | 525 | 520 | 262 | 117 |
| d1, Uniform Delay [s] | 58.39 | 13.26 | 21.27 | 21.27 | 49.59 | 53.77 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.04 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1036.78 | 78.18 | 151.41 | 157.15 | 0.32 | 38.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.23 | 1.15 | 1.31 | 1.32 | 0.37 | 0.88 |
| d, Delay for Lane Group [s/veh] | 1095.17 | 91.44 | 172.68 | 178.43 | 49.91 | 92.62 |
| Lane Group LOS | F | F | F | F | D | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 25.56 | 25.53 | 35.68 | 36.15 | 2.84 | 4.55 |
| 50th-Percentile Queue Length [ft/ln] | 639.05 | 638.16 | 891.94 | 903.70 | 71.09 | 113.65 |
| 95th-Percentile Queue Length [veh/ln] | 41.84 | 38.01 | 55.17 | 56.14 | 5.12 | 8.04 |
| 95th-Percentile Queue Length [ft/ln] | 1046.10 | 950.22 | 1379.28 | 1403.44 | 127.97 | 201.06 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1095.17 | 91.44 | 175.48 | 178.43 | 49.91 | 92.62 |
| Movement LOS | F | F | F | F | D | F |
| d_A, Approach Delay [s/veh] | 246.05 | | 175.55 | | 72.02 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 205.58 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.444 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.129 | 3.088 | 2.117 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.941 | 2.692 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Intersection Level Of Service Report
## Intersection 19: Willow Rd (SR 114)/O'Brien Dr

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 106.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.259 |

### Intersection Setup

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1395 | 878 | 42 | 1187 | 237 | 259 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1395 | 878 | 42 | 1187 | 237 | 259 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 371 | 234 | 11 | 316 | 63 | 69 |
| Total Analysis Volume [veh/h] | 1484 | 934 | 45 | 1263 | 252 | 276 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 93 | 93 | 4 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.71 | 0.71 | 0.03 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.96 | 0.63 | 0.03 | 0.85 | 0.19 | 0.19 |
| s, saturation flow rate [veh/h] | 1549 | 1477 | 1704 | 1494 | 1312 | 1509 |
| c, Capacity [veh/h] | 1104 | 1052 | 57 | 1149 | 230 | 265 |
| d1, Uniform Delay [s] | 18.68 | 13.55 | 62.31 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 161.10 | 11.10 | 8.53 | 57.87 | 77.94 | 74.17 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.34 | 0.89 | 0.79 | 1.10 | 1.07 | 1.07 |
| d, Delay for Lane Group [s/veh] | 179.78 | 24.65 | 70.85 | 72.87 | 131.50 | 127.73 |
| Lane Group LOS | F | C | E | F | F | F |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 38.21 | 19.83 | 1.59 | 21.67 | 12.49 | 14.09 |
| 50th-Percentile Queue Length [ft/ln] | 955.23 | 495.71 | 39.85 | 541.77 | 312.29 | 352.17 |
| 95th-Percentile Queue Length [veh/ln] | 59.84 | 27.13 | 2.87 | 31.71 | 18.88 | 20.91 |
| 95th-Percentile Queue Length [ft/ln] | 1495.95 | 678.28 | 71.73 | 792.86 | 471.94 | 522.86 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 179.78 | 24.65 | 70.85 | 72.87 | 131.50 | 127.73 |
| Movement LOS | F | C | E | F | F | F |
| d_A, Approach Delay [s/veh] | 119.86 | | 72.80 | | 129.49 | |
| Approach LOS | F | | E | | F | |
| d_I, Intersection Delay [s/veh] | 106.58 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.259 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.448 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.18 | 3.45 | 44.20 |
| I_b,int, Bicycle LOS Score for Intersection | 3.554 | 2.639 | 2.431 |
| Bicycle LOS | D | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 206.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.533 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 160 | 1808 | 351 | 40 | 1347 | 7 | 95 | 142 | 458 | 298 | 167 | 241 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 160 | 1808 | 351 | 40 | 1347 | 7 | 95 | 142 | 414 | 298 | 167 | 207 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 43 | 481 | 93 | 11 | 358 | 2 | 25 | 38 | 110 | 79 | 44 | 55 |
| Total Analysis Volume [veh/h] | 170 | 1923 | 373 | 43 | 1433 | 7 | 101 | 151 | 440 | 317 | 178 | 220 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 4 | 46 | 46 | 36 | 36 | 36 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.03 | 0.36 | 0.36 | 0.27 | 0.27 | 0.27 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.44 | 0.47 | 0.02 | 0.63 | 0.63 | 0.07 | 0.10 | 0.33 | 0.21 | 0.22 | 0.33 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1647 | 1781 | 1491 | 781 | 1420 | 1577 | 1322 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 178 | 1480 | 705 | 55 | 536 | 281 | 386 | 428 | 359 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 58.21 | 37.15 | 37.15 | 62.54 | 41.64 | 41.64 | 37.13 | 38.14 | 46.78 | 55.02 | 55.02 | 54.28 |
| k, delay calibration | 0.10 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.50 | 0.14 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 20.82 | 32.17 | 60.55 | 8.43 | 351.33 | 358.33 | 0.13 | 0.18 | 123.83 | 162.65 | 241.75 | 545.26 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.95 | 1.03 | 1.09 | 0.78 | 1.76 | 1.76 | 0.26 | 0.35 | 1.23 | 1.34 | 1.45 | 2.14 |
| d, Delay for Lane Group [s/veh] | 79.02 | 69.33 | 97.70 | 70.97 | 392.96 | 399.97 | 37.26 | 38.32 | 170.62 | 217.66 | 296.76 | 599.54 |
| Lane Group LOS | E | F | F | E | F | F | D | D | F | F | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.51 | 29.10 | 33.30 | 1.55 | 34.73 | 36.92 | 2.55 | 3.92 | 23.72 | 9.19 | 12.26 | 18.86 |
| 50th-Percentile Queue Length [ft/ln] | 162.76 | 727.52 | 832.58 | 38.85 | 868.26 | 922.98 | 63.83 | 98.03 | 593.07 | 229.68 | 306.59 | 471.58 |
| 95th-Percentile Queue Length [veh/ln] | 10.70 | 38.88 | 45.53 | 2.80 | 57.48 | 60.80 | 4.60 | 7.06 | 35.50 | 15.82 | 20.65 | 32.16 |
| 95th-Percentile Queue Length [ft/ln] | 267.38 | 972.02 | 1138.19 | 69.93 | 1437.00 | 1520.00 | 114.90 | 176.45 | 887.61 | 395.52 | 516.35 | 803.88 |

**Movement, Approach, & Intersection Results**

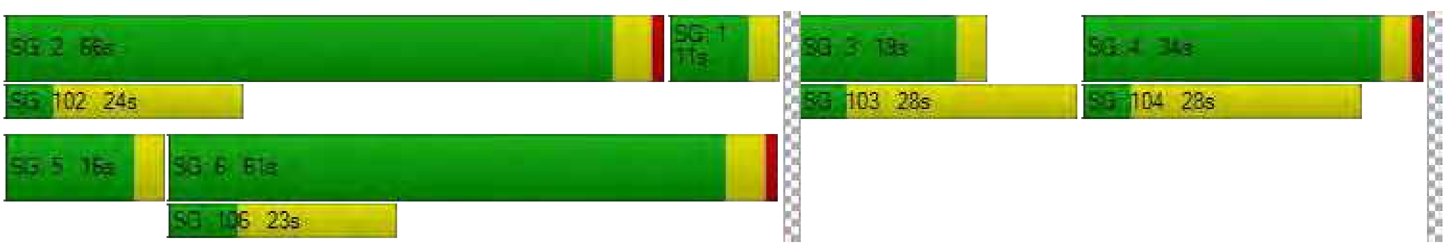
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.02 | 75.16 | 97.70 | 70.97 | 395.35 | 399.97 | 37.26 | 38.32 | 170.62 | 217.66 | 296.76 | 599.54 |
| Movement LOS | E | E | F | E | F | F | D | D | F | F | F | F |
| d_A, Approach Delay [s/veh] | | 78.83 | | | 385.97 | | | 122.28 | | | 354.85 | |
| Approach LOS | | E | | | F | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 206.34 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.533 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.486 | 3.049 | 2.477 | 2.624 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.916 | 2.375 | 2.774 | 2.795 |
| Bicycle LOS | C | B | C | C |

## Sequence

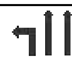
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 77.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.152 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1402 | 1226 | 655 | 441 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1402 | 1226 | 356 | 441 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 351 | 307 | 89 | 110 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1402 | 1226 | 356 | 441 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.54 | 0.44 | 0.29 | 0.48 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 22.85 | 27.29 | 22.94 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.23 | 0.16 | 0.27 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 44.07 | 55.87 | 5.08 | 111.84 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 1.08 | 1.11 | 0.73 | 1.20 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 66.92 | 83.16 | 28.02 | 139.13 | 0.00 |
| Lane Group LOS | D | F | F | C | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 20.53 | 19.52 | 6.66 | 18.95 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 513.21 | 488.12 | 166.55 | 473.69 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 29.62 | 28.75 | 10.90 | 29.15 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 740.57 | 718.80 | 272.38 | 728.82 | 0.00 |

### Movement, Approach, & Intersection Results

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 66.92 | 83.16 | 28.02 | 139.13 | 0.00 |
| Movement LOS | D | F | F | C | F | A |
| d_A, Approach Delay [s/veh] | 66.18 | | 70.75 | | 139.13 | |
| Approach LOS | E | | E | | F | |
| d_I, Intersection Delay [s/veh] | 77.47 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.152 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.452 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 3.111 | 1.560 |
| Bicycle LOS | C | C | A |

### Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 128.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.137 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 23 | 913 | 7 | 36 | 931 | 108 | 67 | 14 | 32 | 59 | 12 | 360 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 23 | 913 | 7 | 36 | 931 | 108 | 67 | 14 | 26 | 59 | 12 | 360 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 238 | 2 | 9 | 242 | 28 | 17 | 4 | 7 | 15 | 3 | 94 |
| Total Analysis Volume [veh/h] | 24 | 951 | 7 | 38 | 970 | 113 | 70 | 15 | 27 | 61 | 13 | 375 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 14 | 14 | 14 | 30 | 30 |
| g / C, Green / Cycle | 0.03 | 0.58 | 0.58 | 0.04 | 0.60 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.29 | 0.29 | 0.04 | 0.70 | 0.04 | 0.04 | 0.02 | 0.06 | 0.32 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1396 | 1335 | 952 | 1202 |
| c, Capacity [veh/h] | 25 | 844 | 1107 | 42 | 926 | 79 | 116 | 110 | 172 | 217 |
| d1, Uniform Delay [s] | 80.82 | 20.12 | 20.12 | 79.04 | 33.01 | 72.48 | 72.45 | 71.03 | 59.54 | 68.01 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 78.21 | 0.95 | 0.72 | 44.67 | 88.13 | 3.81 | 2.57 | 1.13 | 1.24 | 372.11 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.98 | 0.49 | 0.49 | 0.91 | 1.17 | 0.44 | 0.44 | 0.24 | 0.35 | 1.79 |
| d, Delay for Lane Group [s/veh] | 159.03 | 21.06 | 20.84 | 123.72 | 121.15 | 76.29 | 75.03 | 72.16 | 60.77 | 440.13 |
| Lane Group LOS | F | C | C | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.57 | 9.80 | 12.79 | 2.16 | 59.08 | 1.53 | 2.19 | 1.14 | 2.35 | 31.74 |
| 50th-Percentile Queue Length [ft/ln] | 39.36 | 244.92 | 319.66 | 53.94 | 1477.04 | 38.30 | 54.70 | 28.53 | 58.66 | 793.53 |
| 95th-Percentile Queue Length [veh/ln] | 2.83 | 14.93 | 18.65 | 3.88 | 81.42 | 2.76 | 3.94 | 2.05 | 4.22 | 50.65 |
| 95th-Percentile Queue Length [ft/ln] | 70.85 | 373.25 | 466.27 | 97.10 | 2035.62 | 68.95 | 98.46 | 51.36 | 105.58 | 1266.26 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 159.03 | 20.94 | 20.84 | 123.72 | 121.15 | 121.15 | 75.68 | 75.03 | 72.16 | 60.77 | 440.13 | 440.13 |
| Movement LOS | F | C | C | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 24.31 | | | 121.23 | | | 74.73 | | | 388.59 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 128.61 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.137 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 72.32 | 72.32 | 72.32 | 72.32 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.576 | 2.823 | 2.190 | 2.107 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 241 | 241 | 362 | 362 |
| d_b, Bicycle Delay [s] | 64.22 | 64.19 | 55.83 | 55.72 |
| I_b,int, Bicycle LOS Score for Intersection | 2.370 | 3.409 | 1.754 | 2.300 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.940 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 37 | 783 | 7 | 4 | 878 | 186 | 283 | 6 | 64 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 37 | 783 | 7 | 4 | 878 | 186 | 283 | 6 | 64 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 206 | 2 | 1 | 231 | 49 | 74 | 2 | 17 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 39 | 824 | 7 | 4 | 924 | 196 | 298 | 6 | 67 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 105 | 105 | 105 | 105 | 37 | 37 |
| g / C, Green / Cycle | 0.70 | 0.70 | 0.70 | 0.70 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.46 | 0.01 | 0.63 | 0.27 | 0.01 |
| s, saturation flow rate [veh/h] | 493 | 1826 | 671 | 1778 | 1392 | 1744 |
| c, Capacity [veh/h] | 137 | 1278 | 342 | 1244 | 385 | 455 |
| d1, Uniform Delay [s] | 54.56 | 12.39 | 23.79 | 18.25 | 57.69 | 42.92 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.12 | 2.58 | 0.06 | 10.57 | 37.59 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.28 | 0.65 | 0.01 | 0.90 | 0.96 | 0.02 |
| d, Delay for Lane Group [s/veh] | 59.68 | 14.96 | 23.85 | 28.82 | 95.27 | 42.93 |
| Lane Group LOS | E | B | C | C | F | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.53 | 15.94 | 0.09 | 32.80 | 18.40 | 0.26 |
| 50th-Percentile Queue Length [ft/ln] | 38.18 | 398.51 | 2.21 | 820.00 | 460.06 | 6.56 |
| 95th-Percentile Queue Length [veh/ln] | 2.75 | 22.49 | 0.16 | 42.19 | 25.44 | 0.47 |
| 95th-Percentile Queue Length [ft/ln] | 68.72 | 562.20 | 3.98 | 1054.81 | 635.94 | 11.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 59.68 | 14.96 | 14.96 | 23.85 | 28.82 | 28.82 | 95.27 | 95.27 | 95.27 | 42.93 | 42.93 | 42.93 |
| Movement LOS | E | B | B | C | C | C | F | F | F | D | D | D |
| d_A, Approach Delay [s/veh] | 16.97 | | | 28.80 | | | 95.27 | | | 42.93 | | |
| Approach LOS | B | | | C | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 34.91 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.940 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.470 | 3.120 | 2.091 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.77 | 42.89 | 42.63 |
| I_b,int, Bicycle LOS Score for Intersection | 2.995 | 3.414 | 2.172 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.709 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 686 | 151 | 52 | 919 | 0 | 21 | 111 | 11 | 153 | 95 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 686 | 151 | 52 | 919 | 0 | 21 | 111 | 11 | 153 | 95 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 186 | 41 | 14 | 250 | 0 | 6 | 30 | 3 | 42 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 746 | 164 | 57 | 999 | 0 | 23 | 121 | 12 | 166 | 103 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 112 | 112 | 112 | 112 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.75 | 0.75 | 0.75 | 0.75 | 0.20 | 0.20 | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.52 | 0.10 | 0.54 | 0.02 | 0.07 | 0.13 | 0.12 |
| s, saturation flow rate [veh/h] | 573 | 1756 | 586 | 1846 | 1169 | 1856 | 1232 | 1715 |
| c, Capacity [veh/h] | 295 | 1310 | 316 | 1377 | 140 | 370 | 201 | 342 |
| d1, Uniform Delay [s] | 24.60 | 10.03 | 24.42 | 10.54 | 64.90 | 51.71 | 66.34 | 54.49 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.21 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.17 | 3.06 | 1.25 | 3.36 | 0.55 | 0.59 | 15.04 | 2.35 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.69 | 0.18 | 0.73 | 0.16 | 0.36 | 0.83 | 0.60 |
| d, Delay for Lane Group [s/veh] | 24.77 | 13.09 | 25.67 | 13.90 | 65.45 | 52.30 | 81.38 | 56.84 |
| Lane Group LOS | C | B | C | B | E | D | F | E |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 16.07 | 1.37 | 18.53 | 0.86 | 4.46 | 7.31 | 7.33 |
| 50th-Percentile Queue Length [ft/ln] | 4.61 | 401.66 | 34.18 | 463.25 | 21.48 | 111.39 | 182.74 | 183.16 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 22.64 | 2.46 | 25.59 | 1.55 | 7.92 | 11.74 | 11.77 |
| 95th-Percentile Queue Length [ft/ln] | 8.30 | 566.00 | 61.53 | 639.74 | 38.66 | 197.93 | 293.58 | 294.13 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.77 | 13.09 | 13.09 | 25.67 | 13.90 | 13.90 | 65.45 | 52.30 | 52.30 | 81.38 | 56.84 | 56.84 |
| Movement LOS | C | B | B | C | B | B | E | D | D | F | E | E |
| d_A, Approach Delay [s/veh] | 13.19 | | | 14.54 | | | 54.24 | | | 67.85 | | |
| Approach LOS | B | | | B | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 24.41 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.709 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.35 | 64.35 | 64.35 | 64.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.768 | 2.579 | 2.048 | 2.238 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.84 | 4.84 | 48.29 | 48.29 |
| I_b,int, Bicycle LOS Score for Intersection | 3.074 | 3.302 | 1.817 | 2.170 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 64.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.621 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 297 | 156 | 374 | 138 | 445 | 132 | 456 | 170 | 343 | 331 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 297 | 37 | 374 | 138 | 0 | 132 | 456 | 170 | 343 | 331 | 20 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 77 | 10 | 97 | 36 | 0 | 34 | 119 | 44 | 89 | 86 | 5 |
| Total Analysis Volume [veh/h] | 28 | 309 | 39 | 390 | 144 | 0 | 138 | 475 | 177 | 357 | 345 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 27 | 27 | 27 | 57 | 57 | 57 | 22 | 22 | 22 | 22 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.38 | 0.38 | 0.38 | 0.15 | 0.15 | 0.15 | 0.15 | 0.16 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.17 | 0.03 | 0.15 | 0.15 | 0.00 | 0.08 | 0.12 | 0.13 | 0.12 | 0.14 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1447 | 1772 | 1817 | 1567 | 1774 | 1892 | 1892 | 1491 | 1734 | 1803 | 1634 |
| c, Capacity [veh/h] | 331 | 334 | 265 | 675 | 692 | 596 | 265 | 282 | 282 | 222 | 286 | 297 | 269 |
| d1, Uniform Delay [s] | 50.86 | 60.27 | 51.34 | 33.78 | 33.78 | 0.00 | 58.85 | 61.82 | 62.30 | 61.30 | 60.79 | 60.77 | 60.88 |
| k, delay calibration | 0.11 | 0.36 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.19 | 0.22 | 0.18 | 0.14 | 0.14 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 26.86 | 0.25 | 1.70 | 1.66 | 0.00 | 1.59 | 10.00 | 14.47 | 10.29 | 8.88 | 8.46 | 10.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.93 | 0.15 | 0.39 | 0.39 | 0.00 | 0.52 | 0.82 | 0.86 | 0.80 | 0.85 | 0.85 | 0.85 |
| d, Delay for Lane Group [s/veh] | 50.96 | 87.14 | 51.60 | 35.48 | 35.44 | 0.00 | 60.44 | 71.83 | 76.77 | 71.59 | 69.67 | 69.23 | 70.91 |
| Lane Group LOS | D | F | D | D | D | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.90 | 14.08 | 1.26 | 7.49 | 7.67 | 0.00 | 4.99 | 9.36 | 10.25 | 7.14 | 9.67 | 10.01 | 9.29 |
| 50th-Percentile Queue Length [ft/ln] | 22.40 | 351.91 | 31.61 | 187.35 | 191.81 | 0.00 | 124.7 | 233.9 | 256.1 | 178.5 | 241.84 | 250.20 | 232.25 |
| 95th-Percentile Queue Length [veh/ln] | 1.61 | 20.23 | 2.28 | 11.98 | 12.22 | 0.00 | 8.65 | 14.37 | 15.50 | 11.53 | 14.77 | 15.20 | 14.29 |
| 95th-Percentile Queue Length [ft/ln] | 40.32 | 505.74 | 56.90 | 299.58 | 305.38 | 0.00 | 216.2 | 359.3 | 387.4 | 288.1 | 369.36 | 379.90 | 357.21 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.96 | 87.14 | 51.60 | 35.47 | 35.44 | 0.00 | 60.44 | 74.36 | 71.59 | 69.52 | 70.25 | 70.91 |
| Movement LOS | D | F | D | D | D | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | | 80.76 | | | 35.46 | | | 71.31 | | | 69.91 | |
| Approach LOS | | F | | | D | | | E | | | E | |
| d_I, Intersection Delay [s/veh] | 64.46 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.621 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.46 | 63.46 | 63.46 | 63.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.519 | 4.295 | 4.335 | 2.758 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 457 |
| d_b, Bicycle Delay [s] | 49.75 | 39.81 | 50.32 | 45.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.376 | 4.091 | 3.036 | 2.156 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 60.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.102 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1821 | 0 | 0 | 906 | 771 | 1251 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1821 | 0 | 0 | 906 | 771 | 1251 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 469 | 0 | 0 | 234 | 199 | 322 |
| Total Analysis Volume [veh/h] | 1877 | 0 | 0 | 934 | 795 | 1290 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.54 | 0.27 | 0.23 | 0.47 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 14.31 | 9.05 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.24 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.23 | 0.72 | 0.23 | 153.31 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.91 | 0.45 | 0.66 | 1.33 |
| d, Delay for Lane Group [s/veh] | 21.53 | 9.77 | 22.10 | 179.25 |
| Lane Group LOS | C | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 14.56 | 4.13 | 6.00 | 29.21 |
| 50th-Percentile Queue Length [ft/ln] | 363.92 | 103.34 | 149.89 | 730.22 |
| 95th-Percentile Queue Length [veh/ln] | 20.81 | 7.44 | 10.01 | 44.86 |
| 95th-Percentile Queue Length [ft/ln] | 520.35 | 186.00 | 250.29 | 1121.47 |

**Movement, Approach, & Intersection Results**

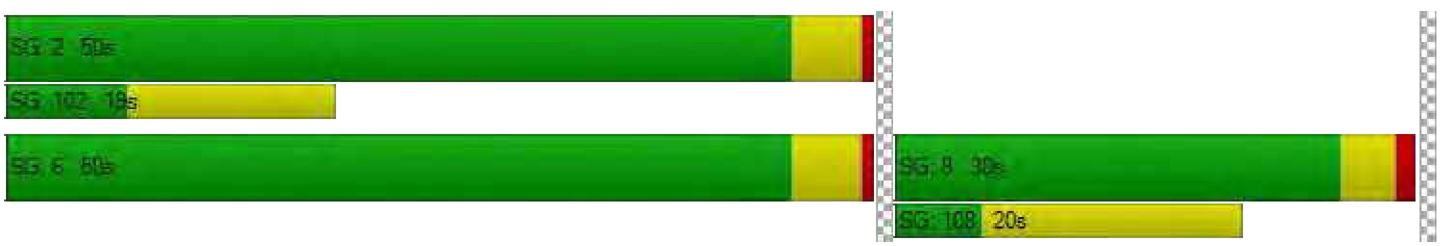
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.53 | 0.00 | 0.00 | 9.77 | 22.10 | 179.25 |
| Movement LOS | C | | | A | C | F |
| d_A, Approach Delay [s/veh] | 21.53 | | 9.77 | | 119.33 | |
| Approach LOS | C | | A | | F | |
| d_I, Intersection Delay [s/veh] | 60.94 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.102 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.126 | 2.633 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.108 | 2.330 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 24.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.875 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 493 | 10 | 52 | 183 | 35 | 37 | 41 | 23 | 22 | 55 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 493 | 10 | 52 | 183 | 35 | 37 | 41 | 23 | 22 | 55 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 129 | 3 | 16 | 57 | 11 | 12 | 13 | 7 | 6 | 15 | 36 |
| Total Analysis Volume [veh/h] | 14 | 515 | 10 | 65 | 229 | 44 | 47 | 52 | 29 | 24 | 60 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 616 | 583 | 504 | 552 |
| Degree of Utilization, x | 0.87 | 0.58 | 0.25 | 0.41 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 10.20 | 3.69 | 1.00 | 2.01 |
| 95th-Percentile Queue Length [ft] | 254.92 | 92.19 | 24.99 | 50.34 |
| Approach Delay [s/veh] | 36.32 | 17.32 | 12.55 | 14.05 |
| Approach LOS | E | C | B | B |
| Intersection Delay [s/veh] | 24.53 | | | |
| Intersection LOS | C | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 68.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.878 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1371 | 10 | 30 | 7 | 8 | 481 | 296 | 2095 | 761 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1371 | 10 | 30 | 7 | 8 | 481 | 296 | 2095 | 761 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 357 | 3 | 8 | 2 | 2 | 125 | 77 | 546 | 198 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1428 | 10 | 31 | 7 | 8 | 501 | 308 | 2182 | 793 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.11 | 0.54 | 0.18 | 0.18 | 0.23 | 0.23 | 0.23 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.35 | 0.01 | 0.01 | 0.16 | 0.16 | 0.21 | 0.43 | 0.46 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1624 | 1480 | 1444 | 5075 | 1806 |
| c, Capacity [veh/h] | 208 | 2143 | 339 | 293 | 367 | 335 | 327 | 2122 | 755 |
| d1, Uniform Delay [s] | 70.43 | 28.01 | 54.28 | 54.32 | 57.30 | 57.30 | 60.29 | 46.56 | 46.56 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.16 | 0.16 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 50.50 | 1.66 | 0.03 | 0.04 | 4.08 | 4.46 | 26.62 | 27.22 | 62.41 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.95 | 0.67 | 0.07 | 0.08 | 0.72 | 0.72 | 0.94 | 1.03 | 1.10 |
|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 120.93 | 29.67 | 54.31 | 54.36 | 61.37 | 61.75 | 86.91 | 73.78 | 108.96 |
| Lane Group LOS | F | C | D | D | E | E | F | F | F |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.98 | 13.71 | 0.86 | 0.78 | 10.45 | 9.56 | 14.63 | 33.26 | 42.88 |
| 50th-Percentile Queue Length [ft/ln] | 274.42 | 342.66 | 21.43 | 19.47 | 261.29 | 239.01 | 365.73 | 831.40 | 1071.96 |
| 95th-Percentile Queue Length [veh/ln] | 16.41 | 19.78 | 1.54 | 1.40 | 15.75 | 14.63 | 20.90 | 43.65 | 57.44 |
| 95th-Percentile Queue Length [ft/ln] | 410.25 | 494.45 | 38.58 | 35.04 | 393.84 | 365.78 | 522.55 | 1091.14 | 1436.03 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 120.93 | 120.93 | 29.67 | 54.31 | 54.34 | 54.36 | 61.37 | 61.56 | 86.91 | 73.78 | 108.96 | 108.96 |
| Movement LOS | F | F | C | D | D | D | E | E | F | F | F | F |
| d_A, Approach Delay [s/veh] | 40.73 | | | 54.33 | | | 71.11 | | | 83.46 | | |
| Approach LOS | D | | | D | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 68.75 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.878 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.595 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 4.241 | 1.599 | 2.234 | 6.526 |
| Bicycle LOS | D | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 100.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.740 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1357 | 623 | 0 | 1321 | 919 | 0 | 0 | 0 | 1097 | 0 | 394 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1357 | 623 | 0 | 1321 | 919 | 0 | 0 | 0 | 1097 | 0 | 394 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 350 | 156 | 0 | 340 | 237 | 0 | 0 | 0 | 274 | 0 | 109 |
| Total Analysis Volume [veh/h] | 0 | 1399 | 623 | 0 | 1362 | 947 | 0 | 0 | 0 | 1097 | 0 | 438 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 0 | | | 0 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 6 | | | 1 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.27 | 1.08 | | 0.31 | 0.15 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 2711 | 2711 | 471 | | 1276 | 1038 |
| d1, Uniform Delay [s] | 11.85 | 11.73 | 18.06 | | 23.53 | 19.11 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 0.67 | 462.77 | | 1.81 | 0.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.50 | 2.01 | | 0.86 | 0.42 |
| d, Delay for Lane Group [s/veh] | 12.55 | 12.40 | 480.82 | | 25.34 | 19.38 |
| Lane Group LOS | B | B | F | | C | B |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.96 | 4.78 | 67.87 | | 9.28 | 2.94 |
| 50th-Percentile Queue Length [ft/ln] | 123.95 | 119.39 | 1696.65 | | 232.00 | 73.62 |
| 95th-Percentile Queue Length [veh/ln] | 8.61 | 8.36 | 113.77 | | 14.28 | 5.30 |
| 95th-Percentile Queue Length [ft/ln] | 215.25 | 208.99 | 2844.17 | | 356.89 | 132.52 |

**Movement, Approach, & Intersection Results**

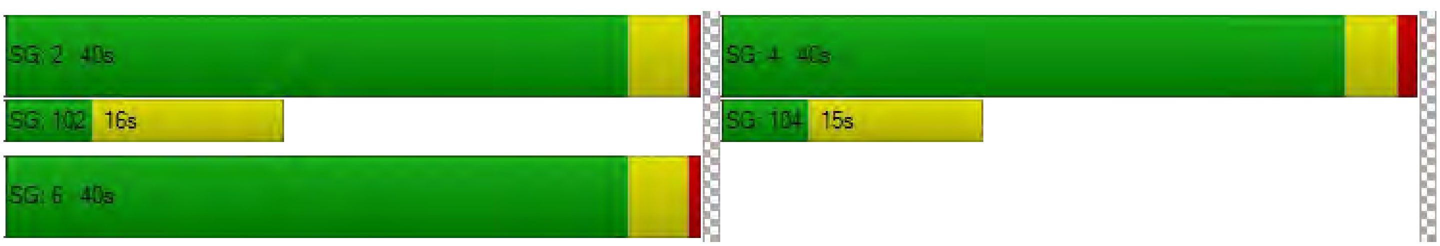
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.55 | 0.00 | 0.00 | 12.40 | 480.82 | 0.00 | 0.00 | 0.00 | 25.34 | 0.00 | 19.38 |
| Movement LOS | | B | | | B | F | | | | C | | B |
| d_A, Approach Delay [s/veh] | 12.55 | | | 204.52 | | | 0.00 | | | 23.64 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 100.34 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.740 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.035 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.329 | 2.830 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 146.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.617 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1718 | 748 | 0 | 1931 | 424 | 0 | 0 | 0 | 391 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1718 | 748 | 0 | 1931 | 424 | 0 | 0 | 0 | 391 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 443 | 193 | 0 | 498 | 106 | 0 | 0 | 0 | 98 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1771 | 771 | 0 | 1991 | 424 | 0 | 0 | 0 | 391 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 0 | | | 0 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 5 | | | 3 | | | 0 | | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.35 | 0.50 | 0.73 | | 0.11 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 18.70 | 21.54 | 21.97 | | 13.57 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.85 | 66.88 | 288.03 | | 0.08 | 113.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.79 | 1.11 | 1.63 | | 0.25 | 1.24 |
| d, Delay for Lane Group [s/veh] | 21.56 | 88.42 | 310.00 | | 13.65 | 135.29 |
| Lane Group LOS | C | F | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 9.11 | 24.54 | 39.43 | | 2.07 | 17.06 |
| 50th-Percentile Queue Length [ft/ln] | 227.79 | 613.41 | 985.84 | | 51.69 | 426.40 |
| 95th-Percentile Queue Length [veh/ln] | 14.06 | 35.09 | 64.41 | | 3.72 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 351.55 | 877.28 | 1610.34 | | 93.05 | 680.82 |

**Movement, Approach, & Intersection Results**

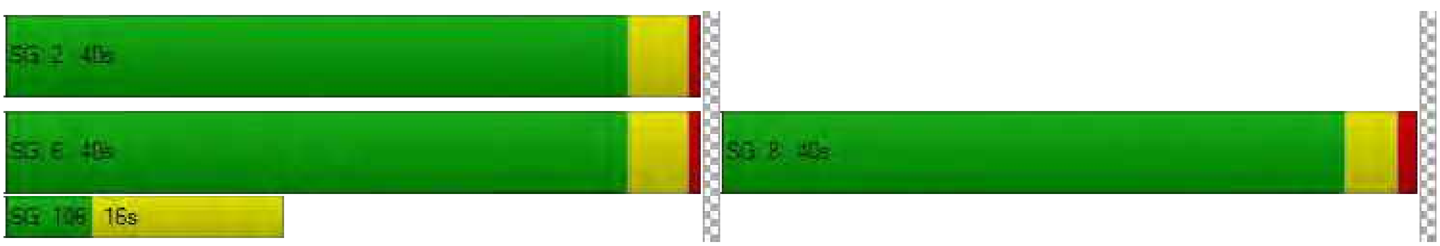
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 21.56 | 88.42 | 0.00 | 310.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.65 | 0.00 | 135.29 |
| Movement LOS | | C | F | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 41.84 | | | 310.00 | | | 0.00 | | | 97.78 | | |
| Approach LOS | D | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 146.10 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.617 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.958 | 2.655 | 4.132 | 1.560 |
| Bicycle LOS | C | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 44.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.032 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 324 | 292 | 1225 | 756 | 625 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 324 | 292 | 1225 | 756 | 625 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 77 | 322 | 199 | 164 | 517 |
| Total Analysis Volume [veh/h] | 341 | 307 | 1289 | 796 | 658 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 109 | 109 | 109 | 109 | 109 | 109 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 79 | 79 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.46 | 0.46 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.23 | 0.26 | 0.51 | 0.76 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 861 | 5020 |
| c, Capacity [veh/h] | 627 | 242 | 2278 | 710 | 643 | 3643 |
| d1, Uniform Delay [s] | 40.36 | 44.50 | 21.56 | 29.50 | 28.85 | 6.97 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.27 | 148.76 | 0.08 | 72.34 | 41.35 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.54 | 1.27 | 0.57 | 1.12 | 1.02 | 0.57 |
| d, Delay for Lane Group [s/veh] | 40.63 | 193.26 | 21.65 | 101.84 | 70.19 | 7.02 |
| Lane Group LOS | D | F | C | F | F | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.16 | 16.49 | 7.33 | 30.78 | 12.26 | 5.57 |
| 50th-Percentile Queue Length [ft/ln] | 103.99 | 412.23 | 183.15 | 769.50 | 306.58 | 139.13 |
| 95th-Percentile Queue Length [veh/ln] | 7.49 | 25.79 | 11.77 | 43.35 | 18.34 | 9.43 |
| 95th-Percentile Queue Length [ft/ln] | 187.18 | 644.63 | 294.13 | 1083.65 | 458.42 | 235.85 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

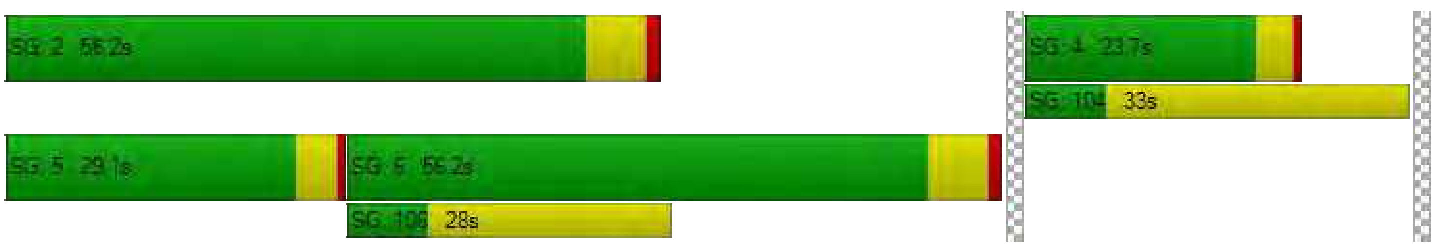
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 40.63 | 193.26 | 21.65 | 101.84 | 70.19 | 7.02 |
| Movement LOS | D | F | C | F | F | A |
| d_A, Approach Delay [s/veh] | 112.94 | | 52.26 | | 22.28 | |
| Approach LOS | F | | D | | C | |
| d_I, Intersection Delay [s/veh] | 44.50 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 1.032 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.06 | 44.06 | 44.06 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.250 | 3.647 | 3.506 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 367 | 917 | 917 |
| d_b, Bicycle Delay [s] | 36.33 | 15.97 | 15.97 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.706 | 3.058 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.713 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 438 | 93 | 1790 | 486 | 160 | 2354 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 438 | 93 | 1790 | 486 | 160 | 2354 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 113 | 24 | 461 | 125 | 41 | 607 |
| Total Analysis Volume [veh/h] | 452 | 96 | 1845 | 501 | 165 | 2427 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 73 | 73 | 73 | 73 | 73 | 73 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 12 | 12 | 38 | 38 | 8 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.52 | 0.52 | 0.11 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.06 | 0.37 | 0.34 | 0.09 | 0.48 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1493 | 1810 | 5024 |
| c, Capacity [veh/h] | 533 | 254 | 2550 | 768 | 207 | 3439 |
| d1, Uniform Delay [s] | 29.55 | 27.06 | 13.76 | 12.87 | 31.61 | 7.05 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.47 | 0.35 | 0.15 | 0.35 | 2.68 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.38 | 0.72 | 0.65 | 0.80 | 0.71 |
| d, Delay for Lane Group [s/veh] | 31.01 | 27.40 | 13.91 | 13.22 | 34.28 | 7.16 |
| Lane Group LOS | C | C | B | B | C | A |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.86 | 1.48 | 6.18 | 4.75 | 2.77 | 4.46 |
| 50th-Percentile Queue Length [ft/ln] | 96.59 | 37.12 | 154.40 | 118.85 | 69.35 | 111.48 |
| 95th-Percentile Queue Length [veh/ln] | 6.95 | 2.67 | 10.25 | 8.33 | 4.99 | 7.92 |
| 95th-Percentile Queue Length [ft/ln] | 173.85 | 66.82 | 256.29 | 208.25 | 124.82 | 198.06 |

**Movement, Approach, & Intersection Results**

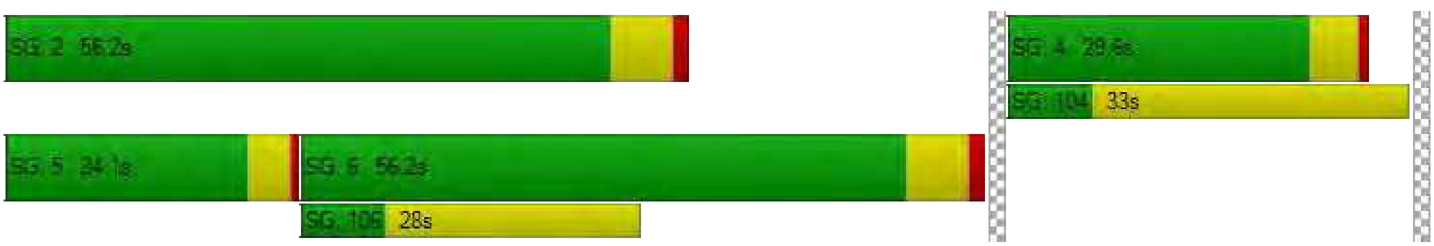
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.01 | 27.40 | 13.91 | 13.22 | 34.28 | 7.16 |
| Movement LOS | C | C | B | B | C | A |
| d_A, Approach Delay [s/veh] | 30.38 | | 13.76 | | 8.88 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 13.12 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.713 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 26.37 | 26.37 | 26.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.366 | 3.669 | 3.529 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 684 | 1368 | 1368 |
| d_b, Bicycle Delay [s] | 15.81 | 3.65 | 3.64 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.850 | 2.985 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.734 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 66 | 51 | 1116 | 396 | 247 | 2478 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 66 | 51 | 1116 | 396 | 247 | 2478 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 13 | 291 | 103 | 64 | 645 |
| Total Analysis Volume [veh/h] | 69 | 53 | 1163 | 413 | 257 | 2581 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 64 | 64 | 64 | 64 | 64 | 64 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 40 | 40 | 49 | 49 |
| g / C, Green / Cycle | 0.08 | 0.08 | 0.62 | 0.62 | 0.77 | 0.77 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.06 | 0.27 | 0.31 | 0.22 | 0.57 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1151 | 4496 |
| c, Capacity [veh/h] | 92 | 83 | 2640 | 824 | 967 | 3447 |
| d1, Uniform Delay [s] | 28.70 | 28.79 | 6.24 | 6.59 | 2.95 | 4.09 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.22 | 4.23 | 0.04 | 0.18 | 0.05 | 0.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.68 | 0.72 | 0.44 | 0.50 | 0.27 | 0.75 |
| d, Delay for Lane Group [s/veh] | 31.93 | 33.03 | 6.29 | 6.76 | 3.00 | 4.21 |
| Lane Group LOS | C | C | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.97 | 0.95 | 1.66 | 1.90 | 0.09 | 1.18 |
| 50th-Percentile Queue Length [ft/ln] | 24.28 | 23.70 | 41.55 | 47.41 | 2.15 | 29.38 |
| 95th-Percentile Queue Length [veh/ln] | 1.75 | 1.71 | 2.99 | 3.41 | 0.16 | 2.12 |
| 95th-Percentile Queue Length [ft/ln] | 43.70 | 42.67 | 74.78 | 85.34 | 3.88 | 52.88 |

**Movement, Approach, & Intersection Results**

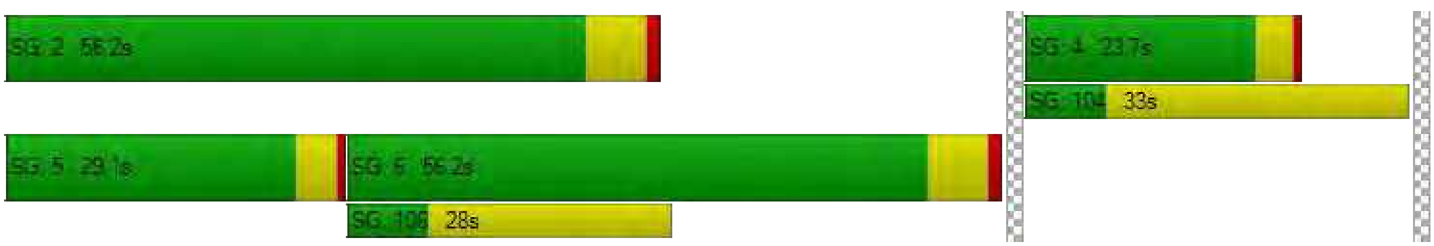
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.05 | 33.03 | 6.29 | 6.76 | 3.00 | 4.21 |
| Movement LOS | C | C | A | A | A | A |
| d_A, Approach Delay [s/veh] | 32.46 | | 6.41 | | 4.10 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.67 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.734 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.87 | 21.87 | 21.87 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.545 | 3.458 | 3.448 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 626 | 1566 | 1566 |
| d_b, Bicycle Delay [s] | 15.06 | 1.50 | 1.50 |
| I_b,int, Bicycle LOS Score for Intersection | 1.761 | 2.426 | 3.121 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 170.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.610 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 428 | 390 | 10 | 408 | 337 | 21 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 428 | 390 | 10 | 408 | 337 | 21 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 122 | 111 | 3 | 116 | 96 | 6 |
| Total Analysis Volume [veh/h] | 486 | 443 | 11 | 464 | 383 | 24 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 929 | 547 | 512 |
| Degree of Utilization, x | 1.61 | 0.87 | 0.79 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 50.83 | 9.60 | 7.43 |
| 95th-Percentile Queue Length [ft] | 1270.74 | 240.12 | 185.67 |
| Approach Delay [s/veh] | 299.10 | 38.82 | 32.04 |
| Approach LOS | F | E | D |
| Intersection Delay [s/veh] | 170.82 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.945 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 48 | 970 | 234 | 86 | 2766 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 48 | 970 | 234 | 86 | 2766 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 13 | 258 | 62 | 23 | 736 |
| Total Analysis Volume [veh/h] | 0 | 51 | 1032 | 249 | 91 | 2943 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 52 | 52 | 52 | 52 | 52 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 31 | 31 | 39 | 39 |
| g / C, Green / Cycle | 0.06 | 0.59 | 0.59 | 0.75 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.24 | 0.19 | 0.14 | 0.66 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 648 | 4426 |
| c, Capacity [veh/h] | 28 | 2481 | 774 | 617 | 3300 |
| d1, Uniform Delay [s] | 24.41 | 5.89 | 5.49 | 2.36 | 5.05 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 372.10 | 0.04 | 0.09 | 0.04 | 0.36 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.80 | 0.42 | 0.32 | 0.15 | 0.89 |
| d, Delay for Lane Group [s/veh] | 396.52 | 5.93 | 5.58 | 2.40 | 5.40 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.27 | 1.11 | 0.76 | 0.02 | 0.45 |
| 50th-Percentile Queue Length [ft/ln] | 81.70 | 27.70 | 18.99 | 0.45 | 11.23 |
| 95th-Percentile Queue Length [veh/ln] | 5.88 | 1.99 | 1.37 | 0.03 | 0.81 |
| 95th-Percentile Queue Length [ft/ln] | 147.05 | 49.85 | 34.19 | 0.82 | 20.22 |

**Movement, Approach, & Intersection Results**

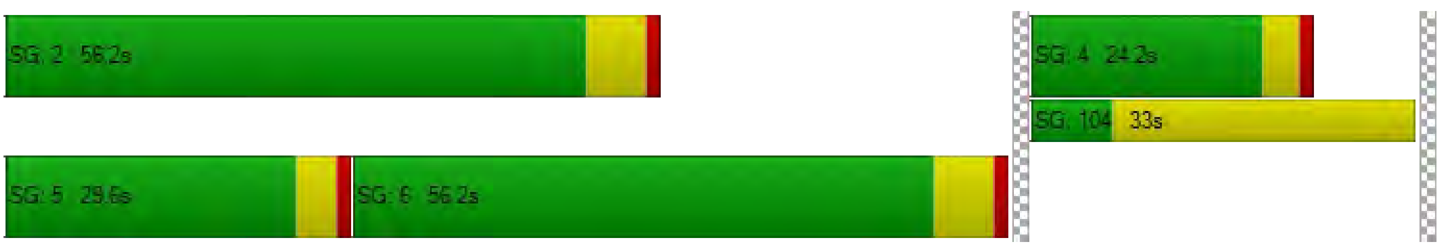
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 396.52 | 5.93 | 5.58 | 2.40 | 5.40 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 396.52 | | 5.86 | | 5.31 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 10.04 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.945 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 16.21 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.445 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 768 | 1920 | 1920 |
| d_b, Bicycle Delay [s] | 9.89 | 0.04 | 0.04 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.264 | 3.228 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 207: Chilco St/Constitution Dr

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 52.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.716 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 255 | 395 | 196 | 766 | 277 | 423 | 90 | 10 | 111 | 42 | 24 | 84 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 255 | 395 | 196 | 766 | 277 | 423 | 90 | 10 | 111 | 42 | 24 | 84 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 65 | 101 | 50 | 195 | 71 | 108 | 23 | 3 | 28 | 11 | 6 | 21 |
| Total Analysis Volume [veh/h] | 260 | 403 | 200 | 782 | 283 | 432 | 92 | 10 | 113 | 43 | 24 | 86 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 17 | 59 | 0 | 9 | 51 | 0 | 0 | 31 | 31 | 0 | 31 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 15 | 30 | 23 | 38 | 13 | 13 | 6 | 6 |
| g / C, Green / Cycle | 0.17 | 0.34 | 0.26 | 0.43 | 0.14 | 0.14 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.36 | 0.23 | 0.43 | 0.06 | 0.08 | 0.04 | 0.05 |
| s, saturation flow rate [veh/h] | 1767 | 1658 | 3431 | 1676 | 1775 | 1462 | 1760 | 1577 |
| c, Capacity [veh/h] | 305 | 564 | 901 | 722 | 256 | 211 | 125 | 112 |
| d1, Uniform Delay [s] | 35.40 | 29.07 | 31.03 | 24.91 | 34.26 | 34.78 | 39.80 | 39.89 |
| k, delay calibration | 0.11 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.76 | 57.51 | 2.70 | 31.21 | 1.00 | 2.12 | 5.09 | 6.44 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 1.07 | 0.87 | 0.99 | 0.40 | 0.54 | 0.63 | 0.66 |
| d, Delay for Lane Group [s/veh] | 42.16 | 86.58 | 33.74 | 56.12 | 35.26 | 36.90 | 44.89 | 46.33 |
| Lane Group LOS | D | F | C | E | D | D | D | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.86 | 20.33 | 8.01 | 20.00 | 2.02 | 2.32 | 1.81 | 1.74 |
| 50th-Percentile Queue Length [ft/ln] | 146.58 | 508.29 | 200.24 | 499.98 | 50.61 | 58.01 | 45.34 | 43.59 |
| 95th-Percentile Queue Length [veh/ln] | 9.83 | 28.96 | 12.65 | 27.33 | 3.64 | 4.18 | 3.26 | 3.14 |
| 95th-Percentile Queue Length [ft/ln] | 245.86 | 724.00 | 316.28 | 683.34 | 91.09 | 104.42 | 81.62 | 78.47 |

**Movement, Approach, & Intersection Results**

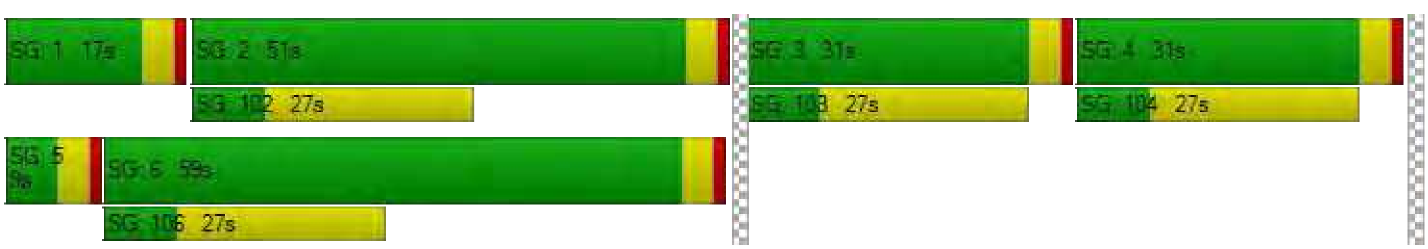
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 42.16 | 86.58 | 86.58 | 33.74 | 56.12 | 56.12 | 35.26 | 35.26 | 36.90 | 44.89 | 44.89 | 46.17 |
| Movement LOS | D | F | F | C | E | E | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 73.20 | | | 44.43 | | | 36.12 | | | 45.59 | | |
| Approach LOS | E | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 52.94 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.716 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.69 | 33.69 | 33.69 | 33.69 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.362 | 2.703 | 2.241 | 2.409 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1250 | 1068 | 614 | 614 |
| d_b, Bicycle Delay [s] | 6.19 | 9.55 | 21.14 | 21.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.984 | 4.030 | 1.914 | 1.812 |
| Bicycle LOS | C | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 359.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.661 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 197 | 333 | 118 | 190 | 301 | 335 | 39 | 34 | 191 | 0 | 252 | 24 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 197 | 333 | 118 | 190 | 301 | 335 | 39 | 34 | 191 | 0 | 252 | 24 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 93 | 33 | 53 | 84 | 93 | 11 | 9 | 53 | 0 | 70 | 7 |
| Total Analysis Volume [veh/h] | 219 | 370 | 131 | 211 | 334 | 372 | 43 | 38 | 212 | 0 | 280 | 27 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.92 | 0.16 | 0.46 | 0.28 | 0.11 | 0.12 |
| s, saturation flow rate [veh/h] | 781 | 1357 | 1552 | 1030 | 1371 | 1290 |
| c, Capacity [veh/h] | 276 | 399 | 457 | 302 | 439 | 380 |
| d1, Uniform Delay [s] | 43.16 | 30.03 | 35.95 | 35.54 | 28.39 | 28.70 |
| k, delay calibration | 0.50 | 0.11 | 0.50 | 0.43 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 733.57 | 1.08 | 256.29 | 40.58 | 0.49 | 0.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 2.61 | 0.53 | 1.55 | 0.97 | 0.36 | 0.40 |
| d, Delay for Lane Group [s/veh] | 776.73 | 31.12 | 292.24 | 76.12 | 28.88 | 29.36 |
| Lane Group LOS | F | C | F | E | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 63.30 | 4.39 | 43.58 | 10.41 | 3.06 | 2.98 |
| 50th-Percentile Queue Length [ft/ln] | 1582.53 | 109.82 | 1089.60 | 260.36 | 76.53 | 74.43 |
| 95th-Percentile Queue Length [veh/ln] | 103.77 | 7.83 | 67.47 | 15.71 | 5.51 | 5.36 |
| 95th-Percentile Queue Length [ft/ln] | 2594.13 | 195.75 | 1686.87 | 392.68 | 137.76 | 133.98 |

**Movement, Approach, & Intersection Results**

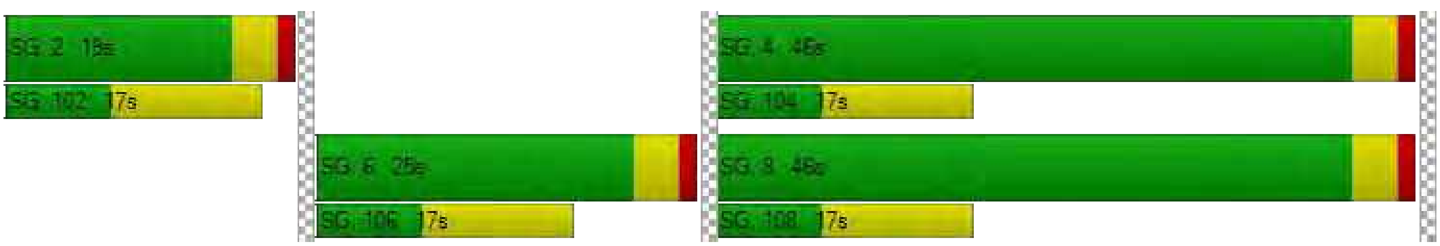
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 776.73 | 776.73 | 776.73 | 31.12 | 292.24 | 292.24 | 76.12 | 76.12 | 76.12 | 28.88 | 29.09 | 29.36 |
| Movement LOS | F | F | F | C | F | F | E | E | E | C | C | C |
| d_A, Approach Delay [s/veh] | 776.73 | | | 232.15 | | | 76.12 | | | 29.12 | | |
| Approach LOS | F | | | F | | | E | | | C | | |
| d_I, Intersection Delay [s/veh] | 359.13 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.661 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 40.56 | 40.56 | 40.56 | 40.56 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.408 | 2.299 | 2.458 | 2.301 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 824 | 412 | 294 | 824 |
| d_b, Bicycle Delay [s] | 17.62 | 32.13 | 37.07 | 17.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.748 | 3.073 | 2.043 | 1.813 |
| Bicycle LOS | B | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# Intersection Level Of Service Report
## Intersection 264: Adams Drive/O'Brien Drive

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 62.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.497 |

### Intersection Setup

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 49 | 95 | 179 | 220 | 343 | 126 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 95 | 179 | 220 | 343 | 126 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 31 | 58 | 71 | 111 | 41 |
| Total Analysis Volume [veh/h] | 64 | 123 | 232 | 286 | 445 | 164 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.50 | 0.23 | 0.24 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 62.37 | 41.00 | 9.98 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | E | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 5.02 | 5.02 | 0.95 | 0.95 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 125.46 | 125.46 | 23.83 | 23.83 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 48.31 | | 4.47 | | 0.00 | |
| Approach LOS | E | | A | | A | |
| d_I, Intersection Delay [s/veh] | 8.64 | | | | | |
| Intersection LOS | F | | | | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 20.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.057 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 230 | 42 | 60 | 103 | 13 | 108 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 230 | 42 | 60 | 103 | 13 | 108 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 68 | 12 | 18 | 30 | 4 | 32 |
| Total Analysis Volume [veh/h] | 271 | 49 | 71 | 121 | 15 | 127 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.21 | 0.00 | 0.00 | 0.00 | 0.06 | 0.16 |
| d_M, Delay for Movement [s/veh] | 8.43 | 0.00 | 0.00 | 0.00 | 20.11 | 10.90 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.77 | 0.77 | 0.00 | 0.00 | 0.80 | 0.80 |
| 95th-Percentile Queue Length [ft/ln] | 19.25 | 19.25 | 0.00 | 0.00 | 20.11 | 20.11 |
| d_A, Approach Delay [s/veh] | 7.14 | | 0.00 | | 11.87 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 6.07 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | | | | | |
| Maximum Recall | | | | | | |
| Pedestrian Recall | | | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

**Lane Group Results**

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | | | | | |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.00 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.000 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 45.00 | 45.00 | 45.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.141 | 2.463 | 2.141 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 | 0 |
| d_b, Bicycle Delay [s] | 45.00 | 45.00 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 | 1.560 |
| Bicycle LOS | A | A | A |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 2.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Exiting Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjusted Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 0 | 0 | 0 | 0 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1380 | 1380 | 1380 | 1380 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1353 | 1353 | 1353 | 1353 |
| X, volume / capacity | 0.00 | 0.00 | 0.00 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | A | A | A |
| 95th-Percentile Queue Length [veh] | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 |
| Approach Delay [s/veh] | 2.66 | 2.66 | 2.66 | 2.66 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 2.66 | | | |
| Intersection LOS | A | | | |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro | Scenario 19 Cumulative AM (2040 vols)
Report File: P:\...\Cumulative AM.pdf | 12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 1037 | 1481 | 1341 | 539 | 4398 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 42 | 1324 | 7 | 448 | 1259 | 338 | 13 | 4 | 68 | 353 | 19 | 0 | 3875 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 220 | 983 | 124 | 29 | 1031 | 413 | 622 | 76 | 230 | 39 | 21 | 25 | 3813 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 836 | 82 | 425 | 755 | 47 | 339 | 68 | 2 | 45 | 52 | 339 | 2990 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 569 | 520 | 508 | 501 | 104 | 2289 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 684 | 206 | 288 | 747 | 56 | 2529 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 829 | 110 | 1297 | 2940 | 333 | 416 | 5925 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 249 | 596 | 277 | 38 | 76 | 72 | 391 | 475 | 195 | 1133 | 2572 | 72 | 6146 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 99 | 820 | 379 | 190 | 1297 | 48 | 47 | 56 | 48 | 56 | 431 | 373 | 3844 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 237 | 1304 | 1231 | 31 | 88 | 95 | 2986 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1395 | 878 | 42 | 1187 | 237 | 259 | 3998 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 160 | 1808 | 351 | 40 | 1347 | 7 | 95 | 142 | 458 | 298 | 167 | 241 | 5114 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1402 | 1226 | 655 | 441 | 60 | 3849 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 23 | 913 | 7 | 36 | 931 | 108 | 67 | 14 | 32 | 59 | 12 | 360 | 2562 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 37 | 783 | 7 | 4 | 878 | 186 | 283 | 6 | 64 | 1 | 2 | 6 | 2257 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 686 | 151 | 52 | 919 | 0 | 21 | 111 | 11 | 153 | 95 | 93 | 2299 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 297 | 156 | 374 | 138 | 445 | 132 | 456 | 170 | 343 | 331 | 20 | 2889 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1821 | 906 | 771 | 1251 | 4749 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 493 | 10 | 52 | 183 | 35 | 37 | 41 | 23 | 22 | 55 | 131 | 1095 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1371 | 10 | 30 | 7 | 8 | 481 | 296 | 2095 | 761 | 34 | 5282 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1357 | 623 | 1321 | 919 | 1097 | 394 | 5711 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1718 | 748 | 1931 | 424 | 391 | 789 | 6001 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 324 | 292 | 1225 | 756 | 625 | 1963 | 5185 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 438 | 93 | 1790 | 486 | 160 | 2354 | 5321 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 66 | 51 | 1116 | 396 | 247 | 2478 | 4354 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 428 | 390 | 10 | 408 | 337 | 21 | 1594 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 48 | 970 | 234 | 86 | 2766 | 4104 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 255 | 395 | 196 | 766 | 277 | 423 | 90 | 10 | 111 | 42 | 24 | 84 | 2673 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 197 | 333 | 118 | 190 | 301 | 335 | 39 | 34 | 191 | 0 | 252 | 24 | 2014 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 49 | 95 | 179 | 220 | 343 | 126 | 1012 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 230 | 42 | 60 | 103 | 13 | 108 | 556 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Cumulative AM.pdf

Scenario 19 Cumulative AM (2040 vols)
12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 1037 | 1481 | 1341 | 539 | 4398 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1037** | **1481** | **1341** | **539** | **4398** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 42 | 1324 | 7 | 448 | 1259 | 338 | 13 | 4 | 68 | 353 | 19 | 0 | 3875 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **42** | **1324** | **7** | **448** | **1259** | **338** | **13** | **4** | **68** | **353** | **19** | **0** | **3875** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 220 | 983 | 124 | 29 | 1031 | 413 | 622 | 76 | 230 | 39 | 21 | 25 | 3813 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **220** | **983** | **124** | **29** | **1031** | **413** | **622** | **76** | **230** | **39** | **21** | **25** | **3813** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 836 | 82 | 425 | 755 | 47 | 339 | 68 | 2 | 45 | 52 | 339 | 2990 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **836** | **82** | **425** | **755** | **47** | **339** | **68** | **2** | **45** | **52** | **339** | **2990** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 569 | 520 | 508 | 501 | 104 | 2289 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **569** | **520** | **508** | **501** | **104** | **2289** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 684 | 206 | 288 | 747 | 56 | 2529 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **344** | **21** | **684** | **206** | **288** | **747** | **56** | **2529** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 829 | 110 | 1297 | 2940 | 333 | 416 | 5925 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **829** | **110** | **1297** | **2940** | **333** | **416** | **5925** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 249 | 596 | 277 | 38 | 76 | 72 | 391 | 475 | 195 | 1133 | 2572 | 72 | 6146 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **249** | **596** | **277** | **38** | **76** | **72** | **391** | **475** | **195** | **1133** | **2572** | **72** | **6146** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 99 | 820 | 379 | 190 | 1297 | 48 | 47 | 56 | 48 | 56 | 431 | 373 | 3844 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **99** | **820** | **379** | **190** | **1297** | **48** | **47** | **56** | **48** | **56** | **431** | **373** | **3844** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 237 | 1304 | 1231 | 31 | 88 | 95 | 2986 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **237** | **1304** | **1231** | **31** | **88** | **95** | **2986** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1395 | 878 | 42 | 1187 | 237 | 259 | 3998 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1395** | **878** | **42** | **1187** | **237** | **259** | **3998** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 160 | 1808 | 351 | 40 | 1347 | 7 | 95 | 142 | 458 | 298 | 167 | 241 | 5114 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **160** | **1808** | **351** | **40** | **1347** | **7** | **95** | **142** | **458** | **298** | **167** | **241** | **5114** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1402 | 1226 | 655 | 441 | 60 | 3849 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1402** | **1226** | **655** | **441** | **60** | **3849** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 23 | 913 | 7 | 36 | 931 | 108 | 67 | 14 | 32 | 59 | 12 | 360 | 2562 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **23** | **913** | **7** | **36** | **931** | **108** | **67** | **14** | **32** | **59** | **12** | **360** | **2562** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 37 | 783 | 7 | 4 | 878 | 186 | 283 | 6 | 64 | 1 | 2 | 6 | 2257 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **37** | **783** | **7** | **4** | **878** | **186** | **283** | **6** | **64** | **1** | **2** | **6** | **2257** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 686 | 151 | 52 | 919 | 0 | 21 | 111 | 11 | 153 | 95 | 93 | 2299 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **686** | **151** | **52** | **919** | **0** | **21** | **111** | **11** | **153** | **95** | **93** | **2299** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 297 | 156 | 374 | 138 | 445 | 132 | 456 | 170 | 343 | 331 | 20 | 2889 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **297** | **156** | **374** | **138** | **445** | **132** | **456** | **170** | **343** | **331** | **20** | **2889** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1821 | 906 | 771 | 1251 | 4749 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1821** | **906** | **771** | **1251** | **4749** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 493 | 10 | 52 | 183 | 35 | 37 | 41 | 23 | 22 | 55 | 131 | 1095 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **493** | **10** | **52** | **183** | **35** | **37** | **41** | **23** | **22** | **55** | **131** | **1095** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1371 | 10 | 30 | 7 | 8 | 481 | 296 | 2095 | 761 | 34 | 5282 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1371** | **10** | **30** | **7** | **8** | **481** | **296** | **2095** | **761** | **34** | **5282** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1357 | 623 | 1321 | 919 | 1097 | 394 | 5711 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1357** | **623** | **1321** | **919** | **1097** | **394** | **5711** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1718 | 748 | 1931 | 424 | 391 | 789 | 6001 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1718** | **748** | **1931** | **424** | **391** | **789** | **6001** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 324 | 292 | 1225 | 756 | 625 | 1963 | 5185 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **324** | **292** | **1225** | **756** | **625** | **1963** | **5185** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 438 | 93 | 1790 | 486 | 160 | 2354 | 5321 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **438** | **93** | **1790** | **486** | **160** | **2354** | **5321** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 66 | 51 | 1116 | 396 | 247 | 2478 | 4354 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **66** | **51** | **1116** | **396** | **247** | **2478** | **4354** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 428 | 390 | 10 | 408 | 337 | 21 | 1594 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **428** | **390** | **10** | **408** | **337** | **21** | **1594** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 48 | 970 | 234 | 86 | 2766 | 4104 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **970** | **234** | **86** | **2766** | **4104** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 255 | 395 | 196 | 766 | 277 | 423 | 90 | 10 | 111 | 42 | 24 | 84 | 2673 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **255** | **395** | **196** | **766** | **277** | **423** | **90** | **10** | **111** | **42** | **24** | **84** | **2673** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 197 | 333 | 118 | 190 | 301 | 335 | 39 | 34 | 191 | 0 | 252 | 24 | 2014 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **197** | **333** | **118** | **190** | **301** | **335** | **39** | **34** | **191** | **0** | **252** | **24** | **2014** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 49 | 95 | 179 | 220 | 343 | 126 | 1012 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **49** | **95** | **179** | **220** | **343** | **126** | **1012** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 230 | 42 | 60 | 103 | 13 | 108 | 556 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **230** | **42** | **60** | **103** | **13** | **108** | **556** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 516 | 270 | 208 | 101 |
| 2 | 501 | 262 | 202 | 98 |
| 3 | 490 | 257 | 198 | 96 |
| 4 | 459 | 240 | 185 | 90 |
| 5 | 408 | 213 | 164 | 80 |
| 6 | 402 | 211 | 162 | 79 |
| 7 | 397 | 208 | 160 | 78 |
| 8 | 361 | 189 | 146 | 71 |
| 9 | 356 | 186 | 144 | 70 |
| 10 | 351 | 184 | 141 | 69 |
| 11 | 304 | 159 | 123 | 60 |
| 12 | 284 | 149 | 114 | 56 |
| 13 | 279 | 146 | 112 | 55 |
| 14 | 206 | 108 | 83 | 40 |
| 15 | 206 | 108 | 83 | 40 |
| 16 | 144 | 76 | 58 | 28 |
| 17 | 83 | 43 | 33 | 16 |
| 18 | 83 | 43 | 33 | 16 |
| 19 | 46 | 24 | 19 | 9 |
| 20 | 26 | 14 | 10 | 5 |
| 21 | 15 | 8 | 6 | 3 |
| 22 | 5 | 3 | 2 | 1 |
| 23 | 5 | 3 | 2 | 1 |
| 24 | 5 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 786 | 1 | 208 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 763 | 1 | 202 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 747 | 1 | 198 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 699 | 1 | 185 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 621 | 1 | 164 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 613 | 1 | 162 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 605 | 1 | 160 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 550 | 1 | 146 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 542 | 1 | 144 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 535 | 1 | 141 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 463 | 1 | 123 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 433 | 1 | 114 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 425 | 1 | 112 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 314 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 314 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 220 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 126 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 126 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 70 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 40 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 23 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 7 | 11 | 13 | 13 | 2 | 7 | 10 | 13 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 14 | 12.6 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:48 | 0:21 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 208 | 101 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1095 | 1095 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 418 | 818 | 358 |
| 2 | 405 | 793 | 347 |
| 3 | 397 | 777 | 340 |
| 4 | 372 | 728 | 319 |
| 5 | 330 | 646 | 283 |
| 6 | 326 | 638 | 279 |
| 7 | 322 | 630 | 276 |
| 8 | 293 | 573 | 251 |
| 9 | 288 | 564 | 247 |
| 10 | 284 | 556 | 243 |
| 11 | 247 | 483 | 211 |
| 12 | 230 | 450 | 197 |
| 13 | 226 | 442 | 193 |
| 14 | 167 | 327 | 143 |
| 15 | 167 | 327 | 143 |
| 16 | 117 | 229 | 100 |
| 17 | 67 | 131 | 57 |
| 18 | 67 | 131 | 57 |
| 19 | 38 | 74 | 32 |
| 20 | 21 | 41 | 18 |
| 21 | 13 | 25 | 11 |
| 22 | 4 | 8 | 4 |
| 23 | 4 | 8 | 4 |
| 24 | 4 | 8 | 4 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1236 | 1 | 358 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1198 | 1 | 347 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1174 | 1 | 340 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1100 | 1 | 319 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 976 | 1 | 283 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 964 | 1 | 279 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 952 | 1 | 276 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 866 | 1 | 251 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 852 | 1 | 247 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 840 | 1 | 243 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 730 | 1 | 211 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 680 | 1 | 197 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 13 | 1 | 668 | 1 | 193 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 14 | 1 | 494 | 1 | 143 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 494 | 1 | 143 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 346 | 1 | 100 | No | No | No | Yes | No | No | No | No | No | No |
| 17 | 1 | 198 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 198 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 112 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 62 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 38 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 15 | 15 | 16 | 10 | 13 | 13 | 15 | 13 | 4 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 32 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 3:11 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 358 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1594 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 469 | 399 | 144 |
| 2 | 455 | 387 | 140 |
| 3 | 446 | 379 | 137 |
| 4 | 417 | 355 | 128 |
| 5 | 371 | 315 | 114 |
| 6 | 366 | 311 | 112 |
| 7 | 361 | 307 | 111 |
| 8 | 328 | 279 | 101 |
| 9 | 324 | 275 | 99 |
| 10 | 319 | 271 | 98 |
| 11 | 277 | 235 | 85 |
| 12 | 258 | 219 | 79 |
| 13 | 253 | 215 | 78 |
| 14 | 188 | 160 | 58 |
| 15 | 188 | 160 | 58 |
| 16 | 131 | 112 | 40 |
| 17 | 75 | 64 | 23 |
| 18 | 75 | 64 | 23 |
| 19 | 42 | 36 | 13 |
| 20 | 23 | 20 | 7 |
| 21 | 14 | 12 | 4 |
| 22 | 5 | 4 | 1 |
| 23 | 5 | 4 | 1 |
| 24 | 5 | 4 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 868 | 1 | 144 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 842 | 1 | 140 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 825 | 1 | 137 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 4 | 1 | 772 | 1 | 128 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 5 | 1 | 686 | 1 | 114 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 677 | 1 | 112 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 668 | 1 | 111 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 607 | 1 | 101 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 599 | 1 | 99 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 590 | 1 | 98 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 512 | 1 | 85 | No | No | No | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 477 | 1 | 79 | No | No | No | No | No | No | No | Yes | No | No |
| 13 | 1 | 468 | 1 | 78 | No | No | No | No | No | No | No | Yes | No | No |
| 14 | 1 | 348 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 348 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 243 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 139 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 139 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 78 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 43 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 26 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 11 | 4 | 8 | 10 | 13 | 2 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 48.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:55 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 144 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1012 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 272 | 163 | 121 |
| 2 | 264 | 158 | 117 |
| 3 | 258 | 155 | 115 |
| 4 | 242 | 145 | 108 |
| 5 | 215 | 129 | 96 |
| 6 | 212 | 127 | 94 |
| 7 | 209 | 126 | 93 |
| 8 | 190 | 114 | 85 |
| 9 | 188 | 112 | 83 |
| 10 | 185 | 111 | 82 |
| 11 | 160 | 96 | 71 |
| 12 | 150 | 90 | 67 |
| 13 | 147 | 88 | 65 |
| 14 | 109 | 65 | 48 |
| 15 | 109 | 65 | 48 |
| 16 | 76 | 46 | 34 |
| 17 | 44 | 26 | 19 |
| 18 | 44 | 26 | 19 |
| 19 | 24 | 15 | 11 |
| 20 | 14 | 8 | 6 |
| 21 | 8 | 5 | 4 |
| 22 | 3 | 2 | 1 |
| 23 | 3 | 2 | 1 |
| 24 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 435 | 1 | 121 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 2 | 1 | 422 | 1 | 117 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 3 | 1 | 413 | 1 | 115 | No | No | Yes | Yes | No | No | No | No | No | No |
| 4 | 1 | 387 | 1 | 108 | No | No | Yes | Yes | No | No | No | No | No | No |
| 5 | 1 | 344 | 1 | 96 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 339 | 1 | 94 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 335 | 1 | 93 | No | No | No | Yes | No | No | No | No | No | No |
| 8 | 1 | 304 | 1 | 85 | No | No | No | Yes | No | No | No | No | No | No |
| 9 | 1 | 300 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 296 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 256 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 240 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 235 | 1 | 65 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 174 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 174 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 122 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 70 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 70 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 39 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 22 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 13 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 1 | 4 | 8 | 0 | 0 | 0 | 2 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:23 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 121 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 556 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

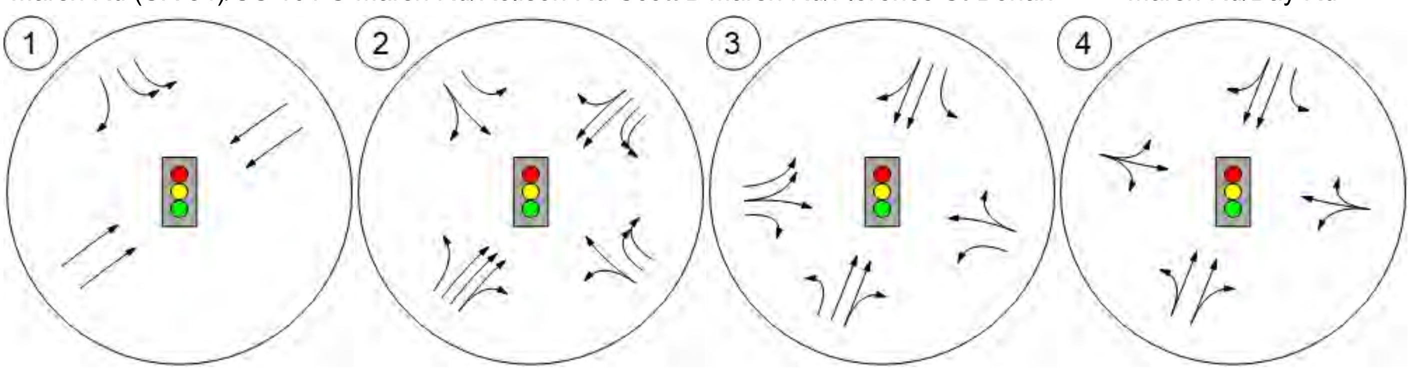
Study Intersections

Generated with PTV VISTRO

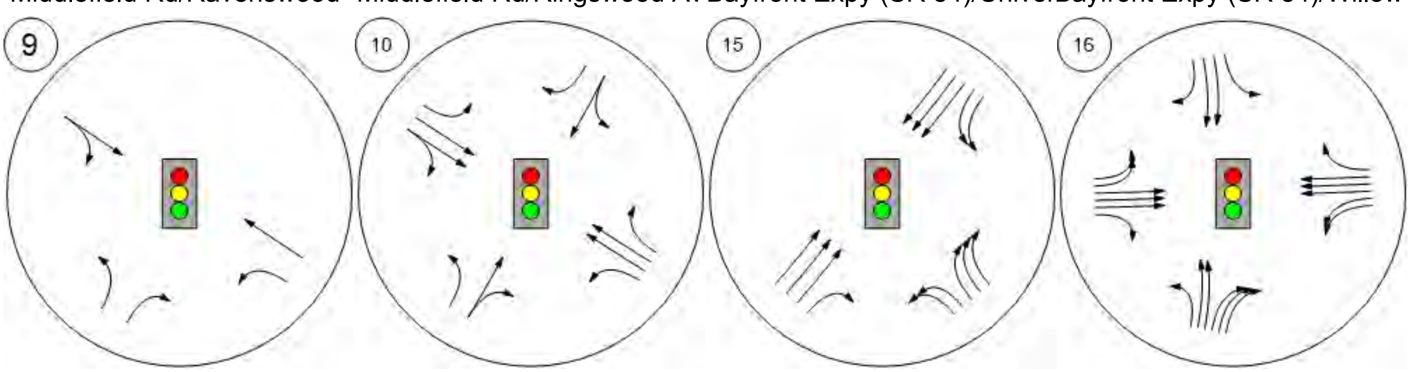
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd

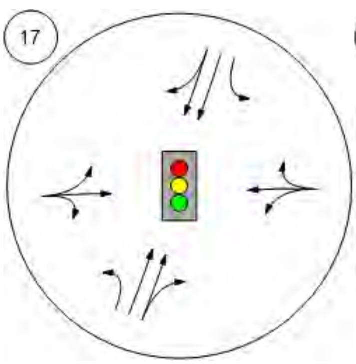



Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

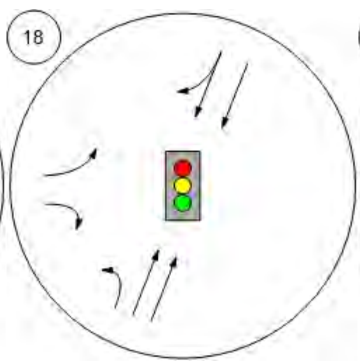


## Lane Configuration and Traffic Control

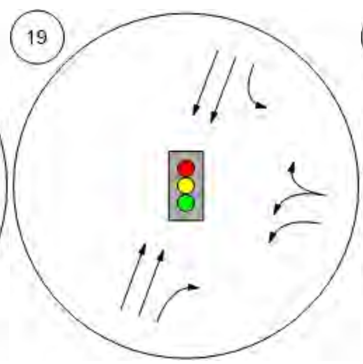

Willow Rd (SR 114)/Hamilton



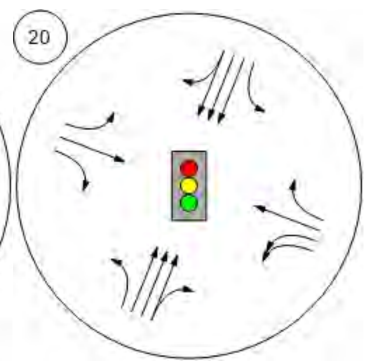

Willow Rd (SR 114)/Ivy Dr



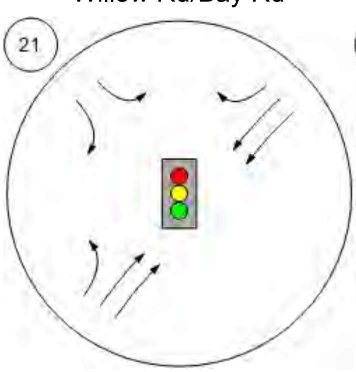

Willow Rd (SR 114)/O'Brien



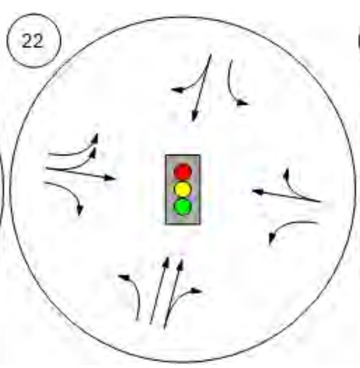

Willow Rd (SR 114)/Newbrid



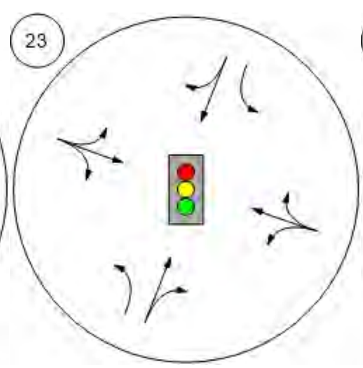

Willow Rd/Bay Rd



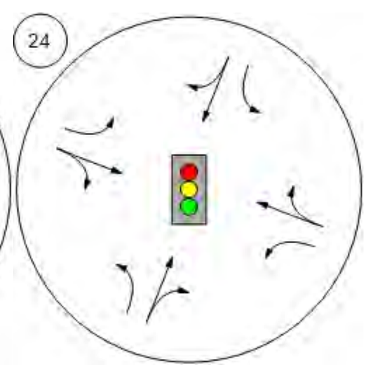

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



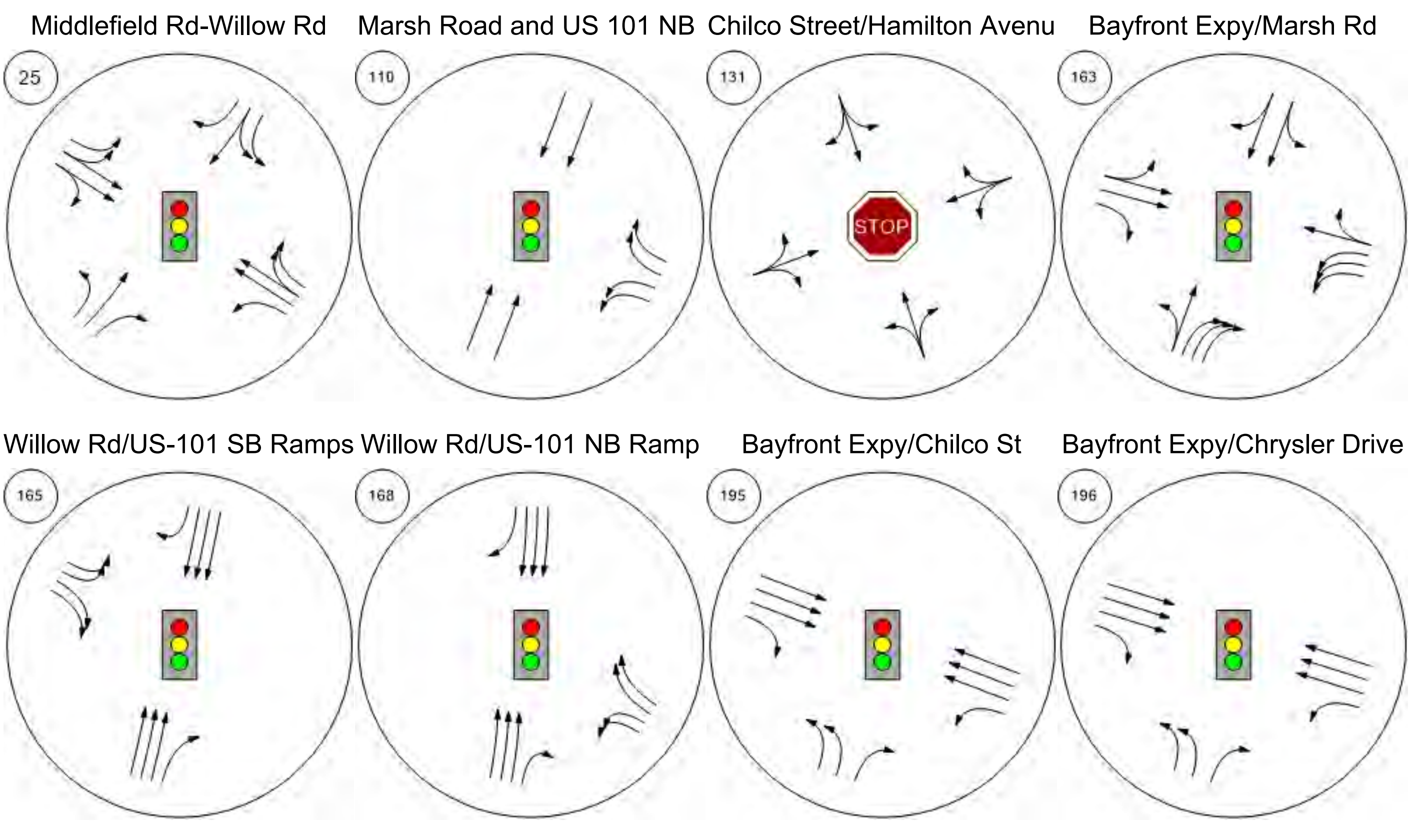

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

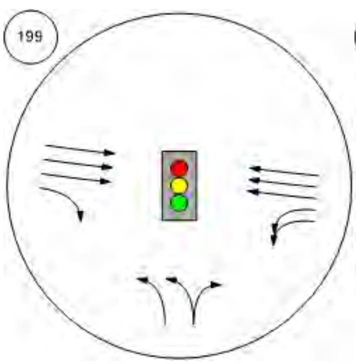



Generated with PTV VISTRO

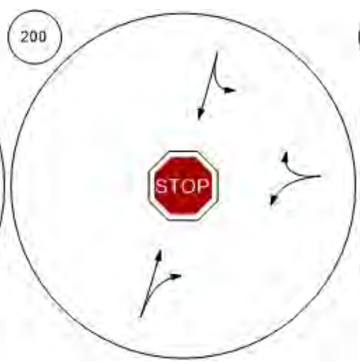
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

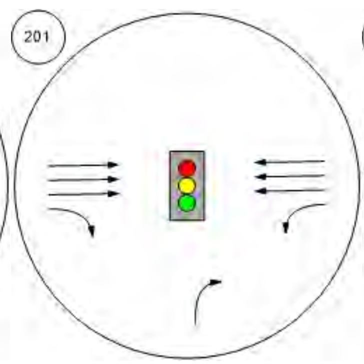

Bayfront Expwy/Bldg 21



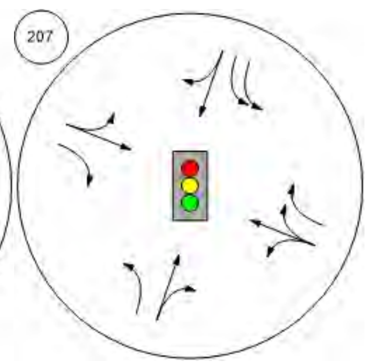

O'Brien Drive/Kavanaugh Dri



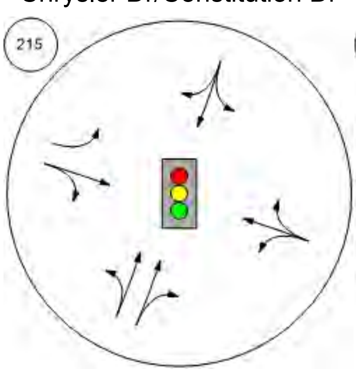

Bayfront Expwy/Bldg 20



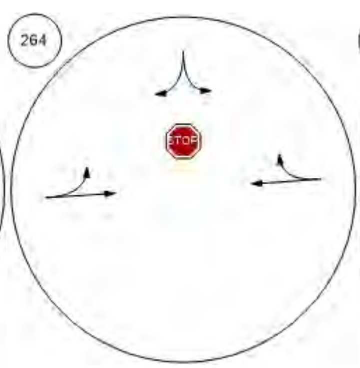

Chilco St/Constitution Dr



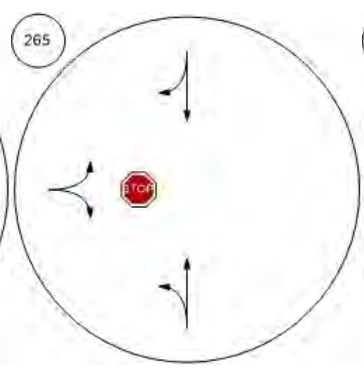

Chrysler Dr/Constitution Dr



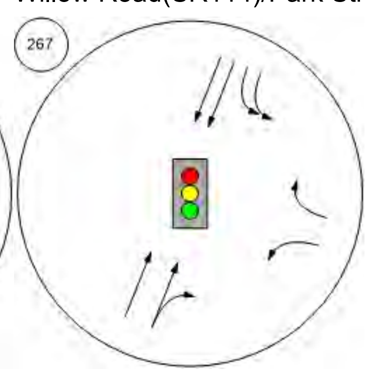

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

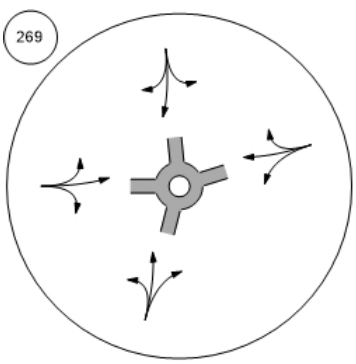


Generated with PTV VISTRO

Version 2021 (SP 0-6)

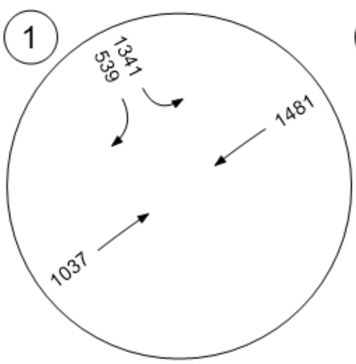
Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

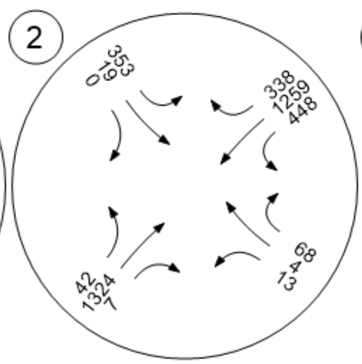


Traffic Volume - Base Volume

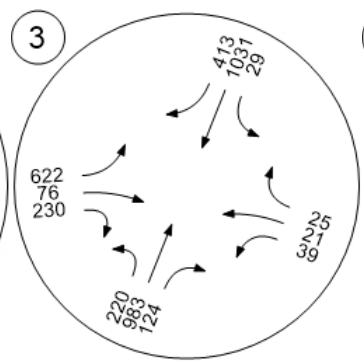

Marsh Rd (SR 84)/US 101 S



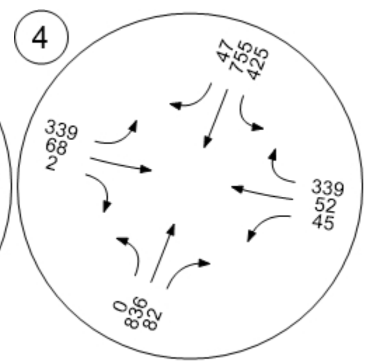

Marsh Rd/Rolison Rd-Scott D



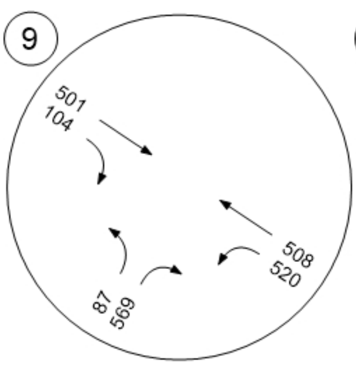

Marsh Rd/Florence St-Bohan



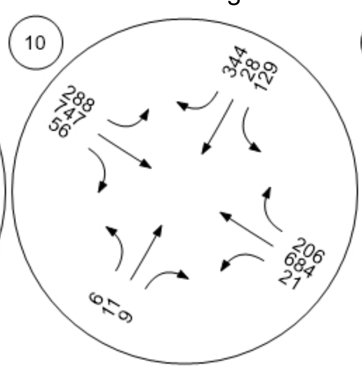

Marsh Rd/Bay Rd



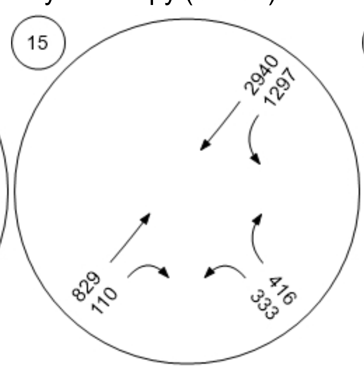

Middlefield Rd/Ravenswood



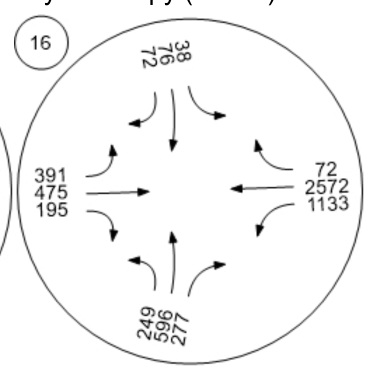

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

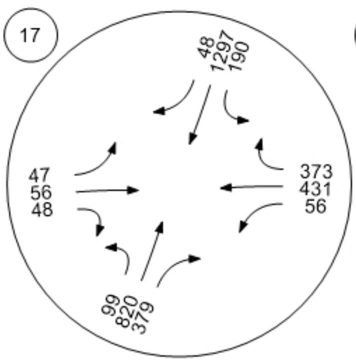


Generated with PTV VISTRO

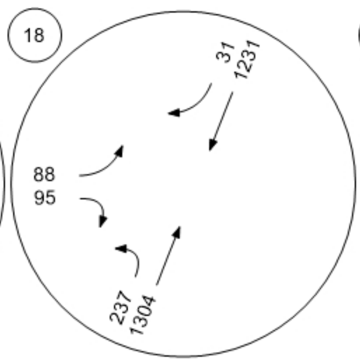
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

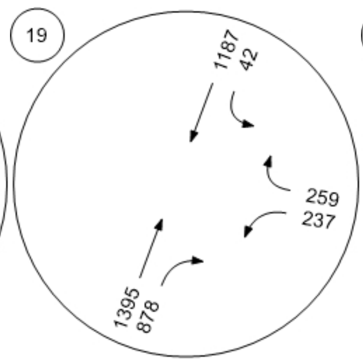

Willow Rd (SR 114)/Hamilton



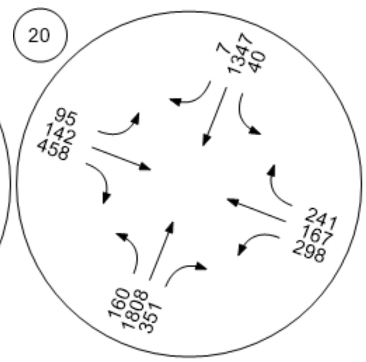

Willow Rd (SR 114)/Ivy Dr



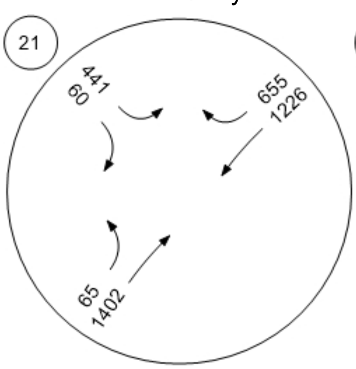

Willow Rd (SR 114)/O'Brien



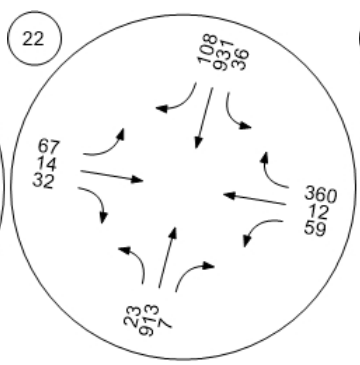

Willow Rd (SR 114)/Newbrid



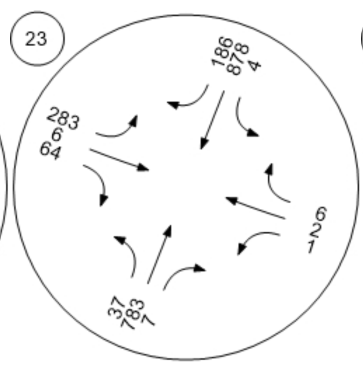

Willow Rd/Bay Rd



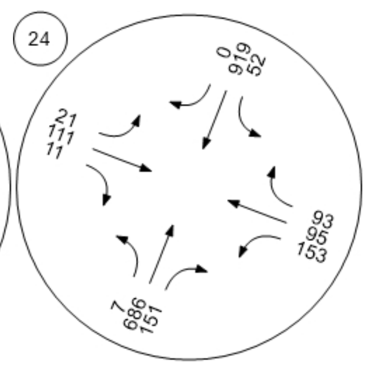

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

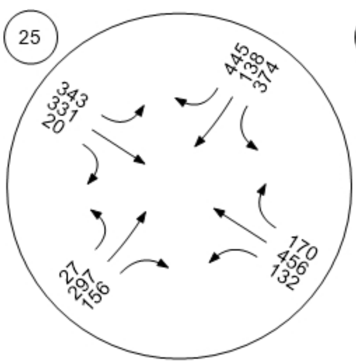


Generated with PTV VISTRO

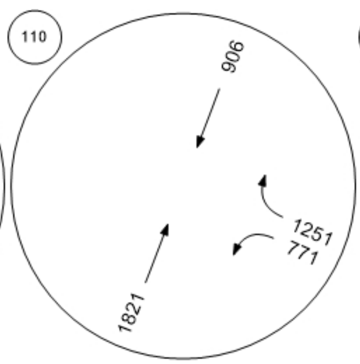
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

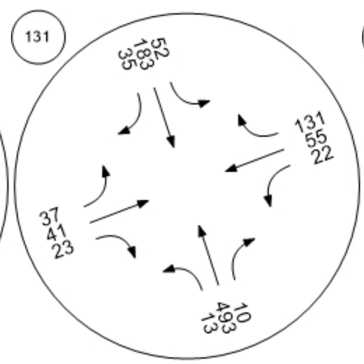

Middlefield Rd-Willow Rd



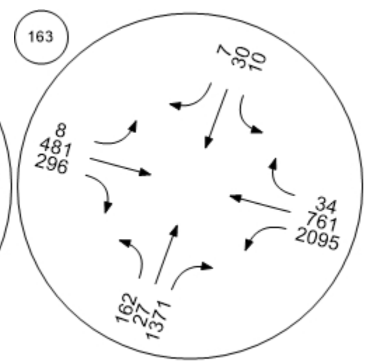

Marsh Road and US 101 NB



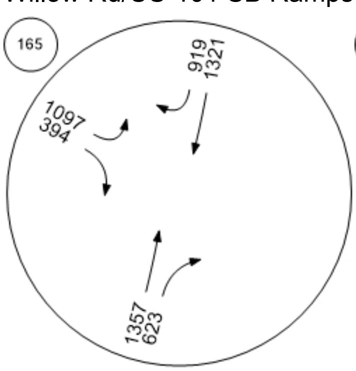

Chilco Street/Hamilton Avenu



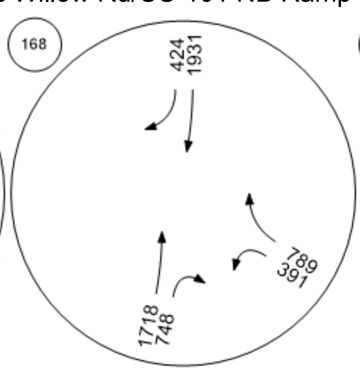

Bayfront Expy/Marsh Rd



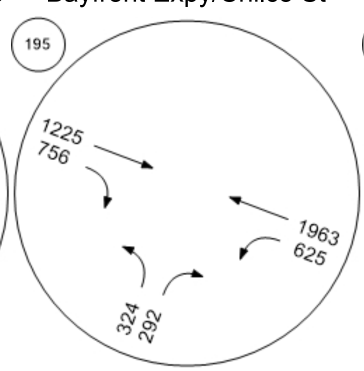

Willow Rd/US-101 SB Ramps



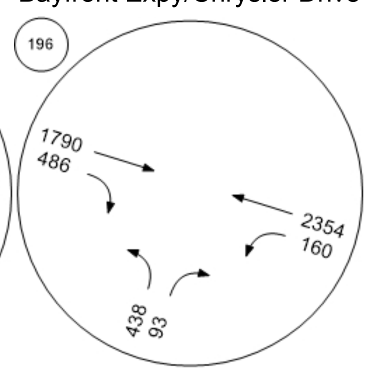

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

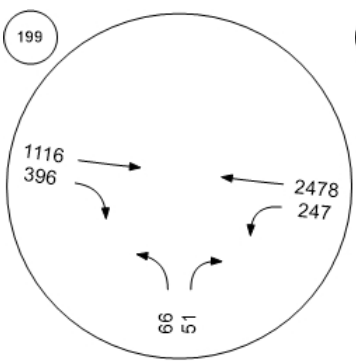


Generated with PTV VISTRO

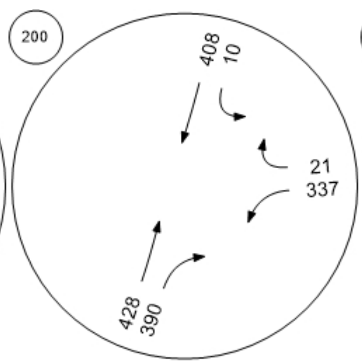
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

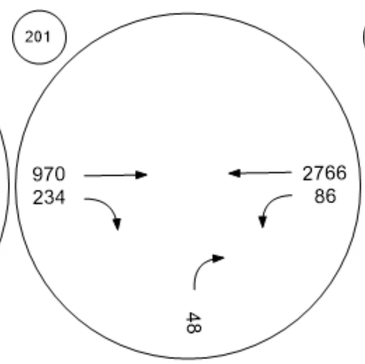

Bayfront Expwy/Bldg 21



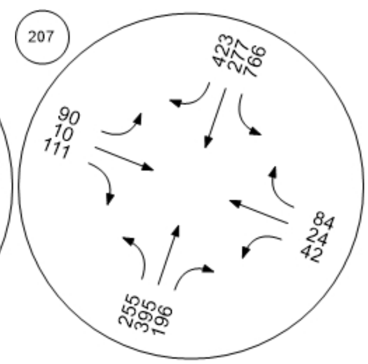

O'Brien Drive/Kavanaugh Dri



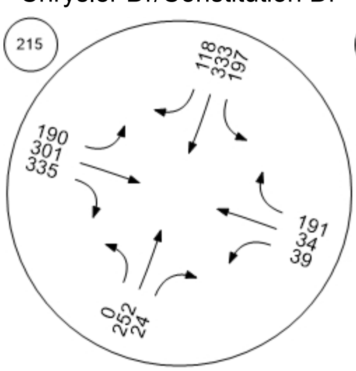

Bayfront Expwy/Bldg 20



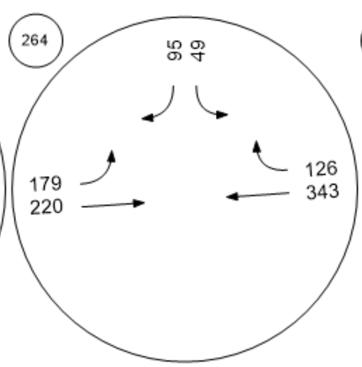

Chilco St/Constitution Dr



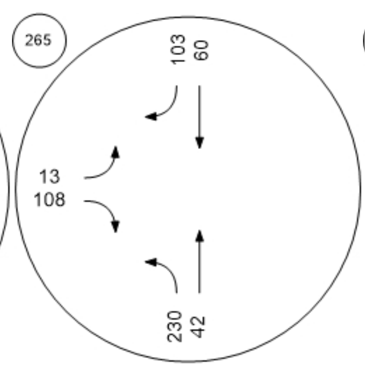

Chrysler Dr/Constitution Dr



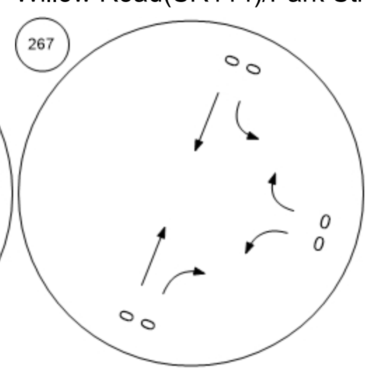

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

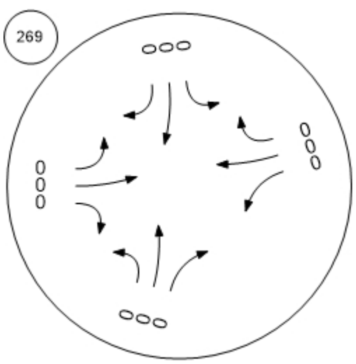


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Base Volume


O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-6)

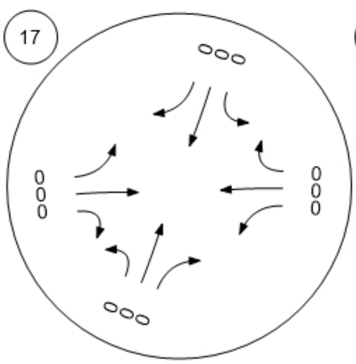
Traffic Volume - In-Process Volume


Generated with PTV VISTRO

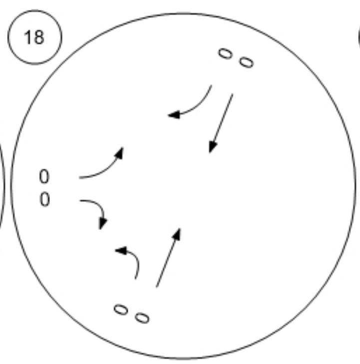
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

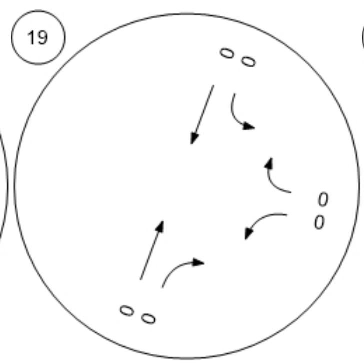

Willow Rd (SR 114)/Hamilton



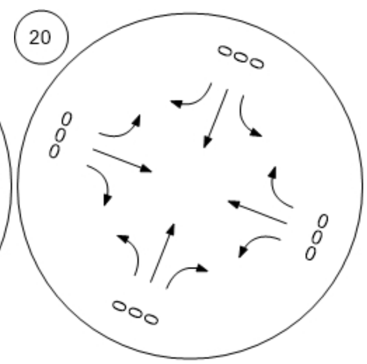

Willow Rd (SR 114)/Ivy Dr



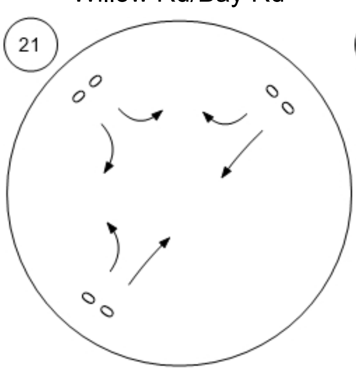

Willow Rd (SR 114)/O'Brien



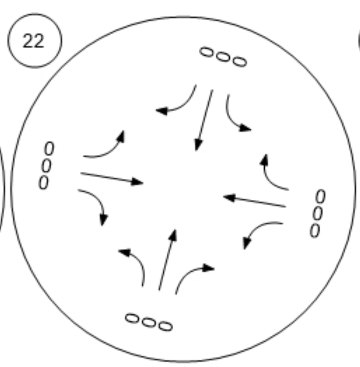

Willow Rd (SR 114)/Newbrid



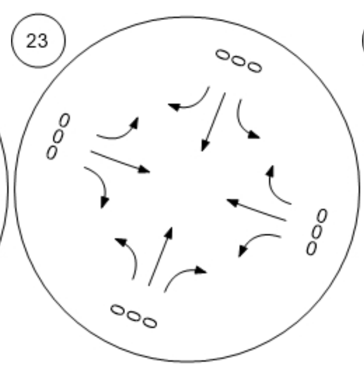

Willow Rd/Bay Rd



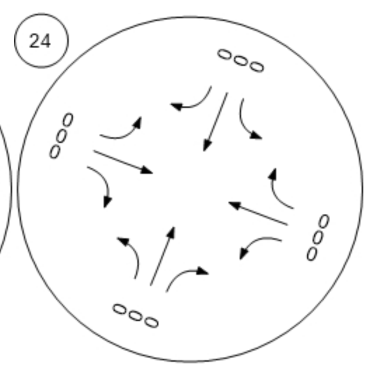

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

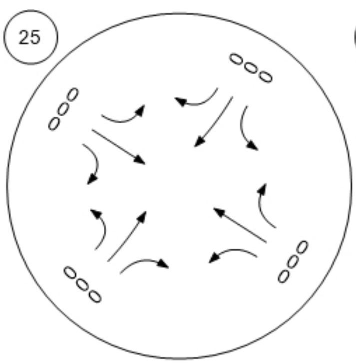



Willow Rd/Gilbert Ave

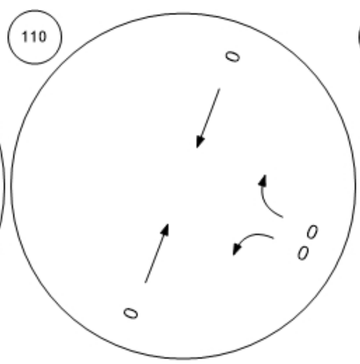


## Traffic Volume - In-Process Volume

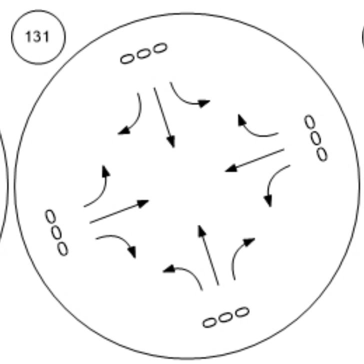

Middlefield Rd-Willow Rd



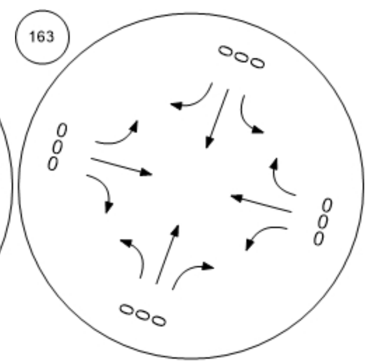

Marsh Road and US 101 NB



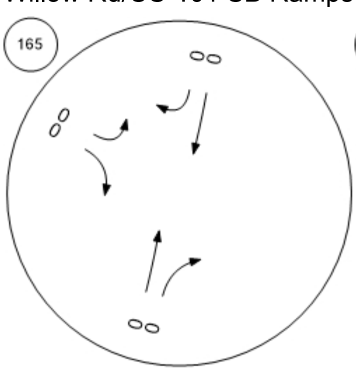

Chilco Street/Hamilton Avenu



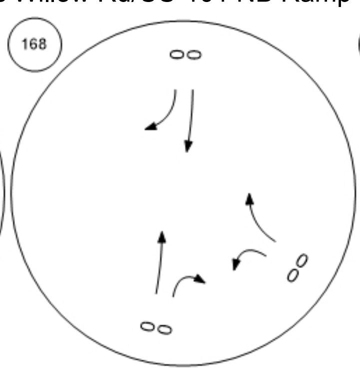

Bayfront Expy/Marsh Rd



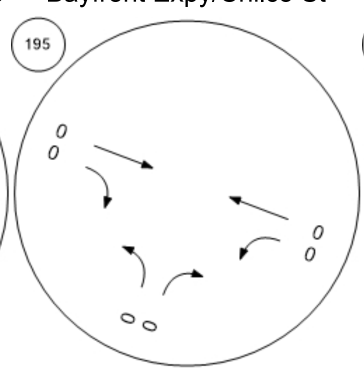

Willow Rd/US-101 SB Ramps



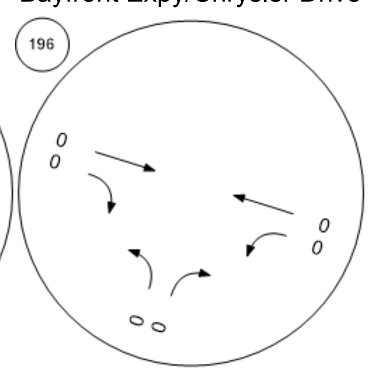

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

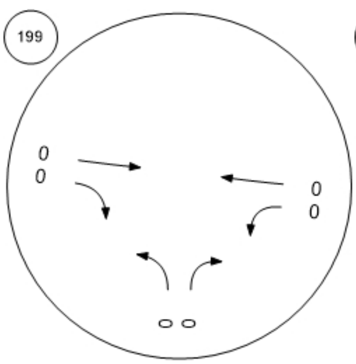


Generated with PTV VISTRO

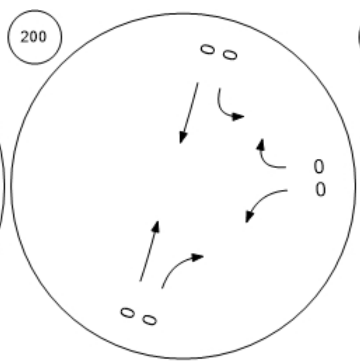
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

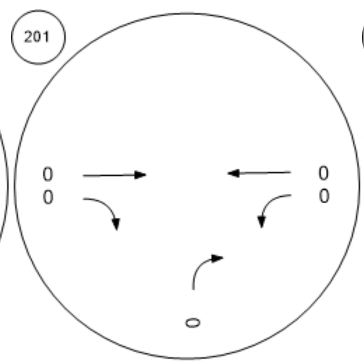

Bayfront Expwy/Bldg 21



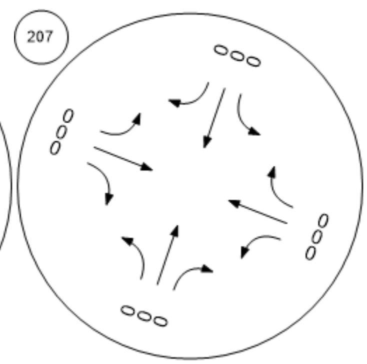

O'Brien Drive/Kavanaugh Dri



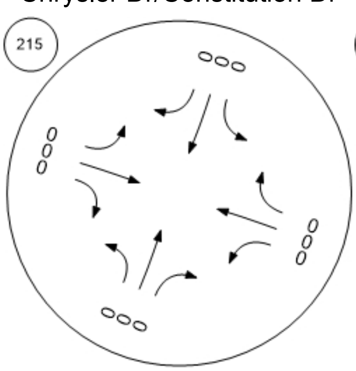

Bayfront Expwy/Bldg 20



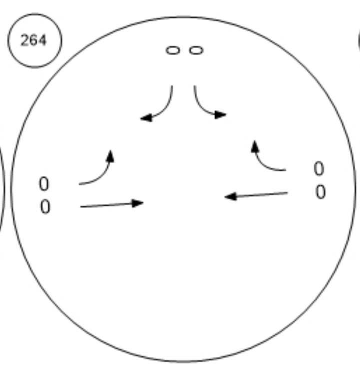

Chilco St/Constitution Dr



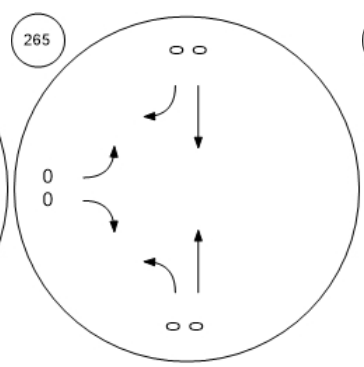

Chrysler Dr/Constitution Dr



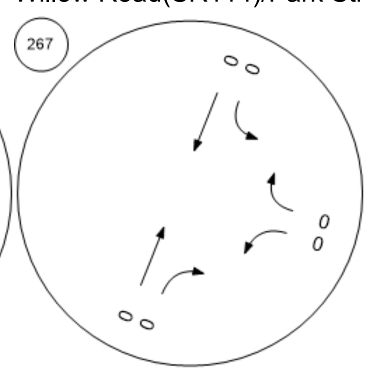

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

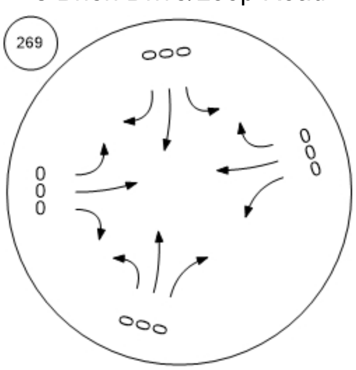


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road

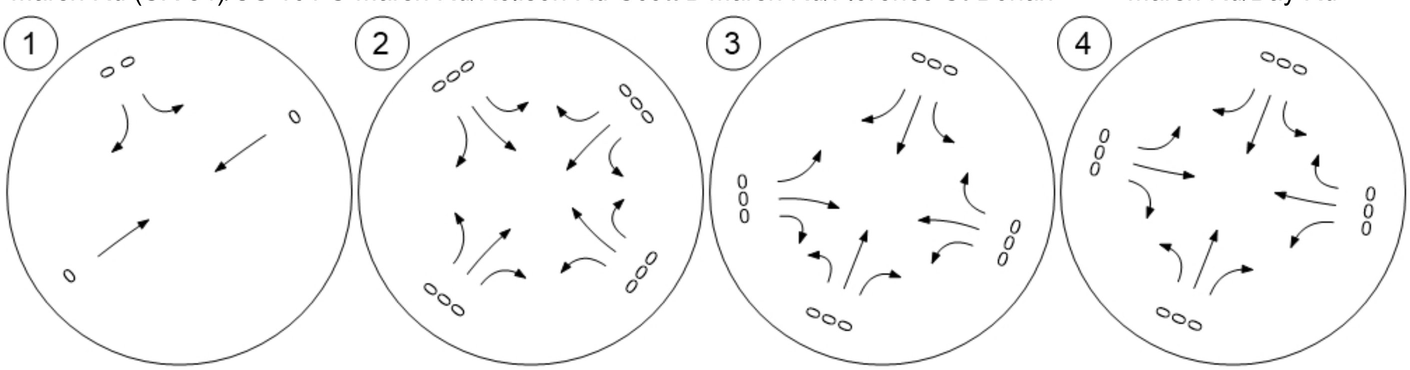


Generated with PTV VISTRO

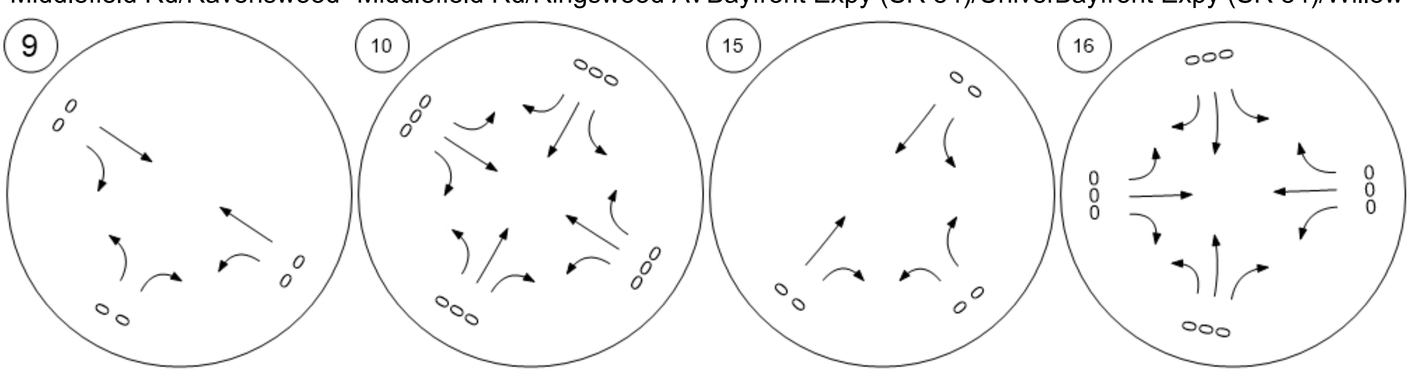
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

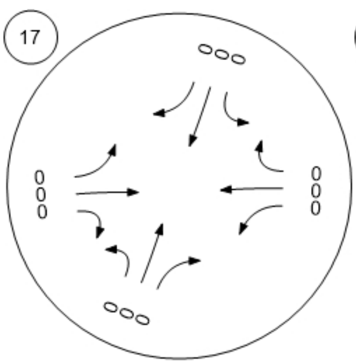


Generated with PTV VISTRO

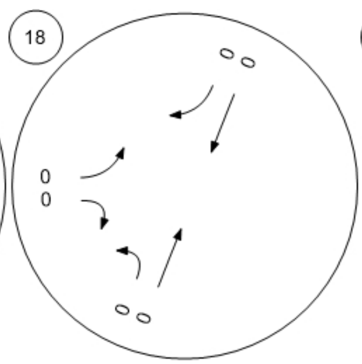
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

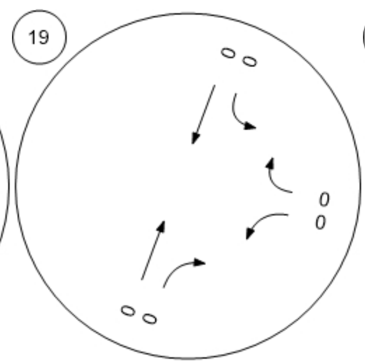

Willow Rd (SR 114)/Hamilton



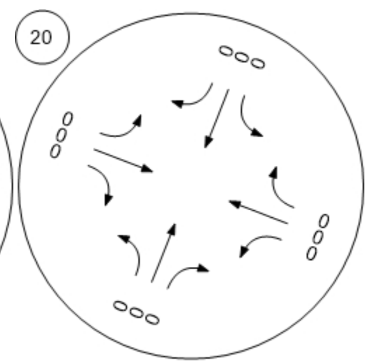

Willow Rd (SR 114)/Ivy Dr



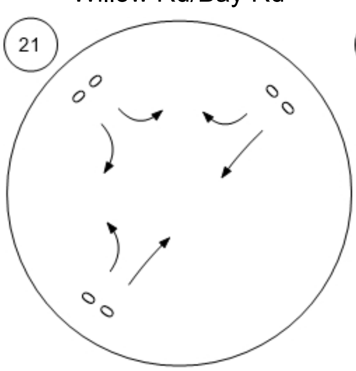

Willow Rd (SR 114)/O'Brien



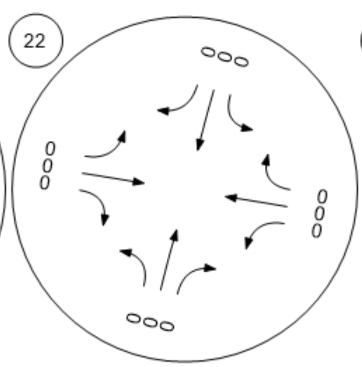

Willow Rd (SR 114)/Newbrid



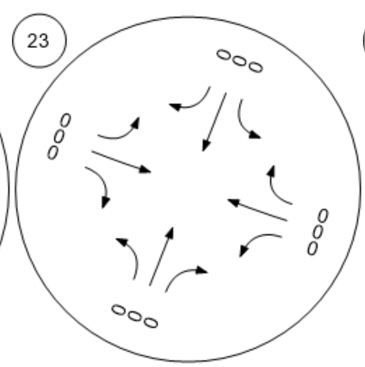

Willow Rd/Bay Rd



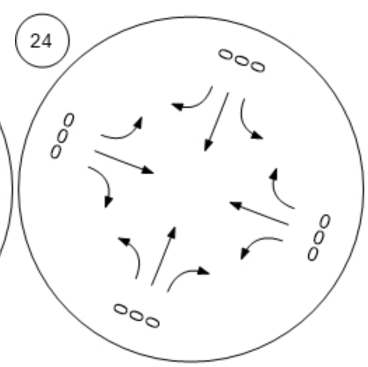

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

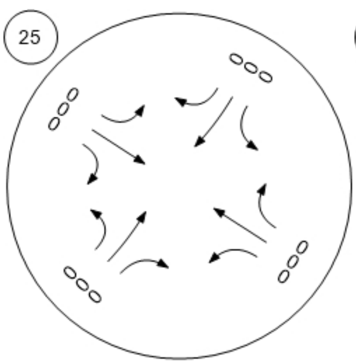



Willow Rd/Gilbert Ave

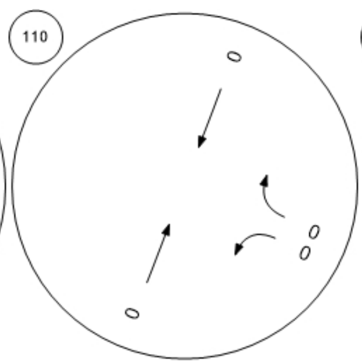


Traffic Volume - Net New Site Trips

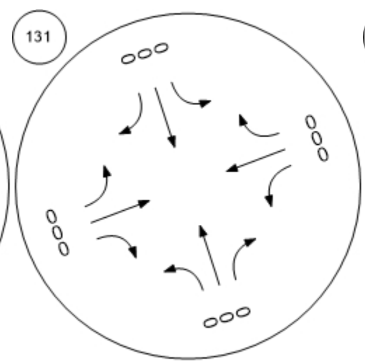

Middlefield Rd-Willow Rd



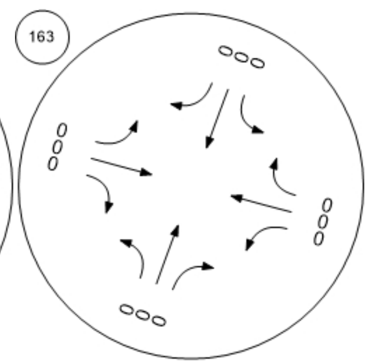

Marsh Road and US 101 NB



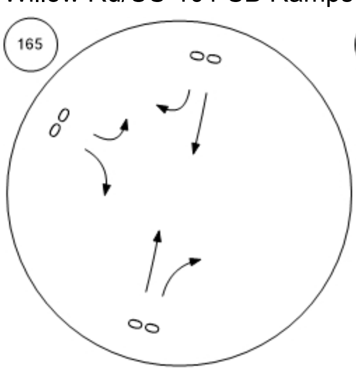

Chilco Street/Hamilton Avenu



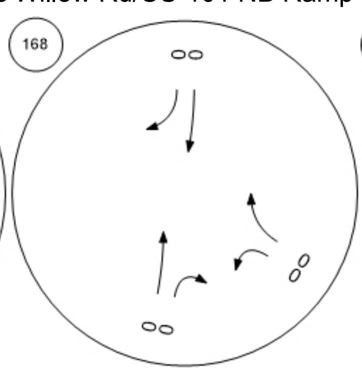

Bayfront Expy/Marsh Rd



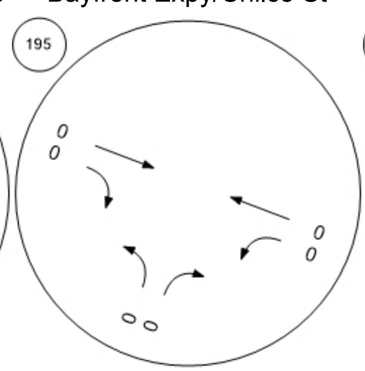

Willow Rd/US-101 SB Ramps



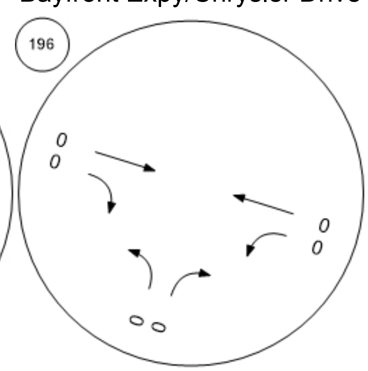

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

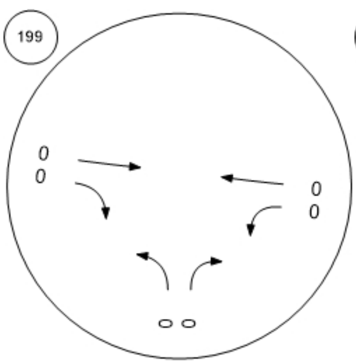


Generated with PTV VISTRO

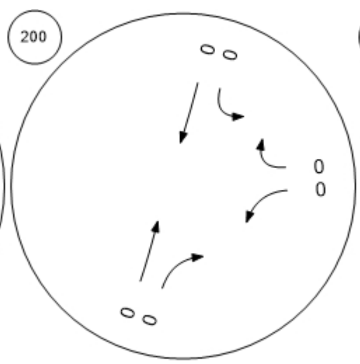
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

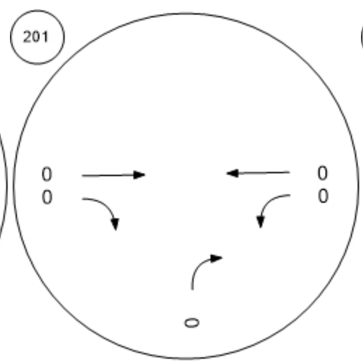

Bayfront Expwy/Bldg 21



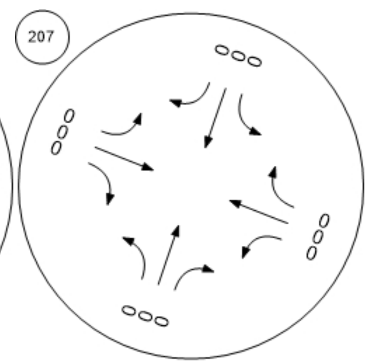

O'Brien Drive/Kavanaugh Dri



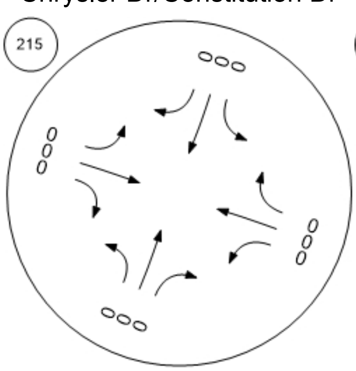

Bayfront Expwy/Bldg 20



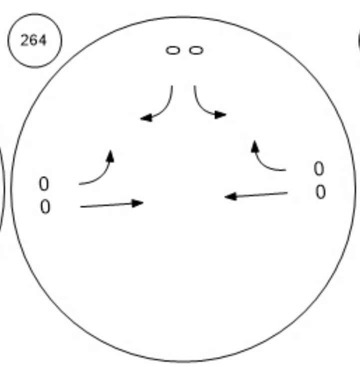

Chilco St/Constitution Dr



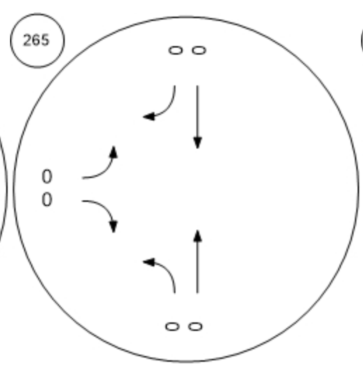

Chrysler Dr/Constitution Dr



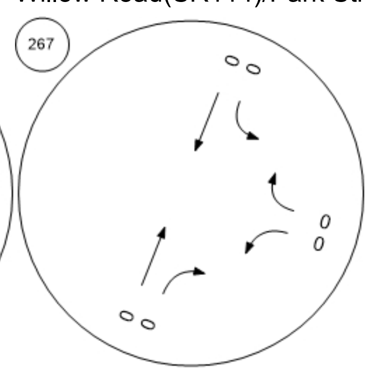

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

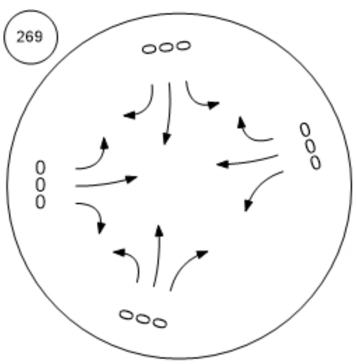



Willow Road(SR114)/Park Str

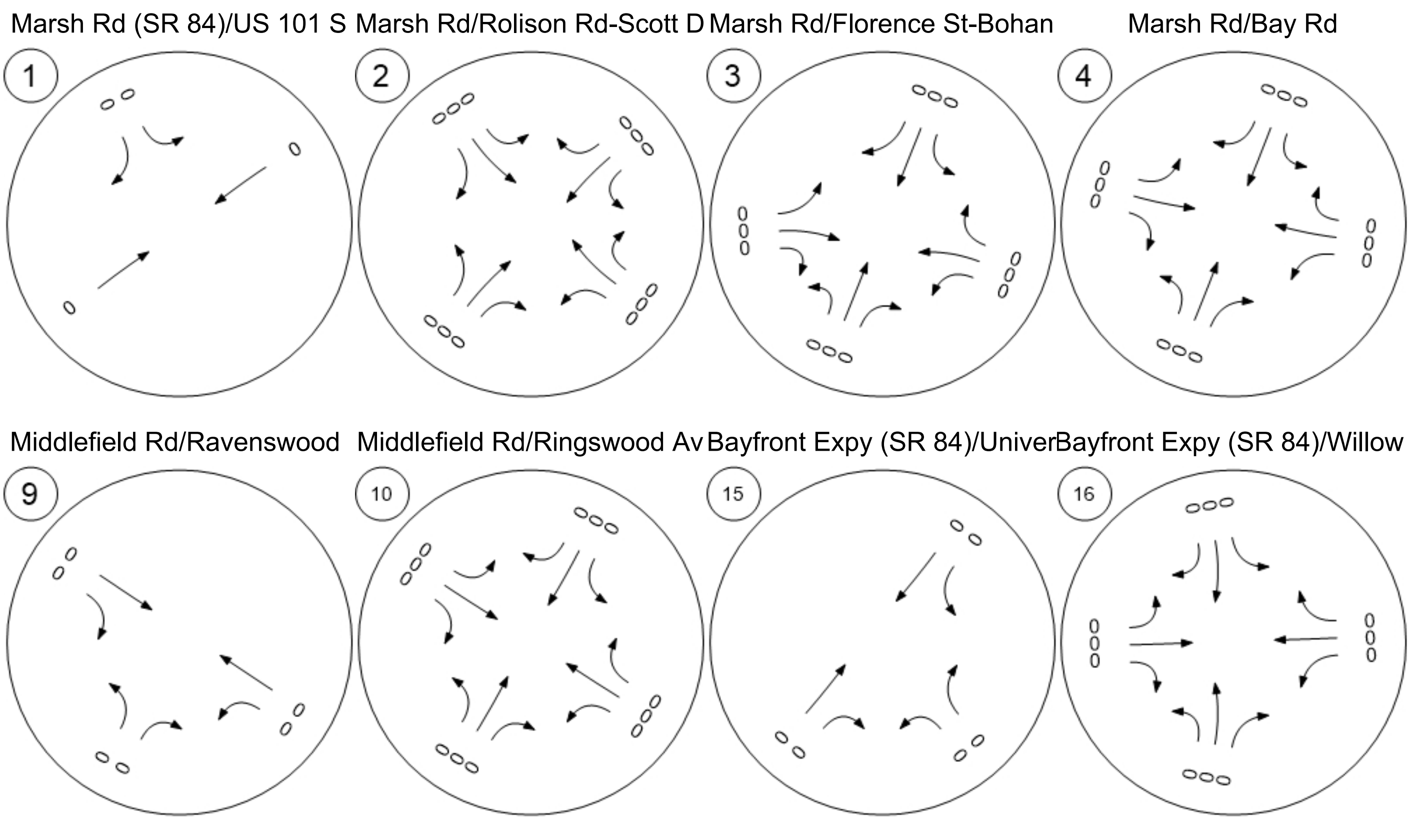


Traffic Volume - Net New Site Trips


O'Brien Drive/Loop Road



Traffic Volume - Other Volume

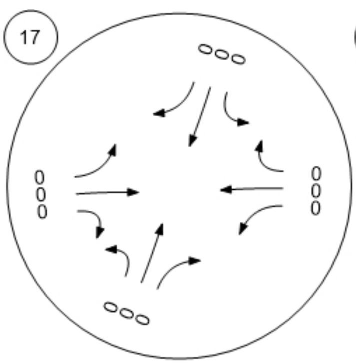



Generated with PTV VISTRO

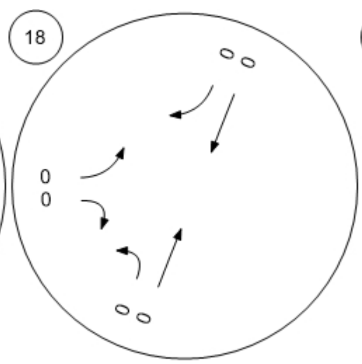
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

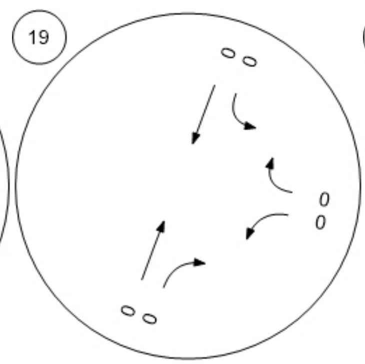

Willow Rd (SR 114)/Hamilton



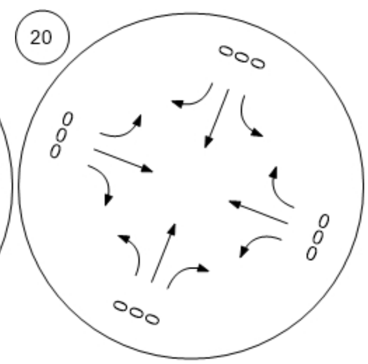

Willow Rd (SR 114)/Ivy Dr



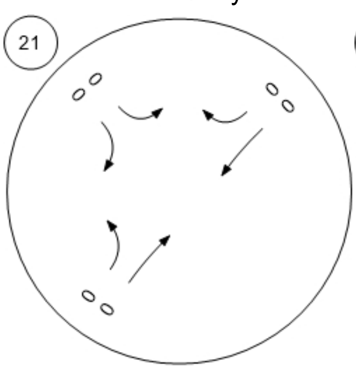

Willow Rd (SR 114)/O'Brien



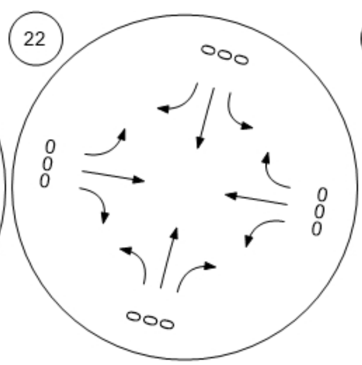

Willow Rd (SR 114)/Newbrid



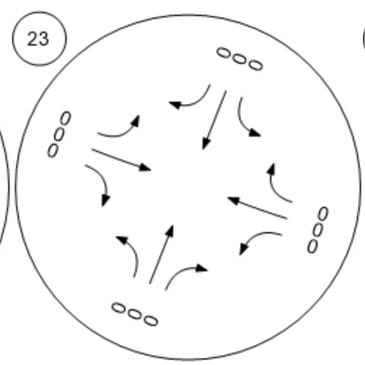

Willow Rd/Bay Rd



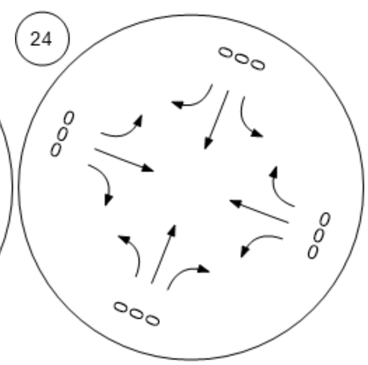

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

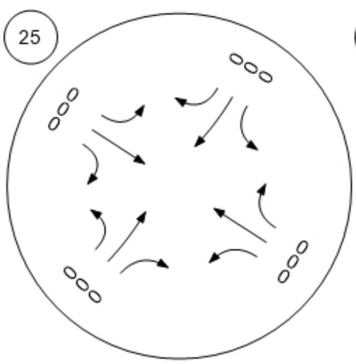


Generated with PTV VISTRO

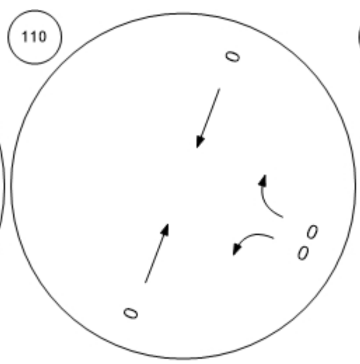
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

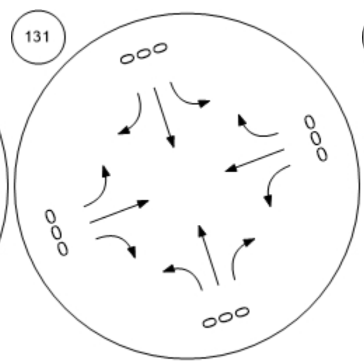

Middlefield Rd-Willow Rd



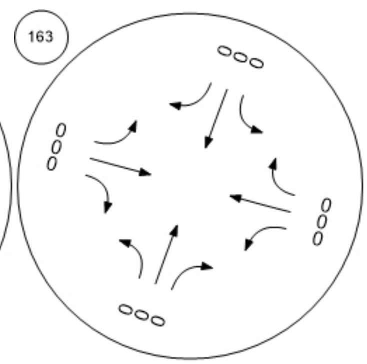

Marsh Road and US 101 NB



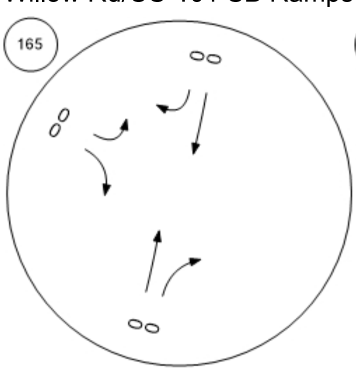

Chilco Street/Hamilton Avenu



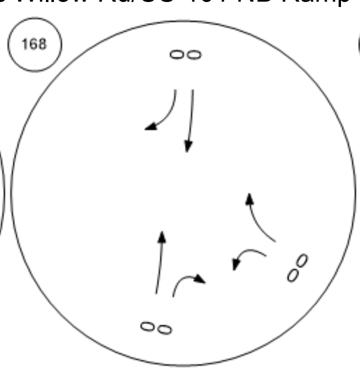

Bayfront Expy/Marsh Rd



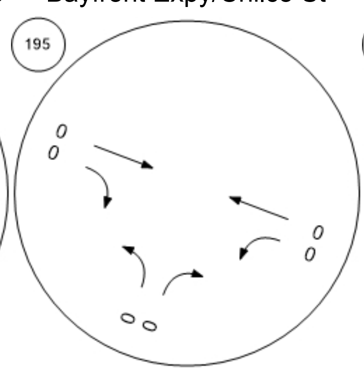

Willow Rd/US-101 SB Ramps



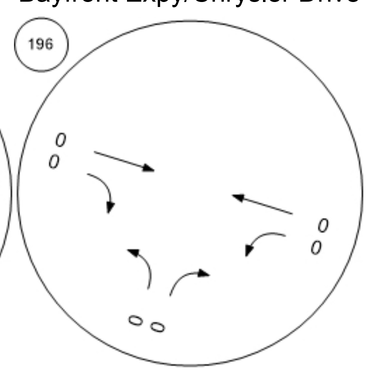

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

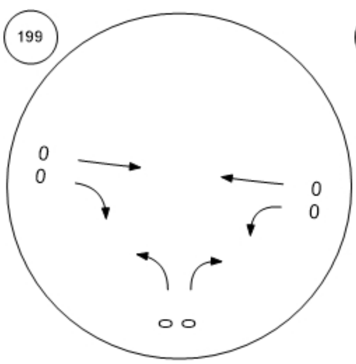


Generated with PTV VISTRO

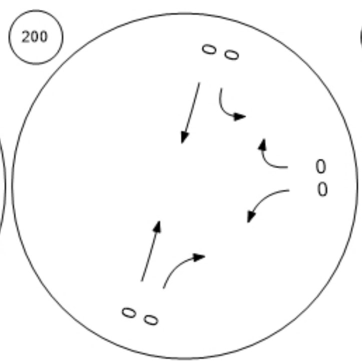
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

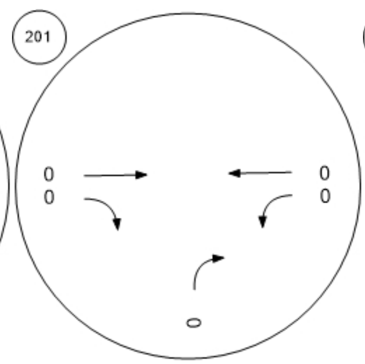

Bayfront Expwy/Bldg 21



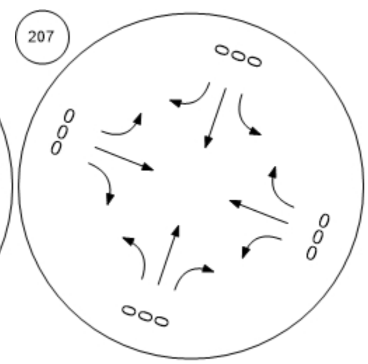

O'Brien Drive/Kavanaugh Dri



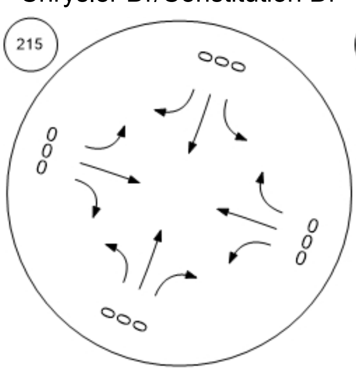

Bayfront Expwy/Bldg 20



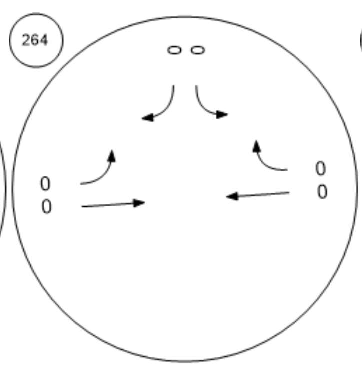

Chilco St/Constitution Dr



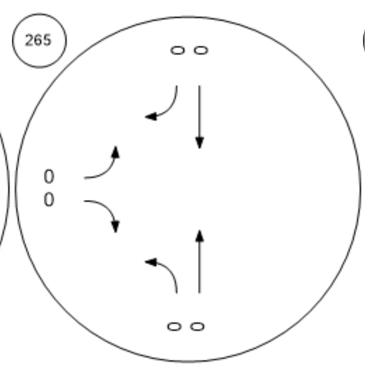

Chrysler Dr/Constitution Dr



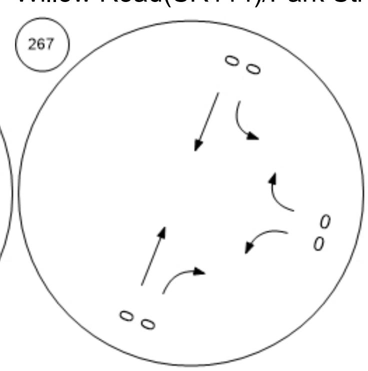

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

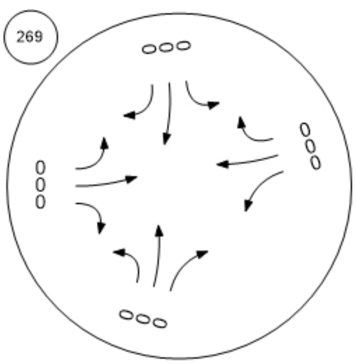


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume


O'Brien Drive/Loop Road

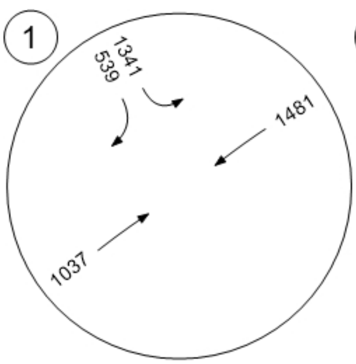


Generated with PTV VISTRO

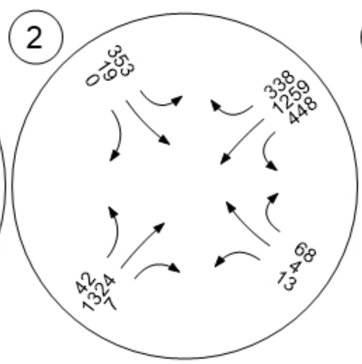
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

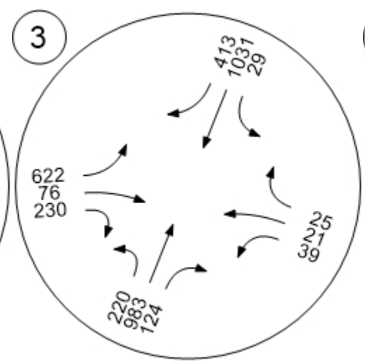

Marsh Rd (SR 84)/US 101 S



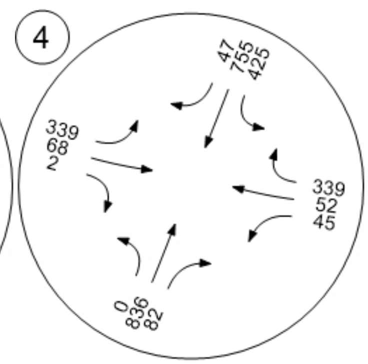

Marsh Rd/Rolison Rd-Scott D



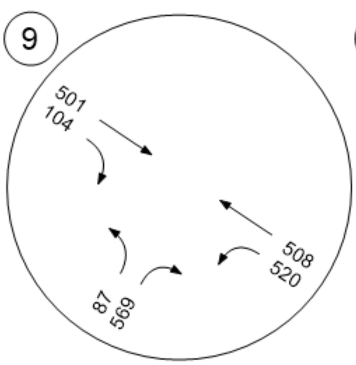

Marsh Rd/Florence St-Bohan



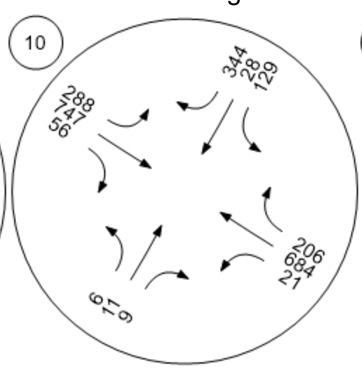

Marsh Rd/Bay Rd



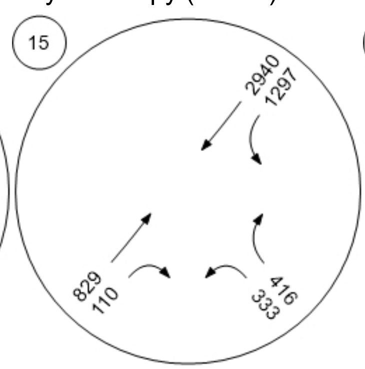

Middlefield Rd/Ravenswood



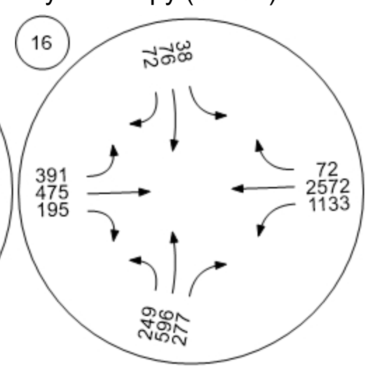

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer



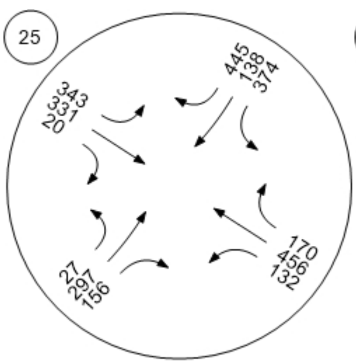

Bayfront Expy (SR 84)/Willow



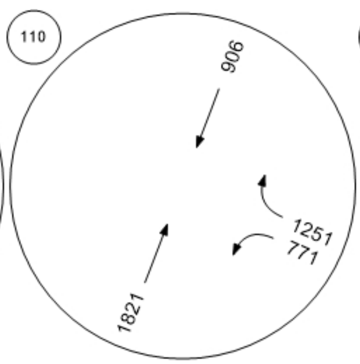
Traffic Volume - Future Total Volume


## Traffic Volume - Future Total Volume

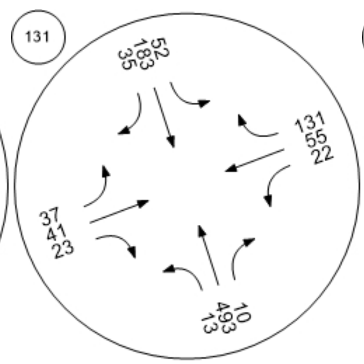

Middlefield Rd-Willow Rd



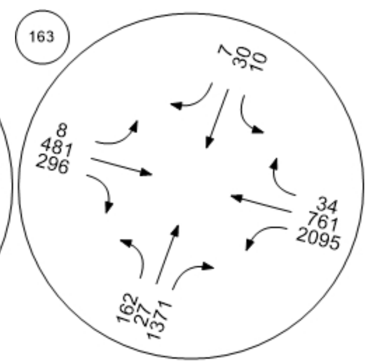

Marsh Road and US 101 NB



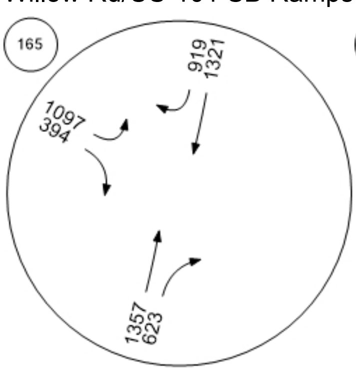

Chilco Street/Hamilton Avenu



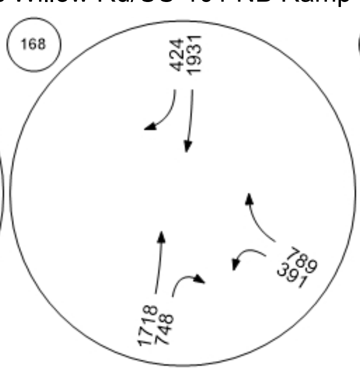

Bayfront Expy/Marsh Rd



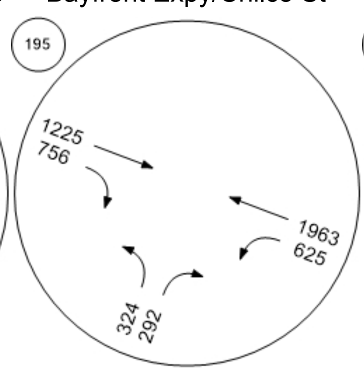

Willow Rd/US-101 SB Ramps



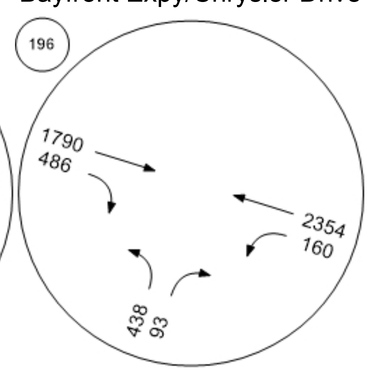

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

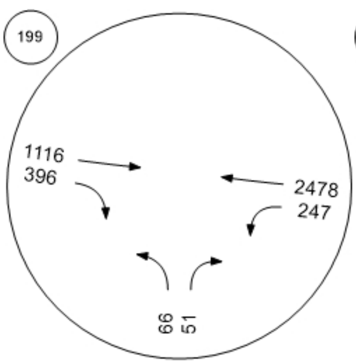


Generated with PTV VISTRO

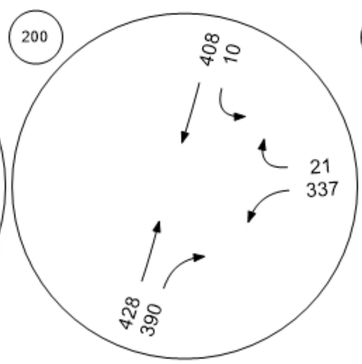
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

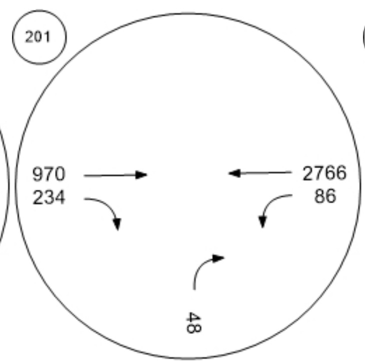

### Bayfront Expwy/Bldg 21



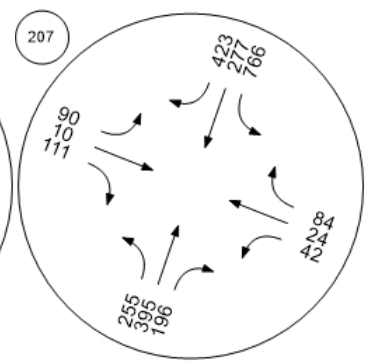

### O'Brien Drive/Kavanaugh Dri



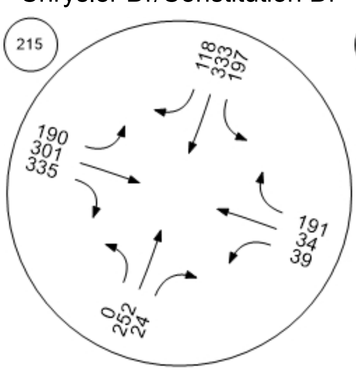

### Bayfront Expwy/Bldg 20



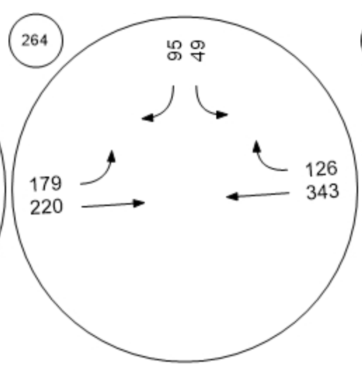

### Chilco St/Constitution Dr



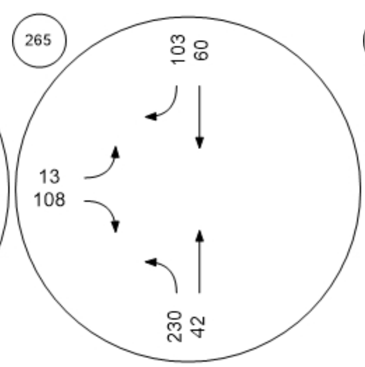

### Chrysler Dr/Constitution Dr



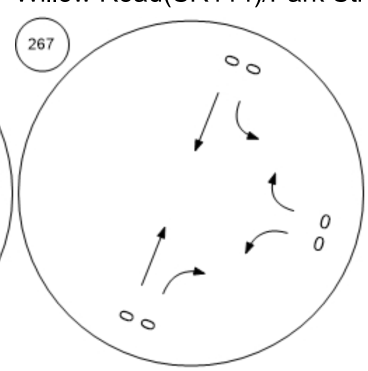

### Adams Drive/O'Brien Drive




### Adam Court/Adams Drive




### Willow Road(SR114)/Park Str

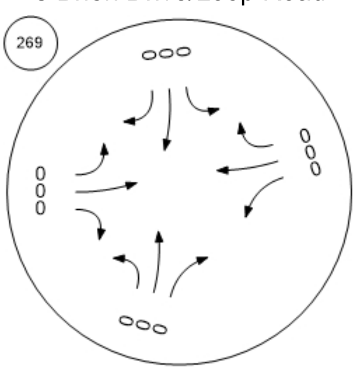


Generated with PTV VISTRO

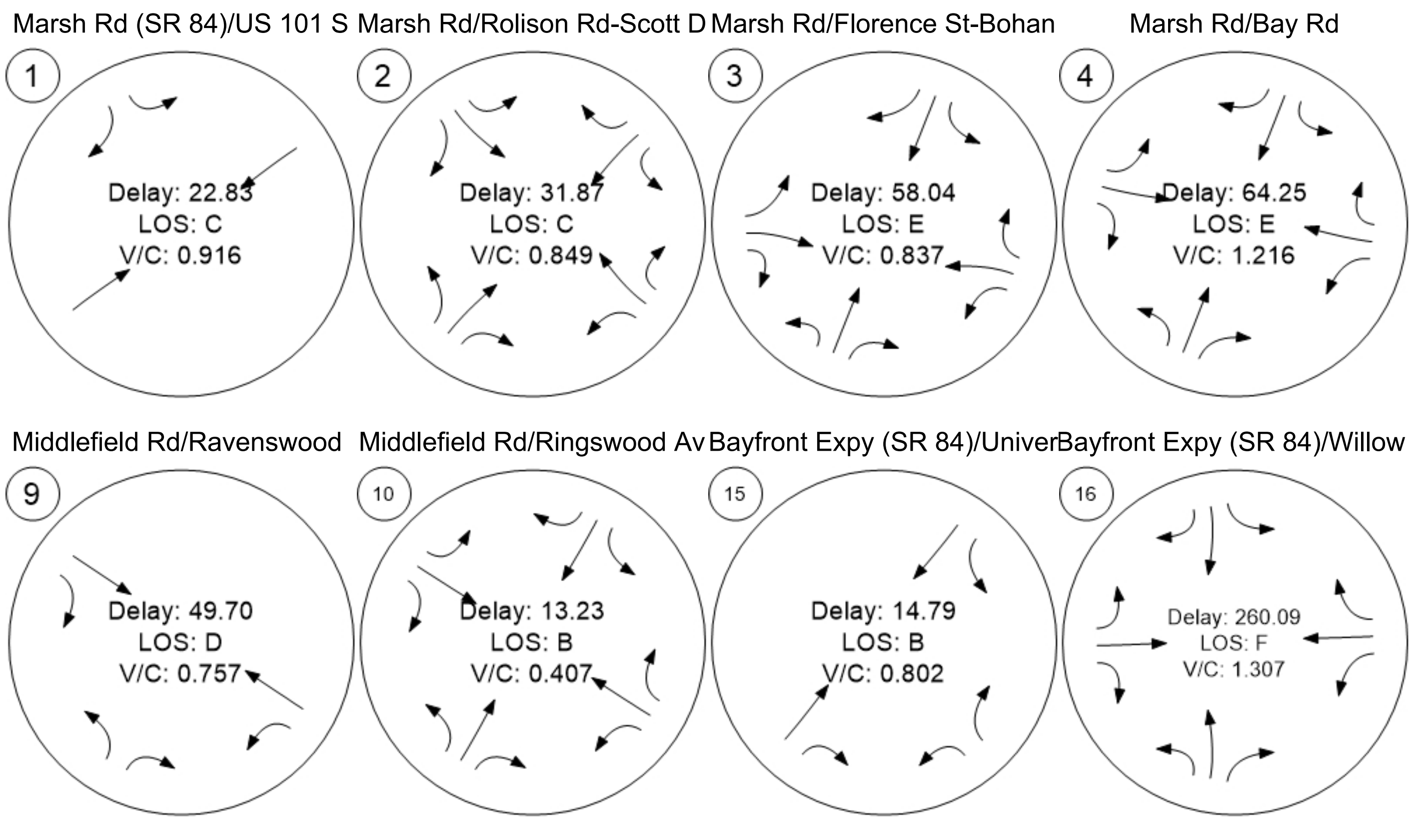
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume


O'Brien Drive/Loop Road

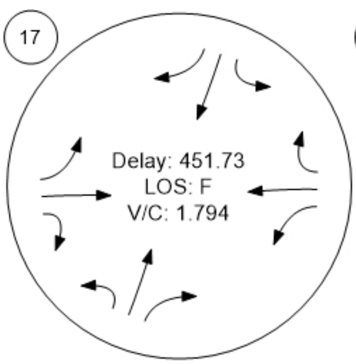


Traffic Conditions

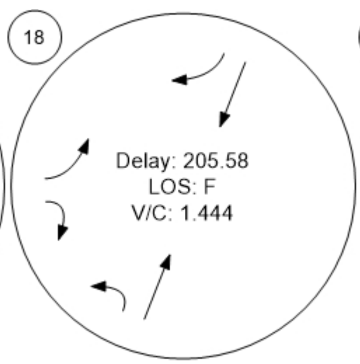



Traffic Conditions

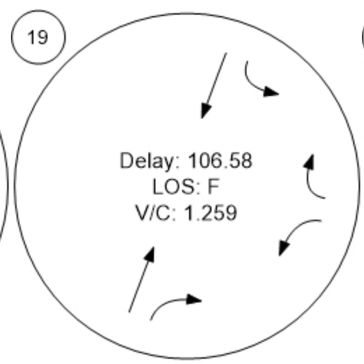

Willow Rd (SR 114)/Hamilton



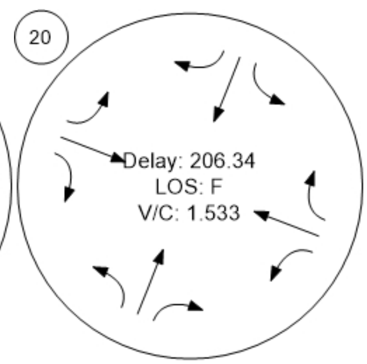

Willow Rd (SR 114)/Ivy Dr



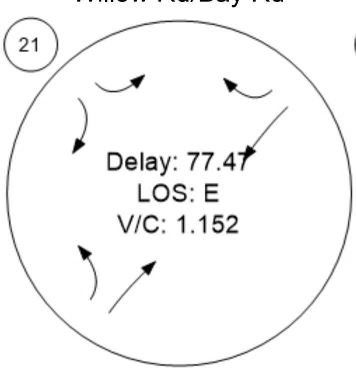

Willow Rd (SR 114)/O'Brien



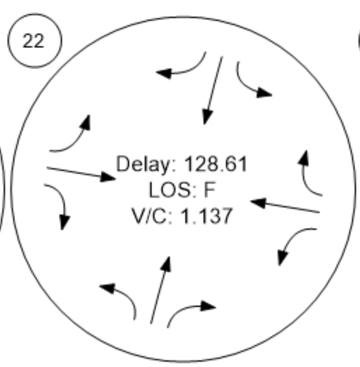

Willow Rd (SR 114)/Newbrid



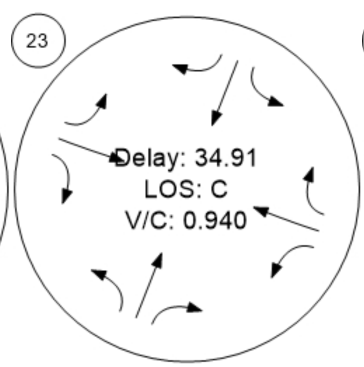

Willow Rd/Bay Rd



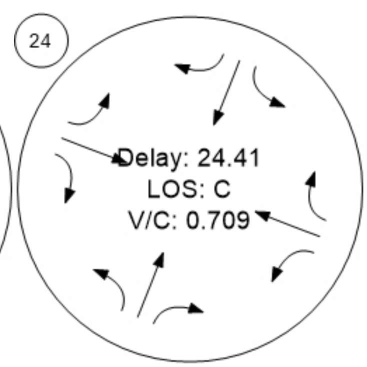

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

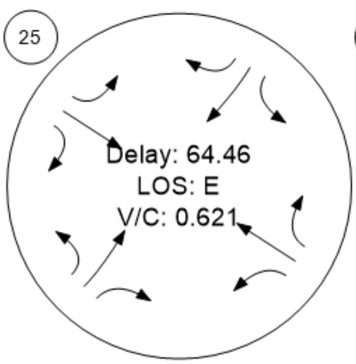



Willow Rd/Gilbert Ave

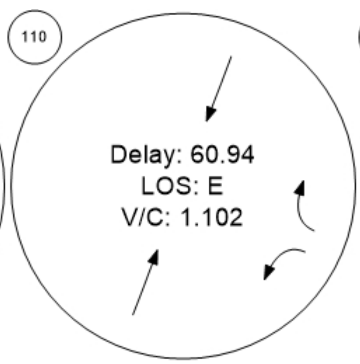


## Traffic Conditions

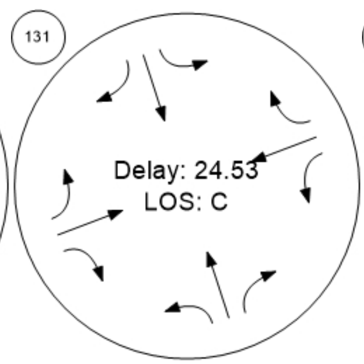

Middlefield Rd-Willow Rd



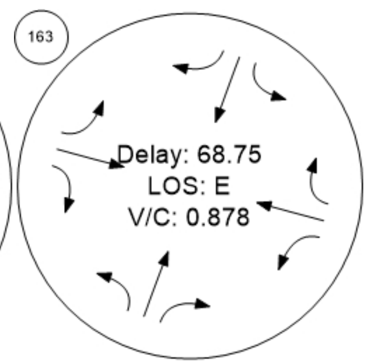

Marsh Road and US 101 NB



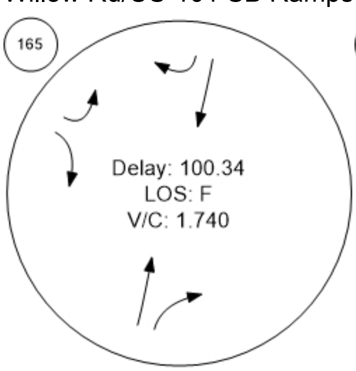

Chilco Street/Hamilton Avenu



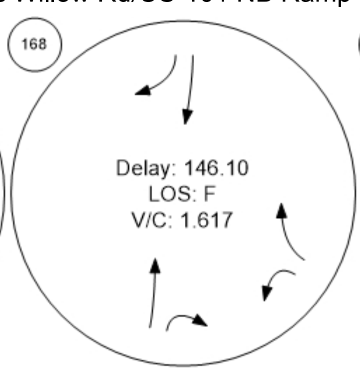

Bayfront Expy/Marsh Rd



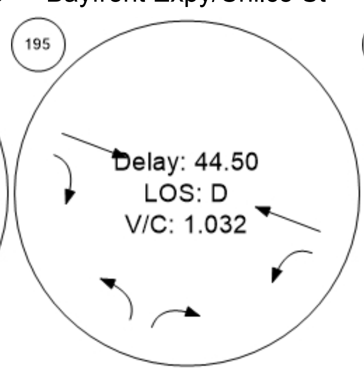

Willow Rd/US-101 SB Ramps



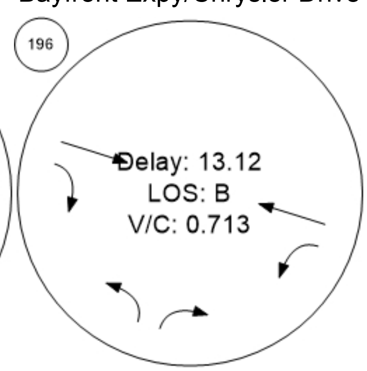

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

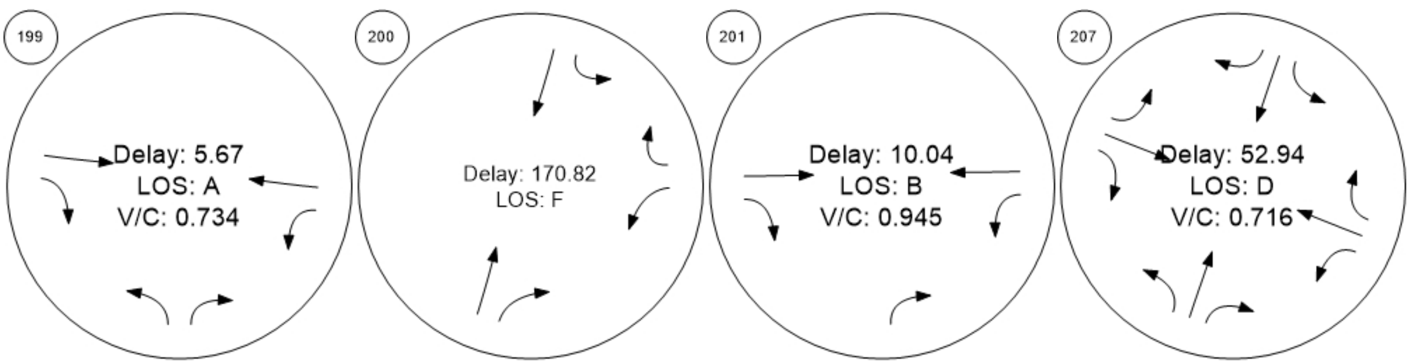


Generated with PTV VISTRO

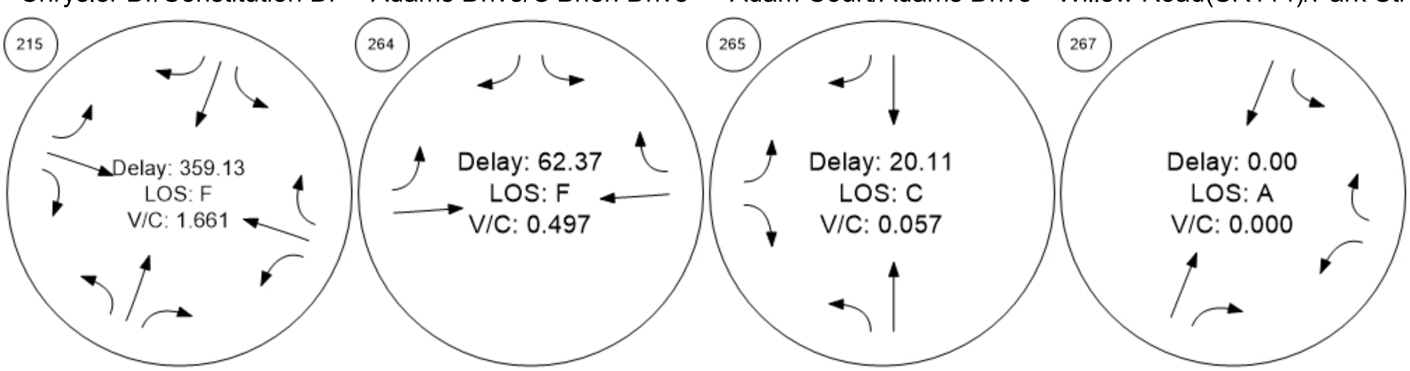
Version 2021 (SP 0-6)

## Traffic Conditions


Bayfront Expwy/Bldg 21 | O'Brien Drive/Kavanaugh Dri | Bayfront Expwy/Bldg 20 | Chilco St/Constitution Dr




Chrysler Dr/Constitution Dr | Adams Drive/O'Brien Drive | Adam Court/Adams Drive | Willow Road(SR114)/Park Str

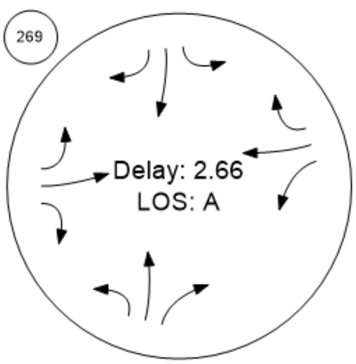


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions


O'Brien Drive/Loop Road

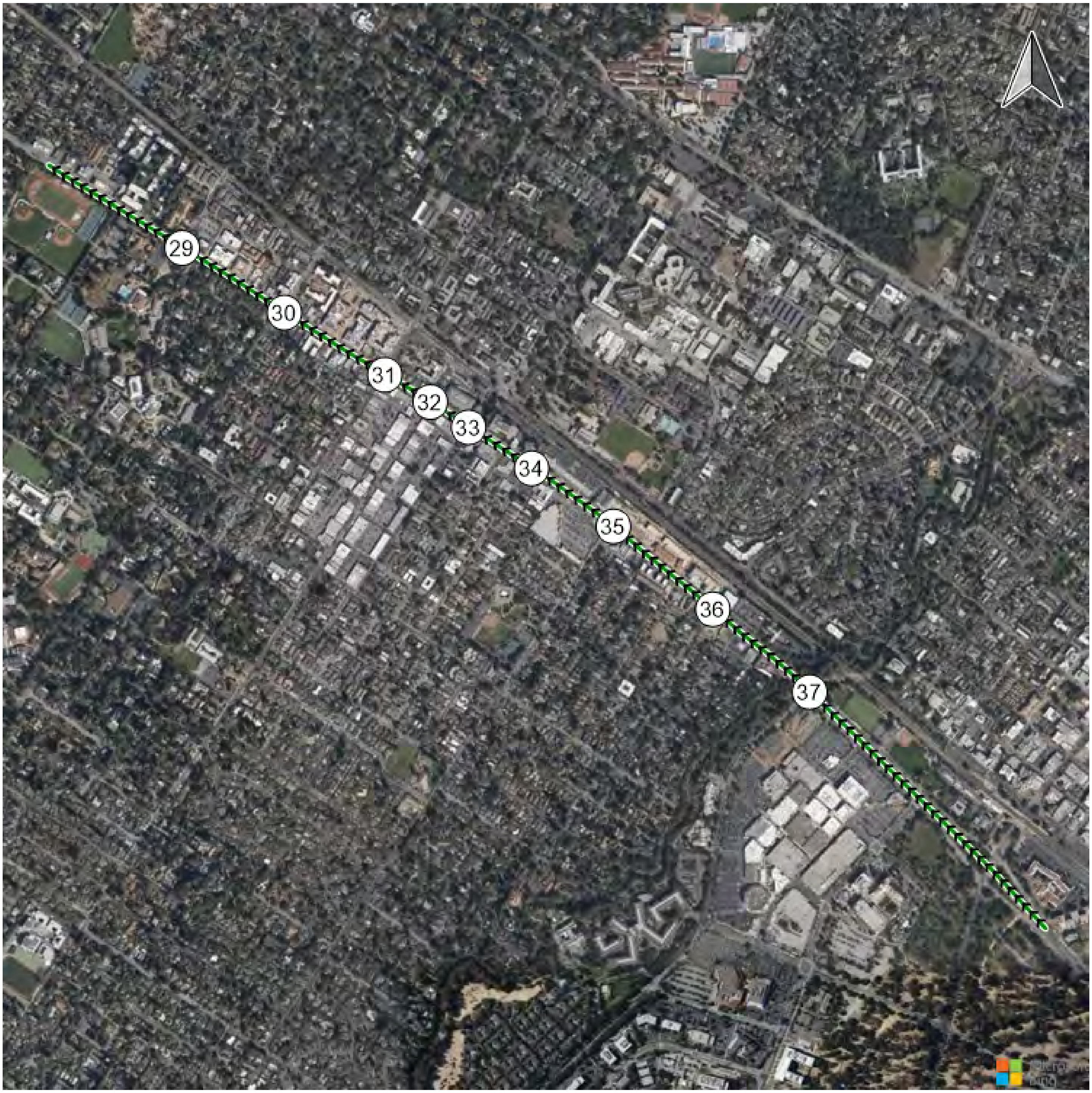


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 1: ECR NB



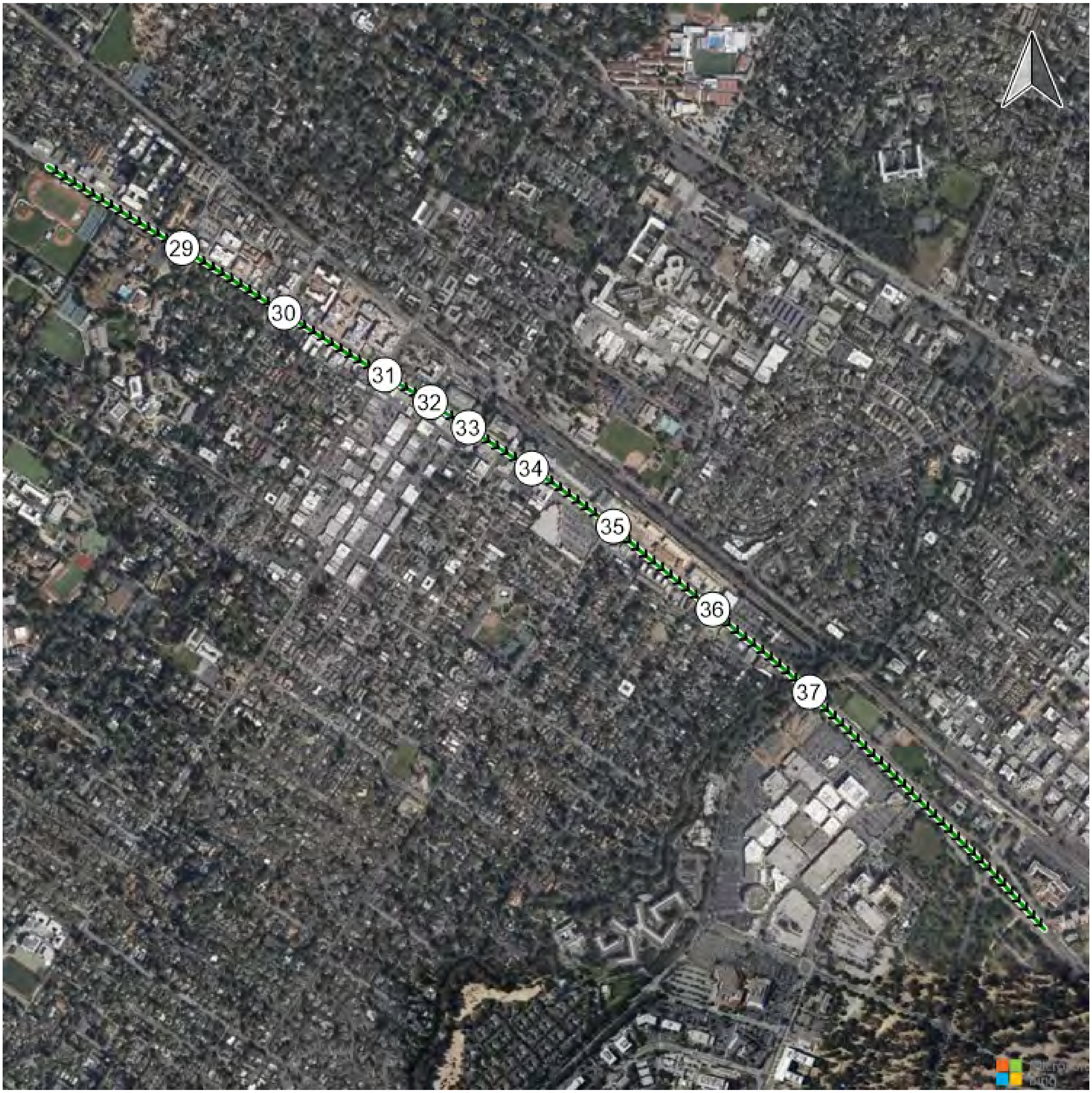
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



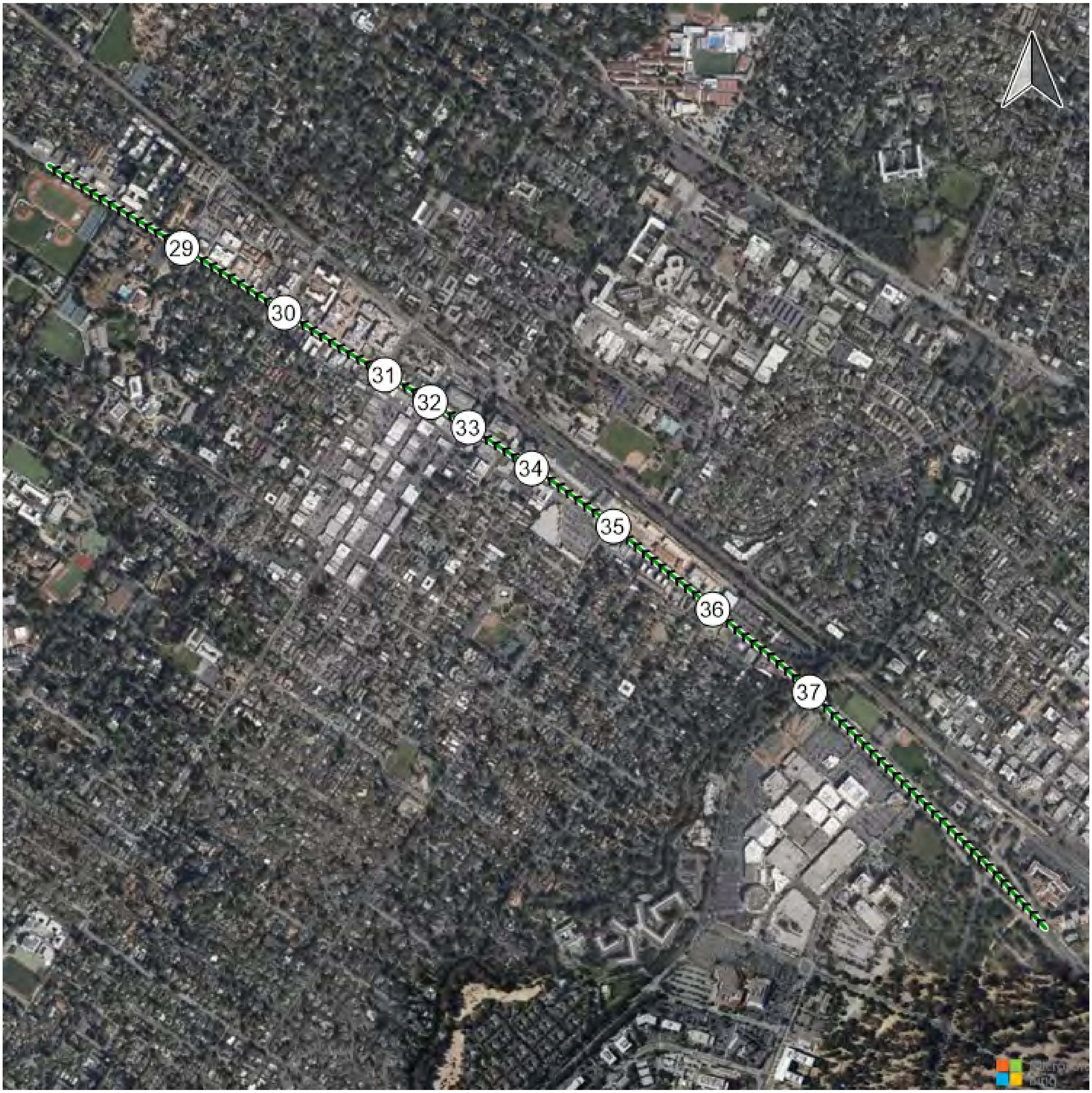
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



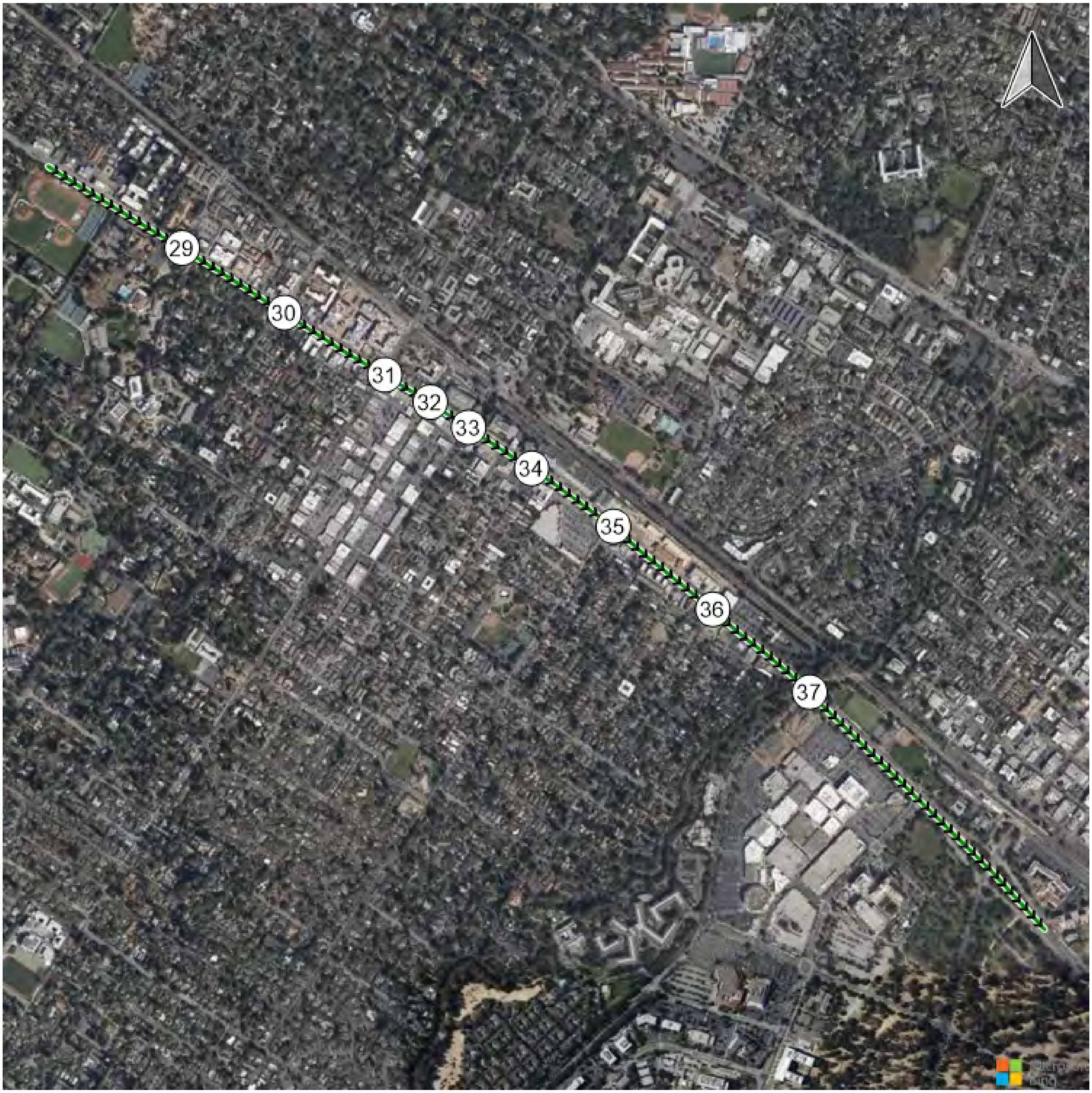
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Cumulative PM.pdf

Scenario 19 Cumulative PM (2040 vols)

12/30/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.806 | 19.2 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.591 | 17.9 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.848 | 52.5 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.876 | 47.6 | D |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.289 | 20.2 | C |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.534 | 21.0 | C |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NEB Thru | 1.162 | 138.7 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | SB Thru | 1.435 | 284.1 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Right | 2.183 | 570.4 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.274 | 131.3 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 2.564 | 522.9 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.608 | 274.4 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.408 | 226.4 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.276 | 221.9 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.693 | 13.1 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.565 | 14.2 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.713 | 42.5 | D |
|  |  |  | HCM 6th |  |  |  |  |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.994 | 22.9 | C |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 1.489 | 151.1 | F |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | WB Left | 1.071 | 65.0 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 2.089 | 162.6 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.264 | 239.8 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.118 | 69.6 | E |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | NB Left | 0.979 | 39.5 | D |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.940 | 36.3 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.636 | 189.8 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.888 | 18.7 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.240 | 113.5 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.403 | 148.7 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 1.739 | 512.7 | F |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.089 | 16.4 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.806 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 959 | 1163 | 279 | 1338 | 444 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 959 | 1163 | 279 | 1338 | 444 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 245 | 297 | 70 | 341 | 113 |
| Total Analysis Volume [veh/h] | 0 | 979 | 1187 | 279 | 1365 | 453 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.34 | 0.40 | 0.28 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2122 | 1785 | 1411 | 665 |
| d1, Uniform Delay [s] | 11.66 | 14.77 | 22.92 | 19.15 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.72 | 1.98 | 2.59 | 2.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.46 | 0.66 | 0.97 | 0.68 |
| d, Delay for Lane Group [s/veh] | 12.38 | 16.75 | 25.51 | 21.73 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.95 | 7.53 | 12.06 | 6.88 |
| 50th-Percentile Queue Length [ft/ln] | 123.73 | 188.36 | 301.38 | 172.00 |
| 95th-Percentile Queue Length [veh/ln] | 8.60 | 12.04 | 17.75 | 11.18 |
| 95th-Percentile Queue Length [ft/ln] | 214.94 | 300.90 | 443.73 | 279.55 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.38 | 16.75 | 0.00 | 25.51 | 21.73 |
| Movement LOS | | B | B | | C | C |
| d_A, Approach Delay [s/veh] | 12.38 | | 16.75 | | 24.57 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 19.24 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.806 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.871 | 0.000 | 2.524 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.81 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.539 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.591 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 49 | 1326 | 7 | 75 | 1046 | 249 | 15 | 6 | 412 | 304 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 1326 | 7 | 75 | 1046 | 249 | 15 | 6 | 86 | 304 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 345 | 2 | 20 | 272 | 65 | 4 | 2 | 22 | 79 | 2 | 1 |
| Total Analysis Volume [veh/h] | 51 | 1381 | 7 | 78 | 1090 | 259 | 16 | 6 | 90 | 317 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 99 | 99 | 98 | 98 | 98 | 9 | 9 | 18 | 18 |
| g / C, Green / Cycle | 0.05 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.06 | 0.06 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.26 | 0.26 | 0.09 | 0.37 | 0.38 | 0.01 | 0.03 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 899 | 1877 | 1739 | 1833 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 90 | 2519 | 1320 | 650 | 1315 | 1218 | 114 | 176 | 231 | 219 |
| d1, Uniform Delay [s] | 64.84 | 7.92 | 7.92 | 8.29 | 9.96 | 10.10 | 62.26 | 63.54 | 58.54 | 58.54 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.14 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.08 | 0.40 | 0.77 | 0.10 | 1.51 | 1.72 | 0.60 | 1.72 | 3.22 | 3.40 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.36 | 0.36 | 0.12 | 0.53 | 0.54 | 0.19 | 0.51 | 0.73 | 0.73 |
| d, Delay for Lane Group [s/veh] | 68.92 | 8.33 | 8.70 | 8.39 | 11.47 | 11.81 | 62.86 | 65.25 | 61.76 | 61.94 |
| Lane Group LOS | E | A | A | A | B | B | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.88 | 5.14 | 5.52 | 0.38 | 9.92 | 9.59 | 0.77 | 1.61 | 5.99 | 5.68 |
| 50th-Percentile Queue Length [ft/ln] | 46.90 | 128.62 | 138.12 | 9.59 | 247.99 | 239.75 | 19.29 | 40.32 | 149.63 | 142.09 |
| 95th-Percentile Queue Length [veh/ln] | 3.38 | 8.86 | 9.38 | 0.69 | 15.08 | 14.67 | 1.39 | 2.90 | 10.00 | 9.59 |
| 95th-Percentile Queue Length [ft/ln] | 84.42 | 221.62 | 234.49 | 17.26 | 377.12 | 366.71 | 34.73 | 72.58 | 249.93 | 239.84 |

**Movement, Approach, & Intersection Results**

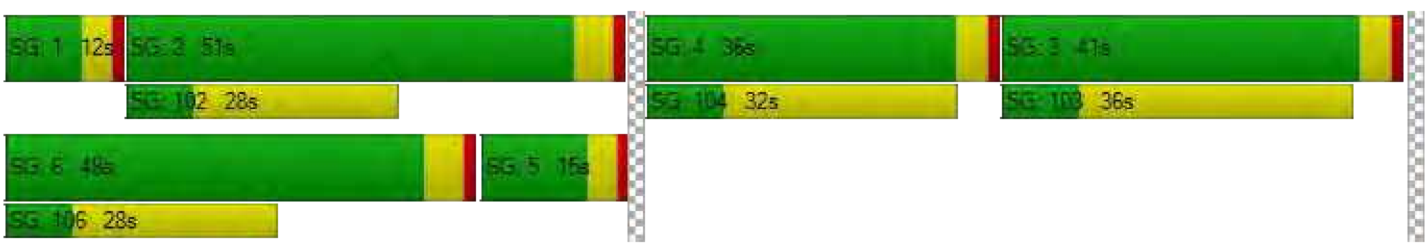
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 68.92 | 8.45 | 8.70 | 8.39 | 11.59 | 11.81 | 62.86 | 62.86 | 65.25 | 61.84 | 61.94 | 61.94 |
| Movement LOS | E | A | A | A | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 10.60 | | | 11.46 | | | 64.78 | | | 61.85 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 17.88 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.591 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.957 | 3.190 | 2.944 | 2.135 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.351 | 2.737 | 2.282 | 2.099 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 52.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.848 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 293 | 675 | 54 | 13 | 996 | 354 | 462 | 34 | 236 | 128 | 85 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 293 | 675 | 54 | 13 | 996 | 354 | 462 | 34 | 62 | 128 | 85 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 79 | 181 | 15 | 3 | 268 | 95 | 124 | 9 | 17 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 315 | 726 | 58 | 14 | 1071 | 381 | 497 | 37 | 67 | 138 | 91 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 86 | 86 | 4 | 70 | 70 | 26 | 26 | 26 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.50 | 0.50 | 0.18 | 0.18 | 0.18 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.40 | 0.42 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 1867 | 1676 | 1774 | 1821 | 1572 | 1751 | 1786 |
| c, Capacity [veh/h] | 252 | 1147 | 1113 | 45 | 939 | 843 | 325 | 334 | 288 | 200 | 204 |
| d1, Uniform Delay [s] | 59.92 | 12.91 | 12.92 | 66.82 | 28.90 | 29.70 | 54.75 | 54.74 | 48.65 | 59.52 | 59.27 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 140.34 | 0.83 | 0.86 | 1.45 | 7.11 | 9.40 | 3.64 | 3.55 | 0.30 | 3.14 | 2.66 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.25 | 0.35 | 0.35 | 0.31 | 0.80 | 0.83 | 0.81 | 0.81 | 0.23 | 0.69 | 0.66 |
| d, Delay for Lane Group [s/veh] | 200.26 | 13.74 | 13.78 | 68.27 | 36.01 | 39.10 | 58.39 | 58.29 | 48.95 | 62.65 | 61.93 |
| Lane Group LOS | F | B | B | E | D | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 18.72 | 6.19 | 6.05 | 0.51 | 22.27 | 21.78 | 9.32 | 9.56 | 2.06 | 4.93 | 4.75 |
| 50th-Percentile Queue Length [ft/ln] | 468.07 | 154.75 | 151.20 | 12.71 | 556.76 | 544.55 | 233.04 | 238.97 | 51.40 | 123.24 | 118.74 |
| 95th-Percentile Queue Length [veh/ln] | 28.42 | 10.27 | 10.08 | 0.91 | 30.01 | 29.44 | 14.33 | 14.63 | 3.70 | 8.57 | 8.32 |
| 95th-Percentile Queue Length [ft/ln] | 710.60 | 256.76 | 252.04 | 22.87 | 750.25 | 735.90 | 358.21 | 365.73 | 92.51 | 214.28 | 208.09 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 200.26 | 13.76 | 13.78 | 68.27 | 36.94 | 39.10 | 58.35 | 58.29 | 48.95 | 62.65 | 61.93 | 61.93 |
| Movement LOS | F | B | B | E | D | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 67.21 | | | 37.80 | | | 57.29 | | | 62.30 | | |
| Approach LOS | E | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 52.55 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.848 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.957 | 3.059 | 2.717 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.466 | 2.769 | 2.838 | 2.008 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 47.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.876 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 61 | 416 | 703 | 81 | 96 | 26 | 2 | 65 | 76 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 61 | 416 | 703 | 81 | 96 | 26 | 2 | 65 | 76 | 339 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 17 | 117 | 197 | 23 | 27 | 7 | 1 | 18 | 21 | 95 |
| Total Analysis Volume [veh/h] | 2 | 837 | 69 | 467 | 790 | 91 | 108 | 29 | 2 | 73 | 85 | 381 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 29 | 29 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.20 | 0.58 | 0.58 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.26 | 0.24 | 0.24 | 0.24 | 0.31 |
| s, saturation flow rate [veh/h] | 1860 | 1644 | 1795 | 1885 | 1806 | 584 | 1727 |
| c, Capacity [veh/h] | 679 | 560 | 361 | 1092 | 1046 | 292 | 679 |
| d1, Uniform Delay [s] | 23.50 | 23.55 | 32.07 | 9.32 | 9.36 | 21.66 | 23.55 |
| k, delay calibration | 0.50 | 0.50 | 0.24 | 0.50 | 0.50 | 0.30 | 0.41 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.16 | 9.44 | 142.67 | 1.14 | 1.21 | 3.36 | 7.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.76 | 1.29 | 0.41 | 0.41 | 0.48 | 0.79 |
| d, Delay for Lane Group [s/veh] | 29.66 | 33.00 | 174.74 | 10.46 | 10.57 | 25.02 | 31.28 |
| Lane Group LOS | C | C | F | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.65 | 8.13 | 20.92 | 4.01 | 3.92 | 2.45 | 10.22 |
| 50th-Percentile Queue Length [ft/ln] | 216.24 | 203.29 | 523.02 | 100.37 | 98.06 | 61.25 | 255.50 |
| 95th-Percentile Queue Length [veh/ln] | 13.47 | 12.81 | 32.13 | 7.23 | 7.06 | 4.41 | 15.46 |
| 95th-Percentile Queue Length [ft/ln] | 336.82 | 320.20 | 803.19 | 180.67 | 176.51 | 110.24 | 386.57 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.66 | 31.09 | 33.00 | 174.74 | 10.51 | 10.57 | 25.02 | 25.02 | 25.02 | 31.28 | 31.28 | 31.28 |
| Movement LOS | C | C | C | F | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 31.23 | | | 67.41 | | | 25.02 | | | 31.28 | | |
| Approach LOS | C | | | E | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 47.57 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.876 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.82 | 29.82 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.055 | 1.840 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.74 | 8.66 | 17.46 | 17.43 |
| I_b,int, Bicycle LOS Score for Intersection | 2.309 | 2.672 | 1.789 | 2.449 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.289 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 544 | 481 | 639 | 476 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 481 | 639 | 476 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 124 | 165 | 123 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 496 | 659 | 491 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 83 | 83 | 83 | 83 | 83 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 27 | 64 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.32 | 0.77 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.28 | 0.35 | 0.33 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1806 |
| c, Capacity [veh/h] | 267 | 239 | 582 | 1457 | 818 |
| d1, Uniform Delay [s] | 32.56 | 0.00 | 26.18 | 3.36 | 18.58 |
| k, delay calibration | 0.08 | 0.08 | 0.23 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.20 | 0.00 | 7.45 | 0.22 | 5.71 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.53 | 0.00 | 0.85 | 0.45 | 0.73 |
| d, Delay for Lane Group [s/veh] | 33.76 | 0.00 | 33.64 | 3.58 | 24.29 |
| Lane Group LOS | C | A | C | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.64 | 0.00 | 9.74 | 2.29 | 9.76 |
| 50th-Percentile Queue Length [ft/ln] | 66.11 | 0.00 | 243.60 | 57.13 | 244.03 |
| 95th-Percentile Queue Length [veh/ln] | 4.76 | 0.00 | 14.86 | 4.11 | 14.89 |
| 95th-Percentile Queue Length [ft/ln] | 119.00 | 0.00 | 371.59 | 102.84 | 372.13 |

**Movement, Approach, & Intersection Results**

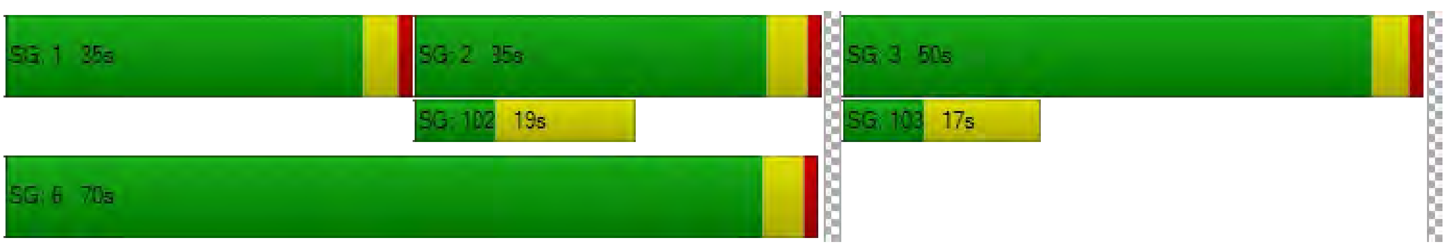
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.76 | 0.00 | 33.64 | 3.58 | 24.29 | 24.29 |
| Movement LOS | C | A | C | A | C | C |
| d_A, Approach Delay [s/veh] | 33.76 | | 16.49 | | 24.29 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 20.24 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 2.289 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.17 | 31.17 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.925 | 2.879 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1105 | 1578 | 734 |
| d_b, Bicycle Delay [s] | 8.34 | 1.87 | 16.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.465 | 2.546 |
| Bicycle LOS | A | C | B |

## Sequence

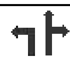
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.534 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 214 | 0 | 289 | 2 | 770 | 136 | 328 | 718 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 214 | 0 | 281 | 2 | 770 | 79 | 328 | 718 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 56 | 0 | 74 | 1 | 203 | 21 | 86 | 189 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 225 | 0 | 296 | 2 | 811 | 83 | 345 | 756 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

### Phasing & Timing

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 34 | 34 | 34 | 34 | 82 | 65 | 65 | 80 | 75 | 75 |
| g / C, Green / Cycle | 0.28 | 0.28 | 0.28 | 0.28 | 0.69 | 0.54 | 0.54 | 0.66 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.20 | 0.19 | 0.00 | 0.23 | 0.05 | 0.39 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1421 | 1719 | 1128 | 1540 | 748 | 3569 | 1559 | 881 | 1873 | 1871 |
| c, Capacity [veh/h] | 156 | 482 | 376 | 431 | 535 | 1944 | 849 | 583 | 1179 | 1177 |
| d1, Uniform Delay [s] | 53.51 | 32.37 | 42.14 | 38.22 | 7.31 | 16.10 | 13.12 | 10.67 | 10.34 | 10.34 |
| k, delay calibration | 0.10 | 0.10 | 0.25 | 0.23 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 0.13 | 3.49 | 4.07 | 0.00 | 0.66 | 0.23 | 4.37 | 0.72 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.14 | 0.60 | 0.69 | 0.00 | 0.42 | 0.10 | 0.59 | 0.32 | 0.32 |
| d, Delay for Lane Group [s/veh] | 54.22 | 32.50 | 45.63 | 42.28 | 7.31 | 16.76 | 13.35 | 15.04 | 11.06 | 11.06 |
| Lane Group LOS | D | C | D | D | A | B | B | B | B | B |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.54 | 6.47 | 8.17 | 0.02 | 6.51 | 1.11 | 4.16 | 4.64 | 4.63 |
| 50th-Percentile Queue Length [ft/ln] | 27.21 | 38.57 | 161.81 | 204.15 | 0.41 | 162.73 | 27.74 | 104.03 | 115.88 | 115.79 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 2.78 | 10.64 | 12.85 | 0.03 | 10.69 | 2.00 | 7.49 | 8.17 | 8.16 |
| 95th-Percentile Queue Length [ft/ln] | 48.98 | 69.43 | 266.12 | 321.31 | 0.75 | 267.33 | 49.94 | 187.25 | 204.15 | 204.02 |

**Movement, Approach, & Intersection Results**

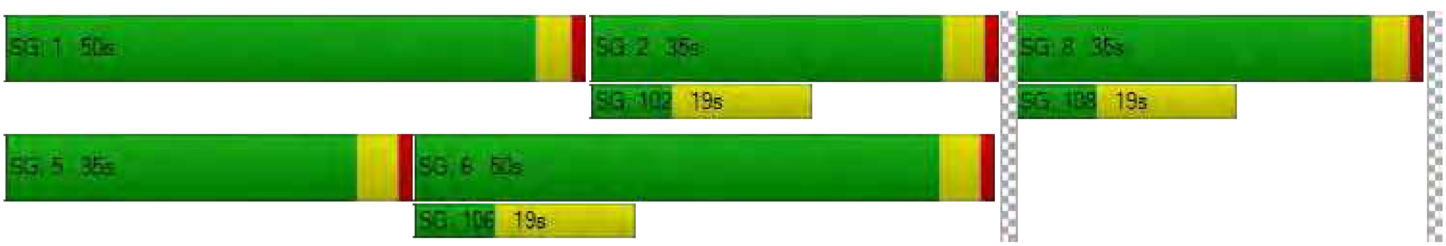
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.22 | 32.50 | 32.50 | 45.63 | 45.63 | 42.28 | 7.31 | 16.76 | 13.35 | 15.04 | 11.06 | 11.06 |
| Movement LOS | D | C | C | D | D | D | A | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | | 40.01 | | | 43.73 | | | 16.42 | | | 12.31 | |
| Approach LOS | | D | | | D | | | B | | | B | |
| d_I, Intersection Delay [s/veh] | | | | | | 21.05 | | | | | | |
| Intersection LOS | | | | | | C | | | | | | |
| Intersection V/C | | | | | | 0.534 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.979 | 2.571 | 3.241 | 2.878 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.432 | 2.346 | 2.470 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 138.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.162 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3685 | 27 | 390 | 970 | 68 | 1942 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3685 | 27 | 390 | 970 | 68 | 1942 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 940 | 7 | 99 | 247 | 17 | 495 |
| Total Analysis Volume [veh/h] | 3760 | 28 | 398 | 990 | 69 | 1982 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 159 | 159 | 159 | 159 | 159 | 159 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 40 | 132 | 15 | 59 |
| g / C, Green / Cycle | 0.57 | 0.57 | 0.25 | 0.83 | 0.09 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.74 | 0.02 | 0.12 | 0.20 | 0.02 | 0.47 |
| s, saturation flow rate [veh/h] | 5077 | 1398 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2881 | 794 | 854 | 4172 | 309 | 1579 |
| d1, Uniform Delay [s] | 34.30 | 15.14 | 50.18 | 2.82 | 66.42 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 137.96 | 0.02 | 0.15 | 0.04 | 0.13 | 115.30 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.31 | 0.04 | 0.47 | 0.24 | 0.22 | 1.26 |
| d, Delay for Lane Group [s/veh] | 172.26 | 15.16 | 50.33 | 2.86 | 66.55 | 165.05 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 70.15 | 0.43 | 6.54 | 1.42 | 1.30 | 37.44 |
| 50th-Percentile Queue Length [ft/ln] | 1753.71 | 10.85 | 163.39 | 35.52 | 32.54 | 935.91 |
| 95th-Percentile Queue Length [veh/ln] | 101.84 | 0.78 | 10.73 | 2.56 | 2.34 | 54.77 |
| 95th-Percentile Queue Length [ft/ln] | 2546.00 | 19.52 | 268.21 | 63.94 | 58.57 | 1369.25 |

**Movement, Approach, & Intersection Results**

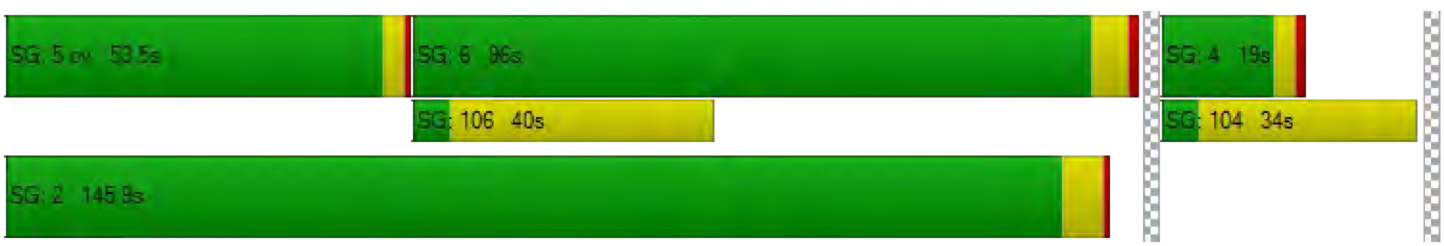
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 172.26 | 15.16 | 50.33 | 2.86 | 66.55 | 165.05 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 171.10 | | 16.47 | | 161.74 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 138.75 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.162 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 70.53 | 0.00 | 70.53 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.860 | 0.000 | 3.106 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 530 | 555 | 189 |
| d_b, Bicycle Delay [s] | 42.83 | 41.40 | 64.98 |
| I_b,int, Bicycle LOS Score for Intersection | 3.643 | 2.323 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 284.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.435 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 220 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 310 | 559 | 829 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 220 | 95 | 1112 | 159 | 332 | 76 | 76 | 2469 | 265 | 559 | 829 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 24 | 287 | 41 | 86 | 20 | 20 | 636 | 68 | 144 | 214 | 9 |
| Total Analysis Volume [veh/h] | 227 | 98 | 1146 | 164 | 342 | 78 | 78 | 2545 | 273 | 576 | 855 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 11 | | | 11 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 11 | | | 11 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 8 | | | 0 | | | 8 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 8 | | | 0 | | | 8 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 3 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 16 | 14 | 41 | 9 | 9 | 9 | 67 | 40 | 40 | 67 | 58 | 58 |
| g / C, Green / Cycle | 0.15 | 0.14 | 0.39 | 0.08 | 0.08 | 0.08 | 0.63 | 0.38 | 0.38 | 0.63 | 0.55 | 0.55 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.07 | 0.28 | 0.09 | 0.21 | 0.05 | 0.08 | 0.83 | 0.31 | 0.41 | 0.17 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4141 | 1748 | 1606 | 1442 | 965 | 3084 | 889 | 1400 | 4959 | 1615 |
| c, Capacity [veh/h] | 261 | 201 | 1616 | 148 | 136 | 122 | 622 | 1162 | 335 | 929 | 2714 | 884 |
| d1, Uniform Delay [s] | 44.20 | 42.48 | 27.17 | 48.60 | 48.60 | 46.77 | 8.05 | 33.10 | 29.77 | 24.36 | 13.15 | 11.11 |
| k, delay calibration | 0.17 | 0.11 | 0.16 | 0.36 | 0.49 | 0.11 | 0.11 | 0.24 | 0.30 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.21 | 1.83 | 0.85 | 94.53 | 701.89 | 5.44 | 0.09 | 537.00 | 12.30 | 0.68 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.49 | 0.71 | 1.11 | 2.51 | 0.64 | 0.13 | 2.19 | 0.82 | 0.62 | 0.31 | 0.04 |
| d, Delay for Lane Group [s/veh] | 57.41 | 44.31 | 28.02 | 143.13 | 750.49 | 52.21 | 8.14 | 570.10 | 42.08 | 25.04 | 13.21 | 11.13 |
| Lane Group LOS | E | D | C | F | F | D | A | F | D | C | B | B |
| Critical Lane Group | Yes | No | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 6.63 | 1.21 | 7.83 | 7.86 | 15.09 | 2.20 | 0.33 | 67.39 | 7.24 | 2.84 | 3.62 | 0.37 |
| 50th-Percentile Queue Length [ft/ln] | 165.72 | 30.32 | 195.82 | 196.50 | 377.18 | 54.92 | 8.33 | 1684.65 | 180.99 | 71.07 | 90.38 | 9.18 |
| 95th-Percentile Queue Length [veh/ln] | 10.85 | 2.18 | 12.42 | 12.91 | 25.75 | 3.95 | 0.60 | 110.80 | 11.65 | 5.12 | 6.51 | 0.66 |
| 95th-Percentile Queue Length [ft/ln] | 271.27 | 54.57 | 310.57 | 322.80 | 643.87 | 98.85 | 15.00 | 2769.94 | 291.30 | 127.93 | 162.68 | 16.53 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

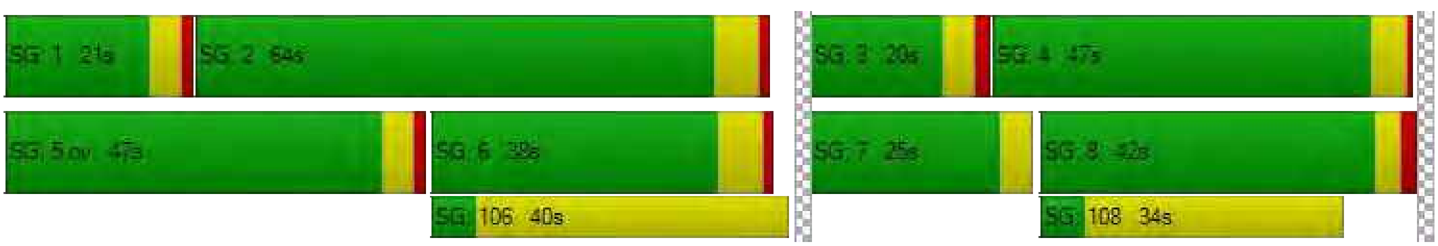
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 57.41 | 44.31 | 28.02 | 143.13 | 750.49 | 52.21 | 8.14 | 570.10 | 42.08 | 25.04 | 13.21 | 11.13 |
| Movement LOS | E | D | C | F | F | D | A | F | D | C | B | B |
| d_A, Approach Delay [s/veh] | 33.64 | | | 486.67 | | | 505.18 | | | 17.81 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 284.10 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.435 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.42 | 0.00 | 44.42 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.465 | 0.000 | 3.256 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 803 | 707 | 603 | 1094 |
| d_b, Bicycle Delay [s] | 19.00 | 22.20 | 25.87 | 10.90 |
| I_b,int, Bicycle LOS Score for Intersection | 2.773 | 2.099 | 3.177 | 2.366 |
| Bicycle LOS | C | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

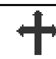
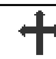
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 570.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.183 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 43 | 1065 | 302 | 138 | 994 | 54 | 123 | 201 | 35 | 193 | 195 | 299 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 1065 | 302 | 138 | 994 | 54 | 123 | 201 | 35 | 193 | 195 | 299 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 303 | 86 | 39 | 282 | 15 | 35 | 57 | 10 | 55 | 55 | 85 |
| Total Analysis Volume [veh/h] | 49 | 1210 | 343 | 157 | 1130 | 61 | 140 | 228 | 40 | 219 | 222 | 340 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 83 | 83 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.64 | 0.64 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.96 | 1.01 | 0.40 | 0.73 | 0.73 | 0.93 | 1.31 |
| s, saturation flow rate [veh/h] | 545 | 826 | 749 | 391 | 826 | 806 | 438 | 594 |
| c, Capacity [veh/h] | 164 | 464 | 420 | 161 | 526 | 514 | 148 | 174 |
| d1, Uniform Delay [s] | 33.67 | 28.46 | 28.46 | 42.79 | 23.56 | 23.56 | 53.62 | 45.22 |
| k, delay calibration | 0.22 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.09 | 329.28 | 371.83 | 64.68 | 83.84 | 88.20 | 810.48 | 1582.60 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.30 | 1.71 | 1.81 | 0.98 | 1.14 | 1.15 | 2.76 | 4.49 |
| d, Delay for Lane Group [s/veh] | 35.76 | 357.74 | 400.29 | 107.47 | 107.39 | 111.76 | 864.11 | 1627.82 |
| Lane Group LOS | D | F | F | F | F | F | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.49 | 55.64 | 55.38 | 4.52 | 27.06 | 27.03 | 38.23 | 81.90 |
| 50th-Percentile Queue Length [ft/ln] | 12.16 | 1391.12 | 1384.44 | 112.98 | 676.61 | 675.77 | 955.67 | 2047.43 |
| 95th-Percentile Queue Length [veh/ln] | 0.88 | 91.47 | 92.33 | 8.01 | 39.44 | 39.64 | 64.28 | 131.90 |
| 95th-Percentile Queue Length [ft/ln] | 21.90 | 2286.63 | 2308.30 | 200.14 | 986.01 | 991.09 | 1606.94 | 3297.62 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.76 | 372.36 | 400.29 | 107.47 | 109.44 | 111.76 | 864.11 | 864.11 | 864.11 | 1627.82 | 1627.82 | 1627.82 |
| Movement LOS | D | F | F | F | F | F | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 368.05 | | | 109.32 | | | 864.11 | | | 1627.82 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 570.39 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 2.183 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.41 | 54.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.366 | 3.165 | 2.079 | 2.474 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1124 | 1078 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.47 | 13.93 | 36.42 | 36.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.881 | 2.672 | 2.233 | 2.848 |
| Bicycle LOS | C | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 131.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.274 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 207 | 933 | 1212 | 87 | 115 | 122 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 207 | 933 | 1212 | 87 | 115 | 122 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 56 | 251 | 326 | 23 | 31 | 33 |
| Total Analysis Volume [veh/h] | 223 | 1003 | 1303 | 94 | 124 | 131 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 21 | 102 | 78 | 78 | 21 | 21 |
| g / C, Green / Cycle | 0.16 | 0.79 | 0.60 | 0.60 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.64 | 0.84 | 0.86 | 0.12 | 0.15 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 808 | 1022 | 897 |
| c, Capacity [veh/h] | 205 | 1239 | 500 | 486 | 164 | 144 |
| d1, Uniform Delay [s] | 54.41 | 8.17 | 25.88 | 25.88 | 52.12 | 53.40 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.06 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 87.39 | 5.78 | 190.86 | 208.29 | 4.18 | 25.47 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.09 | 0.81 | 1.40 | 1.44 | 0.76 | 0.91 |
| d, Delay for Lane Group [s/veh] | 141.80 | 13.96 | 216.74 | 234.18 | 56.30 | 78.88 |
| Lane Group LOS | F | B | F | F | E | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 11.58 | 7.06 | 40.35 | 41.60 | 4.06 | 5.20 |
| 50th-Percentile Queue Length [ft/ln] | 289.60 | 176.38 | 1008.84 | 1039.90 | 101.47 | 130.10 |
| 95th-Percentile Queue Length [veh/ln] | 17.84 | 11.41 | 63.42 | 66.02 | 7.31 | 8.95 |
| 95th-Percentile Queue Length [ft/ln] | 445.98 | 285.28 | 1585.41 | 1650.59 | 182.64 | 223.64 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 141.80 | 13.96 | 224.83 | 234.18 | 56.30 | 78.88 |
| Movement LOS | F | B | F | F | E | E |
| d_A, Approach Delay [s/veh] | 37.21 | | 225.46 | | 67.90 | |
| Approach LOS | D | | F | | E | |
| d_I, Intersection Delay [s/veh] | 131.31 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.274 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.010 | 2.970 | 2.144 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.571 | 2.712 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 522.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.564 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 672 | 57 | 1178 | 274 | 492 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 672 | 57 | 1178 | 274 | 492 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 181 | 15 | 317 | 74 | 132 |
| Total Analysis Volume [veh/h] | 1075 | 723 | 61 | 1267 | 295 | 529 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 1.34 | 0.09 | 0.99 | 0.46 | 0.95 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 555 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 97 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 488.66 | 43.45 | 134.38 | 742.76 | 2016.83 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 2.06 | 0.97 | 1.28 | 2.60 | 5.43 |
| d, Delay for Lane Group [s/veh] | 158.87 | 510.32 | 101.91 | 149.37 | 796.32 | 2070.39 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 56.39 | 2.73 | 29.15 | 27.16 | 57.73 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 1409.67 | 68.17 | 728.81 | 678.96 | 1443.32 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 97.79 | 4.91 | 45.78 | 45.61 | 92.15 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 2444.84 | 122.71 | 1144.45 | 1140.29 | 2303.85 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 510.32 | 101.91 | 149.37 | 796.32 | 2070.39 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 300.19 | | 147.19 | | 1614.26 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 522.88 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 2.564 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.480 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 3.043 | 2.655 | 2.919 |
| Bicycle LOS | C | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 274.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.608 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 414 | 1318 | 270 | 79 | 1282 | 27 | 55 | 226 | 574 | 423 | 363 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 414 | 1318 | 270 | 79 | 1282 | 27 | 55 | 226 | 399 | 423 | 363 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 114 | 362 | 74 | 22 | 352 | 7 | 15 | 62 | 110 | 116 | 100 | 3 |
| Total Analysis Volume [veh/h] | 455 | 1448 | 297 | 87 | 1409 | 30 | 60 | 248 | 438 | 465 | 399 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 11 | | | 20 | | | 10 | | | 19 | |
| v_di, Inbound Pedestrian Volume crossing m | | 10 | | | 19 | | | 11 | | | 20 | |
| v_co, Outbound Pedestrian Volume crossing | | 3 | | | 7 | | | 7 | | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 3 | | | 7 | | | 7 | | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 5 | | | 4 | | | 6 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 8 | 50 | 50 | 36 | 36 | 36 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.06 | 0.39 | 0.39 | 0.27 | 0.27 | 0.27 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.47 | 0.48 | 0.09 | 0.51 | 0.51 | 0.03 | 0.26 | 0.28 | 0.14 | 0.31 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1191 | 952 | 1853 | 960 | 1810 | 965 | 1548 | 3409 | 1303 | 1416 |
| c, Capacity [veh/h] | 127 | 1056 | 507 | 59 | 718 | 372 | 496 | 265 | 425 | 420 | 160 | 174 |
| d1, Uniform Delay [s] | 58.50 | 37.32 | 37.32 | 61.00 | 39.82 | 39.82 | 35.41 | 46.08 | 46.51 | 57.00 | 57.00 | 50.36 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.08 | 0.50 | 0.50 | 0.04 | 0.33 | 0.41 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1178.34 | 61.95 | 82.37 | 231.57 | 153.49 | 163.32 | 0.04 | 31.54 | 47.73 | 52.08 | 687.82 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 3.58 | 1.11 | 1.13 | 1.48 | 1.32 | 1.32 | 0.12 | 0.94 | 1.03 | 1.11 | 2.49 | 0.07 |
| d, Delay for Lane Group [s/veh] | 1236.84 | 99.27 | 119.70 | 292.57 | 193.31 | 203.15 | 35.45 | 77.61 | 94.24 | 109.08 | 744.82 | 50.42 |
| Lane Group LOS | F | F | F | F | F | F | D | E | F | F | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 45.77 | 25.12 | 27.00 | 5.72 | 26.72 | 28.69 | 1.45 | 10.09 | 19.06 | 9.92 | 35.91 | 0.35 |
| 50th-Percentile Queue Length [ft/ln] | 1144.37 | 627.93 | 675.06 | 143.01 | 667.88 | 717.30 | 36.28 | 252.35 | 476.59 | 247.97 | 897.64 | 8.77 |
| 95th-Percentile Queue Length [veh/ln] | 71.25 | 35.81 | 38.76 | 10.30 | 41.42 | 44.23 | 2.61 | 15.30 | 26.74 | 15.74 | 57.26 | 0.63 |
| 95th-Percentile Queue Length [ft/ln] | 1781.31 | 895.14 | 969.06 | 257.42 | 1035.50 | 1105.70 | 65.31 | 382.61 | 668.55 | 393.46 | 1431.61 | 15.79 |

**Movement, Approach, & Intersection Results**

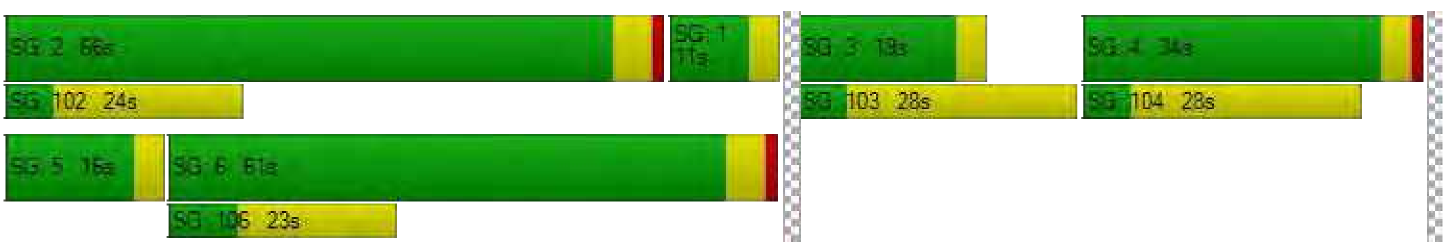
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1236.84 | 103.20 | 119.70 | 292.57 | 196.54 | 203.15 | 35.45 | 77.61 | 94.24 | 109.08 | 744.82 | 50.42 |
| Movement LOS | F | F | F | F | F | F | D | E | F | F | F | D |
| d_A, Approach Delay [s/veh] | 339.88 | | | 202.14 | | | 83.98 | | | 397.84 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 274.38 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.608 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.483 | 2.972 | 2.838 | 2.788 |
| Crosswalk LOS | C | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.54 | 50.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 2.399 | 3.079 | 3.079 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 226.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.408 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 41 | 1329 | 804 | 279 | 342 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 41 | 1329 | 804 | 56 | 342 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 343 | 207 | 14 | 88 | 0 |
| Total Analysis Volume [veh/h] | 42 | 1370 | 829 | 58 | 353 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 3 | 42 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.03 | 0.48 | 0.41 | 0.41 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.82 | 0.49 | 0.04 | 0.42 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1574 | 850 | 1596 |
| c, Capacity [veh/h] | 56 | 806 | 690 | 645 | 348 | 654 |
| d1, Uniform Delay [s] | 42.27 | 22.85 | 25.95 | 15.90 | 25.95 | 0.00 |
| k, delay calibration | 0.04 | 0.44 | 0.19 | 0.15 | 0.46 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.43 | 319.69 | 96.48 | 0.09 | 49.69 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 1.70 | 1.20 | 0.09 | 1.01 | 0.00 |
| d, Delay for Lane Group [s/veh] | 49.70 | 342.54 | 122.43 | 15.98 | 75.64 | 0.00 |
| Lane Group LOS | D | F | F | B | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.01 | 43.38 | 15.83 | 0.69 | 11.60 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 25.21 | 1084.61 | 395.82 | 17.36 | 290.00 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.82 | 71.52 | 25.01 | 1.25 | 17.34 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 45.39 | 1787.96 | 625.24 | 31.25 | 433.57 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 49.70 | 342.54 | 122.43 | 15.98 | 75.64 | 0.00 |
| Movement LOS | D | F | F | B | F | A |
| d_A, Approach Delay [s/veh] | 333.83 | | 115.47 | | 75.64 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 226.43 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.408 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 33.61 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.240 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 820 | 820 | 820 |
| d_b, Bicycle Delay [s] | 15.38 | 15.35 | 15.32 |
| I_b,int, Bicycle LOS Score for Intersection | 2.725 | 2.475 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 221.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.276 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 21 | 21 | 8 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 293 | 1 | 8 | 150 | 5 | 39 | 9 | 6 | 6 | 2 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1170 | 4 | 32 | 600 | 20 | 158 | 34 | 23 | 23 | 9 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 4 | 102 | 13 | 13 | 13 | 19 | 19 |
| g / C, Green / Cycle | 0.01 | 0.65 | 0.65 | 0.02 | 0.67 | 0.08 | 0.08 | 0.08 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.92 | 0.92 | 0.02 | 1.04 | 0.05 | 0.05 | 0.05 | 0.01 | 0.11 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1840 | 444 | 1810 | 555 |
| c, Capacity [veh/h] | 10 | 449 | 384 | 43 | 395 | 144 | 151 | 37 | 225 | 69 |
| d1, Uniform Delay [s] | 75.91 | 26.66 | 26.66 | 74.41 | 25.58 | 68.22 | 68.20 | 67.79 | 59.52 | 66.02 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 119.64 | 196.85 | 199.11 | 22.85 | 267.57 | 4.90 | 4.60 | 16.41 | 0.20 | 30.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 1.41 | 1.41 | 0.75 | 1.57 | 0.65 | 0.65 | 0.63 | 0.10 | 0.88 |
| d, Delay for Lane Group [s/veh] | 195.55 | 223.51 | 225.77 | 97.26 | 293.15 | 73.12 | 72.80 | 84.21 | 59.71 | 96.54 |
| Lane Group LOS | F | F | F | F | F | E | E | F | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.74 | 40.19 | 34.63 | 1.54 | 43.03 | 3.87 | 4.04 | 1.06 | 0.82 | 2.96 |
| 50th-Percentile Queue Length [ft/ln] | 18.58 | 1004.71 | 865.80 | 38.44 | 1075.87 | 96.74 | 100.99 | 26.55 | 20.46 | 73.93 |
| 95th-Percentile Queue Length [veh/ln] | 1.34 | 63.76 | 55.65 | 2.77 | 71.06 | 6.97 | 7.27 | 1.91 | 1.47 | 5.32 |
| 95th-Percentile Queue Length [ft/ln] | 33.45 | 1593.98 | 1391.14 | 69.19 | 1776.53 | 174.14 | 181.79 | 47.79 | 36.83 | 133.08 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 195.55 | 224.55 | 225.77 | 97.26 | 293.15 | 293.15 | 72.99 | 72.80 | 84.21 | 59.71 | 96.54 | 96.54 |
| Movement LOS | F | F | F | F | F | F | E | E | F | E | F | F |
| d_A, Approach Delay [s/veh] | 224.31 | | | 283.54 | | | 74.16 | | | 86.46 | | |
| Approach LOS | F | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 221.85 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.276 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 65.98 | 65.98 | 65.98 | 65.98 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.532 | 2.753 | 2.204 | 2.007 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 261 | 261 | 392 | 392 |
| d_b, Bicycle Delay [s] | 57.98 | 58.15 | 49.55 | 49.55 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.635 | 1.944 | 1.698 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Intersection Level Of Service Report
## Intersection 23: Willow Rd/Coleman Ave

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.693 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 190 | 1 | 1 | 190 | 31 | 40 | 1 | 13 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 24 | 762 | 5 | 2 | 759 | 123 | 160 | 2 | 53 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 73 | 73 | 73 | 73 | 19 | 19 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.73 | 0.73 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.41 | 0.00 | 0.49 | 0.15 | 0.02 |
| s, saturation flow rate [veh/h] | 639 | 1851 | 712 | 1790 | 1412 | 1536 |
| c, Capacity [veh/h] | 357 | 1355 | 440 | 1310 | 325 | 343 |
| d1, Uniform Delay [s] | 15.96 | 6.13 | 11.73 | 7.07 | 38.63 | 33.61 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.17 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.36 | 1.72 | 0.02 | 2.78 | 3.63 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.07 | 0.57 | 0.00 | 0.67 | 0.66 | 0.08 |
| d, Delay for Lane Group [s/veh] | 16.33 | 7.85 | 11.75 | 9.85 | 42.26 | 33.70 |
| Lane Group LOS | B | A | B | A | D | C |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.35 | 6.90 | 0.02 | 8.91 | 5.31 | 0.56 |
| 50th-Percentile Queue Length [ft/ln] | 8.83 | 172.47 | 0.59 | 222.86 | 132.77 | 13.91 |
| 95th-Percentile Queue Length [veh/ln] | 0.64 | 11.21 | 0.04 | 13.81 | 9.09 | 1.00 |
| 95th-Percentile Queue Length [ft/ln] | 15.90 | 280.16 | 1.05 | 345.28 | 227.26 | 25.03 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.33 | 7.85 | 7.85 | 11.75 | 9.85 | 9.85 | 42.26 | 42.26 | 42.26 | 33.70 | 33.70 | 33.70 |
| Movement LOS | B | A | A | B | A | A | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 8.11 | | | 9.85 | | | 42.26 | | | 33.70 | | |
| Approach LOS | A | | | A | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 13.10 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.693 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.57 | 39.57 | 39.57 | 39.57 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.406 | 2.762 | 1.932 | 1.737 |
| Crosswalk LOS | B | C | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1379 | 1379 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.84 | 4.83 | 29.75 | 29.75 |
| I_b,int, Bicycle LOS Score for Intersection | 2.865 | 3.018 | 1.914 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.565 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 125 | 54 | 705 | 10 | 46 | 123 | 5 | 85 | 53 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 125 | 54 | 705 | 10 | 46 | 123 | 5 | 85 | 53 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 33 | 14 | 184 | 3 | 12 | 32 | 1 | 22 | 14 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 130 | 56 | 734 | 10 | 48 | 128 | 5 | 89 | 55 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 74 | 74 | 74 | 74 | 18 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.74 | 0.74 | 0.18 | 0.18 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.45 | 0.08 | 0.40 | 0.04 | 0.07 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 727 | 1793 | 682 | 1854 | 1258 | 1855 | 1272 | 1682 |
| c, Capacity [veh/h] | 468 | 1321 | 415 | 1366 | 196 | 336 | 194 | 305 |
| d1, Uniform Delay [s] | 10.41 | 6.34 | 13.43 | 5.79 | 42.20 | 36.10 | 43.96 | 35.97 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 2.15 | 0.67 | 1.56 | 0.64 | 0.76 | 1.69 | 0.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.62 | 0.13 | 0.54 | 0.24 | 0.40 | 0.46 | 0.38 |
| d, Delay for Lane Group [s/veh] | 10.43 | 8.49 | 14.10 | 7.35 | 42.84 | 36.86 | 45.65 | 36.74 |
| Lane Group LOS | B | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 7.73 | 0.76 | 6.39 | 1.15 | 2.95 | 2.24 | 2.54 |
| 50th-Percentile Queue Length [ft/ln] | 0.83 | 193.21 | 18.94 | 159.74 | 28.77 | 73.66 | 55.98 | 63.57 |
| 95th-Percentile Queue Length [veh/ln] | 0.06 | 12.29 | 1.36 | 10.54 | 2.07 | 5.30 | 4.03 | 4.58 |
| 95th-Percentile Queue Length [ft/ln] | 1.50 | 307.18 | 34.10 | 263.38 | 51.78 | 132.59 | 100.77 | 114.43 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.43 | 8.49 | 8.49 | 14.10 | 7.35 | 7.35 | 42.84 | 36.86 | 36.86 | 45.65 | 36.74 | 36.74 |
| Movement LOS | B | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 8.50 | | | 7.82 | | | 38.45 | | | 40.63 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 14.21 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.565 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.517 | 2.527 | 2.017 | 2.165 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.906 | 2.880 | 1.858 | 1.896 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 42.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.713 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 286 | 264 | 372 | 125 | 301 | 135 | 483 | 184 | 277 | 681 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 286 | 144 | 372 | 125 | 0 | 135 | 483 | 184 | 277 | 681 | 22 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 75 | 38 | 98 | 33 | 0 | 36 | 127 | 48 | 73 | 179 | 6 |
| Total Analysis Volume [veh/h] | 32 | 301 | 152 | 392 | 132 | 0 | 142 | 508 | 194 | 292 | 717 | 23 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 18 | 18 | 18 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.16 | 0.10 | 0.14 | 0.14 | 0.00 | 0.08 | 0.13 | 0.14 | 0.13 | 0.17 | 0.22 | 0.19 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1452 | 1785 | 1853 | 1584 | 1794 | 1892 | 1892 | 1541 | 1718 | 1900 | 1699 |
| c, Capacity [veh/h] | 349 | 370 | 285 | 344 | 357 | 305 | 325 | 343 | 343 | 279 | 428 | 474 | 423 |
| d1, Uniform Delay [s] | 33.48 | 39.13 | 36.29 | 38.79 | 38.78 | 0.00 | 37.07 | 39.26 | 39.59 | 38.89 | 34.57 | 36.57 | 35.64 |
| k, delay calibration | 0.11 | 0.29 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.13 | 0.24 | 0.19 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 10.84 | 1.55 | 3.27 | 3.15 | 0.00 | 0.93 | 2.86 | 3.49 | 3.10 | 2.32 | 10.02 | 5.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.09 | 0.81 | 0.53 | 0.75 | 0.75 | 0.00 | 0.44 | 0.72 | 0.76 | 0.69 | 0.68 | 0.86 | 0.78 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 33.59 | 49.97 | 37.84 | 42.05 | 41.94 | 0.00 | 37.99 | 42.13 | 43.08 | 42.00 | 36.90 | 46.59 | 41.15 |
| Lane Group LOS | C | D | D | D | D | A | D | D | D | D | D | D | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.66 | 8.20 | 3.44 | 6.36 | 6.59 | 0.00 | 3.20 | 6.03 | 6.45 | 4.71 | 6.72 | 10.86 | 8.18 |
| 50th-Percentile Queue Length [ft/ln] | 16.39 | 205.05 | 86.05 | 159.06 | 164.80 | 0.00 | 80.10 | 150.6 | 161.3 | 117.8 | 167.97 | 271.60 | 204.38 |
| 95th-Percentile Queue Length [veh/ln] | 1.18 | 12.90 | 6.20 | 10.50 | 10.80 | 0.00 | 5.77 | 10.05 | 10.62 | 8.27 | 10.97 | 16.27 | 12.86 |
| 95th-Percentile Queue Length [ft/ln] | 29.50 | 322.47 | 154.90 | 262.48 | 270.06 | 0.00 | 144.1 | 251.2 | 265.5 | 206.8 | 274.24 | 406.74 | 321.61 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.59 | 49.97 | 37.84 | 42.01 | 41.94 | 0.00 | 37.99 | 42.62 | 42.00 | 36.90 | 44.26 | 41.15 |
| Movement LOS | C | D | D | D | D | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 45.09 | | | 41.99 | | | 41.70 | | | 42.10 | | |
| Approach LOS | D | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 42.47 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.713 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.51 | 39.51 | 39.51 | 39.51 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.526 | 4.265 | 4.404 | 2.806 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 565 | 813 | 537 | 675 |
| d_b, Bicycle Delay [s] | 26.83 | 18.07 | 27.23 | 22.45 |
| I_b,int, Bicycle LOS Score for Intersection | 2.558 | 4.074 | 3.081 | 2.411 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.994 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1961 | 0 | 0 | 1480 | 570 | 870 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1961 | 0 | 0 | 1480 | 570 | 870 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 495 | 0 | 0 | 374 | 144 | 220 |
| Total Analysis Volume [veh/h] | 1981 | 0 | 0 | 1495 | 576 | 879 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.57 | 0.42 | 0.17 | 0.34 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2070 | 2094 | 1183 | 907 |
| d1, Uniform Delay [s] | 15.29 | 11.47 | 20.28 | 25.48 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.06 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 11.95 | 2.11 | 0.12 | 5.41 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.96 | 0.71 | 0.49 | 0.97 |
| d, Delay for Lane Group [s/veh] | 27.24 | 13.58 | 20.40 | 30.89 |
| Lane Group LOS | C | B | C | C |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 17.50 | 8.57 | 4.02 | 8.36 |
| 50th-Percentile Queue Length [ft/ln] | 437.43 | 214.37 | 100.62 | 209.02 |
| 95th-Percentile Queue Length [veh/ln] | 24.36 | 13.38 | 7.24 | 13.10 |
| 95th-Percentile Queue Length [ft/ln] | 608.93 | 334.43 | 181.11 | 327.58 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

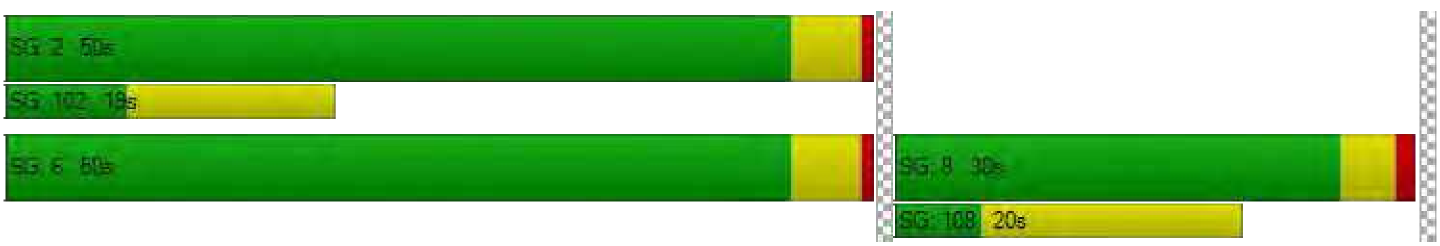
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.24 | 0.00 | 0.00 | 13.58 | 20.40 | 30.89 |
| Movement LOS | C | | | B | C | C |
| d_A, Approach Delay [s/veh] | 27.24 | | 13.58 | | 26.73 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 22.95 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.994 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.188 | 2.479 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.47 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 3.194 | 2.793 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 151.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.489 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 311 | 18 | 146 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 52 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 311 | 18 | 146 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 52 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 84 | 5 | 40 | 188 | 10 | 6 | 37 | 6 | 2 | 5 | 14 |
| Total Analysis Volume [veh/h] | 24 | 336 | 19 | 158 | 753 | 39 | 24 | 149 | 24 | 8 | 20 | 56 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 605 | 950 | 526 | 517 |
| Degree of Utilization, x | 0.63 | 1.49 | 0.37 | 0.16 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 4.37 | 46.64 | 1.73 | 0.58 |
| 95th-Percentile Queue Length [ft] | 109.22 | 1166.05 | 43.13 | 14.38 |
| Approach Delay [s/veh] | 18.44 | 244.75 | 13.89 | 11.30 |
| Approach LOS | C | F | B | B |
| Intersection Delay [s/veh] | 151.05 | | | |
| Intersection LOS | F | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.071 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 757 | 239 | 2568 | 788 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 757 | 239 | 2568 | 788 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 10 | 460 | 3 | 8 | 1 | 2 | 197 | 62 | 669 | 205 | 4 |
| Total Analysis Volume [veh/h] | 205 | 42 | 1840 | 13 | 32 | 5 | 9 | 789 | 249 | 2675 | 821 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 26 | 116 | 10 | 10 | 38 | 38 | 38 | 76 | 76 |
| g / C, Green / Cycle | 0.16 | 0.73 | 0.06 | 0.06 | 0.24 | 0.24 | 0.24 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.44 | 0.02 | 0.01 | 0.22 | 0.22 | 0.16 | 0.52 | 0.50 |
| s, saturation flow rate [veh/h] | 1824 | 4190 | 1707 | 1588 | 1892 | 1724 | 1556 | 5150 | 1678 |
| c, Capacity [veh/h] | 302 | 2949 | 137 | 97 | 450 | 410 | 370 | 2449 | 798 |
| d1, Uniform Delay [s] | 64.44 | 12.51 | 71.59 | 71.56 | 59.60 | 59.60 | 55.09 | 41.95 | 41.95 |
| k, delay calibration | 0.42 | 0.50 | 0.04 | 0.04 | 0.15 | 0.15 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 18.40 | 1.01 | 0.27 | 0.45 | 11.35 | 12.22 | 0.80 | 48.85 | 44.99 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.82 | 0.62 | 0.20 | 0.23 | 0.93 | 0.93 | 0.67 | 1.09 | 1.05 |
|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 82.84 | 13.52 | 71.86 | 72.01 | 70.95 | 71.82 | 55.89 | 90.81 | 86.94 |
| Lane Group LOS | F | B | E | E | E | E | E | F | F |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 11.32 | 11.52 | 1.10 | 0.89 | 18.02 | 16.52 | 9.23 | 42.84 | 41.02 |
| 50th-Percentile Queue Length [ft/ln] | 283.04 | 287.93 | 27.52 | 22.30 | 450.52 | 412.89 | 230.79 | 1071.03 | 1025.56 |
| 95th-Percentile Queue Length [veh/ln] | 16.84 | 17.08 | 1.98 | 1.61 | 24.98 | 23.18 | 14.21 | 57.39 | 53.49 |
| 95th-Percentile Queue Length [ft/ln] | 421.00 | 427.07 | 49.54 | 40.15 | 624.57 | 579.51 | 355.36 | 1434.72 | 1337.27 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 82.84 | 82.84 | 13.52 | 71.86 | 71.94 | 72.01 | 70.95 | 71.37 | 55.89 | 90.81 | 86.94 | 86.94 |
| Movement LOS | F | F | B | E | E | E | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | 21.72 | | | 71.93 | | | 67.68 | | | 89.89 | | |
| Approach LOS | C | | | E | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 65.03 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.071 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.666 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 5.003 | 1.601 | 2.423 | 7.353 |
| Bicycle LOS | F | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 162.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.089 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1045 | 199 | 0 | 1137 | 879 | 0 | 0 | 0 | 0 | 794 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1045 | 199 | 0 | 1137 | 879 | 0 | 0 | 0 | 0 | 794 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 281 | 50 | 0 | 306 | 236 | 0 | 0 | 0 | 0 | 199 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1124 | 199 | 0 | 1223 | 945 | 0 | 0 | 0 | 0 | 794 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.24 | 1.36 | | 0.23 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2750 | 2706 | 374 | | 1265 | 458 |
| d1, Uniform Delay [s] | 10.84 | 11.18 | 17.80 | | 21.12 | 23.61 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.45 | 0.55 | 693.86 | | 0.52 | 4.66 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.41 | 0.45 | 2.52 | | 0.63 | 0.85 |
| d, Delay for Lane Group [s/veh] | 11.29 | 11.72 | 711.66 | | 21.64 | 28.27 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.65 | 4.10 | 77.94 | | 5.89 | 3.49 |
| 50th-Percentile Queue Length [ft/ln] | 91.13 | 102.42 | 1948.55 | | 147.22 | 87.20 |
| 95th-Percentile Queue Length [veh/ln] | 6.56 | 7.37 | 133.33 | | 9.87 | 6.28 |
| 95th-Percentile Queue Length [ft/ln] | 164.04 | 184.36 | 3333.34 | | 246.72 | 156.96 |

**Movement, Approach, & Intersection Results**

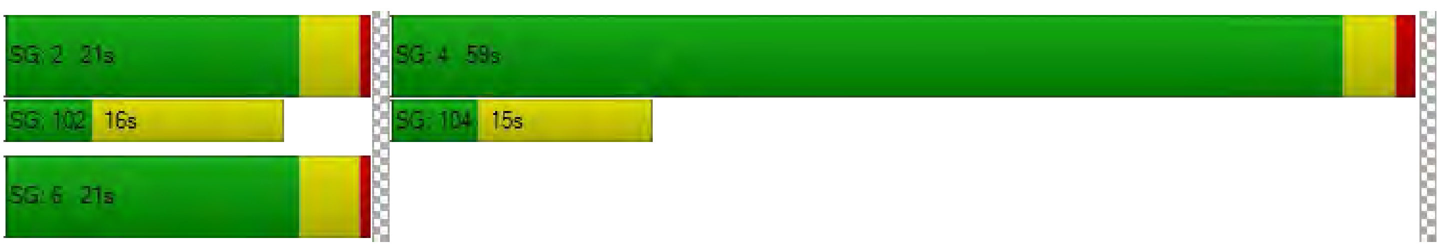
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.29 | 0.00 | 0.00 | 11.72 | 711.66 | 0.00 | 0.00 | 0.00 | 0.00 | 21.64 | 28.27 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | 11.29 | | | 316.82 | | | 0.00 | | | 23.82 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 162.56 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 2.089 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.971 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.178 | 2.752 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 239.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.264 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1309 | 522 | 0 | 1709 | 696 | 0 | 0 | 0 | 304 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1309 | 522 | 0 | 1709 | 696 | 0 | 0 | 0 | 304 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 334 | 133 | 0 | 436 | 174 | 0 | 0 | 0 | 76 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1336 | 533 | 0 | 1744 | 696 | 0 | 0 | 0 | 304 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.44 | 0.34 | 0.57 | | 0.09 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 915 | 473 | 915 | | 2108 | 1011 |
| d1, Uniform Delay [s] | 27.97 | 27.70 | 27.97 | | 7.00 | 14.74 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 213.13 | 80.51 | 411.83 | | 0.03 | 5.32 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.46 | 1.13 | 1.91 | | 0.14 | 0.94 |
| d, Delay for Lane Group [s/veh] | 241.10 | 108.21 | 439.79 | | 7.03 | 20.06 |
| Lane Group LOS | F | F | F | | A | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 23.58 | 19.07 | 40.41 | | 1.01 | 7.34 |
| 50th-Percentile Queue Length [ft/ln] | 589.38 | 476.84 | 1010.21 | | 25.16 | 183.45 |
| 95th-Percentile Queue Length [veh/ln] | 37.98 | 28.16 | 66.18 | | 1.81 | 11.78 |
| 95th-Percentile Queue Length [ft/ln] | 949.42 | 704.04 | 1654.55 | | 45.29 | 294.51 |

**Movement, Approach, & Intersection Results**

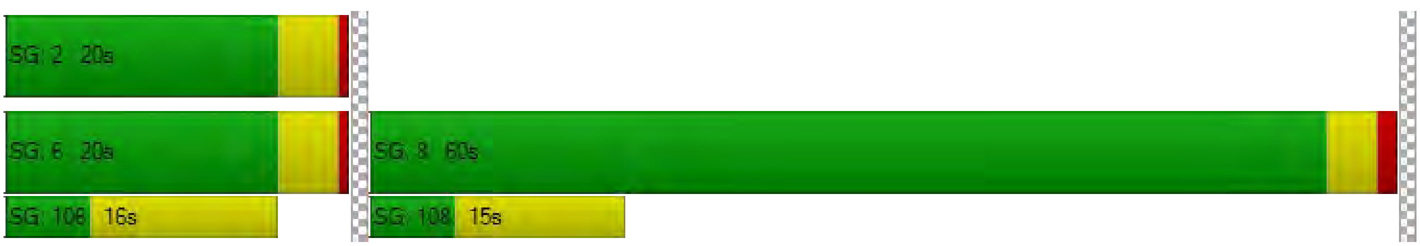
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 241.10 | 108.21 | 0.00 | 439.79 | 0.00 | 0.00 | 0.00 | 0.00 | 7.03 | 0.00 | 20.06 |
| Movement LOS | | F | F | | F | | | | | A | | C |
| d_A, Approach Delay [s/veh] | 203.20 | | | 439.79 | | | 0.00 | | | 16.91 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 239.80 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.264 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.151 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.588 | 2.519 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 69.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.118 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 752 | 588 | 2491 | 348 | 223 | 1827 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 752 | 588 | 2491 | 348 | 223 | 1827 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 202 | 158 | 670 | 94 | 60 | 491 |
| Total Analysis Volume [veh/h] | 809 | 632 | 2678 | 374 | 240 | 1965 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 94 | 94 | 94 | 94 | 94 | 94 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 64 | 64 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.53 | 0.53 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.41 | 0.53 | 0.24 | 0.68 | 0.39 |
| s, saturation flow rate [veh/h] | 3361 | 1543 | 5049 | 1579 | 351 | 4979 |
| c, Capacity [veh/h] | 719 | 330 | 2700 | 844 | 299 | 3387 |
| d1, Uniform Delay [s] | 36.75 | 36.55 | 21.55 | 13.21 | 28.52 | 7.90 |
| k, delay calibration | 0.06 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 58.78 | 422.54 | 3.38 | 0.14 | 19.94 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.13 | 1.91 | 0.99 | 0.44 | 0.80 | 0.58 |
| d, Delay for Lane Group [s/veh] | 95.53 | 459.09 | 24.93 | 13.35 | 48.46 | 7.96 |
| Lane Group LOS | F | F | C | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 13.89 | 46.07 | 18.33 | 4.52 | 3.20 | 5.88 |
| 50th-Percentile Queue Length [ft/ln] | 347.19 | 1151.84 | 458.33 | 113.08 | 80.12 | 147.11 |
| 95th-Percentile Queue Length [veh/ln] | 21.25 | 72.91 | 25.36 | 8.01 | 5.77 | 9.86 |
| 95th-Percentile Queue Length [ft/ln] | 531.21 | 1822.80 | 633.88 | 200.28 | 144.21 | 246.56 |

**Movement, Approach, & Intersection Results**

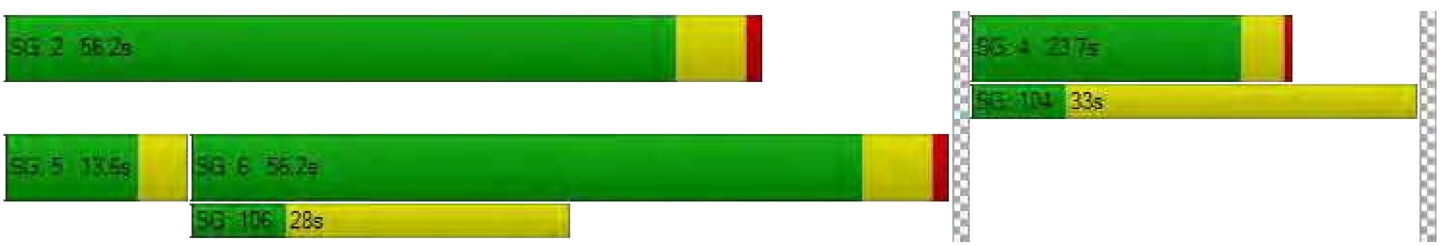
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 95.53 | 459.09 | 24.93 | 13.35 | 48.46 | 7.96 |
| Movement LOS | F | F | C | B | D | A |
| d_A, Approach Delay [s/veh] | 254.98 | | 23.51 | | 12.36 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 69.64 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.118 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.40 | 36.40 | 36.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.978 | 3.407 | 3.364 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 428 | 1070 | 1070 |
| d_b, Bicycle Delay [s] | 29.01 | 10.12 | 10.12 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.238 | 2.772 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 39.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.979 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1032 | 90 | 2679 | 99 | 74 | 2258 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1032 | 90 | 2679 | 99 | 74 | 2258 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 263 | 23 | 683 | 25 | 19 | 576 |
| Total Analysis Volume [veh/h] | 1053 | 92 | 2734 | 101 | 76 | 2304 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 95 | 95 | 95 | 95 | 95 | 95 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 25 | 25 | 50 | 50 | 5 | 59 |
| g / C, Green / Cycle | 0.26 | 0.26 | 0.53 | 0.53 | 0.05 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.06 | 0.54 | 0.06 | 0.04 | 0.46 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 910 | 424 | 2659 | 842 | 100 | 3104 |
| d1, Uniform Delay [s] | 35.09 | 27.43 | 22.59 | 11.44 | 44.32 | 12.54 |
| k, delay calibration | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 72.51 | 0.09 | 14.45 | 0.02 | 4.32 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.16 | 0.22 | 1.03 | 0.12 | 0.76 | 0.74 |
| d, Delay for Lane Group [s/veh] | 107.60 | 27.53 | 37.04 | 11.46 | 48.64 | 12.67 |
| Lane Group LOS | F | C | F | B | D | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 19.54 | 1.65 | 20.30 | 0.97 | 1.82 | 9.16 |
| 50th-Percentile Queue Length [ft/ln] | 488.53 | 41.29 | 507.45 | 24.30 | 45.47 | 229.09 |
| 95th-Percentile Queue Length [veh/ln] | 29.08 | 2.97 | 28.30 | 1.75 | 3.27 | 14.13 |
| 95th-Percentile Queue Length [ft/ln] | 727.07 | 74.32 | 707.40 | 43.73 | 81.84 | 353.20 |

**Movement, Approach, & Intersection Results**

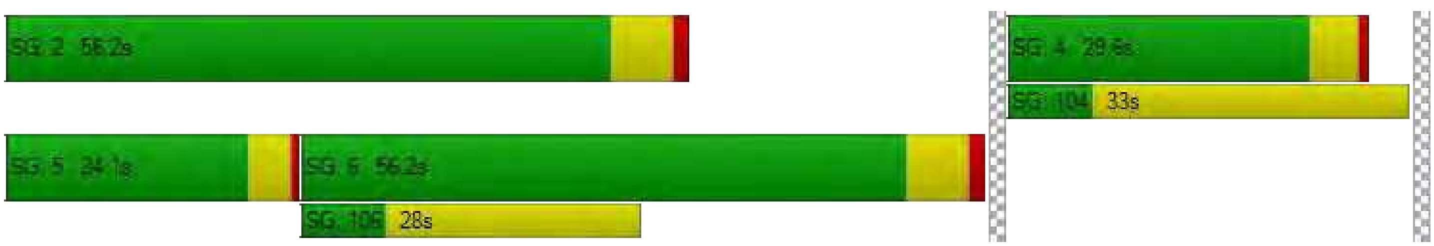
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 107.60 | 27.53 | 37.04 | 11.46 | 48.64 | 12.67 |
| Movement LOS | F | C | F | B | D | B |
| d_A, Approach Delay [s/veh] | 101.17 | | 36.13 | | 13.82 | |
| Approach LOS | F | | D | | B | |
| d_I, Intersection Delay [s/veh] | 39.49 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.979 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 37.19 | 37.19 | 37.19 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.402 | 3.860 | 3.684 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 526 | 1051 | 1051 |
| d_b, Bicycle Delay [s] | 25.84 | 10.70 | 10.70 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.119 | 2.869 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 199: Bafront Expwy/Bldg 21

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.940 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 581 | 164 | 2488 | 60 | 48 | 1269 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 581 | 164 | 2488 | 60 | 48 | 1269 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 148 | 42 | 635 | 15 | 12 | 324 |
| Total Analysis Volume [veh/h] | 593 | 167 | 2539 | 61 | 49 | 1295 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 87 | 87 | 87 | 87 | 87 | 87 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.57 | 0.57 | 0.66 | 0.66 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.56 | 0.04 | 0.10 | 0.29 |
| s, saturation flow rate [veh/h] | 1438 | 1365 | 4507 | 1406 | 471 | 4470 |
| c, Capacity [veh/h] | 330 | 313 | 2588 | 807 | 342 | 2936 |
| d1, Uniform Delay [s] | 33.54 | 33.54 | 18.08 | 8.26 | 20.42 | 7.23 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 104.70 | 112.89 | 2.28 | 0.01 | 0.07 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 1.19 | 0.98 | 0.08 | 0.14 | 0.44 |
| d, Delay for Lane Group [s/veh] | 138.25 | 146.43 | 20.37 | 8.27 | 20.49 | 7.26 |
| Lane Group LOS | F | F | C | A | C | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 16.35 | 16.23 | 14.89 | 0.48 | 0.14 | 3.31 |
| 50th-Percentile Queue Length [ft/ln] | 408.81 | 405.70 | 372.33 | 11.88 | 3.46 | 82.63 |
| 95th-Percentile Queue Length [veh/ln] | 24.96 | 24.97 | 21.22 | 0.86 | 0.25 | 5.95 |
| 95th-Percentile Queue Length [ft/ln] | 624.01 | 624.28 | 530.55 | 21.39 | 6.23 | 148.73 |

**Movement, Approach, & Intersection Results**

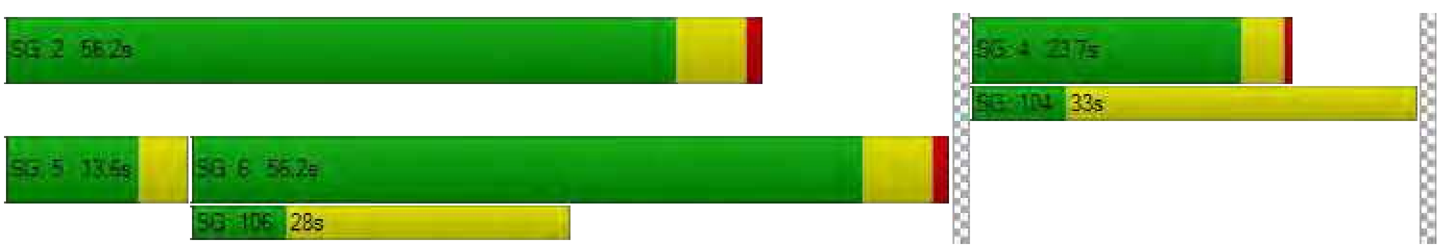
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 141.12 | 146.43 | 20.37 | 8.27 | 20.49 | 7.26 |
| Movement LOS | F | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 142.26 | | 20.09 | | 7.75 | |
| Approach LOS | F | | C | | A | |
| d_I, Intersection Delay [s/veh] | 36.30 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.940 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.21 | 33.21 | 33.21 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.383 | 3.217 | 3.217 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 460 | 1149 | 1149 |
| d_b, Bicycle Delay [s] | 25.81 | 7.88 | 7.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.814 | 2.990 | 2.299 |
| Bicycle LOS | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 189.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.636 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 515 | 399 | 19 | 406 | 215 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 515 | 399 | 19 | 406 | 215 | 20 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 148 | 115 | 5 | 117 | 62 | 6 |
| Total Analysis Volume [veh/h] | 592 | 459 | 22 | 467 | 247 | 23 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 1051 | 600 | 516 |
| Degree of Utilization, x | 1.64 | 0.81 | 0.52 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 57.88 | 8.25 | 3.00 |
| 95th-Percentile Queue Length [ft] | 1446.97 | 206.36 | 75.01 |
| Approach Delay [s/veh] | 308.53 | 29.97 | 17.38 |
| Approach LOS | F | D | C |
| Intersection Delay [s/veh] | 189.84 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.888 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | r | | \|\|\|r | | ┐\|\|\| | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 179 | 2539 | 24 | 49 | 1337 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 179 | 2539 | 24 | 49 | 1337 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 49 | 698 | 7 | 13 | 367 |
| Total Analysis Volume [veh/h] | 0 | 197 | 2790 | 26 | 54 | 1469 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 15 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.18 | 0.61 | 0.61 | 0.70 | 0.70 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.62 | 0.02 | 0.25 | 0.34 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 214 | 4342 |
| c, Capacity [veh/h] | 222 | 2761 | 862 | 224 | 3035 |
| d1, Uniform Delay [s] | 32.75 | 15.91 | 6.31 | 20.33 | 5.60 |
| k, delay calibration | 0.13 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.61 | 7.79 | 0.01 | 0.20 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 1.01 | 0.03 | 0.24 | 0.48 |
| d, Delay for Lane Group [s/veh] | 46.36 | 23.70 | 6.31 | 20.53 | 5.64 |
| Lane Group LOS | D | F | A | C | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.53 | 16.02 | 0.16 | 0.23 | 2.93 |
| 50th-Percentile Queue Length [ft/ln] | 113.26 | 400.48 | 3.96 | 5.83 | 73.16 |
| 95th-Percentile Queue Length [veh/ln] | 8.02 | 22.78 | 0.28 | 0.42 | 5.27 |
| 95th-Percentile Queue Length [ft/ln] | 200.53 | 569.38 | 7.12 | 10.49 | 131.68 |

**Movement, Approach, & Intersection Results**

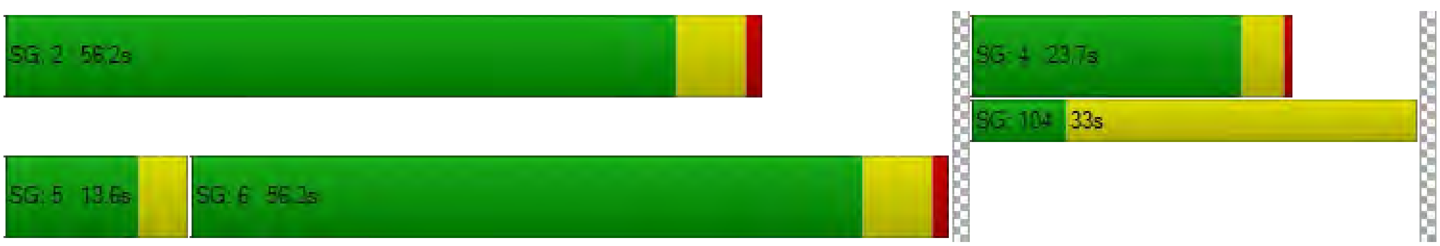
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 46.36 | 23.70 | 6.31 | 20.53 | 5.64 |
| Movement LOS | | D | F | A | C | A |
| d_A, Approach Delay [s/veh] | 46.36 | | 23.54 | | 6.17 | |
| Approach LOS | D | | C | | A | |
| d_I, Intersection Delay [s/veh] | 18.70 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.888 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.30 | 30.60 | 30.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.911 | 3.185 | 3.217 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 489 | 1224 | 1224 |
| d_b, Bicycle Delay [s] | 23.31 | 6.16 | 6.16 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.108 | 2.397 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 113.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.240 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 79 | 391 | 27 | 131 | 414 | 60 | 412 | 21 | 509 | 270 | 18 | 678 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 79 | 391 | 27 | 131 | 414 | 60 | 412 | 21 | 509 | 270 | 18 | 678 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 22 | 111 | 8 | 37 | 118 | 17 | 117 | 6 | 145 | 77 | 5 | 193 |
| Total Analysis Volume [veh/h] | 90 | 444 | 31 | 149 | 470 | 68 | 468 | 24 | 578 | 307 | 20 | 770 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 1,3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 10 | 34 | 0 | 11 | 35 | 0 | 0 | 40 | 40 | 0 | 45 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 115 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 9 | 32 | 7 | 30 | 30 | 77 | 30 | 30 |
| g / C, Green / Cycle | 0.08 | 0.28 | 0.06 | 0.26 | 0.26 | 0.67 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.26 | 0.04 | 0.30 | 0.28 | 0.38 | 0.36 | 0.35 |
| s, saturation flow rate [veh/h] | 1767 | 1834 | 3431 | 1768 | 1771 | 1539 | 1506 | 1577 |
| c, Capacity [veh/h] | 143 | 510 | 216 | 460 | 460 | 1031 | 440 | 410 |
| d1, Uniform Delay [s] | 51.31 | 40.54 | 52.95 | 42.68 | 42.68 | 9.88 | 44.16 | 42.68 |
| k, delay calibration | 0.11 | 0.45 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.45 | 23.98 | 3.91 | 97.75 | 61.41 | 2.20 | 128.49 | 167.74 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.93 | 0.69 | 1.17 | 1.07 | 0.56 | 1.25 | 1.34 |
| d, Delay for Lane Group [s/veh] | 55.76 | 64.52 | 56.87 | 140.43 | 104.09 | 12.08 | 172.65 | 210.42 |
| Lane Group LOS | E | E | E | F | F | B | F | F |
| Critical Lane Group | No | No | No | Yes | Yes | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.70 | 16.37 | 2.23 | 25.41 | 20.81 | 7.63 | 28.54 | 30.64 |
| 50th-Percentile Queue Length [ft/ln] | 67.40 | 409.31 | 55.76 | 635.25 | 520.13 | 190.78 | 713.59 | 765.89 |
| 95th-Percentile Queue Length [veh/ln] | 4.85 | 23.01 | 4.01 | 36.86 | 29.44 | 12.16 | 42.11 | 46.23 |
| 95th-Percentile Queue Length [ft/ln] | 121.32 | 575.21 | 100.37 | 921.39 | 735.98 | 304.04 | 1052.75 | 1155.78 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.76 | 64.52 | 64.52 | 56.87 | 140.43 | 140.43 | 104.09 | 104.09 | 12.08 | 172.65 | 172.65 | 199.56 |
| Movement LOS | E | E | E | E | F | F | F | F | B | F | F | F |
| d_A, Approach Delay [s/veh] | 63.13 | | | 122.31 | | | 54.39 | | | 191.54 | | |
| Approach LOS | E | | | F | | | D | | | F | | |
| d_I, Intersection Delay [s/veh] | 113.48 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.240 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.17 | 47.17 | 47.17 | 47.17 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.013 | 2.774 | 2.358 | 2.460 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 520 | 538 | 624 | 711 |
| d_b, Bicycle Delay [s] | 31.55 | 30.82 | 27.27 | 23.94 |
| I_b,int, Bicycle LOS Score for Intersection | 2.492 | 2.693 | 3.325 | 3.370 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 148.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.403 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 362 | 54 | 40 | 343 | 146 | 3 | 50 | 8 | 245 | 0 | 490 | 83 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 362 | 54 | 40 | 343 | 146 | 3 | 50 | 8 | 245 | 0 | 490 | 83 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 91 | 14 | 10 | 86 | 37 | 1 | 13 | 2 | 61 | 0 | 123 | 21 |
| Total Analysis Volume [veh/h] | 362 | 54 | 40 | 343 | 146 | 3 | 50 | 8 | 245 | 0 | 490 | 83 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 8 | | | 7 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 7 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 38 | 22 | 22 | 18 | 38 | 38 |
| g / C, Green / Cycle | 0.42 | 0.24 | 0.24 | 0.20 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.85 | 0.21 | 0.09 | 0.34 | 0.18 | 0.19 |
| s, saturation flow rate [veh/h] | 535 | 1609 | 1680 | 899 | 1628 | 1468 |
| c, Capacity [veh/h] | 298 | 390 | 407 | 181 | 729 | 621 |
| d1, Uniform Delay [s] | 36.07 | 32.92 | 28.43 | 36.00 | 18.18 | 18.44 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.46 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 255.25 | 6.56 | 0.55 | 323.48 | 1.71 | 2.26 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.53 | 0.88 | 0.37 | 1.67 | 0.41 | 0.44 |
| d, Delay for Lane Group [s/veh] | 291.31 | 39.48 | 28.98 | 359.48 | 19.89 | 20.70 |
| Lane Group LOS | F | D | C | F | B | C |
| Critical Lane Group | Yes | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 27.71 | 7.73 | 2.70 | 20.17 | 4.52 | 4.27 |
| 50th-Percentile Queue Length [ft/ln] | 692.83 | 193.22 | 67.38 | 504.35 | 113.06 | 106.64 |
| 95th-Percentile Queue Length [veh/ln] | 45.58 | 12.29 | 4.85 | 33.47 | 8.01 | 7.65 |
| 95th-Percentile Queue Length [ft/ln] | 1139.50 | 307.20 | 121.28 | 836.76 | 200.24 | 191.32 |

**Movement, Approach, & Intersection Results**

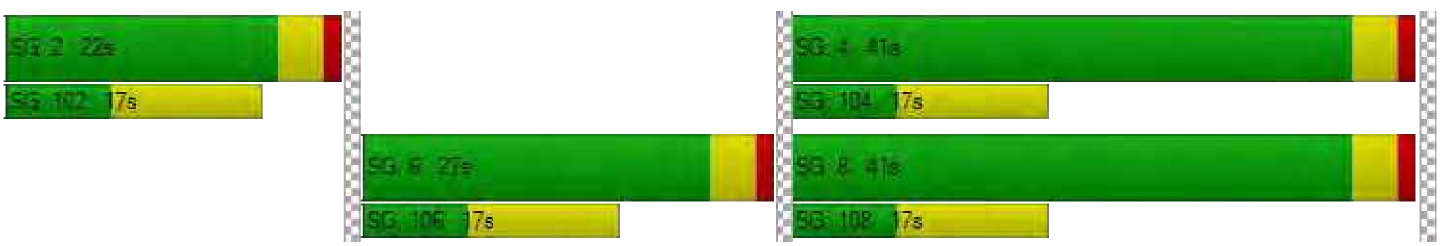
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 291.31 | 291.31 | 291.31 | 39.48 | 28.98 | 28.98 | 359.48 | 359.48 | 359.48 | 19.89 | 20.21 | 20.70 |
| Movement LOS | F | F | F | D | C | C | F | F | F | B | C | C |
| d_A, Approach Delay [s/veh] | 291.31 | | | 36.30 | | | 359.48 | | | 20.28 | | |
| Approach LOS | F | | | D | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 148.71 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.403 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.72 | 34.72 | 34.72 | 34.72 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.438 | 2.115 | 2.665 | 2.161 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 821 | 511 | 400 | 821 |
| d_b, Bicycle Delay [s] | 15.64 | 24.98 | 28.85 | 15.64 |
| I_b,int, Bicycle LOS Score for Intersection | 2.312 | 2.371 | 2.060 | 2.032 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 264: Adams Drive/O'Brien Drive

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 512.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.739 |

### Intersection Setup

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 173 | 157 | 266 | 316 | 197 | 51 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 173 | 157 | 266 | 316 | 197 | 51 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 52 | 47 | 80 | 95 | 59 | 15 |
| Total Analysis Volume [veh/h] | 208 | 189 | 320 | 381 | 237 | 61 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 1.74 | 0.25 | 0.26 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 512.66 | 487.30 | 8.90 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 29.66 | 29.66 | 1.03 | 1.03 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 741.53 | 741.53 | 25.77 | 25.77 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 500.59 | | 4.06 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 144.40 | | | | | |
| Intersection LOS | F | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 265: Adam Court/ Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.089 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 106 | 210 | 35 | 15 | 30 | 242 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 106 | 210 | 35 | 15 | 30 | 242 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 33 | 65 | 11 | 5 | 9 | 75 |
| Total Analysis Volume [veh/h] | 131 | 259 | 43 | 19 | 37 | 299 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.09 | 0.00 | 0.00 | 0.00 | 0.09 | 0.31 |
| d_M, Delay for Movement [s/veh] | 7.62 | 0.00 | 0.00 | 0.00 | 16.41 | 11.46 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.29 | 0.29 | 0.00 | 0.00 | 1.91 | 1.91 |
| 95th-Percentile Queue Length [ft/ln] | 7.14 | 7.14 | 0.00 | 0.00 | 47.83 | 47.83 |
| d_A, Approach Delay [s/veh] | 2.56 | | 0.00 | | 12.01 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 6.39 | | | | | |
| Intersection LOS | C | | | | | |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro

Report File: P:\...\Cumulative PM.pdf

Scenario 19 Cumulative PM (2040 vols)

12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 959 | 1163 | 1338 | 444 | 3904 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 49 | 1326 | 7 | 75 | 1046 | 249 | 15 | 6 | 412 | 304 | 6 | 4 | 3499 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 293 | 675 | 54 | 13 | 996 | 354 | 462 | 34 | 236 | 128 | 85 | 40 | 3370 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 61 | 416 | 703 | 81 | 96 | 26 | 2 | 65 | 76 | 339 | 2612 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 544 | 481 | 639 | 476 | 104 | 2381 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 214 | 0 | 289 | 2 | 770 | 136 | 328 | 718 | 2 | 2557 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3685 | 27 | 390 | 970 | 68 | 1942 | 7082 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 220 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 310 | 559 | 829 | 34 | 6341 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 43 | 1065 | 302 | 138 | 994 | 54 | 123 | 201 | 35 | 193 | 195 | 299 | 3642 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 207 | 933 | 1212 | 87 | 115 | 122 | 2676 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 672 | 57 | 1178 | 274 | 492 | 3673 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 414 | 1318 | 270 | 79 | 1282 | 27 | 55 | 226 | 574 | 423 | 363 | 56 | 5087 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 41 | 1329 | 804 | 279 | 342 | 40 | 2835 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 | 1941 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 | 1746 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 125 | 54 | 705 | 10 | 46 | 123 | 5 | 85 | 53 | 58 | 1923 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 286 | 264 | 372 | 125 | 301 | 135 | 483 | 184 | 277 | 681 | 22 | 3160 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1961 | 1480 | 570 | 870 | 4881 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 311 | 18 | 146 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 52 | 1480 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 757 | 239 | 2568 | 788 | 14 | 6426 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1045 | 199 | 1137 | 879 | 794 | 352 | 4406 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1309 | 522 | 1709 | 696 | 304 | 859 | 5399 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 752 | 588 | 2491 | 348 | 223 | 1827 | 6229 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 1032 | 90 | 2679 | 99 | 74 | 2258 | 6232 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 581 | 164 | 2488 | 60 | 48 | 1269 | 4610 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 515 | 399 | 19 | 406 | 215 | 20 | 1574 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 179 | 2539 | 24 | 49 | 1337 | 4128 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 79 | 391 | 27 | 131 | 414 | 60 | 412 | 21 | 509 | 270 | 18 | 678 | 3010 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 362 | 54 | 40 | 343 | 146 | 3 | 50 | 8 | 245 | 0 | 490 | 83 | 1824 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 173 | 157 | 266 | 316 | 197 | 51 | 1160 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 106 | 210 | 35 | 15 | 30 | 242 | 638 |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro

Report File: P:\...\Cumulative PM.pdf

Scenario 19 Cumulative PM (2040 vols)

12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 959 | 1163 | 1338 | 444 | 3904 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **959** | **1163** | **1338** | **444** | **3904** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 49 | 1326 | 7 | 75 | 1046 | 249 | 15 | 6 | 412 | 304 | 6 | 4 | 3499 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **49** | **1326** | **7** | **75** | **1046** | **249** | **15** | **6** | **412** | **304** | **6** | **4** | **3499** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 293 | 675 | 54 | 13 | 996 | 354 | 462 | 34 | 236 | 128 | 85 | 40 | 3370 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **293** | **675** | **54** | **13** | **996** | **354** | **462** | **34** | **236** | **128** | **85** | **40** | **3370** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 61 | 416 | 703 | 81 | 96 | 26 | 2 | 65 | 76 | 339 | 2612 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **61** | **416** | **703** | **81** | **96** | **26** | **2** | **65** | **76** | **339** | **2612** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 544 | 481 | 639 | 476 | 104 | 2381 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **544** | **481** | **639** | **476** | **104** | **2381** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 214 | 0 | 289 | 2 | 770 | 136 | 328 | 718 | 2 | 2557 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **214** | **0** | **289** | **2** | **770** | **136** | **328** | **718** | **2** | **2557** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3685 | 27 | 390 | 970 | 68 | 1942 | 7082 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3685** | **27** | **390** | **970** | **68** | **1942** | **7082** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 220 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 310 | 559 | 829 | 34 | 6341 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **220** | **95** | **1112** | **159** | **332** | **146** | **76** | **2469** | **310** | **559** | **829** | **34** | **6341** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 43 | 1065 | 302 | 138 | 994 | 54 | 123 | 201 | 35 | 193 | 195 | 299 | 3642 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **43** | **1065** | **302** | **138** | **994** | **54** | **123** | **201** | **35** | **193** | **195** | **299** | **3642** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 207 | 933 | 1212 | 87 | 115 | 122 | 2676 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **207** | **933** | **1212** | **87** | **115** | **122** | **2676** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 672 | 57 | 1178 | 274 | 492 | 3673 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **672** | **57** | **1178** | **274** | **492** | **3673** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 414 | 1318 | 270 | 79 | 1282 | 27 | 55 | 226 | 574 | 423 | 363 | 56 | 5087 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **414** | **1318** | **270** | **79** | **1282** | **27** | **55** | **226** | **574** | **423** | **363** | **56** | **5087** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 41 | 1329 | 804 | 279 | 342 | 40 | 2835 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **41** | **1329** | **804** | **279** | **342** | **40** | **2835** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 | 1941 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1053** | **4** | **29** | **540** | **18** | **142** | **31** | **39** | **21** | **8** | **47** | **1941** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 | 1746 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **693** | **5** | **2** | **691** | **112** | **146** | **2** | **48** | **15** | **4** | **6** | **1746** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 125 | 54 | 705 | 10 | 46 | 123 | 5 | 85 | 53 | 58 | 1923 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **125** | **54** | **705** | **10** | **46** | **123** | **5** | **85** | **53** | **58** | **1923** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 286 | 264 | 372 | 125 | 301 | 135 | 483 | 184 | 277 | 681 | 22 | 3160 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **286** | **264** | **372** | **125** | **301** | **135** | **483** | **184** | **277** | **681** | **22** | **3160** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1961 | 1480 | 570 | 870 | 4881 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1961** | **1480** | **570** | **870** | **4881** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 311 | 18 | 146 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 52 | 1480 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **311** | **18** | **146** | **696** | **36** | **21** | **132** | **21** | **7** | **18** | **52** | **1480** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 757 | 239 | 2568 | 788 | 14 | 6426 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **197** | **40** | **1766** | **12** | **31** | **5** | **9** | **757** | **239** | **2568** | **788** | **14** | **6426** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1045 | 199 | 1137 | 879 | 794 | 352 | 4406 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1045** | **199** | **1137** | **879** | **794** | **352** | **4406** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1309 | 522 | 1709 | 696 | 304 | 859 | 5399 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1309** | **522** | **1709** | **696** | **304** | **859** | **5399** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 752 | 588 | 2491 | 348 | 223 | 1827 | 6229 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **752** | **588** | **2491** | **348** | **223** | **1827** | **6229** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 1032 | 90 | 2679 | 99 | 74 | 2258 | 6232 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1032** | **90** | **2679** | **99** | **74** | **2258** | **6232** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 581 | 164 | 2488 | 60 | 48 | 1269 | 4610 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **581** | **164** | **2488** | **60** | **48** | **1269** | **4610** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 515 | 399 | 19 | 406 | 215 | 20 | 1574 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **515** | **399** | **19** | **406** | **215** | **20** | **1574** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 179 | 2539 | 24 | 49 | 1337 | 4128 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **2539** | **24** | **49** | **1337** | **4128** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 79 | 391 | 27 | 131 | 414 | 60 | 412 | 21 | 509 | 270 | 18 | 678 | 3010 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **79** | **391** | **27** | **131** | **414** | **60** | **412** | **21** | **509** | **270** | **18** | **678** | **3010** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 362 | 54 | 40 | 343 | 146 | 3 | 50 | 8 | 245 | 0 | 490 | 83 | 1824 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **362** | **54** | **40** | **343** | **146** | **3** | **50** | **8** | **245** | **0** | **490** | **83** | **1824** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 173 | 157 | 266 | 316 | 197 | 51 | 1160 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **173** | **157** | **266** | **316** | **197** | **51** | **1160** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 106 | 210 | 35 | 15 | 30 | 242 | 638 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **106** | **210** | **35** | **15** | **30** | **242** | **638** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 351 | 878 | 77 | 174 |
| 2 | 340 | 852 | 75 | 169 |
| 3 | 333 | 834 | 73 | 165 |
| 4 | 312 | 781 | 69 | 155 |
| 5 | 277 | 694 | 61 | 137 |
| 6 | 274 | 685 | 60 | 136 |
| 7 | 270 | 676 | 59 | 134 |
| 8 | 246 | 615 | 54 | 122 |
| 9 | 242 | 606 | 53 | 120 |
| 10 | 239 | 597 | 52 | 118 |
| 11 | 207 | 518 | 45 | 103 |
| 12 | 193 | 483 | 42 | 96 |
| 13 | 190 | 474 | 42 | 94 |
| 14 | 140 | 351 | 31 | 70 |
| 15 | 140 | 351 | 31 | 70 |
| 16 | 98 | 246 | 22 | 49 |
| 17 | 56 | 140 | 12 | 28 |
| 18 | 56 | 140 | 12 | 28 |
| 19 | 32 | 79 | 7 | 16 |
| 20 | 18 | 44 | 4 | 9 |
| 21 | 11 | 26 | 2 | 5 |
| 22 | 4 | 9 | 1 | 2 |
| 23 | 4 | 9 | 1 | 2 |
| 24 | 4 | 9 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1229 | 1 | 174 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1192 | 1 | 169 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1167 | 1 | 165 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1093 | 1 | 155 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 971 | 1 | 137 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 959 | 1 | 136 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 946 | 1 | 134 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 861 | 1 | 122 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 9 | 1 | 848 | 1 | 120 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 836 | 1 | 118 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 725 | 1 | 103 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 676 | 1 | 96 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 664 | 1 | 94 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 491 | 1 | 70 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 491 | 1 | 70 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 344 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 196 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 196 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 111 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 62 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 37 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 9 | 10 | 13 | 10 | 13 | 13 | 15 | 7 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.3 | 13.9 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:14 | 0:40 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 77 | 174 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1480 | 1480 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 425 | 914 | 235 |
| 2 | 412 | 887 | 228 |
| 3 | 404 | 868 | 223 |
| 4 | 378 | 813 | 209 |
| 5 | 336 | 722 | 186 |
| 6 | 332 | 713 | 183 |
| 7 | 327 | 704 | 181 |
| 8 | 298 | 640 | 165 |
| 9 | 293 | 631 | 162 |
| 10 | 289 | 622 | 160 |
| 11 | 251 | 539 | 139 |
| 12 | 234 | 503 | 129 |
| 13 | 230 | 494 | 127 |
| 14 | 170 | 366 | 94 |
| 15 | 170 | 366 | 94 |
| 16 | 119 | 256 | 66 |
| 17 | 68 | 146 | 38 |
| 18 | 68 | 146 | 38 |
| 19 | 38 | 82 | 21 |
| 20 | 21 | 46 | 12 |
| 21 | 13 | 27 | 7 |
| 22 | 4 | 9 | 2 |
| 23 | 4 | 9 | 2 |
| 24 | 4 | 9 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1339 | 1 | 235 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1299 | 1 | 228 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1272 | 1 | 223 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1191 | 1 | 209 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 1058 | 1 | 186 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 1045 | 1 | 183 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 1031 | 1 | 181 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 938 | 1 | 165 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 924 | 1 | 162 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 911 | 1 | 160 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 790 | 1 | 139 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 12 | 1 | 737 | 1 | 129 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 724 | 1 | 127 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 536 | 1 | 94 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 15 | 1 | 536 | 1 | 94 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 16 | 1 | 375 | 1 | 66 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 214 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 214 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 120 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 67 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 40 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 10 | 13 | 13 | 15 | 11 | 13 | 15 | 15 | 10 | 3 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 17.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 235 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1574 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 248 | 582 | 330 |
| 2 | 241 | 565 | 320 |
| 3 | 236 | 553 | 314 |
| 4 | 221 | 518 | 294 |
| 5 | 196 | 460 | 261 |
| 6 | 193 | 454 | 257 |
| 7 | 191 | 448 | 254 |
| 8 | 174 | 407 | 231 |
| 9 | 171 | 402 | 228 |
| 10 | 169 | 396 | 224 |
| 11 | 146 | 343 | 195 |
| 12 | 136 | 320 | 182 |
| 13 | 134 | 314 | 178 |
| 14 | 99 | 233 | 132 |
| 15 | 99 | 233 | 132 |
| 16 | 69 | 163 | 92 |
| 17 | 40 | 93 | 53 |
| 18 | 40 | 93 | 53 |
| 19 | 22 | 52 | 30 |
| 20 | 12 | 29 | 17 |
| 21 | 7 | 17 | 10 |
| 22 | 2 | 6 | 3 |
| 23 | 2 | 6 | 3 |
| 24 | 2 | 6 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 830 | 1 | 330 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 806 | 1 | 320 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 789 | 1 | 314 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 739 | 1 | 294 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 656 | 1 | 261 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 647 | 1 | 257 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 639 | 1 | 254 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 581 | 1 | 231 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No |
| 9 | 1 | 573 | 1 | 228 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 565 | 1 | 224 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 489 | 1 | 195 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 456 | 1 | 182 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 448 | 1 | 178 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 332 | 1 | 132 | No | No | No | Yes | No | No | No | No | No | No |
| 15 | 1 | 332 | 1 | 132 | No | No | No | Yes | No | No | No | No | No | No |
| 16 | 1 | 232 | 1 | 92 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 133 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 133 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 74 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 41 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 24 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 10 | 13 | 13 | 15 | 3 | 7 | 10 | 13 | 8 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 500.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 45:53 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 330 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1160 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 316 | 50 | 272 |
| 2 | 307 | 49 | 264 |
| 3 | 300 | 48 | 258 |
| 4 | 281 | 45 | 242 |
| 5 | 250 | 40 | 215 |
| 6 | 246 | 39 | 212 |
| 7 | 243 | 39 | 209 |
| 8 | 221 | 35 | 190 |
| 9 | 218 | 35 | 188 |
| 10 | 215 | 34 | 185 |
| 11 | 186 | 30 | 160 |
| 12 | 174 | 28 | 150 |
| 13 | 171 | 27 | 147 |
| 14 | 126 | 20 | 109 |
| 15 | 126 | 20 | 109 |
| 16 | 88 | 14 | 76 |
| 17 | 51 | 8 | 44 |
| 18 | 51 | 8 | 44 |
| 19 | 28 | 5 | 24 |
| 20 | 16 | 3 | 14 |
| 21 | 9 | 2 | 8 |
| 22 | 3 | 1 | 3 |
| 23 | 3 | 1 | 3 |
| 24 | 3 | 1 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 366 | 1 | 272 | No | No | Yes | Yes | No | No | No | No | No | No |
| 2 | 1 | 356 | 1 | 264 | No | No | Yes | Yes | No | No | No | No | No | No |
| 3 | 1 | 348 | 1 | 258 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 326 | 1 | 242 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 1 | 290 | 1 | 215 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 285 | 1 | 212 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 282 | 1 | 209 | No | No | No | Yes | No | No | No | No | No | No |
| 8 | 1 | 256 | 1 | 190 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 253 | 1 | 188 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 249 | 1 | 185 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 216 | 1 | 160 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 202 | 1 | 150 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 198 | 1 | 147 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 146 | 1 | 109 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 146 | 1 | 109 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 102 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 59 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 59 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 33 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 19 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 11 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | W |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 12 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:54 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 272 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 638 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

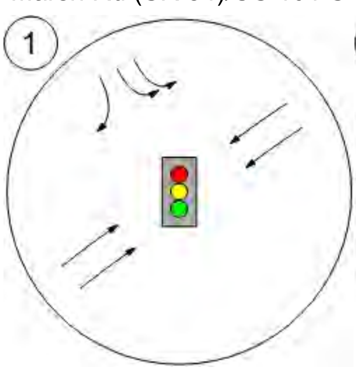
## Study Intersections

Generated with PTV VISTRO

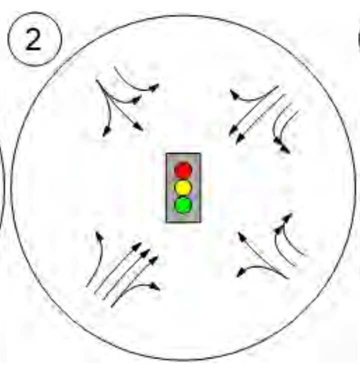
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

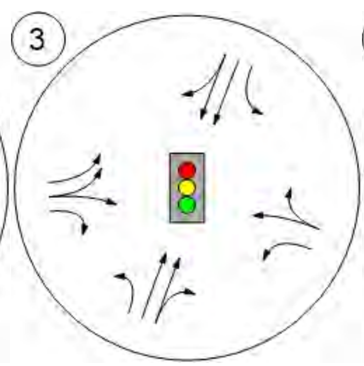

Marsh Rd (SR 84)/US 101 S



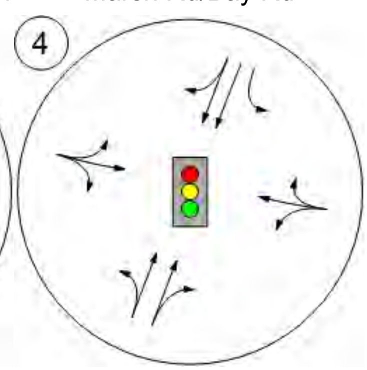

Marsh Rd/Rolison Rd-Scott D



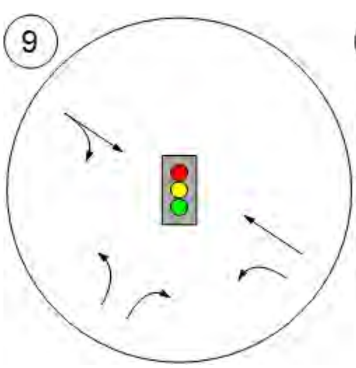

Marsh Rd/Florence St-Bohan



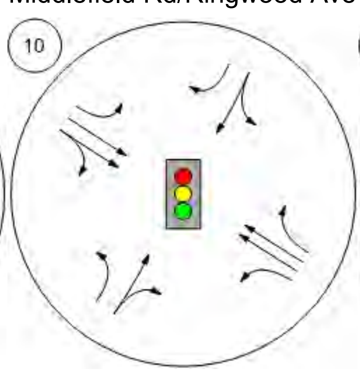

Marsh Rd/Bay Rd



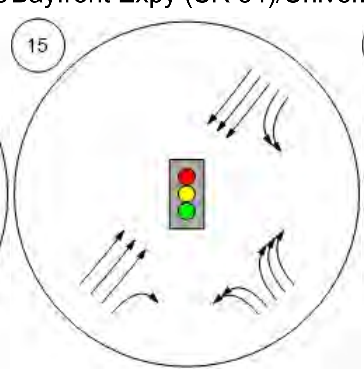

Middlefield Rd/Ravenswood



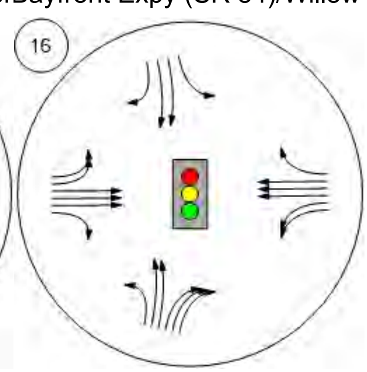

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

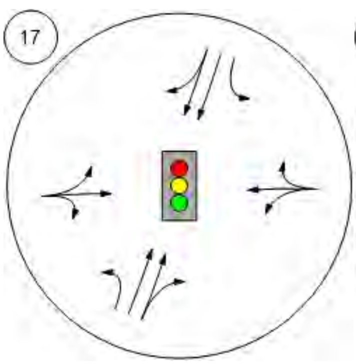


Generated with PTV VISTRO

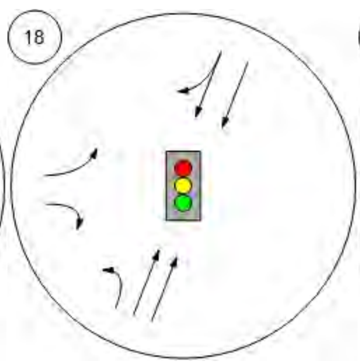
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

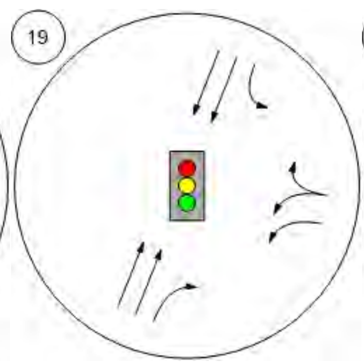

Willow Rd (SR 114)/Hamilton



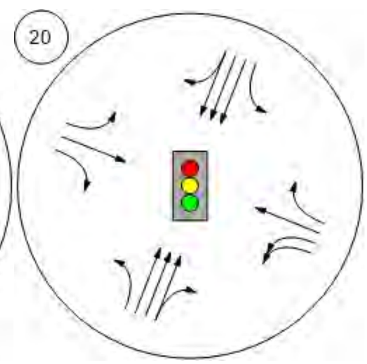

Willow Rd (SR 114)/Ivy Dr



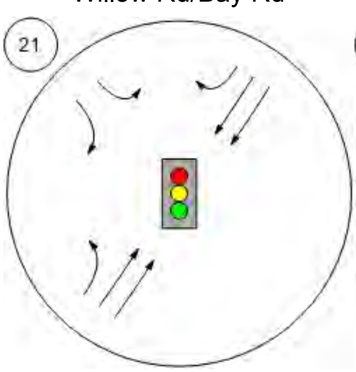

Willow Rd (SR 114)/O'Brien



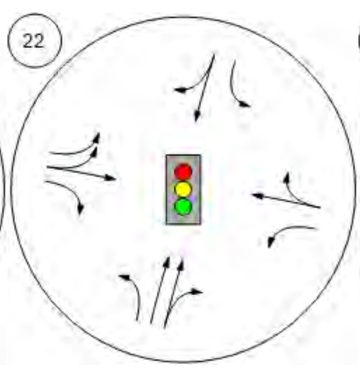

Willow Rd (SR 114)/Newbrid



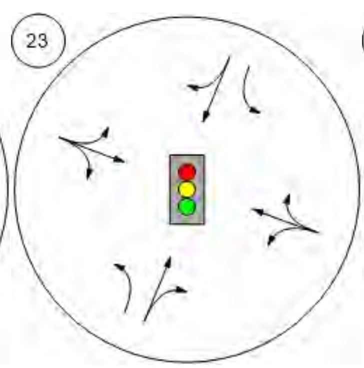

Willow Rd/Bay Rd



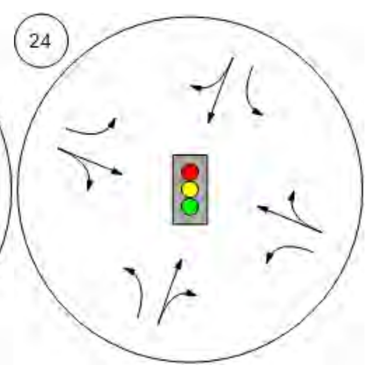

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



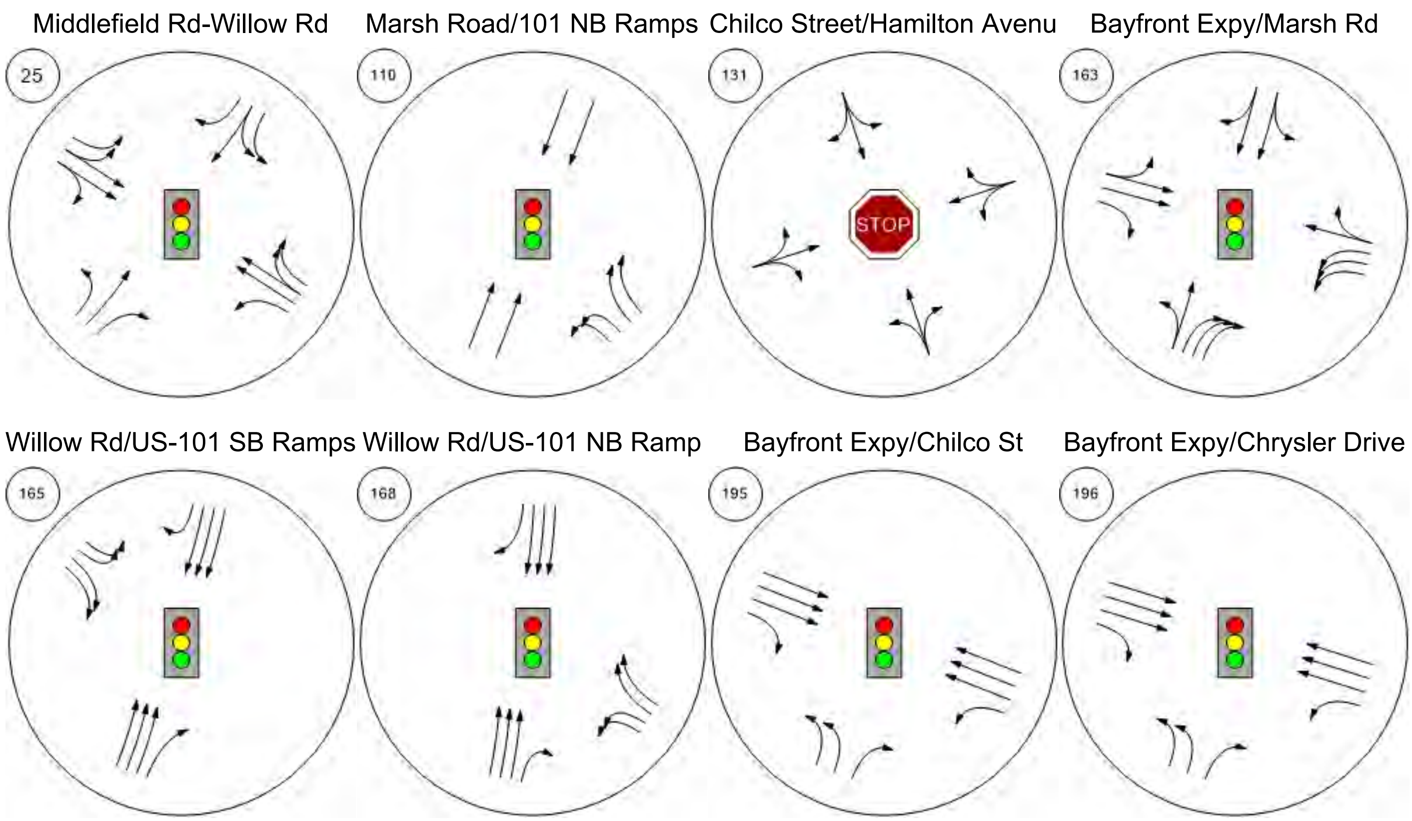

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

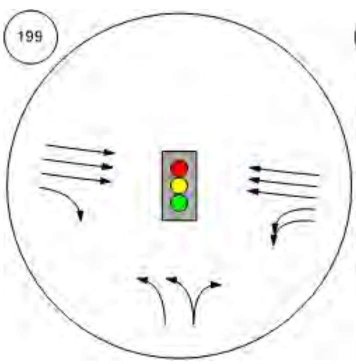
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

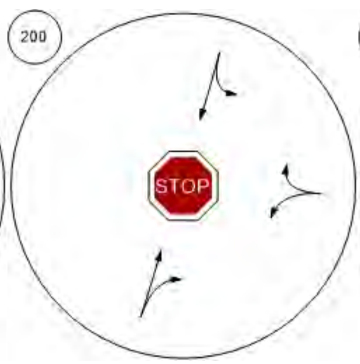



## Lane Configuration and Traffic Control

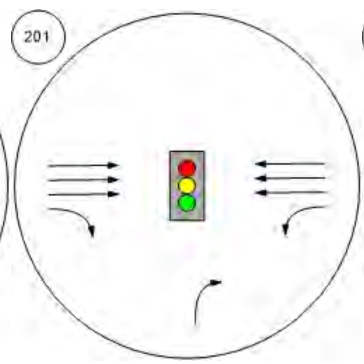

Bafront Expwy/Bldg 21



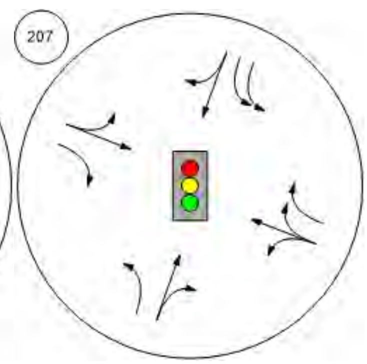

O'Brien Drive/Kavanaugh Dri



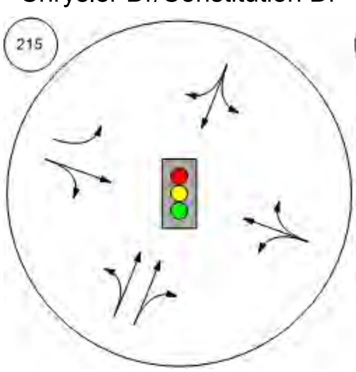

Bayfront Expwy/Bldg 20



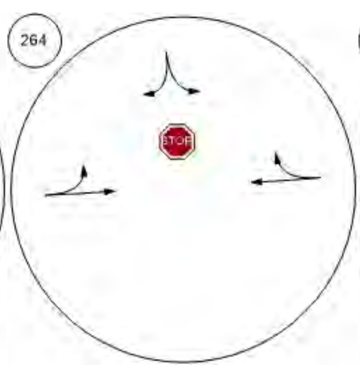

Chilco St/Constitution Dr



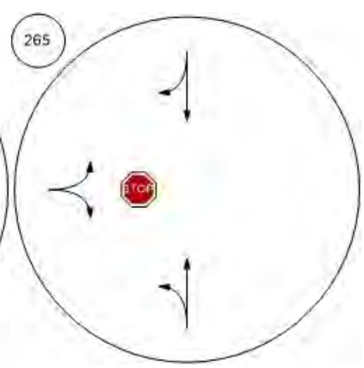

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

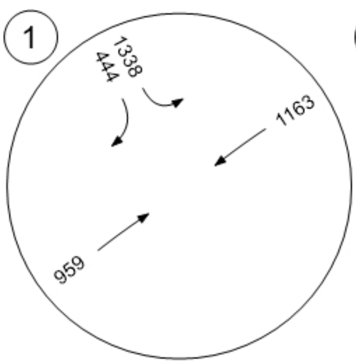


Generated with PTV VISTRO

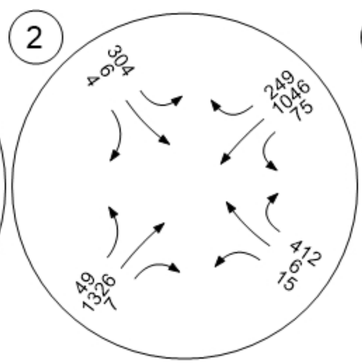
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

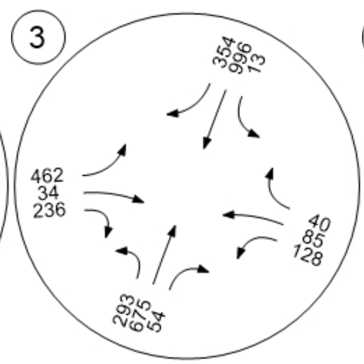

Marsh Rd (SR 84)/US 101 S



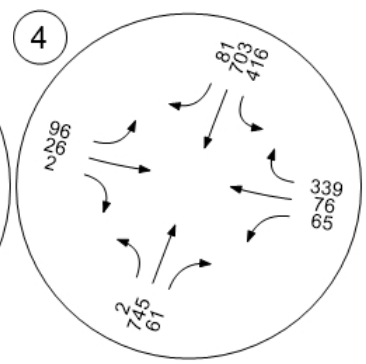

Marsh Rd/Rolison Rd-Scott D



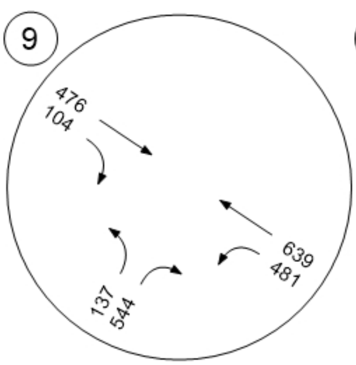

Marsh Rd/Florence St-Bohan



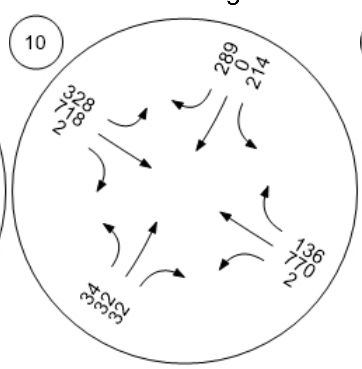

Marsh Rd/Bay Rd



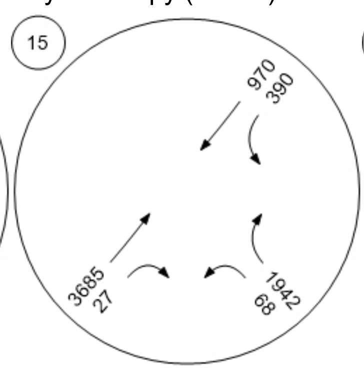

Middlefield Rd/Ravenswood



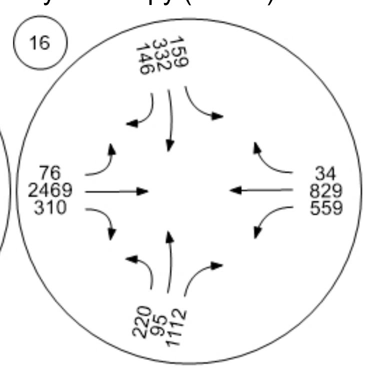

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

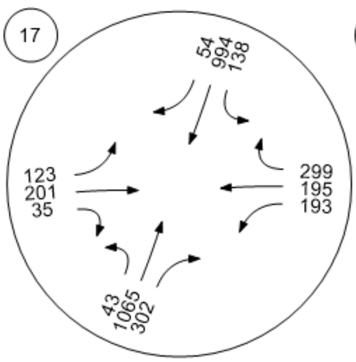


Generated with PTV VISTRO

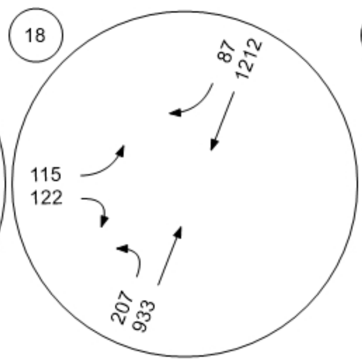
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

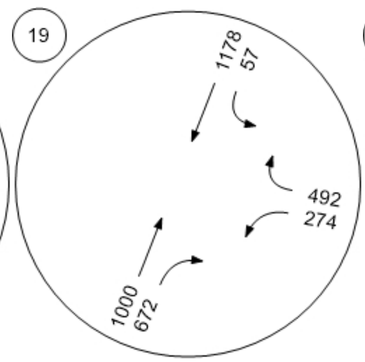

Willow Rd (SR 114)/Hamilton



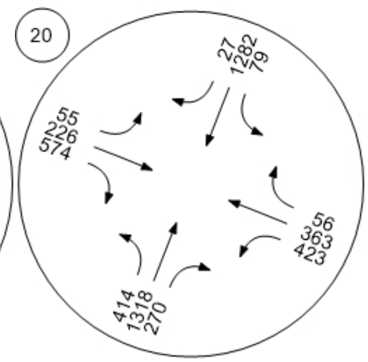

Willow Rd (SR 114)/Ivy Dr



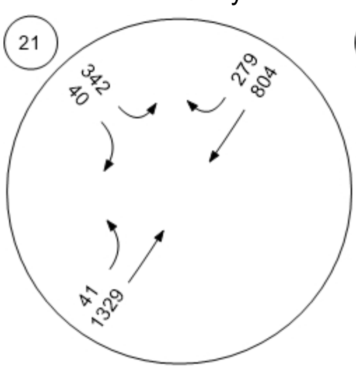

Willow Rd (SR 114)/O'Brien



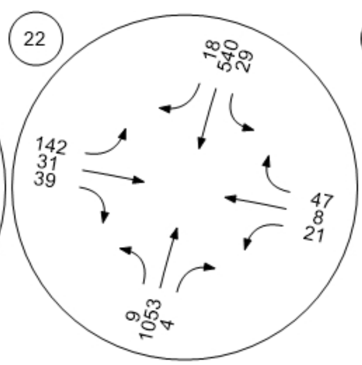

Willow Rd (SR 114)/Newbrid



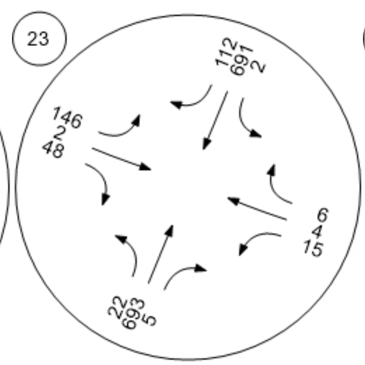

Willow Rd/Bay Rd



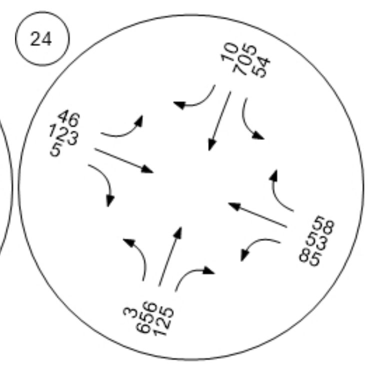

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

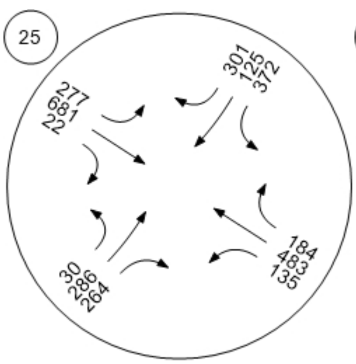



Willow Rd/Gilbert Ave

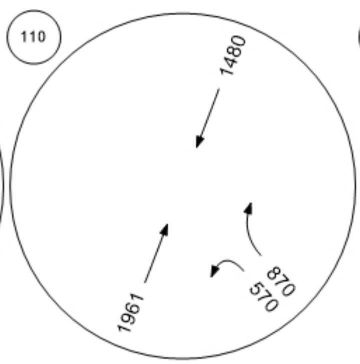


## Traffic Volume - Base Volume

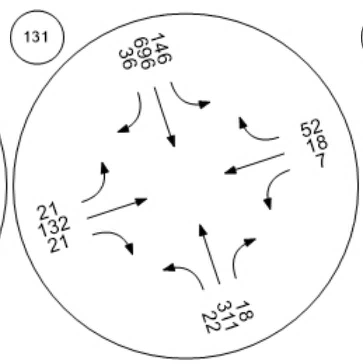

Middlefield Rd-Willow Rd



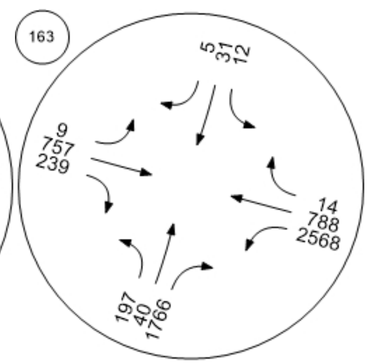

Marsh Road/101 NB Ramps



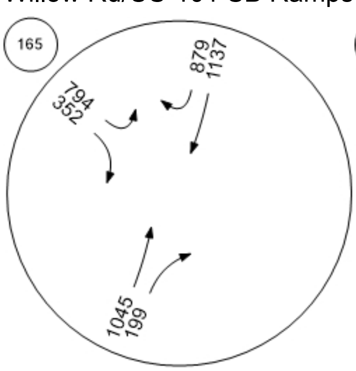

Chilco Street/Hamilton Avenu



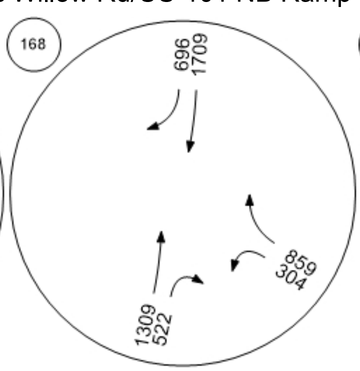

Bayfront Expy/Marsh Rd



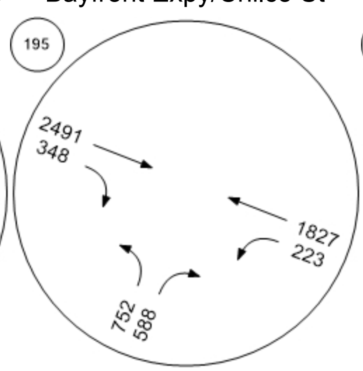

Willow Rd/US-101 SB Ramps



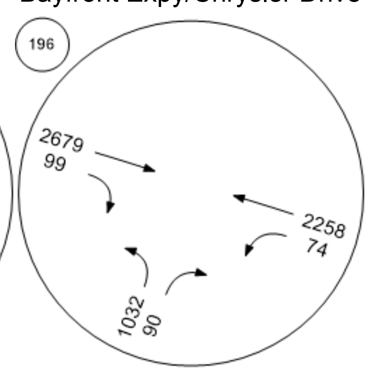

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

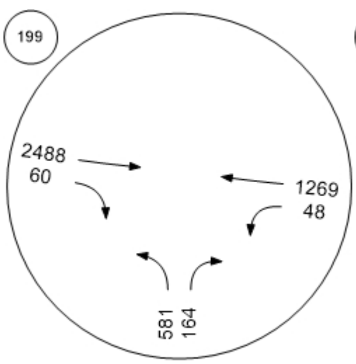


Generated with PTV VISTRO

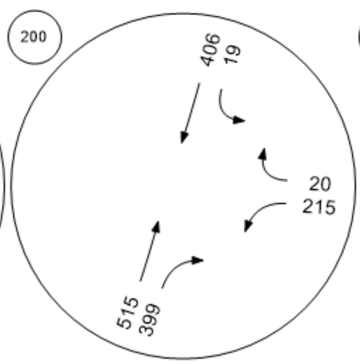
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

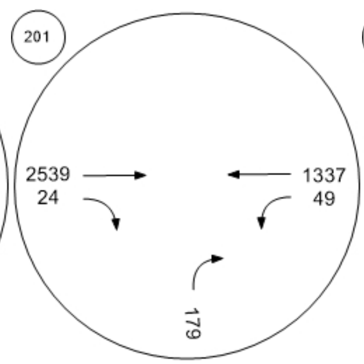

Bafront Expwy/Bldg 21



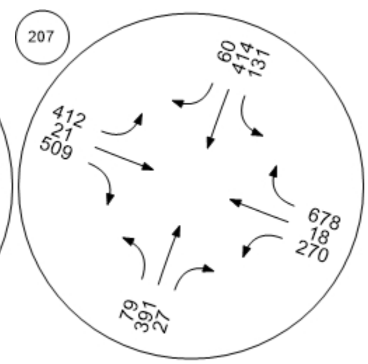

O'Brien Drive/Kavanaugh Dri



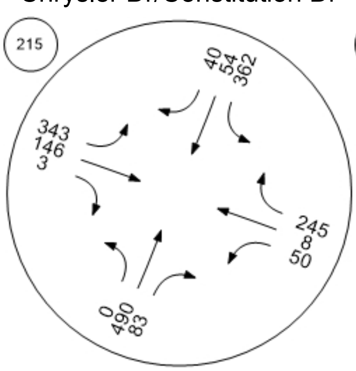

Bayfront Expwy/Bldg 20



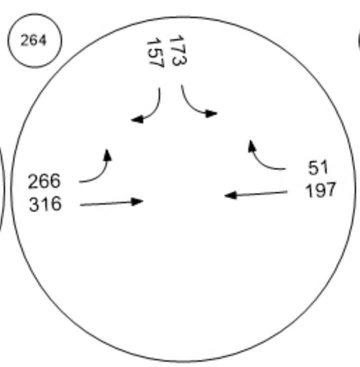

Chilco St/Constitution Dr



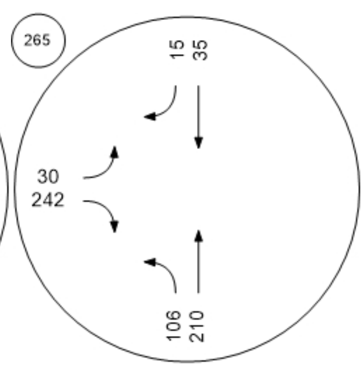

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

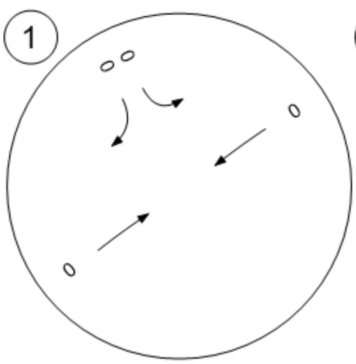


Generated with PTV VISTRO

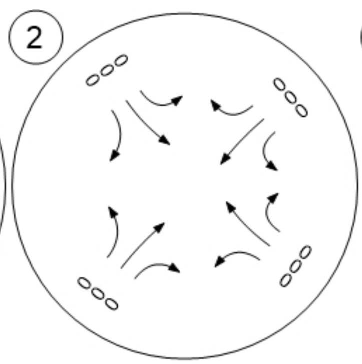
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

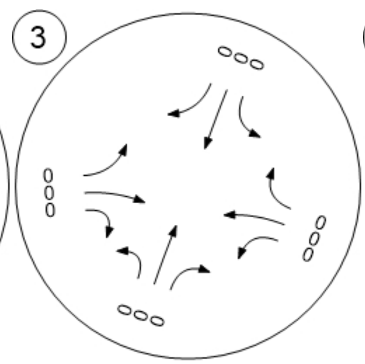

Marsh Rd (SR 84)/US 101 S



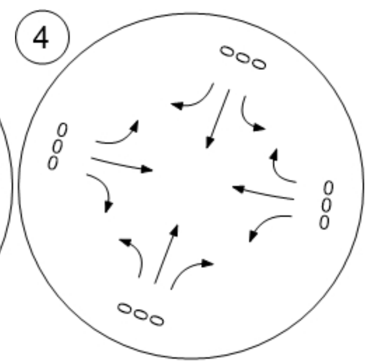
Marsh Rd/Rolison Rd-Scott D



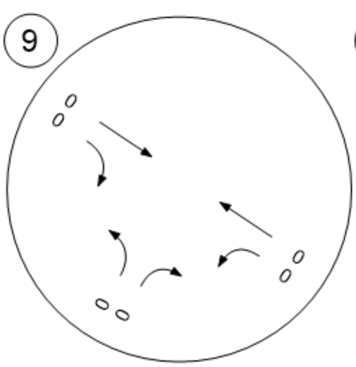
Marsh Rd/Florence St-Bohan



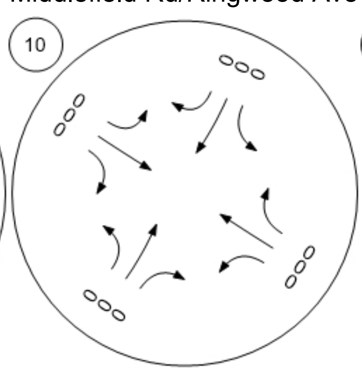
Marsh Rd/Bay Rd



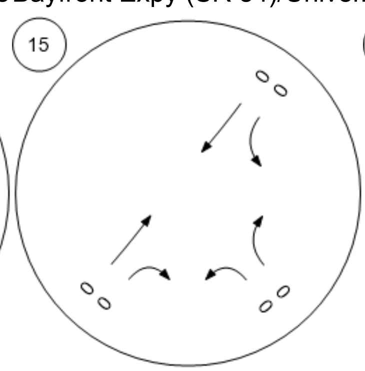
Middlefield Rd/Ravenswood



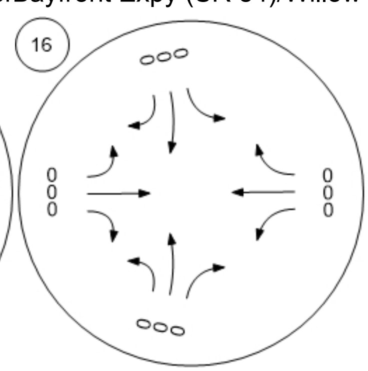
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer



Bayfront Expy (SR 84)/Willow

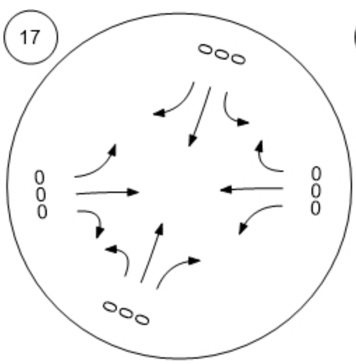


Generated with PTV VISTRO

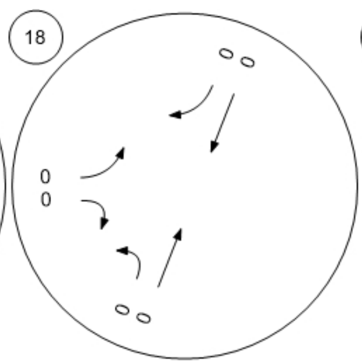
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

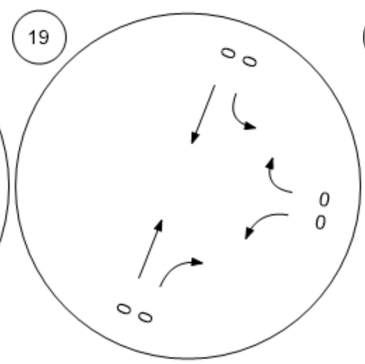

Willow Rd (SR 114)/Hamilton



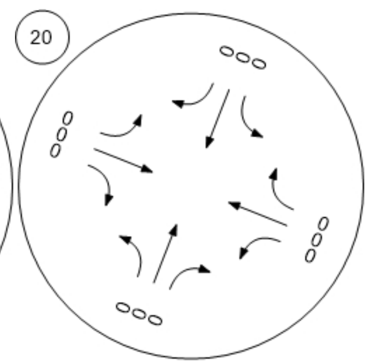
Willow Rd (SR 114)/Ivy Dr



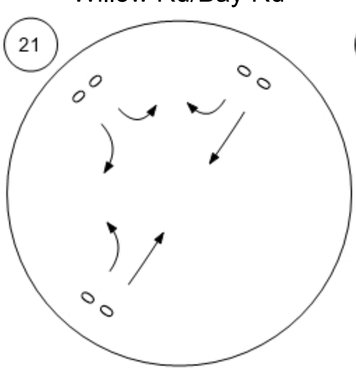
Willow Rd (SR 114)/O'Brien



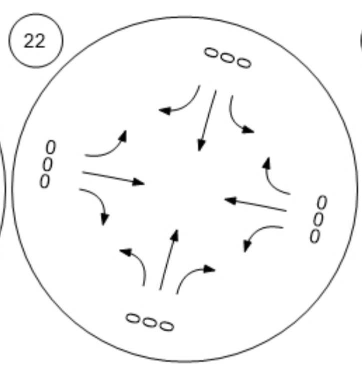
Willow Rd (SR 114)/Newbrid



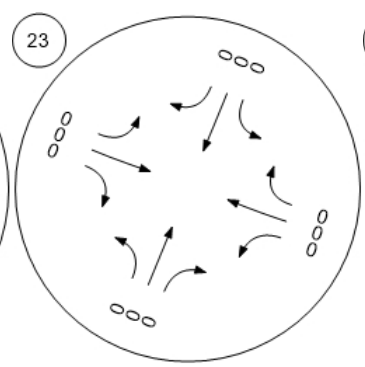
Willow Rd/Bay Rd



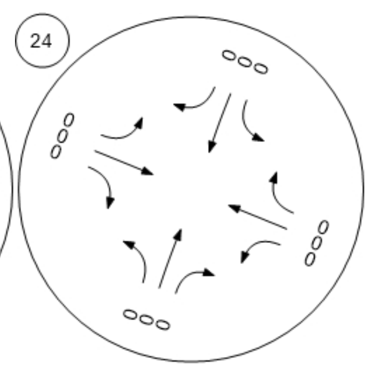
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave



Willow Rd/Gilbert Ave

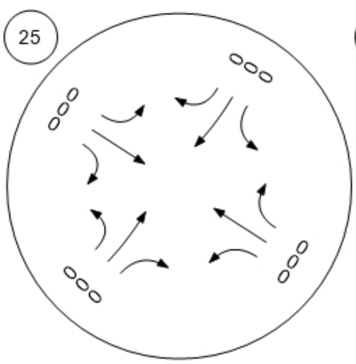


Generated with PTV VISTRO

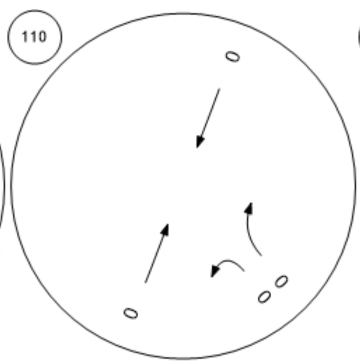
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

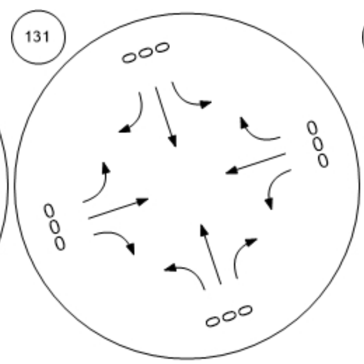

Middlefield Rd-Willow Rd



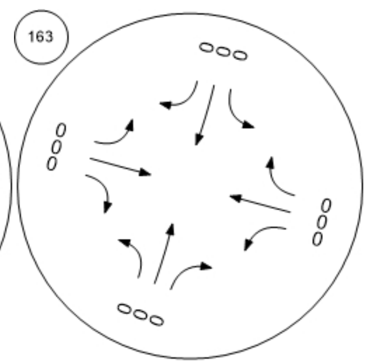

Marsh Road/101 NB Ramps



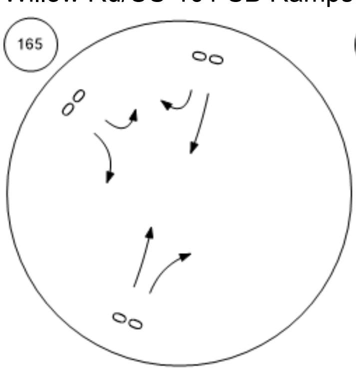

Chilco Street/Hamilton Avenu



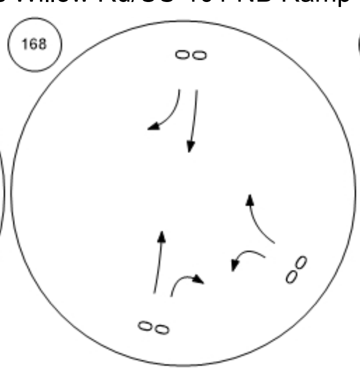

Bayfront Expy/Marsh Rd



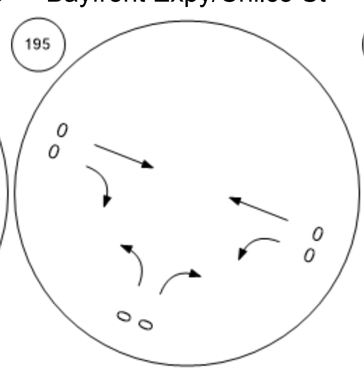

Willow Rd/US-101 SB Ramps



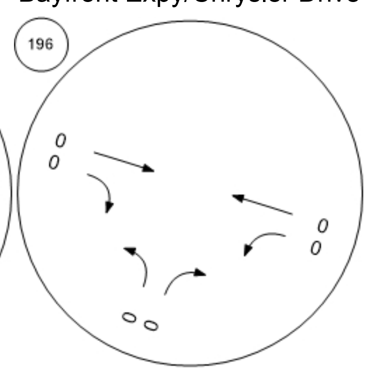

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

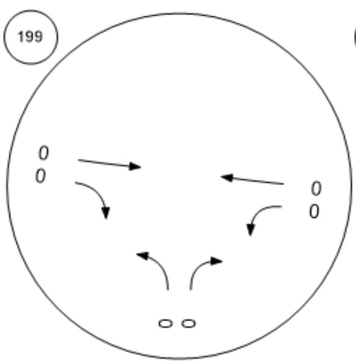



Bayfront Expy/Chrysler Drive

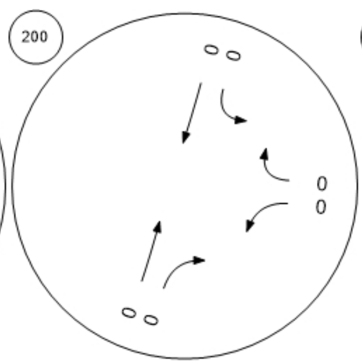


Traffic Volume - In-Process Volume

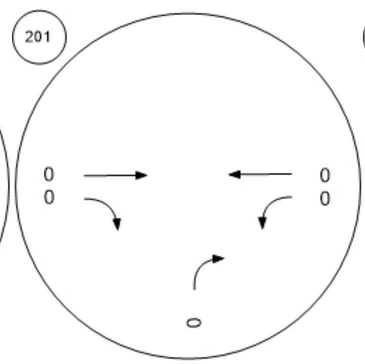

Bafront Expwy/Bldg 21



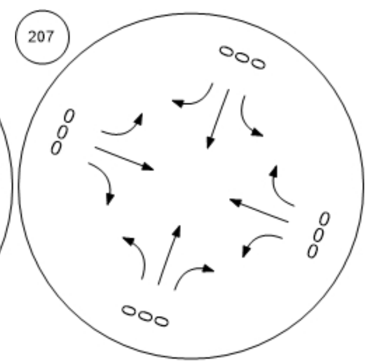

O'Brien Drive/Kavanaugh Dri



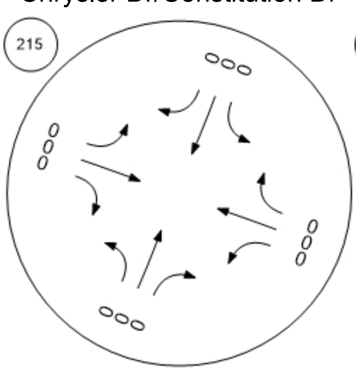

Bayfront Expwy/Bldg 20



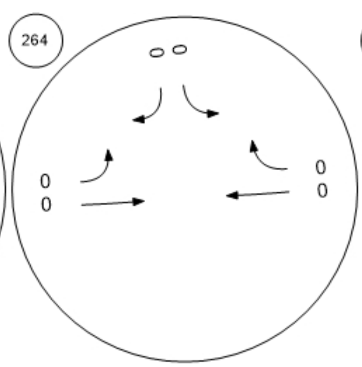

Chilco St/Constitution Dr



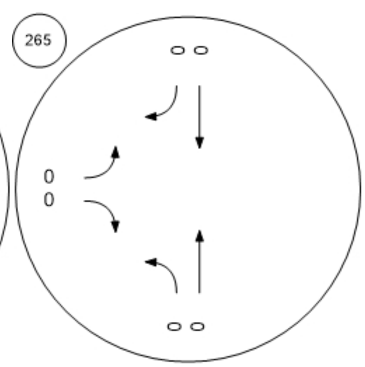

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

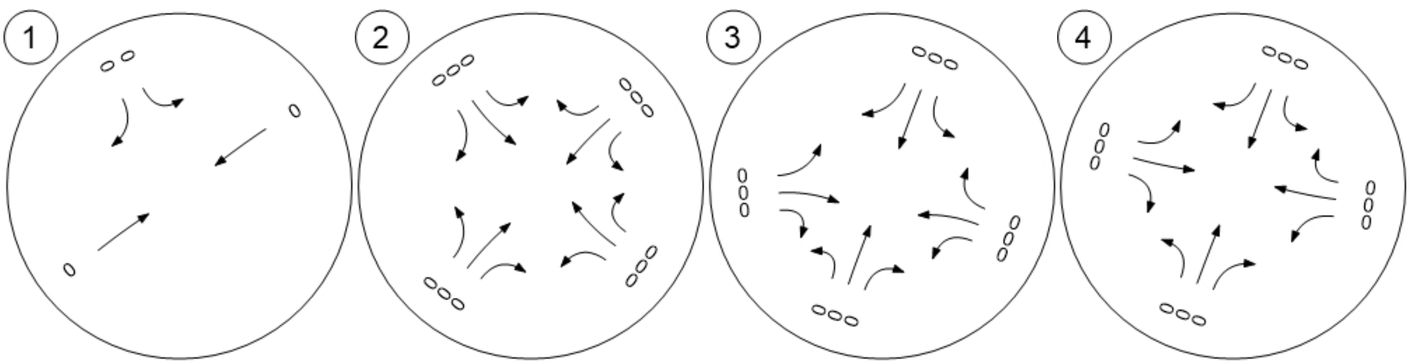


Generated with PTV VISTRO

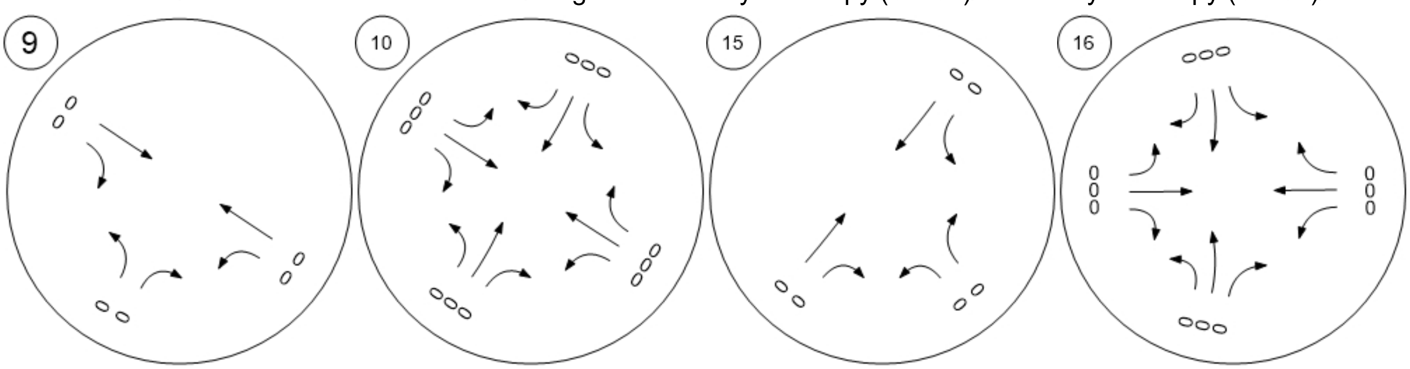
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd

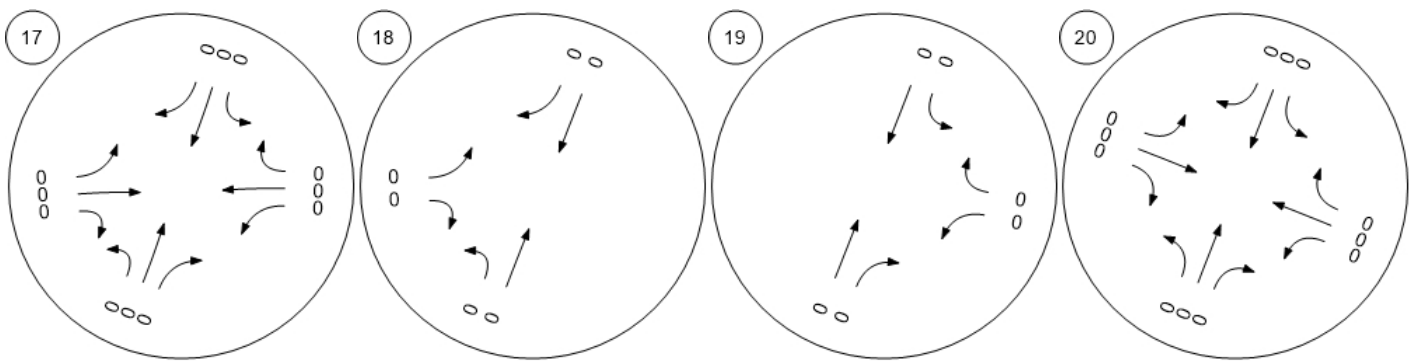



Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

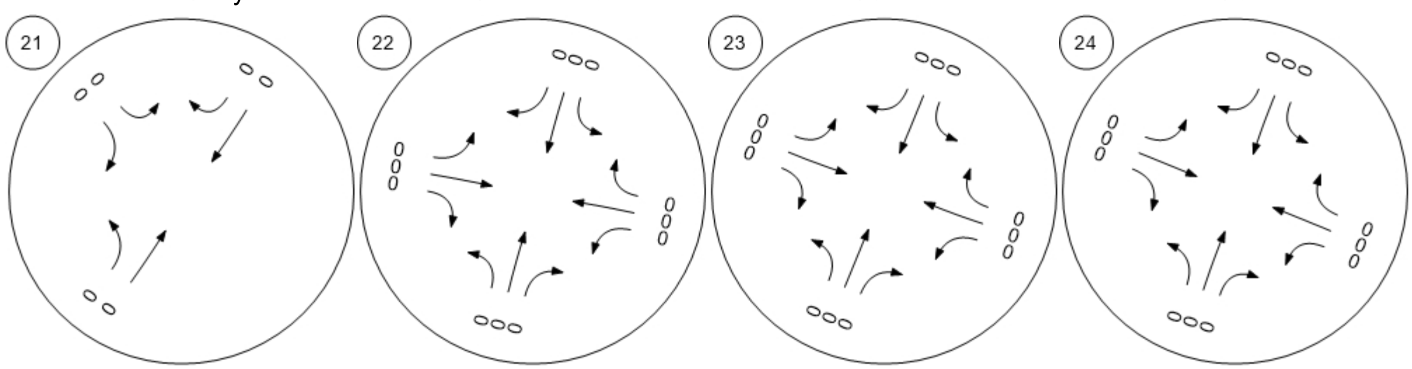


Traffic Volume - Net New Site Trips


Willow Rd (SR 114)/Hamilton | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/O'Brien | Willow Rd (SR 114)/Newbrid



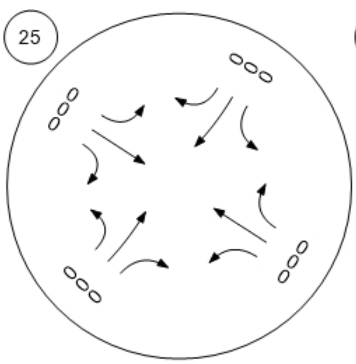

Willow Rd/Bay Rd | Willow Rd/Durham St-VA Me | Willow Rd/Coleman Ave | Willow Rd/Gilbert Ave



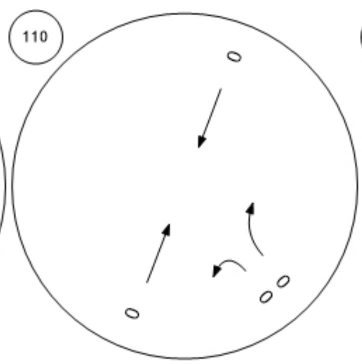
Generated with PTV VISTRO
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

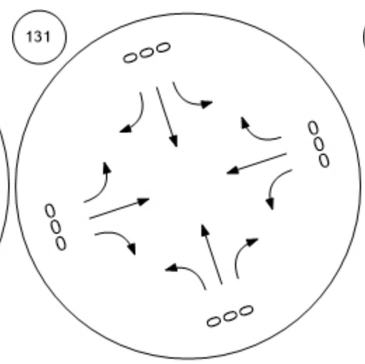

Middlefield Rd-Willow Rd



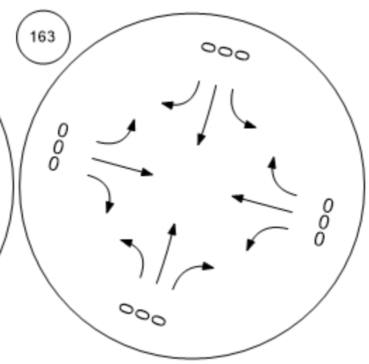

Marsh Road/101 NB Ramps



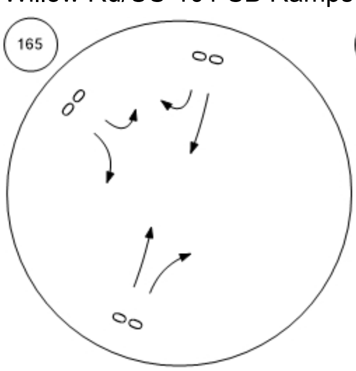

Chilco Street/Hamilton Avenu



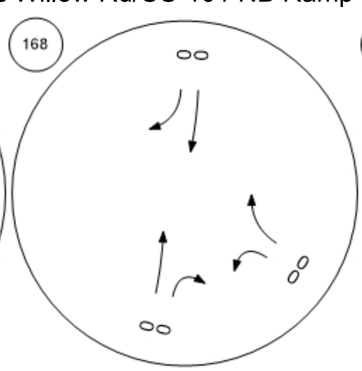

Bayfront Expy/Marsh Rd



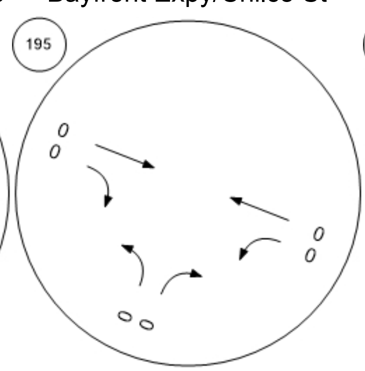

Willow Rd/US-101 SB Ramps



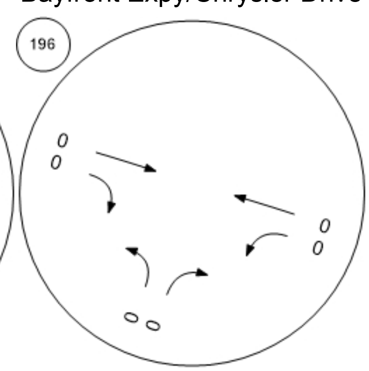

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

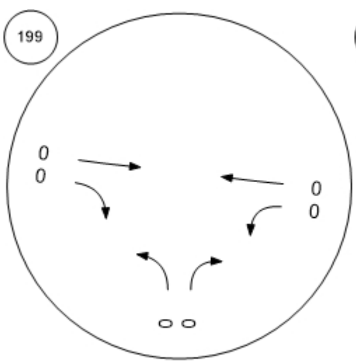


Generated with PTV VISTRO

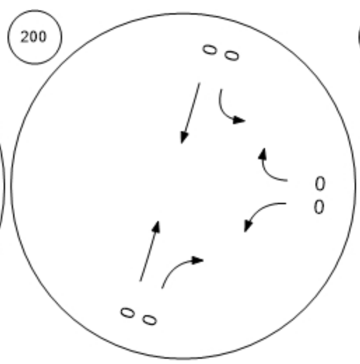
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

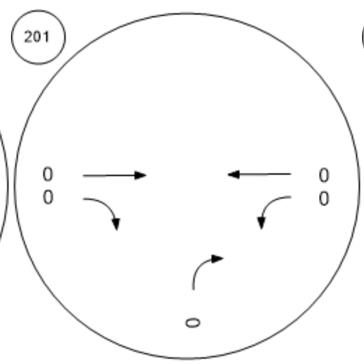

Bafront Expwy/Bldg 21



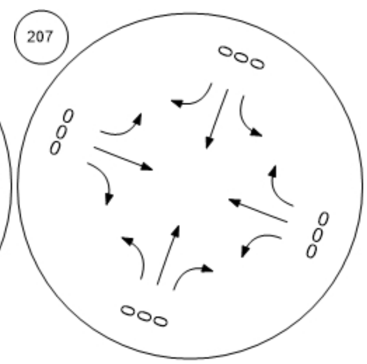

O'Brien Drive/Kavanaugh Dri



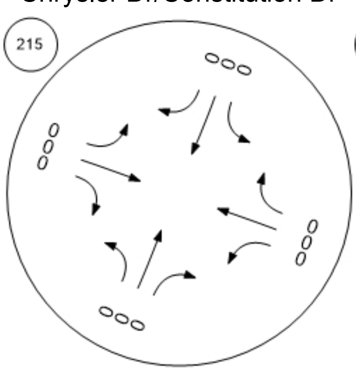

Bayfront Expwy/Bldg 20



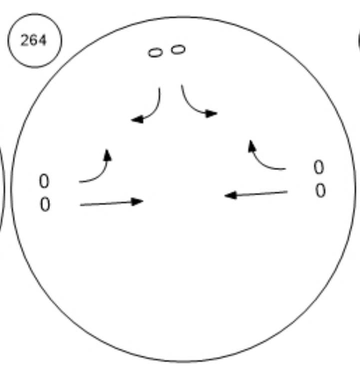

Chilco St/Constitution Dr



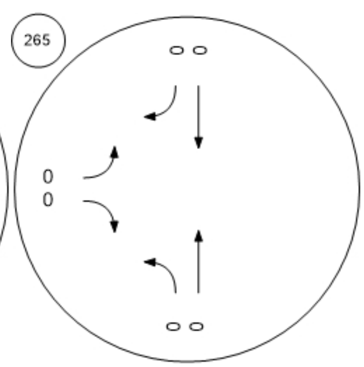

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

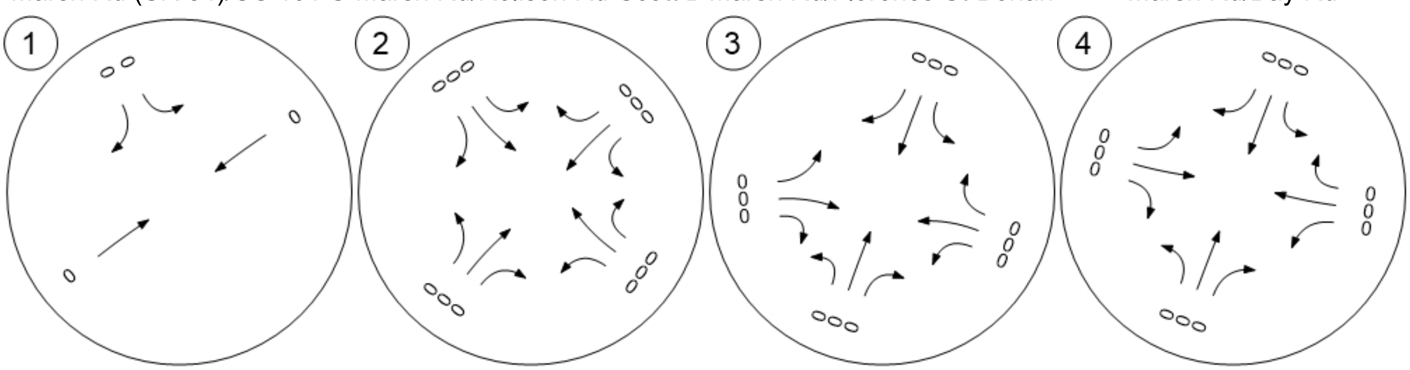


Generated with PTV VISTRO

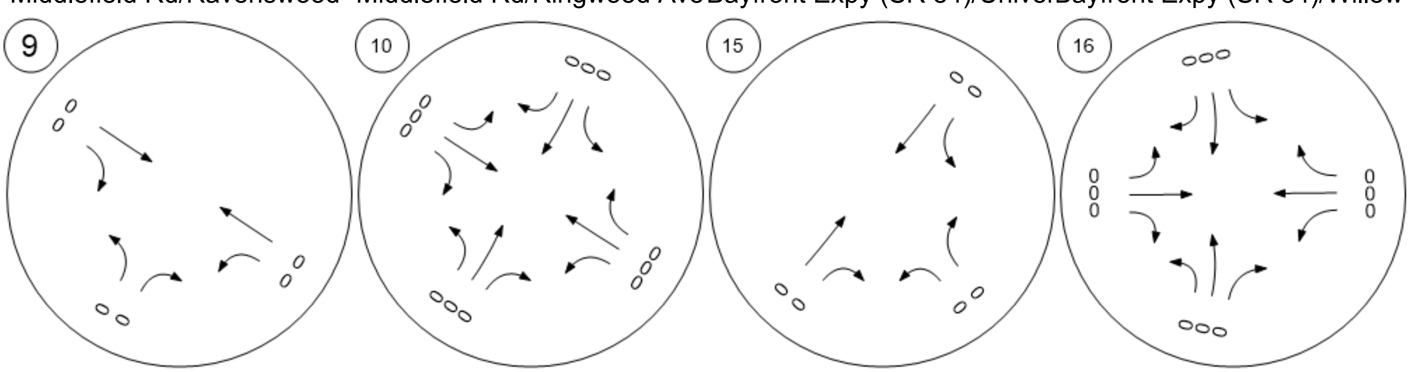
Version 2021 (SP 0-6)

Traffic Volume - Other Volume


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

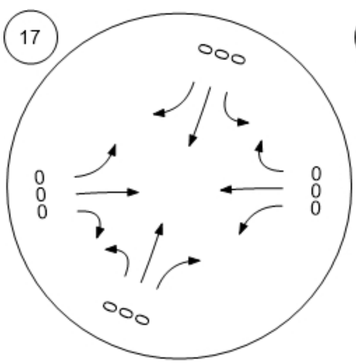


Generated with PTV VISTRO

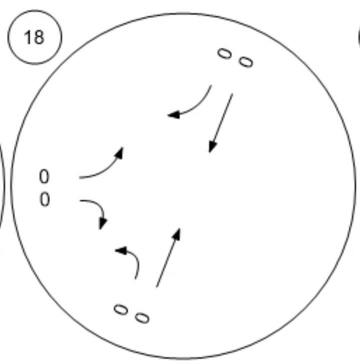
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

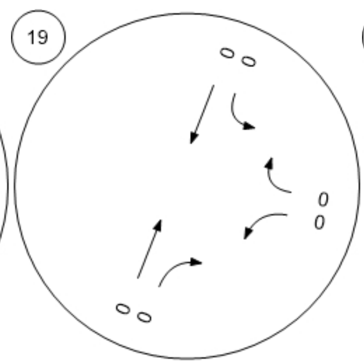

Willow Rd (SR 114)/Hamilton



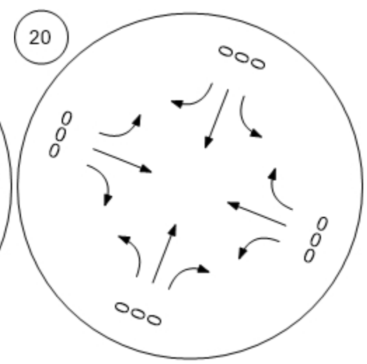

Willow Rd (SR 114)/Ivy Dr



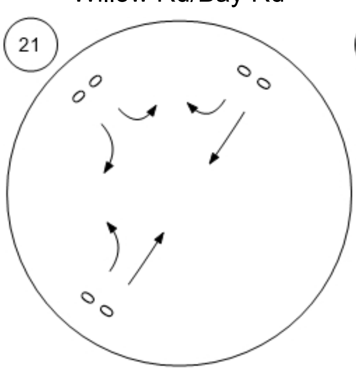

Willow Rd (SR 114)/O'Brien



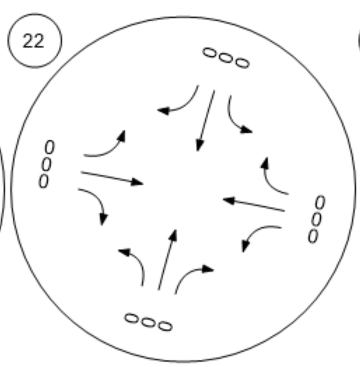

Willow Rd (SR 114)/Newbrid



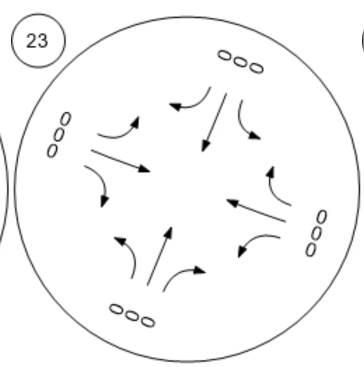

Willow Rd/Bay Rd



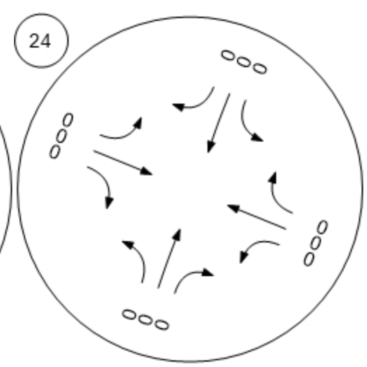

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

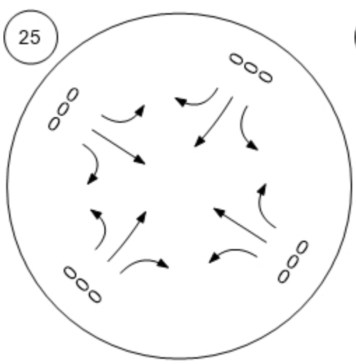


Generated with PTV VISTRO

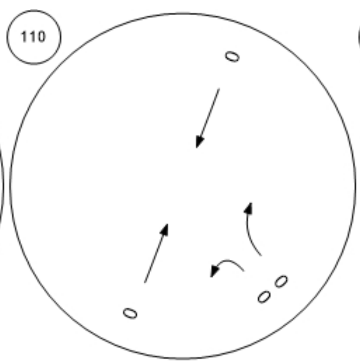
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

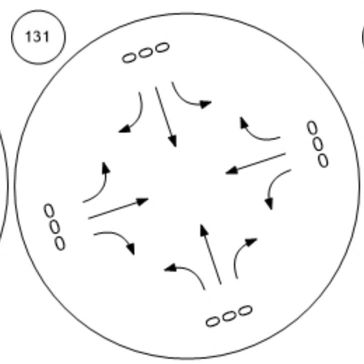

Middlefield Rd-Willow Rd



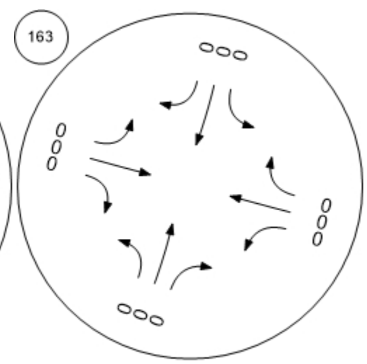

Marsh Road/101 NB Ramps



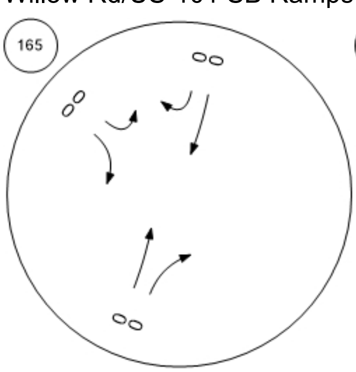

Chilco Street/Hamilton Avenu



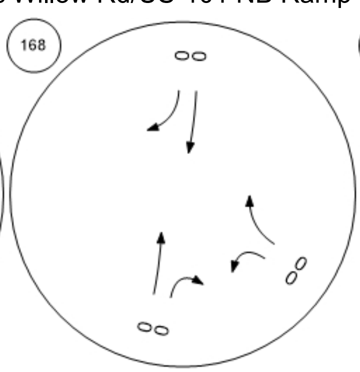

Bayfront Expy/Marsh Rd



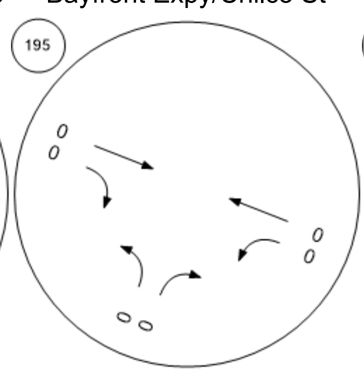

Willow Rd/US-101 SB Ramps



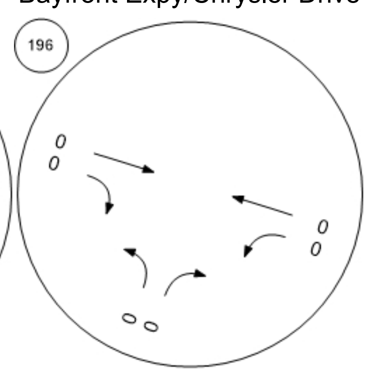

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

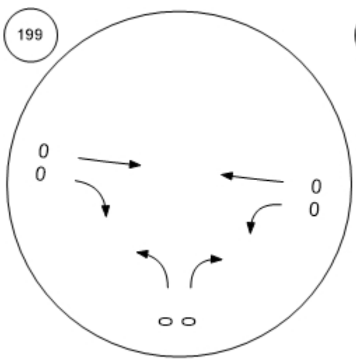



Bayfront Expy/Chrysler Drive

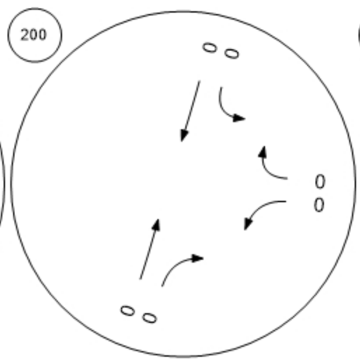


Traffic Volume - Other Volume

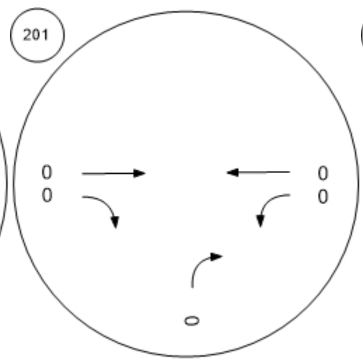

Bafront Expwy/Bldg 21



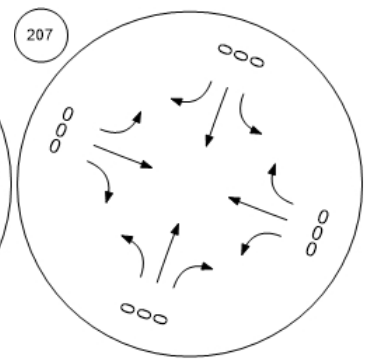

O'Brien Drive/Kavanaugh Dri



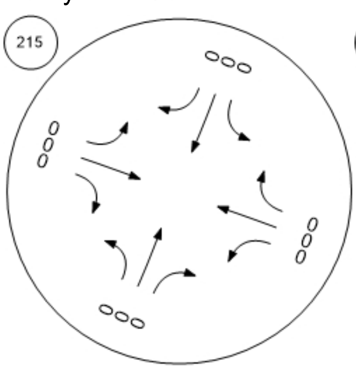

Bayfront Expwy/Bldg 20



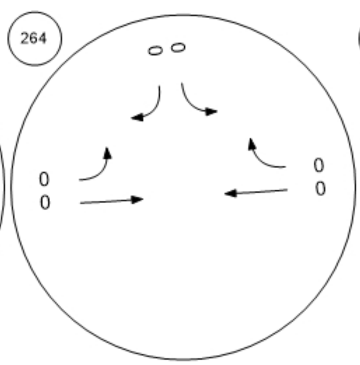

Chilco St/Constitution Dr



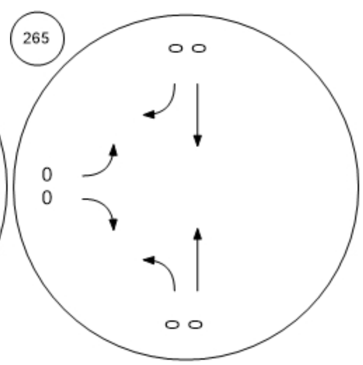

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

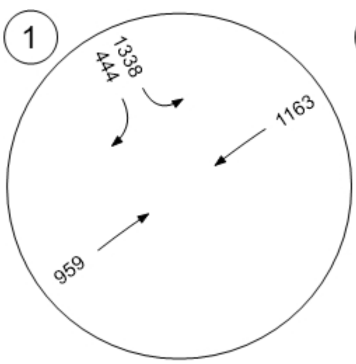


Generated with PTV VISTRO

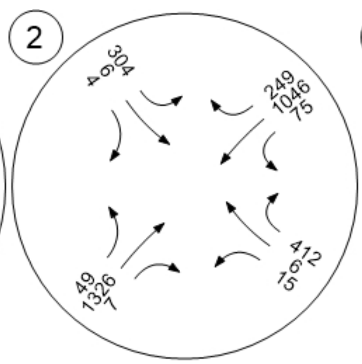
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

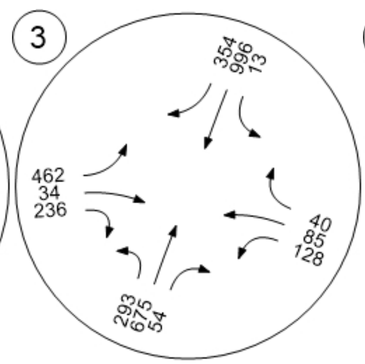

Marsh Rd (SR 84)/US 101 S



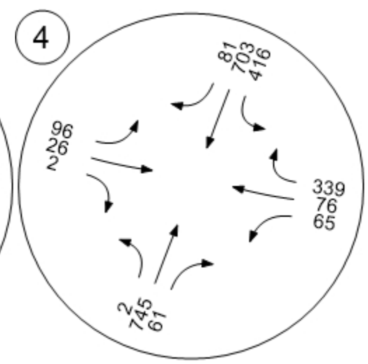

Marsh Rd/Rolison Rd-Scott D



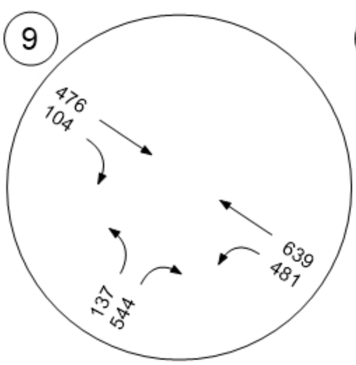

Marsh Rd/Florence St-Bohan



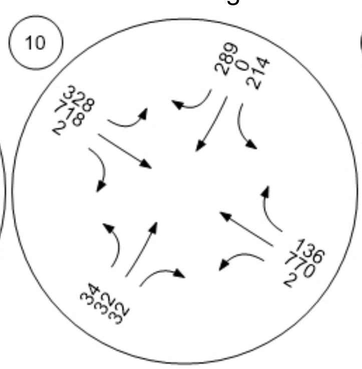

Marsh Rd/Bay Rd



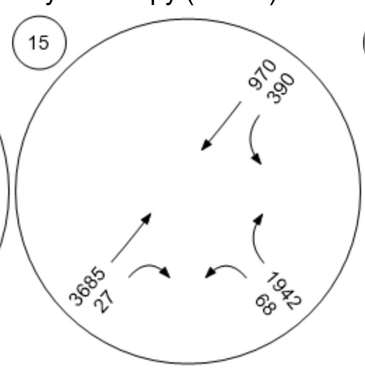

Middlefield Rd/Ravenswood



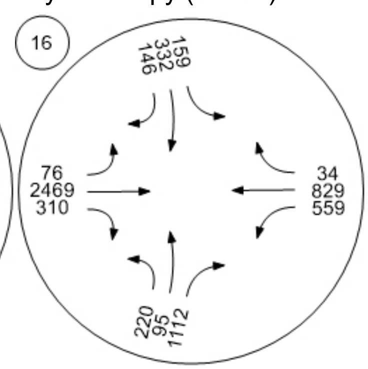

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

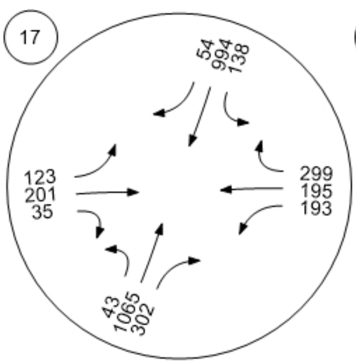


Generated with PTV VISTRO

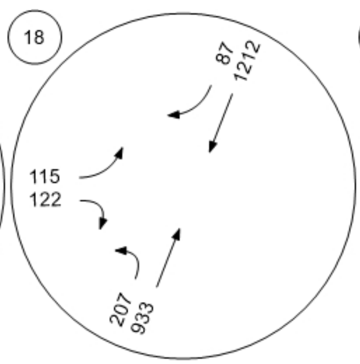
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

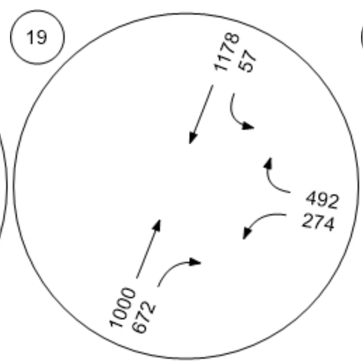

Willow Rd (SR 114)/Hamilton



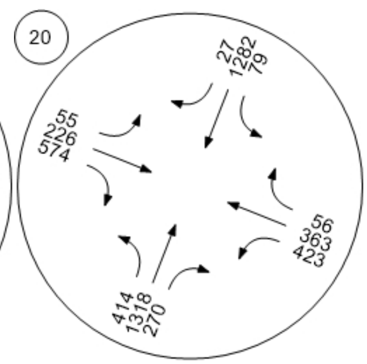

Willow Rd (SR 114)/Ivy Dr



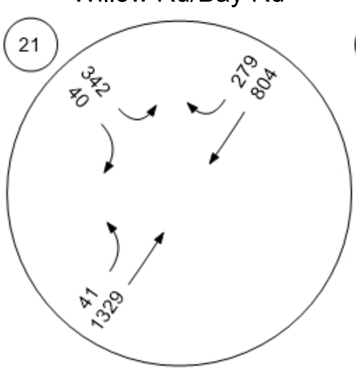

Willow Rd (SR 114)/O'Brien



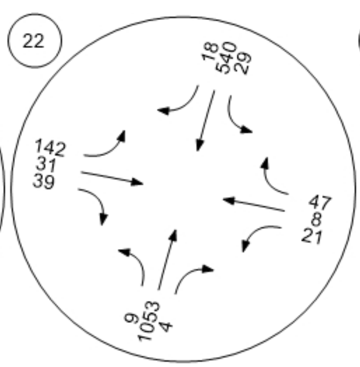

Willow Rd (SR 114)/Newbrid



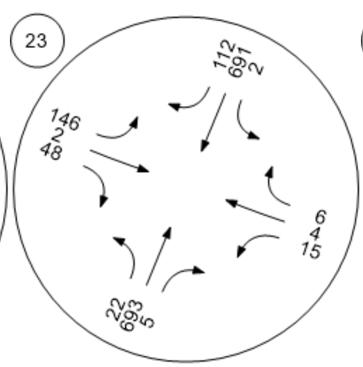

Willow Rd/Bay Rd



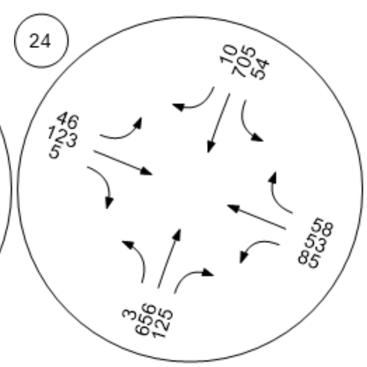

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



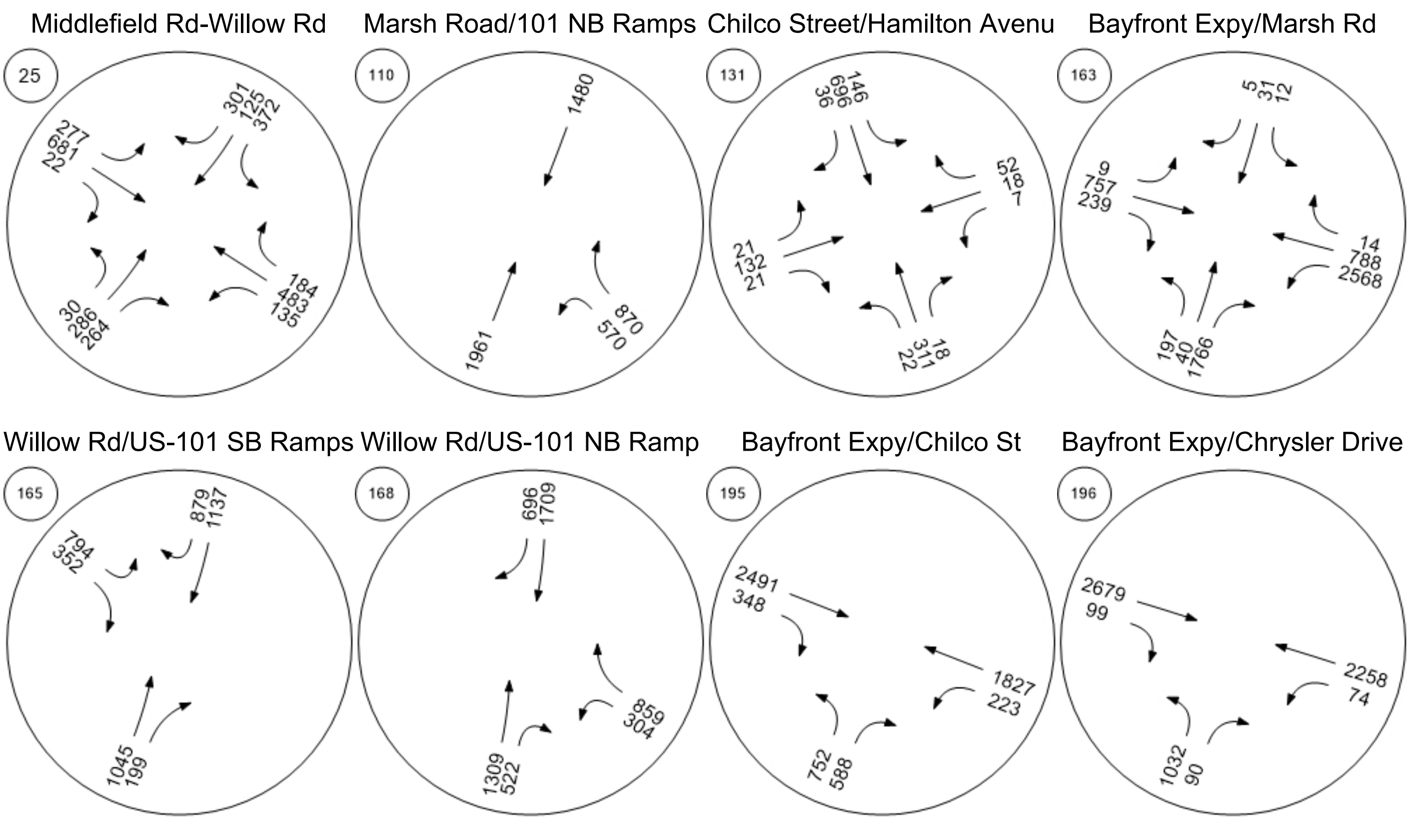

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

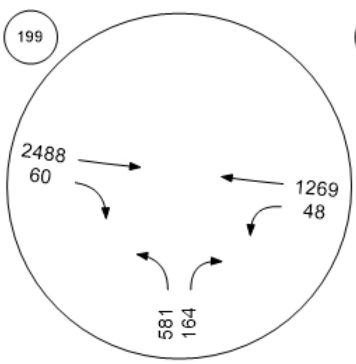



Generated with PTV VISTRO

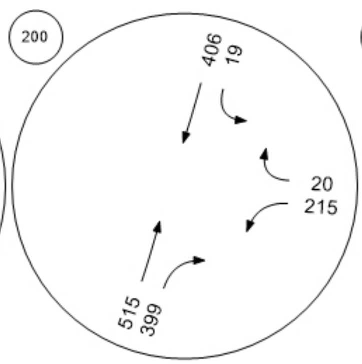
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

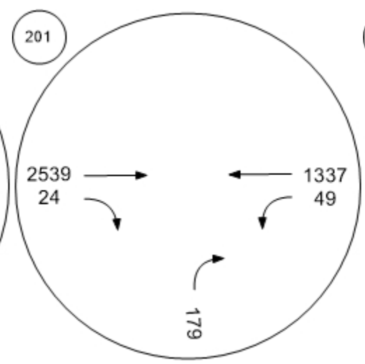

Bafront Expwy/Bldg 21



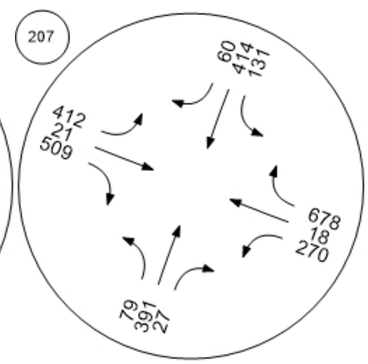

O'Brien Drive/Kavanaugh Dri



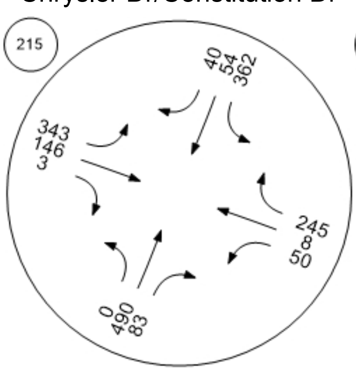

Bayfront Expwy/Bldg 20



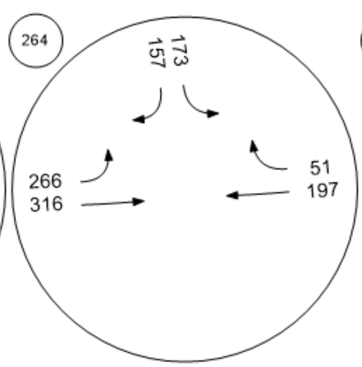

Chilco St/Constitution Dr



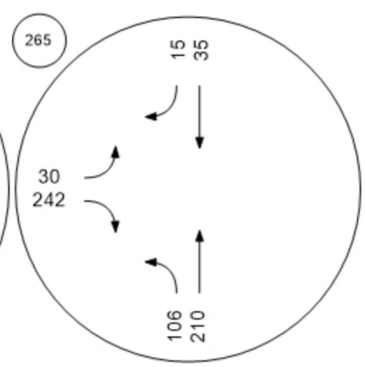

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive



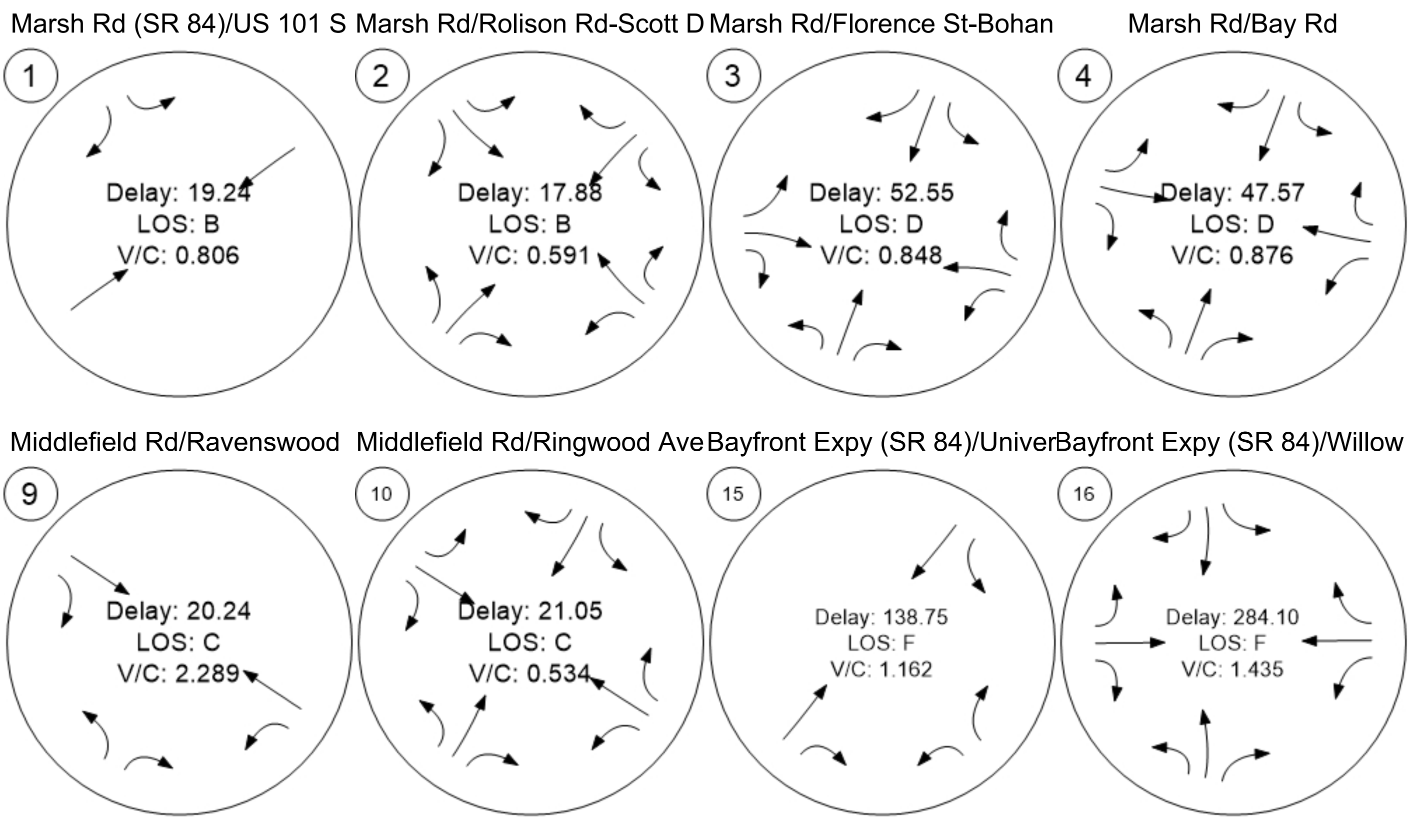

Adam Court/ Adams Drive



Generated with PTV VISTRO

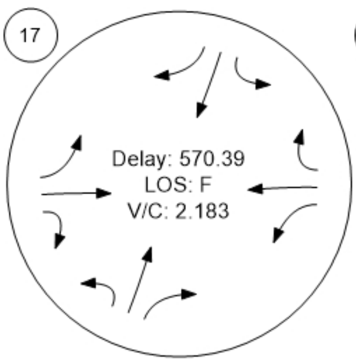
Version 2021 (SP 0-6)

Traffic Conditions

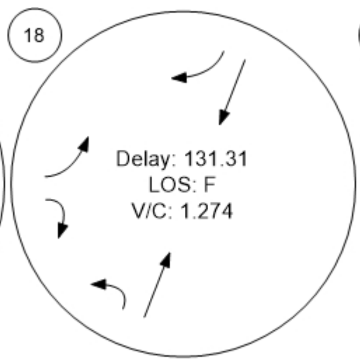



## Traffic Conditions

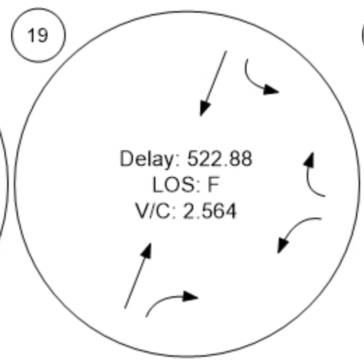

Willow Rd (SR 114)/Hamilton



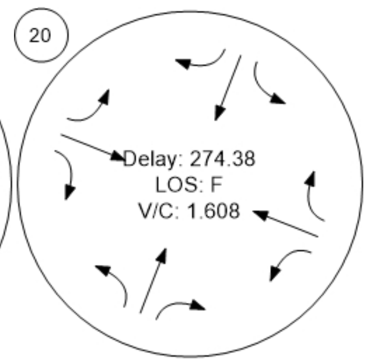

Willow Rd (SR 114)/Ivy Dr



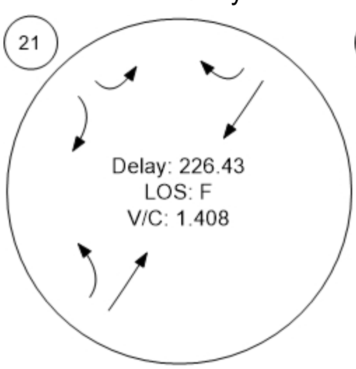

Willow Rd (SR 114)/O'Brien



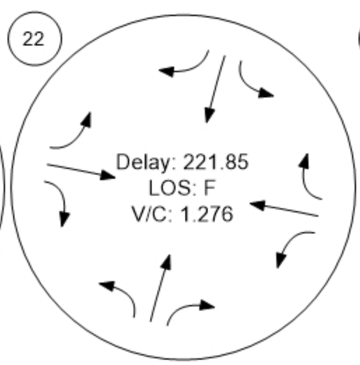

Willow Rd (SR 114)/Newbrid



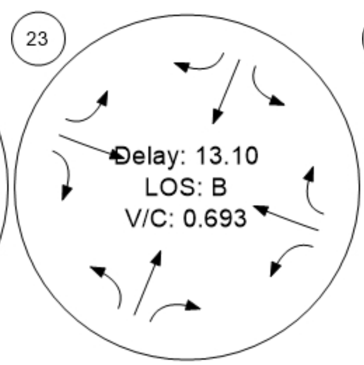

Willow Rd/Bay Rd



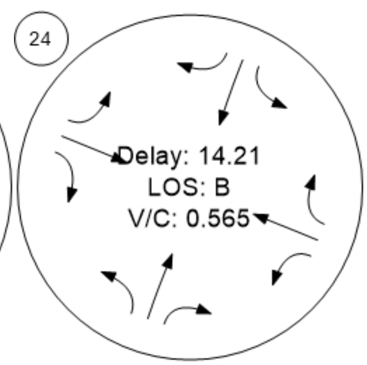

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

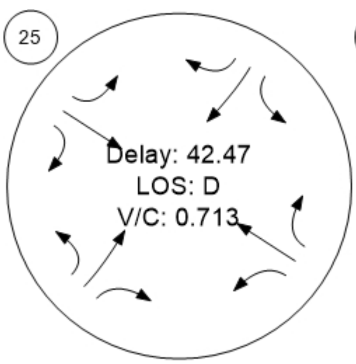


Generated with PTV VISTRO

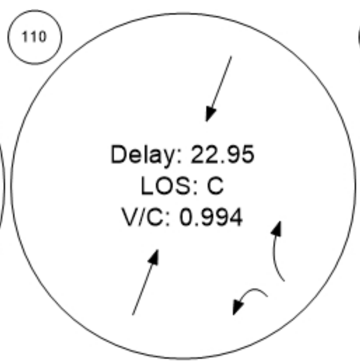
Version 2021 (SP 0-6)

Traffic Conditions

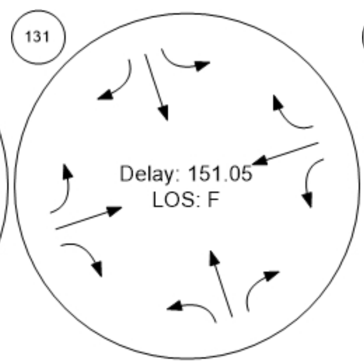

Middlefield Rd-Willow Rd



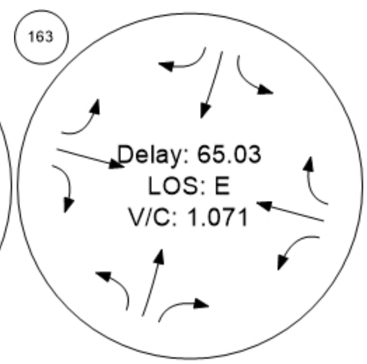

Marsh Road/101 NB Ramps



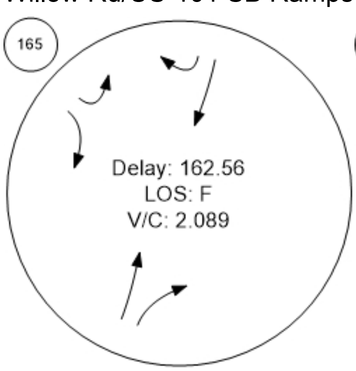

Chilco Street/Hamilton Avenu



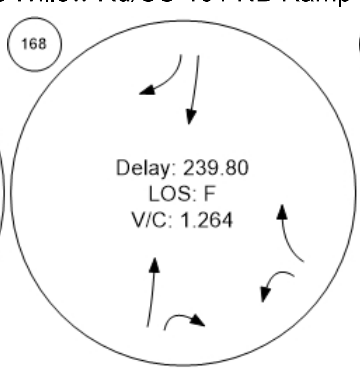

Bayfront Expy/Marsh Rd



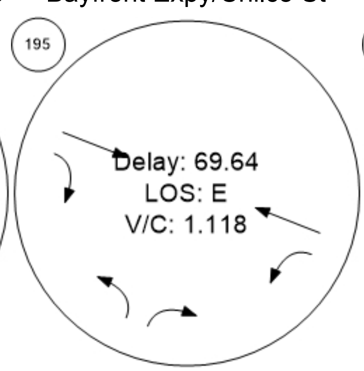

Willow Rd/US-101 SB Ramps



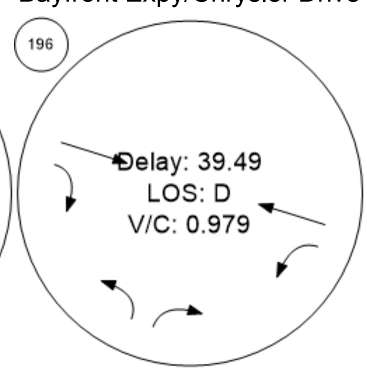

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

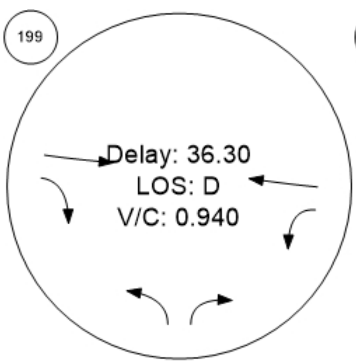


Generated with PTV VISTRO

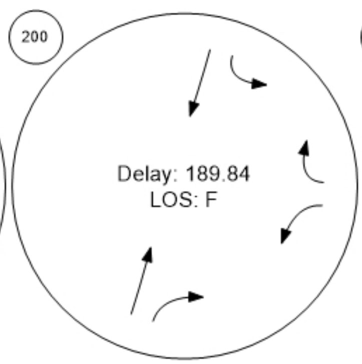
Version 2021 (SP 0-6)

## Traffic Conditions

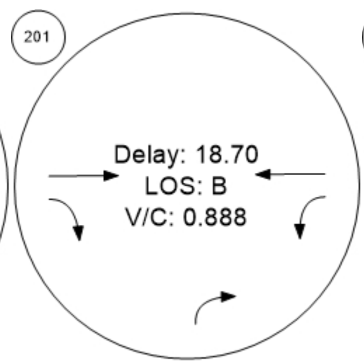

Bafront Expwy/Bldg 21



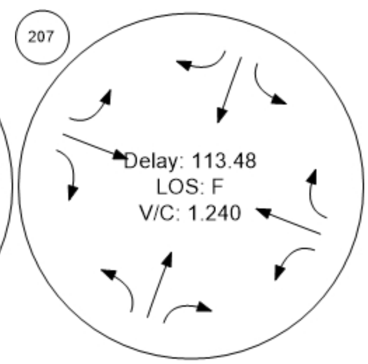

O'Brien Drive/Kavanaugh Dri



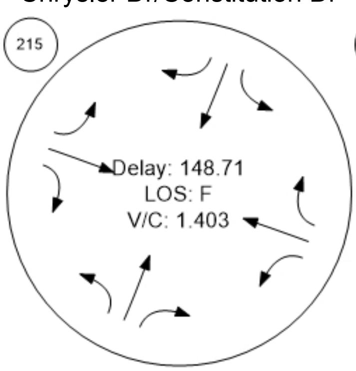

Bayfront Expwy/Bldg 20



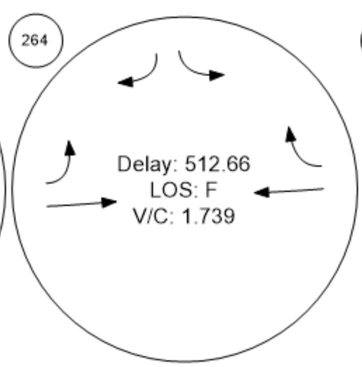

Chilco St/Constitution Dr



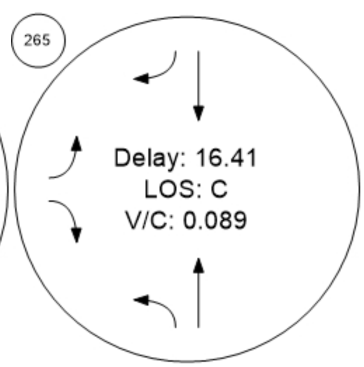

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

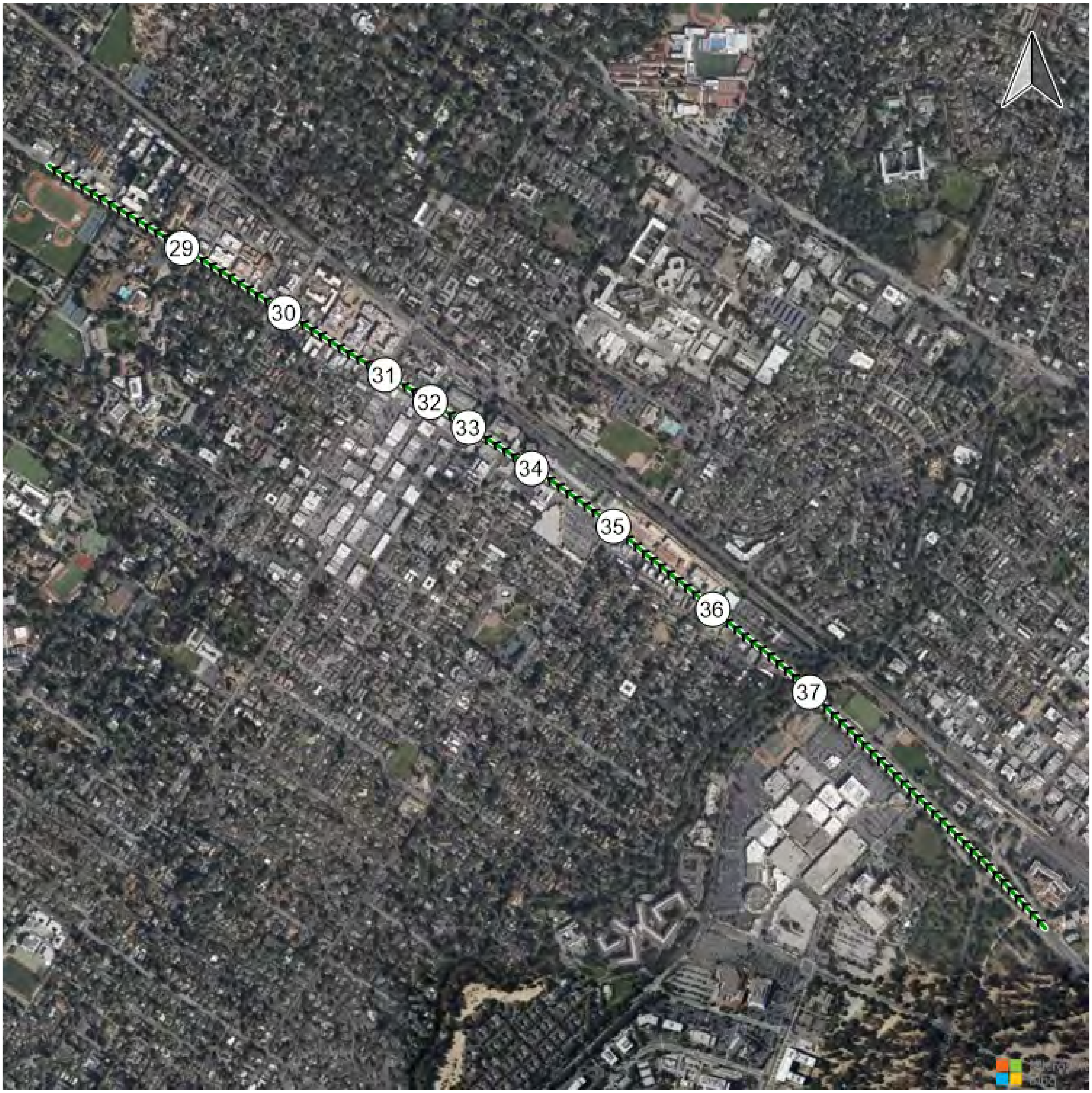


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 1: ECR NB

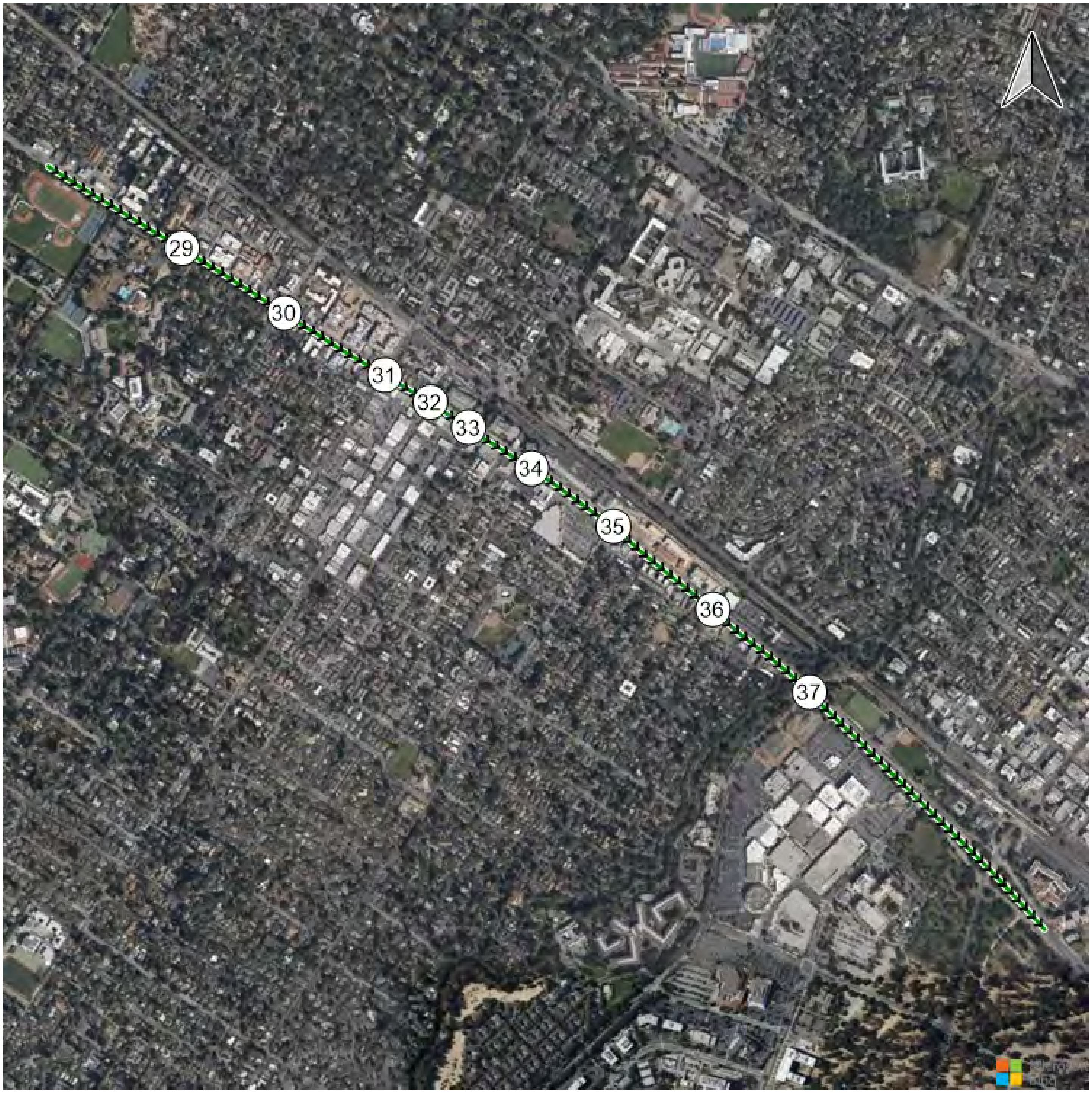


Route 1: ECR NB

Generated with PTV VISTRO
Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



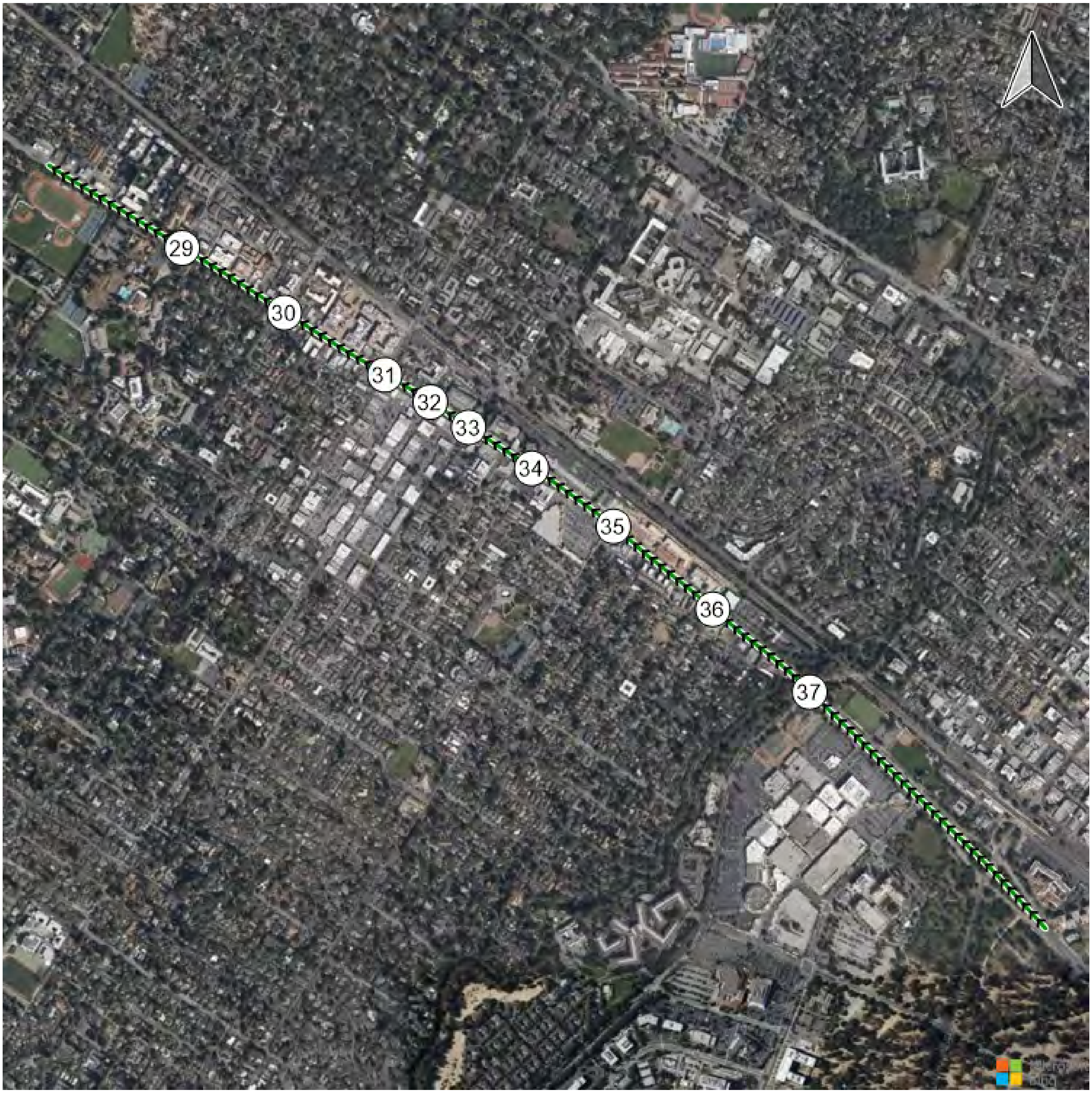
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



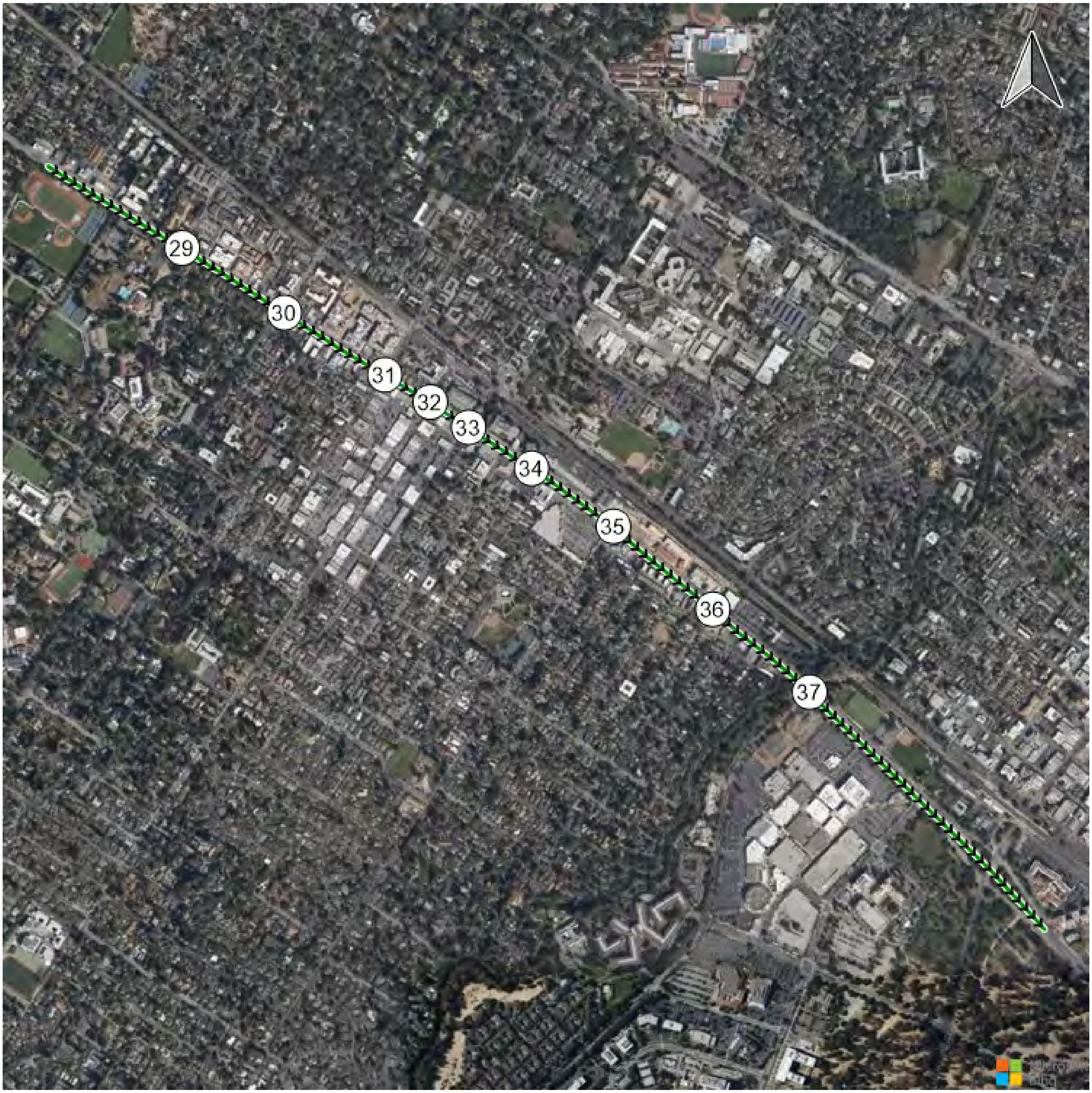
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Cumulative + P AM.pdf

Scenario 20 Cumulative AM (2040 vols)+Project
12/30/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.919 | 24.4 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | SEB Left | 0.842 | 31.8 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.839 | 60.4 | E |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | EB Left | 1.225 | 64.8 | E |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.757 | 49.7 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.411 | 13.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.779 | 13.3 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.299 | 261.8 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Left | 1.179 | 171.2 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.622 | 251.8 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.154 | 78.9 | E |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | WB Right | 1.613 | 232.2 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.179 | 79.1 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | WB Right | 1.138 | 129.2 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.935 | 34.3 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.699 | 23.9 | C |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.627 | 65.0 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 1.118 | 62.2 | E |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.875 | 27.1 | D |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.846 | 65.6 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.727 | 99.4 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.569 | 128.4 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.064 | 49.2 | D |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.762 | 12.8 | B |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.722 | 5.6 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 2.020 | 276.6 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.933 | 9.9 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | SB Right | 0.753 | 51.1 | D |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | SB Thru | 1.631 | 345.5 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 1.075 | 373.4 | F |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.049 | 17.8 | C |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.521 | 34.2 | C |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Right | | 8.8 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.919 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1038 | 1462 | 217 | 1369 | 551 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1038 | 1462 | 217 | 1369 | 551 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 265 | 373 | 54 | 349 | 141 |
| Total Analysis Volume [veh/h] | 0 | 1059 | 1492 | 217 | 1397 | 562 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.42 | 0.41 | 0.36 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2121 | 1772 | 1394 | 650 |
| d1, Uniform Delay [s] | 11.98 | 17.07 | 23.43 | 21.40 |
| k, delay calibration | 0.50 | 0.50 | 0.06 | 0.40 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.84 | 5.06 | 8.57 | 11.93 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.84 | 1.00 | 0.87 |
| d, Delay for Lane Group [s/veh] | 12.82 | 22.13 | 32.01 | 33.33 |
| Lane Group LOS | B | C | F | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.51 | 11.47 | 13.72 | 11.03 |
| 50th-Percentile Queue Length [ft/ln] | 137.79 | 286.87 | 343.02 | 275.87 |
| 95th-Percentile Queue Length [veh/ln] | 9.36 | 17.03 | 19.83 | 16.48 |
| 95th-Percentile Queue Length [ft/ln] | 234.04 | 425.75 | 495.67 | 412.06 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.82 | 22.13 | 0.00 | 32.01 | 33.33 |
| Movement LOS | | B | C | | F | C |
| d_A, Approach Delay [s/veh] | 12.82 | | 22.13 | | 32.39 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 24.40 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.919 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.012 | 0.000 | 2.598 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.433 | 2.791 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.842 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 42 | 1321 | 7 | 448 | 1225 | 346 | 13 | 4 | 68 | 355 | 20 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 1321 | 7 | 448 | 1225 | 346 | 13 | 4 | 9 | 355 | 20 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 367 | 2 | 124 | 340 | 96 | 4 | 1 | 3 | 99 | 6 | 0 |
| Total Analysis Volume [veh/h] | 47 | 1468 | 8 | 498 | 1361 | 384 | 14 | 4 | 10 | 394 | 22 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 96 | 96 | 112 | 102 | 102 | 7 | 7 | 35 | 35 |
| g / C, Green / Cycle | 0.05 | 0.60 | 0.60 | 0.70 | 0.64 | 0.64 | 0.04 | 0.04 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.27 | 0.27 | 0.49 | 0.47 | 0.51 | 0.01 | 0.00 | 0.22 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1018 | 1840 | 1707 | 1829 | 2555 | 1785 | 1900 |
| c, Capacity [veh/h] | 82 | 2122 | 1111 | 693 | 1177 | 1092 | 82 | 115 | 390 | 415 |
| d1, Uniform Delay [s] | 74.70 | 17.56 | 17.56 | 16.62 | 19.72 | 21.21 | 73.64 | 73.20 | 62.47 | 49.38 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.50 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.69 | 0.71 | 1.35 | 6.33 | 4.22 | 6.12 | 0.98 | 0.24 | 47.89 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.58 | 0.46 | 0.46 | 0.72 | 0.74 | 0.80 | 0.22 | 0.09 | 1.01 | 0.05 |
| d, Delay for Lane Group [s/veh] | 79.39 | 18.27 | 18.92 | 22.95 | 23.95 | 27.33 | 74.62 | 73.44 | 110.36 | 49.42 |
| Lane Group LOS | E | B | B | C | C | C | E | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.00 | 9.97 | 10.64 | 3.85 | 22.77 | 24.86 | 0.75 | 0.20 | 21.21 | 0.72 |
| 50th-Percentile Queue Length [ft/ln] | 50.05 | 249.18 | 266.01 | 96.18 | 569.21 | 621.40 | 18.64 | 5.09 | 530.25 | 17.95 |
| 95th-Percentile Queue Length [veh/ln] | 3.60 | 15.15 | 15.99 | 6.93 | 30.59 | 33.03 | 1.34 | 0.37 | 28.92 | 1.29 |
| 95th-Percentile Queue Length [ft/ln] | 90.09 | 378.63 | 399.75 | 173.13 | 764.85 | 825.81 | 33.55 | 9.16 | 723.05 | 32.31 |

**Movement, Approach, & Intersection Results**

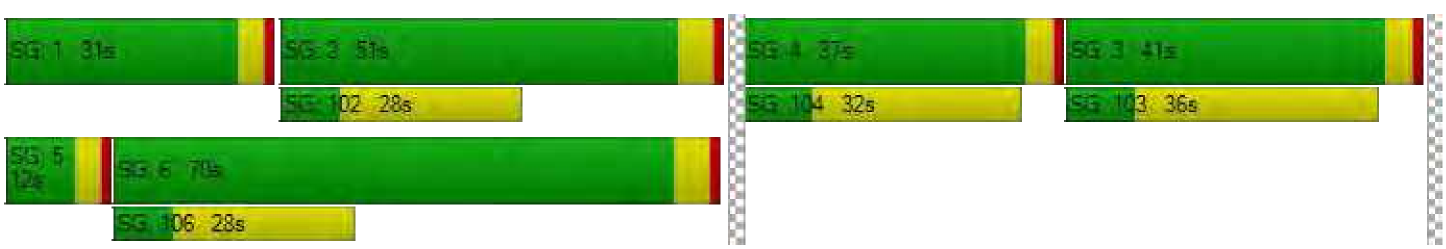
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.39 | 18.49 | 18.92 | 22.95 | 25.16 | 27.33 | 74.62 | 74.62 | 73.44 | 110.36 | 49.42 | 49.42 |
| Movement LOS | E | B | B | C | C | C | E | E | E | F | D | D |
| d_A, Approach Delay [s/veh] | 20.37 | | | 25.04 | | | 74.20 | | | 107.14 | | |
| Approach LOS | C | | | C | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 31.79 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.842 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.43 | 68.43 | 69.35 | 69.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.092 | 3.299 | 2.946 | 2.198 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.61 | 28.18 | 47.41 | 50.54 |
| I_b,int, Bicycle LOS Score for Intersection | 2.397 | 3.410 | 1.703 | 2.246 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 60.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.839 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 215 | 38 | 22 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 59 | 251 | 32 | 7 | 261 | 106 | 162 | 20 | 55 | 10 | 6 | 6 |
| Total Analysis Volume [veh/h] | 235 | 1004 | 130 | 30 | 1045 | 426 | 648 | 79 | 222 | 39 | 23 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 95 | 95 | 5 | 88 | 88 | 39 | 39 | 39 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.55 | 0.55 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.31 | 0.31 | 0.02 | 0.42 | 0.43 | 0.21 | 0.21 | 0.15 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1792 | 1704 | 1823 | 1648 | 1717 | 1706 | 1527 | 1439 | 1214 |
| c, Capacity [veh/h] | 142 | 1120 | 1070 | 58 | 1003 | 907 | 419 | 416 | 372 | 107 | 91 |
| d1, Uniform Delay [s] | 73.44 | 18.72 | 18.83 | 75.88 | 27.77 | 28.38 | 58.10 | 57.96 | 53.30 | 70.35 | 71.32 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.18 | 0.18 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 322.04 | 1.69 | 1.81 | 2.58 | 5.40 | 6.67 | 9.32 | 8.64 | 1.14 | 1.52 | 3.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.65 | 0.51 | 0.52 | 0.51 | 0.76 | 0.78 | 0.88 | 0.87 | 0.60 | 0.36 | 0.54 |
| d, Delay for Lane Group [s/veh] | 395.48 | 20.41 | 20.64 | 78.45 | 33.17 | 35.05 | 67.43 | 66.60 | 54.44 | 71.87 | 75.00 |
| Lane Group LOS | F | C | C | E | C | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 18.58 | 12.85 | 12.52 | 1.26 | 23.62 | 22.70 | 15.48 | 15.14 | 8.12 | 1.59 | 2.06 |
| 50th-Percentile Queue Length [ft/ln] | 464.41 | 321.34 | 313.08 | 31.42 | 590.42 | 567.52 | 387.11 | 378.45 | 203.06 | 39.66 | 51.39 |
| 95th-Percentile Queue Length [veh/ln] | 29.63 | 18.73 | 18.33 | 2.26 | 31.59 | 30.51 | 21.94 | 21.52 | 12.80 | 2.86 | 3.70 |
| 95th-Percentile Queue Length [ft/ln] | 740.87 | 468.34 | 458.18 | 56.56 | 789.67 | 762.86 | 548.45 | 537.97 | 319.90 | 71.40 | 92.51 |

**Movement, Approach, & Intersection Results**

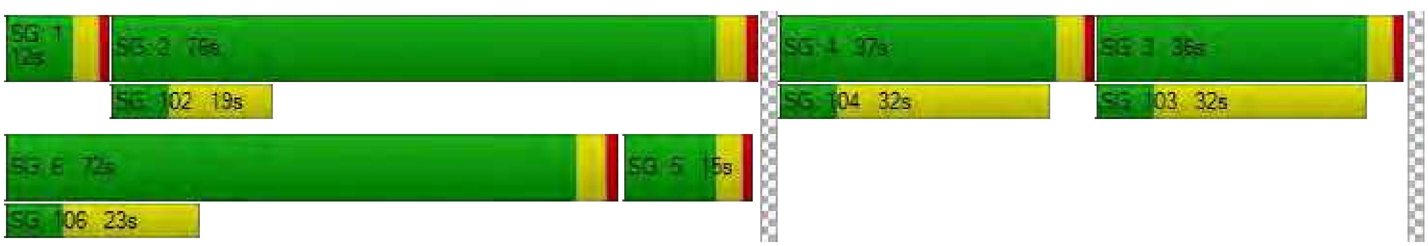
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 395.48 | 20.51 | 20.64 | 78.45 | 33.68 | 35.05 | 67.07 | 66.60 | 54.44 | 71.87 | 75.00 | 75.00 |
| Movement LOS | F | C | C | E | C | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 84.89 | | | 34.96 | | | 64.08 | | | 73.62 | | |
| Approach LOS | F | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 60.40 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.839 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.990 | 3.083 | 2.514 | 2.056 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.689 | 2.798 | 3.150 | 1.705 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 64.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.225 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 839 | 82 | 425 | 755 | 47 | 338 | 69 | 2 | 48 | 57 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 839 | 82 | 425 | 755 | 47 | 338 | 69 | 2 | 48 | 57 | 339 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 214 | 21 | 108 | 193 | 12 | 86 | 18 | 1 | 12 | 15 | 86 |
| Total Analysis Volume [veh/h] | 0 | 856 | 84 | 434 | 770 | 48 | 345 | 70 | 2 | 49 | 58 | 346 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 30 | 30 |
| g / C, Green / Cycle | 0.33 | 0.33 | 0.20 | 0.57 | 0.57 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.25 | 0.23 | 0.23 | 0.64 | 0.26 |
| s, saturation flow rate [veh/h] | 1882 | 1656 | 1708 | 1807 | 1763 | 648 | 1712 |
| c, Capacity [veh/h] | 669 | 549 | 343 | 1030 | 1005 | 324 | 688 |
| d1, Uniform Delay [s] | 24.41 | 24.42 | 32.07 | 9.62 | 9.64 | 31.07 | 21.91 |
| k, delay calibration | 0.50 | 0.50 | 0.23 | 0.50 | 0.50 | 0.50 | 0.34 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.46 | 11.69 | 129.85 | 1.16 | 1.21 | 151.38 | 3.38 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 0.80 | 1.26 | 0.40 | 0.40 | 1.29 | 0.66 |
| d, Delay for Lane Group [s/veh] | 31.87 | 36.11 | 161.92 | 10.79 | 10.84 | 182.44 | 25.29 |
| Lane Group LOS | C | D | F | B | B | F | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.40 | 8.84 | 18.68 | 3.80 | 3.74 | 19.94 | 7.56 |
| 50th-Percentile Queue Length [ft/ln] | 234.97 | 220.99 | 467.07 | 94.97 | 93.56 | 498.61 | 189.10 |
| 95th-Percentile Queue Length [veh/ln] | 14.43 | 13.72 | 28.83 | 6.84 | 6.74 | 31.54 | 12.07 |
| 95th-Percentile Queue Length [ft/ln] | 360.67 | 342.89 | 720.64 | 170.94 | 168.42 | 788.54 | 301.86 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.87 | 33.63 | 36.11 | 161.92 | 10.81 | 10.84 | 182.44 | 182.44 | 182.44 | 25.29 | 25.29 | 25.29 |
| Movement LOS | C | C | D | F | B | B | F | F | F | C | C | C |
| d_A, Approach Delay [s/veh] | | 33.86 | | | 63.20 | | | 182.44 | | | 25.29 | |
| Approach LOS | | C | | | E | | | F | | | C | |
| d_I, Intersection Delay [s/veh] | | | | | | 64.82 | | | | | | |
| Intersection LOS | | | | | | E | | | | | | |
| Intersection V/C | | | | | | 1.225 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.82 | 29.82 | 29.82 | 19.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.695 | 3.421 | 1.921 | 2.199 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.73 | 8.70 | 17.50 | 17.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.335 | 2.593 | 2.248 | 2.307 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.757 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 590 | 520 | 508 | 501 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 520 | 508 | 501 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 138 | 135 | 133 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 553 | 540 | 533 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.31 | 0.29 | 0.36 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1779 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1005 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.30 | 17.79 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 84.97 | 0.61 | 3.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.14 | 0.35 | 0.64 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 25.56 | 2.07 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 639.03 | 51.64 | 308.77 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 36.59 | 3.72 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 914.81 | 92.96 | 452.86 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

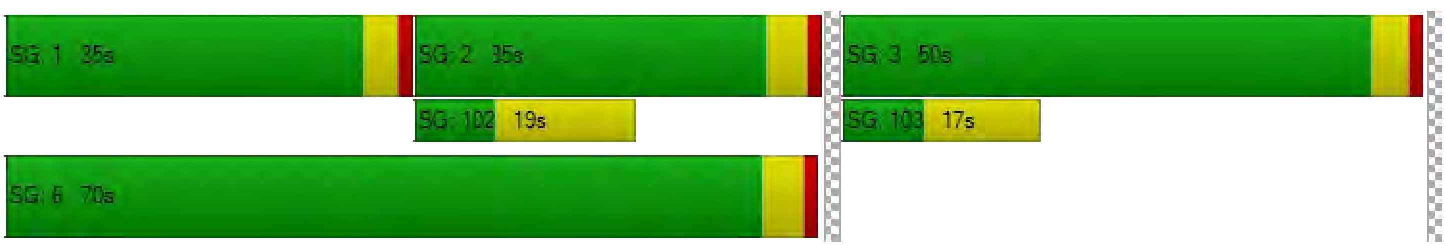
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 | 20.92 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 66.45 | | 20.92 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 49.70 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.757 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.948 | 2.892 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.363 | 2.622 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.411 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 686 | 211 | 301 | 756 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 120 | 21 | 686 | 115 | 301 | 756 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 32 | 6 | 182 | 31 | 80 | 201 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 128 | 22 | 730 | 122 | 320 | 804 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 79 | 79 | 91 | 85 | 85 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.19 | 0.78 | 0.66 | 0.66 | 0.76 | 0.71 | 0.71 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.09 | 0.03 | 0.21 | 0.08 | 0.38 | 0.24 | 0.24 |
| s, saturation flow rate [veh/h] | 1397 | 1736 | 1310 | 1477 | 701 | 3526 | 1473 | 849 | 1840 | 1780 |
| c, Capacity [veh/h] | 124 | 325 | 300 | 277 | 574 | 2331 | 974 | 667 | 1301 | 1258 |
| d1, Uniform Delay [s] | 54.83 | 40.14 | 46.93 | 43.16 | 4.13 | 8.69 | 7.45 | 5.24 | 6.75 | 6.77 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 0.08 | 1.54 | 1.15 | 0.03 | 0.35 | 0.26 | 2.46 | 0.70 | 0.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.07 | 0.56 | 0.46 | 0.04 | 0.31 | 0.13 | 0.48 | 0.34 | 0.34 |
| d, Delay for Lane Group [s/veh] | 54.98 | 40.22 | 48.47 | 44.31 | 4.16 | 9.04 | 7.72 | 7.70 | 7.45 | 7.51 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.56 | 4.82 | 3.46 | 0.11 | 3.87 | 1.15 | 2.40 | 4.06 | 3.99 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 13.93 | 120.51 | 86.61 | 2.87 | 96.77 | 28.72 | 59.97 | 101.53 | 99.71 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 1.00 | 8.42 | 6.24 | 0.21 | 6.97 | 2.07 | 4.32 | 7.31 | 7.18 |
| 95th-Percentile Queue Length [ft/ln] | 8.20 | 25.07 | 210.53 | 155.89 | 5.16 | 174.18 | 51.69 | 107.94 | 182.75 | 179.48 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.98 | 40.22 | 40.22 | 48.47 | 48.47 | 44.31 | 4.16 | 9.04 | 7.72 | 7.70 | 7.48 | 7.51 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 43.38 | | | 46.67 | | | 8.73 | | | 7.54 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.25 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.411 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.008 | 2.916 | 3.162 | 2.839 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.413 | 2.360 | 2.536 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.779 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 857 | 67 | 1319 | 2955 | 241 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 857 | 67 | 1319 | 2955 | 241 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 221 | 17 | 340 | 762 | 62 | 107 |
| Total Analysis Volume [veh/h] | 884 | 69 | 1360 | 3046 | 248 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 75 | 75 | 75 | 75 | 75 | 75 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 21 | 21 | 33 | 57 | 8 | 45 |
| g / C, Green / Cycle | 0.28 | 0.28 | 0.44 | 0.76 | 0.11 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.04 | 0.39 | 0.60 | 0.07 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1548 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1363 | 426 | 1513 | 3831 | 379 | 2494 |
| d1, Uniform Delay [s] | 24.08 | 20.69 | 19.70 | 5.52 | 32.15 | 6.76 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.63 | 0.21 | 0.84 | 0.47 | 0.72 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.65 | 0.16 | 0.90 | 0.80 | 0.65 | 0.17 |
| d, Delay for Lane Group [s/veh] | 24.71 | 20.91 | 20.54 | 5.99 | 32.87 | 6.77 |
| Lane Group LOS | C | C | C | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.07 | 0.83 | 8.86 | 2.78 | 2.11 | 0.84 |
| 50th-Percentile Queue Length [ft/ln] | 101.73 | 20.70 | 221.53 | 69.46 | 52.68 | 21.09 |
| 95th-Percentile Queue Length [veh/ln] | 7.32 | 1.49 | 13.74 | 5.00 | 3.79 | 1.52 |
| 95th-Percentile Queue Length [ft/ln] | 183.12 | 37.26 | 343.57 | 125.03 | 94.82 | 37.96 |

**Movement, Approach, & Intersection Results**

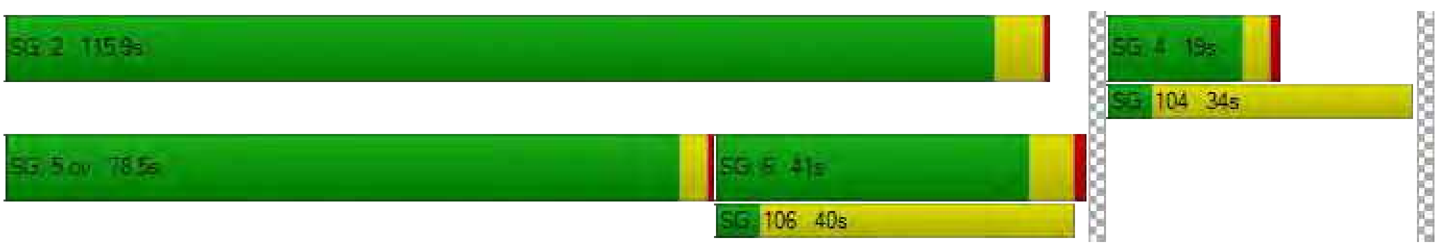
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.71 | 20.91 | 20.54 | 5.99 | 32.87 | 6.77 |
| Movement LOS | C | C | C | A | C | A |
| d_A, Approach Delay [s/veh] | 24.44 | | 10.48 | | 16.33 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 13.34 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.779 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.14 | 0.00 | 29.14 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.671 | 0.000 | 2.929 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 931 | 372 | 399 |
| d_b, Bicycle Delay [s] | 10.75 | 24.92 | 24.10 |
| I_b,int, Bicycle LOS Score for Intersection | 2.084 | 3.983 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 261.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.299 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 253 | 596 | 277 | 38 | 76 | 72 | 391 | 439 | 235 | 1160 | 2513 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 253 | 596 | 277 | 38 | 76 | 56 | 391 | 439 | 129 | 1160 | 2513 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 65 | 152 | 71 | 10 | 19 | 14 | 100 | 112 | 33 | 296 | 641 | 18 |
| Total Analysis Volume [veh/h] | 258 | 608 | 283 | 39 | 78 | 57 | 399 | 448 | 132 | 1184 | 2564 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 3 | | | 2 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 0 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 0 | | | 4 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.35 | 0.28 | 0.07 | 0.06 | 0.03 | 0.05 | 0.26 | 0.09 | 0.09 | 0.44 | 0.51 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 57.77 | 55.98 | 57.37 | 50.10 | 24.65 | 24.64 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.19 | 0.11 | 0.15 | 0.17 | 0.11 | 0.11 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 481.46 | 302.79 | 0.05 | 42.31 | 1.30 | 17.49 | 134.15 | 0.06 | 0.19 | 546.40 | 130.81 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 2.01 | 1.65 | 0.18 | 0.82 | 0.40 | 0.74 | 1.28 | 0.23 | 0.22 | 2.20 | 1.29 | 0.11 |
| d, Delay for Lane Group [s/veh] | 533.60 | 355.33 | 24.50 | 100.07 | 57.28 | 74.85 | 184.24 | 24.71 | 24.83 | 596.99 | 168.89 | 24.16 |
| Lane Group LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 21.13 | 21.26 | 1.81 | 1.81 | 1.24 | 2.18 | 10.71 | 2.97 | 2.65 | 49.29 | 44.19 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 528.33 | 531.54 | 45.13 | 45.24 | 31.12 | 54.62 | 267.84 | 74.26 | 66.16 | 1232.32 | 1104.76 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 35.63 | 34.60 | 3.25 | 3.26 | 2.24 | 3.93 | 17.92 | 5.35 | 4.76 | 78.56 | 64.74 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 890.67 | 865.08 | 81.24 | 81.43 | 56.02 | 98.31 | 448.00 | 133.67 | 119.08 | 1963.93 | 1618.54 | 63.56 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

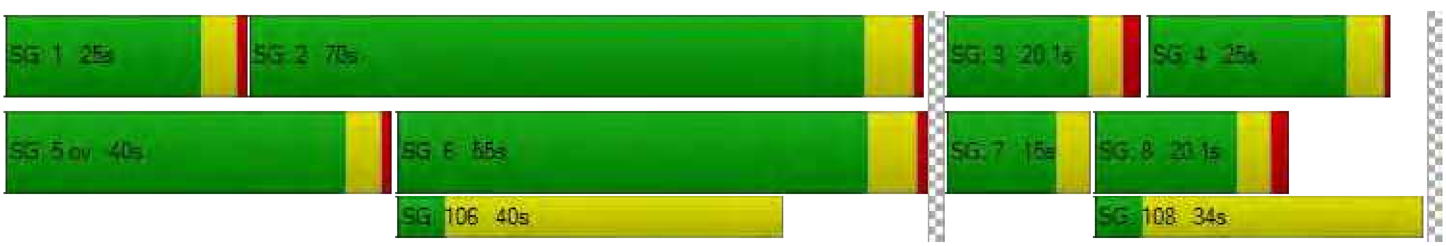
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 533.60 | 355.33 | 24.50 | 100.07 | 57.28 | 74.85 | 184.24 | 24.71 | 24.83 | 596.99 | 168.89 | 24.16 |
| Movement LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | | 313.88 | | | 72.63 | | | 89.74 | | | 298.78 | |
| Approach LOS | | F | | | E | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | 261.76 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.299 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.145 | 0.000 | 3.345 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.63 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.508 | 1.716 | 2.156 | 3.661 |
| Bicycle LOS | B | A | B | D |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 171.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.179 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 100 | 900 | 80 | 488 | 1351 | 48 | 47 | 16 | 48 | 18 | 6 | 161 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 100 | 900 | 80 | 488 | 1351 | 48 | 47 | 16 | 48 | 18 | 6 | 161 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 242 | 22 | 131 | 363 | 13 | 13 | 4 | 13 | 5 | 2 | 43 |
| Total Analysis Volume [veh/h] | 108 | 968 | 86 | 525 | 1453 | 52 | 51 | 17 | 52 | 19 | 6 | 173 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 50 | 100 | 74 | 24 | 74 | 100 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 120 | 96 | 96 | 120 | 104 | 104 | 33 | 33 | 33 | 33 |
| g / C, Green / Cycle | 0.75 | 0.60 | 0.60 | 0.75 | 0.65 | 0.65 | 0.21 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.66 | 0.67 | 0.47 | 0.81 | 0.82 | 0.04 | 0.10 | 0.02 | 0.25 |
| s, saturation flow rate [veh/h] | 404 | 808 | 781 | 1114 | 934 | 917 | 1212 | 705 | 1092 | 727 |
| c, Capacity [veh/h] | 132 | 485 | 469 | 313 | 604 | 593 | 45 | 144 | 150 | 150 |
| d1, Uniform Delay [s] | 50.44 | 31.94 | 31.94 | 51.78 | 28.23 | 28.23 | 80.00 | 56.05 | 64.84 | 63.50 |
| k, delay calibration | 0.42 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 35.97 | 71.31 | 74.06 | 319.32 | 123.99 | 133.65 | 102.84 | 0.91 | 0.38 | 134.89 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 1.10 | 1.11 | 1.68 | 1.25 | 1.27 | 1.13 | 0.48 | 0.13 | 1.19 |
| d, Delay for Lane Group [s/veh] | 86.41 | 103.25 | 106.00 | 371.09 | 152.22 | 161.89 | 182.83 | 56.96 | 65.22 | 198.39 |
| Lane Group LOS | F | F | F | F | F | F | F | E | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.29 | 27.14 | 26.61 | 15.44 | 42.71 | 43.55 | 3.17 | 2.54 | 0.65 | 11.78 |
| 50th-Percentile Queue Length [ft/ln] | 57.14 | 678.48 | 665.29 | 385.93 | 1067.85 | 1088.63 | 79.15 | 63.39 | 16.22 | 294.56 |
| 95th-Percentile Queue Length [veh/ln] | 4.11 | 38.52 | 38.00 | 27.79 | 63.13 | 64.95 | 5.70 | 4.56 | 1.17 | 18.93 |
| 95th-Percentile Queue Length [ft/ln] | 102.85 | 963.03 | 950.11 | 694.67 | 1578.37 | 1623.70 | 142.47 | 114.11 | 29.20 | 473.24 |

**Movement, Approach, & Intersection Results**

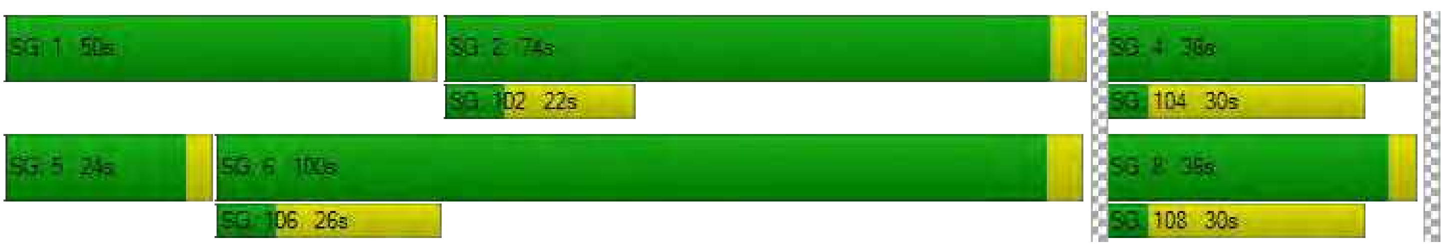
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 86.41 | 104.48 | 106.00 | 371.09 | 156.88 | 161.89 | 182.83 | 56.96 | 56.96 | 65.22 | 198.39 | 198.39 |
| Movement LOS | F | F | F | F | F | F | F | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 102.91 | | | 212.41 | | | 110.46 | | | 185.61 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 171.16 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.179 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 71.25 | 71.25 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.148 | 3.144 | 2.146 | 2.784 |
| Crosswalk LOS | C | C | B | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1200 | 875 | 410 | 413 |
| d_b, Bicycle Delay [s] | 12.90 | 25.80 | 50.69 | 50.68 |
| I_b,int, Bicycle LOS Score for Intersection | 2.518 | 3.234 | 1.758 | 1.886 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 251.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.622 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | ┐‖ | | ‖├ | | ┐┌ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 266 | 1221 | 1418 | 28 | 172 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 266 | 1221 | 1418 | 28 | 172 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 332 | 385 | 8 | 47 | 26 |
| Total Analysis Volume [veh/h] | 289 | 1327 | 1541 | 30 | 187 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 103 | 87 | 87 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.86 | 1.01 | 1.01 | 0.11 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 775 | 1745 | 779 |
| c, Capacity [veh/h] | 80 | 1229 | 525 | 521 | 263 | 117 |
| d1, Uniform Delay [s] | 58.39 | 13.28 | 21.30 | 21.30 | 52.44 | 53.73 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.16 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1210.33 | 49.99 | 233.64 | 238.85 | 5.25 | 38.44 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.62 | 1.08 | 1.50 | 1.51 | 0.71 | 0.88 |
| d, Delay for Lane Group [s/veh] | 1268.72 | 63.27 | 254.94 | 260.14 | 57.69 | 92.16 |
| Lane Group LOS | F | F | F | F | E | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 29.41 | 20.72 | 47.65 | 48.03 | 6.20 | 4.53 |
| 50th-Percentile Queue Length [ft/ln] | 735.22 | 517.97 | 1191.20 | 1200.77 | 154.90 | 113.35 |
| 95th-Percentile Queue Length [veh/ln] | 47.55 | 30.09 | 76.76 | 77.57 | 10.28 | 8.03 |
| 95th-Percentile Queue Length [ft/ln] | 1188.82 | 752.28 | 1918.92 | 1939.30 | 256.96 | 200.65 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1268.72 | 63.27 | 257.49 | 260.14 | 57.69 | 92.16 |
| Movement LOS | F | F | F | F | E | F |
| d_A, Approach Delay [s/veh] | 278.85 | | 257.54 | | 69.93 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 251.80 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.622 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.166 | 3.153 | 2.156 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.893 | 2.856 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 78.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.154 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1323 | 995 | 42 | 1172 | 237 | 138 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1323 | 995 | 42 | 1172 | 237 | 138 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 352 | 265 | 11 | 312 | 63 | 37 |
| Total Analysis Volume [veh/h] | 1407 | 1059 | 45 | 1247 | 252 | 147 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 95 | 95 | 4 | 103 | 20 | 20 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.03 | 0.79 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.91 | 0.72 | 0.03 | 0.83 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1549 | 1478 | 1704 | 1494 | 1312 | 1559 |
| c, Capacity [veh/h] | 1138 | 1085 | 57 | 1182 | 201 | 239 |
| d1, Uniform Delay [s] | 17.24 | 14.51 | 62.26 | 13.55 | 54.04 | 54.06 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.27 | 0.27 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 114.14 | 22.07 | 8.38 | 41.85 | 27.94 | 25.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.24 | 0.98 | 0.78 | 1.05 | 0.91 | 0.91 |
| d, Delay for Lane Group [s/veh] | 131.38 | 36.58 | 70.64 | 55.40 | 81.98 | 79.13 |
| Lane Group LOS | F | D | E | F | F | E |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 31.43 | 27.63 | 1.59 | 18.78 | 7.41 | 8.63 |
| 50th-Percentile Queue Length [ft/ln] | 785.77 | 690.73 | 39.79 | 469.58 | 185.26 | 215.83 |
| 95th-Percentile Queue Length [veh/ln] | 47.85 | 36.25 | 2.86 | 27.11 | 11.87 | 13.45 |
| 95th-Percentile Queue Length [ft/ln] | 1196.33 | 906.24 | 71.61 | 677.66 | 296.87 | 336.29 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 131.38 | 36.58 | 70.64 | 55.40 | 81.30 | 79.13 |
| Movement LOS | F | D | E | F | F | E |
| d_A, Approach Delay [s/veh] | 90.67 | | 55.93 | | 80.43 | |
| Approach LOS | F | | E | | F | |
| d_I, Intersection Delay [s/veh] | 78.89 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.154 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.446 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.17 | 3.45 | 44.18 |
| I_b,int, Bicycle LOS Score for Intersection | 3.594 | 2.626 | 2.218 |
| Bicycle LOS | D | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 232.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.613 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 377 | 262 | 121 | 271 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 498 | 113 | 11 | 364 | 2 | 5 | 25 | 100 | 70 | 32 | 72 |
| Total Analysis Volume [veh/h] | 152 | 1994 | 450 | 43 | 1457 | 7 | 18 | 99 | 401 | 279 | 129 | 288 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 4 | 47 | 47 | 36 | 36 | 36 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.03 | 0.36 | 0.36 | 0.27 | 0.27 | 0.27 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.47 | 0.50 | 0.02 | 0.64 | 0.64 | 0.01 | 0.06 | 0.30 | 0.18 | 0.16 | 0.43 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1627 | 1781 | 1491 | 781 | 1420 | 1577 | 1322 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 176 | 1481 | 698 | 55 | 538 | 281 | 385 | 428 | 359 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 57.69 | 37.14 | 37.14 | 62.54 | 41.56 | 41.56 | 34.95 | 36.82 | 46.80 | 55.02 | 55.02 | 54.28 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.46 | 0.07 | 0.46 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.17 | 54.23 | 94.19 | 8.43 | 361.70 | 368.59 | 0.02 | 0.10 | 81.80 | 88.90 | 91.71 | 838.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 1.10 | 1.18 | 0.78 | 1.79 | 1.79 | 0.05 | 0.23 | 1.12 | 1.18 | 1.05 | 2.81 |
| d, Delay for Lane Group [s/veh] | 62.85 | 91.37 | 131.33 | 70.97 | 403.26 | 410.15 | 34.97 | 36.92 | 128.60 | 143.92 | 146.73 | 892.96 |
| Lane Group LOS | E | F | F | E | F | F | C | D | F | F | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.11 | 33.65 | 39.45 | 1.55 | 35.62 | 37.84 | 0.43 | 2.48 | 19.51 | 6.77 | 7.15 | 27.23 |
| 50th-Percentile Queue Length [ft/ln] | 127.63 | 841.30 | 986.22 | 38.85 | 890.48 | 946.12 | 10.70 | 61.99 | 487.83 | 169.27 | 178.63 | 680.79 |
| 95th-Percentile Queue Length [veh/ln] | 8.81 | 46.16 | 55.75 | 2.80 | 59.01 | 62.39 | 0.77 | 4.46 | 28.56 | 11.79 | 11.78 | 45.44 |
| 95th-Percentile Queue Length [ft/ln] | 220.27 | 1154.07 | 1393.78 | 69.93 | 1475.29 | 1559.87 | 19.25 | 111.58 | 714.09 | 294.81 | 294.45 | 1135.91 |

**Movement, Approach, & Intersection Results**

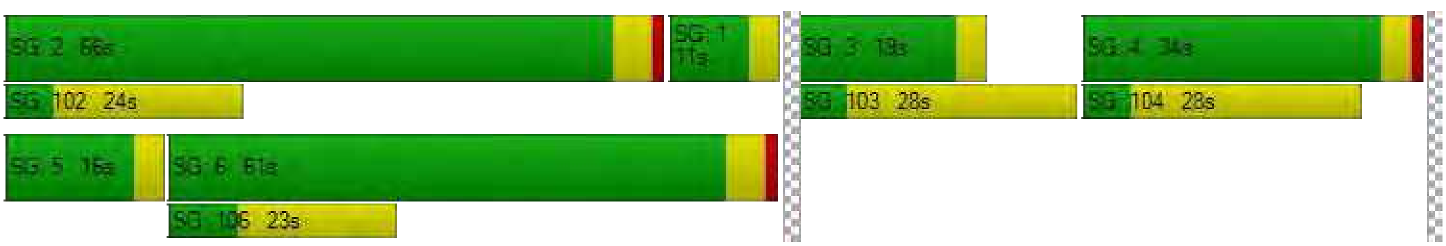
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.85 | 98.81 | 131.33 | 70.97 | 405.61 | 410.15 | 34.97 | 36.92 | 128.60 | 143.92 | 146.73 | 892.96 |
| Movement LOS | E | F | F | E | F | F | C | D | F | F | F | F |
| d_A, Approach Delay [s/veh] | 102.34 | | | 396.08 | | | 107.82 | | | 454.39 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 232.21 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.613 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.500 | 3.059 | 2.418 | 2.625 |
| Crosswalk LOS | D | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.987 | 2.388 | 2.487 | 2.764 |
| Bicycle LOS | C | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 79.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.179 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1387 | 1216 | 627 | 469 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1387 | 1216 | 328 | 469 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 347 | 304 | 82 | 117 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1387 | 1216 | 328 | 469 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.53 | 0.44 | 0.27 | 0.51 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 22.85 | 27.29 | 22.25 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.23 | 0.16 | 0.23 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 39.46 | 52.00 | 3.40 | 142.18 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 1.07 | 1.10 | 0.67 | 1.27 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 62.31 | 79.29 | 25.66 | 169.47 | 0.00 |
| Lane Group LOS | D | F | F | C | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 19.70 | 18.93 | 5.80 | 22.05 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 492.46 | 473.32 | 144.97 | 551.35 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 28.36 | 27.85 | 9.75 | 34.37 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 709.10 | 696.29 | 243.70 | 859.29 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 62.31 | 79.29 | 25.66 | 169.47 | 0.00 |
| Movement LOS | D | F | F | C | F | A |
| d_A, Approach Delay [s/veh] | 61.77 | | 67.90 | | 169.47 | |
| Approach LOS | E | | E | | F | |
| d_I, Intersection Delay [s/veh] | 79.08 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.179 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.452 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.758 | 3.080 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 129.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.138 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 26 | 59 | 12 | 363 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 237 | 2 | 9 | 242 | 28 | 18 | 4 | 7 | 15 | 3 | 95 |
| Total Analysis Volume [veh/h] | 23 | 947 | 7 | 38 | 967 | 113 | 71 | 16 | 27 | 61 | 13 | 378 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 14 | 14 | 14 | 30 | 30 |
| g / C, Green / Cycle | 0.02 | 0.58 | 0.58 | 0.04 | 0.60 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.29 | 0.29 | 0.04 | 0.70 | 0.04 | 0.04 | 0.02 | 0.06 | 0.33 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1397 | 1336 | 952 | 1202 |
| c, Capacity [veh/h] | 23 | 843 | 1105 | 42 | 926 | 79 | 116 | 111 | 172 | 217 |
| d1, Uniform Delay [s] | 80.88 | 20.14 | 20.15 | 78.98 | 32.95 | 72.40 | 72.37 | 70.89 | 59.47 | 67.95 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 82.41 | 0.94 | 0.72 | 44.69 | 86.45 | 3.90 | 2.63 | 1.11 | 1.23 | 377.54 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.98 | 0.49 | 0.49 | 0.91 | 1.17 | 0.45 | 0.44 | 0.24 | 0.35 | 1.80 |
| d, Delay for Lane Group [s/veh] | 163.29 | 21.08 | 20.87 | 123.67 | 119.39 | 76.29 | 75.00 | 72.00 | 60.70 | 445.48 |
| Lane Group LOS | F | C | C | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.53 | 9.75 | 12.73 | 2.16 | 58.65 | 1.57 | 2.24 | 1.14 | 2.34 | 32.09 |
| 50th-Percentile Queue Length [ft/ln] | 38.28 | 243.78 | 318.17 | 53.91 | 1466.27 | 39.19 | 55.97 | 28.49 | 58.59 | 802.13 |
| 95th-Percentile Queue Length [veh/ln] | 2.76 | 14.87 | 18.58 | 3.88 | 80.68 | 2.82 | 4.03 | 2.05 | 4.22 | 51.21 |
| 95th-Percentile Queue Length [ft/ln] | 68.91 | 371.81 | 464.44 | 97.04 | 2017.02 | 70.54 | 100.75 | 51.27 | 105.47 | 1280.37 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 163.29 | 20.96 | 20.87 | 123.67 | 119.39 | 119.39 | 75.67 | 75.00 | 72.00 | 60.70 | 445.48 | 445.48 |
| Movement LOS | F | C | C | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 24.31 | | | 119.54 | | | 74.69 | | | 393.56 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 129.20 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.138 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 72.25 | 72.25 | 72.25 | 72.25 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.574 | 2.822 | 2.190 | 2.108 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 241 | 241 | 362 | 362 |
| d_b, Bicycle Delay [s] | 64.15 | 64.12 | 55.77 | 55.65 |
| I_b,int, Bicycle LOS Score for Intersection | 2.366 | 3.404 | 1.758 | 2.305 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.935 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 37 | 783 | 7 | 4 | 878 | 181 | 280 | 6 | 64 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 37 | 783 | 7 | 4 | 878 | 181 | 280 | 6 | 64 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 206 | 2 | 1 | 231 | 48 | 74 | 2 | 17 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 39 | 824 | 7 | 4 | 924 | 191 | 295 | 6 | 67 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 105 | 105 | 105 | 105 | 37 | 37 |
| g / C, Green / Cycle | 0.70 | 0.70 | 0.70 | 0.70 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.46 | 0.01 | 0.63 | 0.26 | 0.01 |
| s, saturation flow rate [veh/h] | 495 | 1826 | 671 | 1779 | 1393 | 1744 |
| c, Capacity [veh/h] | 141 | 1278 | 342 | 1245 | 385 | 455 |
| d1, Uniform Delay [s] | 53.60 | 12.39 | 23.78 | 18.09 | 57.54 | 42.92 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.79 | 2.58 | 0.06 | 10.19 | 35.98 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.28 | 0.65 | 0.01 | 0.90 | 0.96 | 0.02 |
| d, Delay for Lane Group [s/veh] | 58.39 | 14.96 | 23.85 | 28.28 | 93.53 | 42.93 |
| Lane Group LOS | E | B | C | C | F | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.51 | 15.94 | 0.09 | 32.29 | 18.11 | 0.26 |
| 50th-Percentile Queue Length [ft/ln] | 37.67 | 398.50 | 2.21 | 807.17 | 452.87 | 6.56 |
| 95th-Percentile Queue Length [veh/ln] | 2.71 | 22.49 | 0.16 | 41.61 | 25.09 | 0.47 |
| 95th-Percentile Queue Length [ft/ln] | 67.81 | 562.20 | 3.98 | 1040.13 | 627.37 | 11.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 58.39 | 14.96 | 14.96 | 23.85 | 28.28 | 28.28 | 93.53 | 93.53 | 93.53 | 42.93 | 42.93 | 42.93 |
| Movement LOS | E | B | B | C | C | C | F | F | F | D | D | D |
| d_A, Approach Delay [s/veh] | 16.91 | | | 28.26 | | | 93.53 | | | 42.93 | | |
| Approach LOS | B | | | C | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 34.29 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.935 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.470 | 3.113 | 2.087 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.77 | 42.89 | 42.63 |
| I_b,int, Bicycle LOS Score for Intersection | 2.995 | 3.406 | 2.167 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.699 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 109 | 11 | 146 | 97 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 109 | 11 | 146 | 97 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 186 | 40 | 14 | 248 | 0 | 5 | 30 | 3 | 40 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 746 | 161 | 57 | 993 | 0 | 22 | 118 | 12 | 159 | 105 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 112 | 112 | 112 | 112 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.75 | 0.75 | 0.75 | 0.75 | 0.20 | 0.20 | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.52 | 0.10 | 0.54 | 0.02 | 0.07 | 0.13 | 0.12 |
| s, saturation flow rate [veh/h] | 576 | 1757 | 588 | 1846 | 1167 | 1855 | 1235 | 1716 |
| c, Capacity [veh/h] | 299 | 1311 | 319 | 1377 | 138 | 370 | 203 | 342 |
| d1, Uniform Delay [s] | 24.17 | 9.98 | 24.13 | 10.46 | 65.06 | 51.64 | 65.79 | 54.57 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.19 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.17 | 3.02 | 1.22 | 3.29 | 0.54 | 0.57 | 10.98 | 2.46 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.69 | 0.18 | 0.72 | 0.16 | 0.35 | 0.78 | 0.60 |
| d, Delay for Lane Group [s/veh] | 24.34 | 13.00 | 25.35 | 13.75 | 65.60 | 52.21 | 76.76 | 57.03 |
| Lane Group LOS | C | B | C | B | E | D | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 15.94 | 1.36 | 18.27 | 0.82 | 4.35 | 6.78 | 7.42 |
| 50th-Percentile Queue Length [ft/ln] | 4.57 | 398.44 | 33.94 | 456.83 | 20.57 | 108.69 | 169.49 | 185.40 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 22.48 | 2.44 | 25.28 | 1.48 | 7.77 | 11.05 | 11.88 |
| 95th-Percentile Queue Length [ft/ln] | 8.22 | 562.12 | 61.09 | 632.10 | 37.02 | 194.17 | 276.24 | 297.05 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.34 | 13.00 | 13.00 | 25.35 | 13.75 | 13.75 | 65.60 | 52.21 | 52.21 | 76.76 | 57.03 | 57.03 |
| Movement LOS | C | B | B | C | B | B | E | D | D | E | E | E |
| d_A, Approach Delay [s/veh] | 13.10 | | | 14.38 | | | 54.15 | | | 65.63 | | |
| Approach LOS | B | | | B | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 23.88 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.699 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.35 | 64.35 | 64.35 | 64.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.754 | 2.576 | 2.048 | 2.235 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.84 | 4.84 | 48.29 | 48.29 |
| I_b,int, Bicycle LOS Score for Intersection | 3.069 | 3.292 | 1.810 | 2.162 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

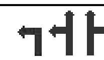
Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.627 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 300 | 153 | 374 | 136 | 452 | 132 | 462 | 170 | 344 | 341 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 300 | 34 | 374 | 136 | 0 | 132 | 462 | 170 | 344 | 341 | 20 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 78 | 9 | 97 | 35 | 0 | 34 | 120 | 44 | 90 | 89 | 5 |
| Total Analysis Volume [veh/h] | 28 | 313 | 35 | 390 | 142 | 0 | 138 | 481 | 177 | 358 | 355 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 28 | 28 | 28 | 56 | 56 | 56 | 23 | 23 | 23 | 23 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.38 | 0.38 | 0.38 | 0.15 | 0.15 | 0.15 | 0.15 | 0.17 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.17 | 0.02 | 0.15 | 0.15 | 0.00 | 0.08 | 0.12 | 0.13 | 0.12 | 0.14 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1448 | 1772 | 1817 | 1567 | 1774 | 1892 | 1892 | 1491 | 1734 | 1805 | 1635 |
| c, Capacity [veh/h] | 333 | 336 | 267 | 666 | 683 | 589 | 268 | 285 | 285 | 225 | 288 | 300 | 272 |
| d1, Uniform Delay [s] | 50.69 | 60.24 | 51.05 | 34.27 | 34.27 | 0.00 | 58.62 | 61.66 | 62.20 | 61.06 | 60.69 | 60.67 | 60.77 |
| k, delay calibration | 0.11 | 0.37 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.20 | 0.23 | 0.18 | 0.15 | 0.15 | 0.16 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 28.04 | 0.22 | 1.75 | 1.70 | 0.00 | 1.54 | 10.02 | 15.11 | 9.73 | 9.47 | 9.03 | 10.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.93 | 0.13 | 0.39 | 0.39 | 0.00 | 0.52 | 0.82 | 0.87 | 0.79 | 0.85 | 0.85 | 0.86 |
| d, Delay for Lane Group [s/veh] | 50.80 | 88.28 | 51.27 | 36.02 | 35.97 | 0.00 | 60.16 | 71.68 | 77.31 | 70.78 | 70.16 | 69.70 | 71.45 |
| Lane Group LOS | D | F | D | D | D | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.89 | 14.36 | 1.13 | 7.53 | 7.71 | 0.00 | 4.98 | 9.44 | 10.46 | 7.10 | 9.86 | 10.21 | 9.48 |
| 50th-Percentile Queue Length [ft/ln] | 22.36 | 359.10 | 28.24 | 188.21 | 192.65 | 0.00 | 124.3 | 235.9 | 261.4 | 177.5 | 246.56 | 255.28 | 236.95 |
| 95th-Percentile Queue Length [veh/ln] | 1.61 | 20.58 | 2.03 | 12.03 | 12.26 | 0.00 | 8.63 | 14.48 | 15.76 | 11.47 | 15.01 | 15.45 | 14.53 |
| 95th-Percentile Queue Length [ft/ln] | 40.24 | 514.49 | 50.83 | 300.70 | 306.47 | 0.00 | 215.8 | 361.9 | 393.9 | 286.7 | 375.32 | 386.30 | 363.18 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.80 | 88.28 | 51.27 | 36.00 | 35.97 | 0.00 | 60.16 | 74.58 | 70.78 | 70.01 | 70.75 | 71.45 |
| Movement LOS | D | F | D | D | D | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 82.04 | | | 36.00 | | | 71.24 | | | 70.41 | | |
| Approach LOS | F | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 64.96 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.627 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.46 | 63.46 | 63.46 | 63.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.518 | 4.295 | 4.337 | 2.761 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 457 |
| d_b, Bicycle Delay [s] | 49.75 | 39.81 | 50.32 | 45.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.376 | 4.087 | 3.041 | 2.165 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# Intersection Level Of Service Report
## Intersection 110: Marsh Road and US 101 NB Ramps

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 62.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.118 |

### Intersection Setup

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1865 | 0 | 0 | 896 | 771 | 1256 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1865 | 0 | 0 | 896 | 771 | 1256 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 481 | 0 | 0 | 231 | 199 | 324 |
| Total Analysis Volume [veh/h] | 1923 | 0 | 0 | 924 | 795 | 1295 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.55 | 0.27 | 0.23 | 0.47 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 14.73 | 9.01 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.24 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.91 | 0.71 | 0.23 | 155.63 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.93 | 0.45 | 0.66 | 1.34 |
| d, Delay for Lane Group [s/veh] | 23.64 | 9.72 | 22.10 | 181.58 |
| Lane Group LOS | C | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 15.72 | 4.07 | 6.00 | 29.52 |
| 50th-Percentile Queue Length [ft/ln] | 393.07 | 101.80 | 149.89 | 738.03 |
| 95th-Percentile Queue Length [veh/ln] | 22.23 | 7.33 | 10.01 | 45.37 |
| 95th-Percentile Queue Length [ft/ln] | 555.64 | 183.25 | 250.29 | 1134.13 |

**Movement, Approach, & Intersection Results**

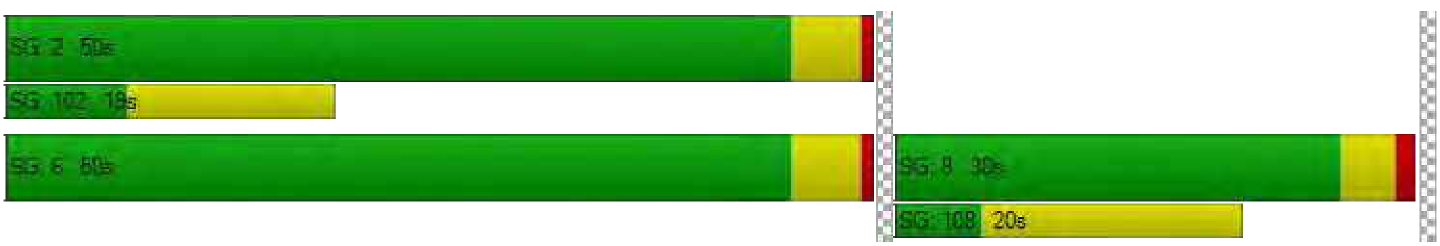
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.64 | 0.00 | 0.00 | 9.72 | 22.10 | 181.58 |
| Movement LOS | C | | | A | C | F |
| d_A, Approach Delay [s/veh] | 23.64 | | 9.72 | | 120.92 | |
| Approach LOS | C | | A | | F | |
| d_I, Intersection Delay [s/veh] | 62.22 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.118 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.136 | 2.634 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.146 | 2.322 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 27.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.875 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 123 | 3 | 25 | 69 | 14 | 12 | 13 | 7 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 493 | 10 | 101 | 276 | 56 | 47 | 52 | 28 | 24 | 56 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 591 | 579 | 482 | 528 |
| Degree of Utilization, x | 0.87 | 0.75 | 0.26 | 0.42 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 10.04 | 6.55 | 1.05 | 2.09 |
| 95th-Percentile Queue Length [ft] | 251.03 | 163.86 | 26.24 | 52.34 |
| Approach Delay [s/veh] | 37.38 | 25.39 | 13.13 | 14.74 |
| Approach LOS | E | D | B | B |
| Intersection Delay [s/veh] | 27.12 | | | |
| Intersection LOS | D | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.846 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 535 | 296 | 2094 | 710 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 535 | 296 | 2094 | 710 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 362 | 3 | 8 | 2 | 2 | 139 | 77 | 545 | 185 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1447 | 10 | 31 | 7 | 8 | 557 | 308 | 2181 | 740 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.11 | 0.54 | 0.18 | 0.18 | 0.23 | 0.23 | 0.23 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.35 | 0.01 | 0.01 | 0.18 | 0.18 | 0.21 | 0.43 | 0.43 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1625 | 1480 | 1444 | 5075 | 1805 |
| c, Capacity [veh/h] | 206 | 2140 | 339 | 293 | 369 | 336 | 328 | 2122 | 754 |
| d1, Uniform Delay [s] | 70.55 | 28.30 | 54.28 | 54.32 | 58.44 | 58.44 | 60.17 | 46.56 | 46.56 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.21 | 0.21 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 52.18 | 1.74 | 0.03 | 0.04 | 7.71 | 8.40 | 25.99 | 27.07 | 39.93 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 0.68 | 0.07 | 0.08 | 0.80 | 0.80 | 0.94 | 1.03 | 1.03 |
| d, Delay for Lane Group [s/veh] | 122.74 | 30.04 | 54.31 | 54.36 | 66.15 | 66.84 | 86.15 | 73.63 | 86.49 |
| Lane Group LOS | F | C | D | D | E | E | F | F | F |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 11.06 | 14.02 | 0.86 | 0.78 | 12.16 | 11.15 | 14.57 | 33.23 | 38.14 |
| 50th-Percentile Queue Length [ft/ln] | 276.50 | 350.53 | 21.43 | 19.47 | 304.07 | 278.69 | 364.16 | 830.69 | 953.41 |
| 95th-Percentile Queue Length [veh/ln] | 16.51 | 20.16 | 1.54 | 1.40 | 17.88 | 16.62 | 20.83 | 43.60 | 49.29 |
| 95th-Percentile Queue Length [ft/ln] | 412.85 | 504.06 | 38.58 | 35.04 | 447.06 | 415.58 | 520.64 | 1089.92 | 1232.32 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 122.74 | 122.74 | 30.04 | 54.31 | 54.34 | 54.36 | 66.15 | 66.48 | 86.15 | 73.63 | 86.49 | 86.49 |
| Movement LOS | F | F | C | D | D | D | E | E | F | F | F | F |
| d_A, Approach Delay [s/veh] | 41.15 | | | 54.33 | | | 73.42 | | | 77.00 | | |
| Approach LOS | D | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 65.56 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.846 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.596 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 4.272 | 1.599 | 2.280 | 6.437 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 99.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.727 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1360 | 623 | 0 | 1264 | 888 | 0 | 0 | 0 | 1188 | 0 | 415 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1360 | 623 | 0 | 1264 | 888 | 0 | 0 | 0 | 1188 | 0 | 415 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 351 | 156 | 0 | 326 | 229 | 0 | 0 | 0 | 297 | 0 | 115 |
| Total Analysis Volume [veh/h] | 0 | 1402 | 623 | 0 | 1303 | 915 | 0 | 0 | 0 | 1188 | 0 | 461 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 41 | 41 | 41 | | 31 | 31 |
| g / C, Green / Cycle | 0.51 | 0.51 | 0.51 | | 0.39 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.26 | 1.04 | | 0.34 | 0.16 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 2595 | 2595 | 450 | | 1357 | 1104 |
| d1, Uniform Delay [s] | 13.07 | 12.73 | 19.00 | | 22.70 | 17.92 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.81 | 0.70 | 471.83 | | 1.94 | 0.25 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.54 | 0.50 | 2.03 | | 0.88 | 0.42 |
| d, Delay for Lane Group [s/veh] | 13.88 | 13.42 | 490.82 | | 24.65 | 18.17 |
| Lane Group LOS | B | B | F | | C | B |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.32 | 4.81 | 66.22 | | 9.99 | 2.99 |
| 50th-Percentile Queue Length [ft/ln] | 133.05 | 120.16 | 1655.48 | | 249.68 | 74.63 |
| 95th-Percentile Queue Length [veh/ln] | 9.11 | 8.40 | 110.89 | | 15.17 | 5.37 |
| 95th-Percentile Queue Length [ft/ln] | 227.63 | 210.05 | 2772.37 | | 379.26 | 134.33 |

**Movement, Approach, & Intersection Results**

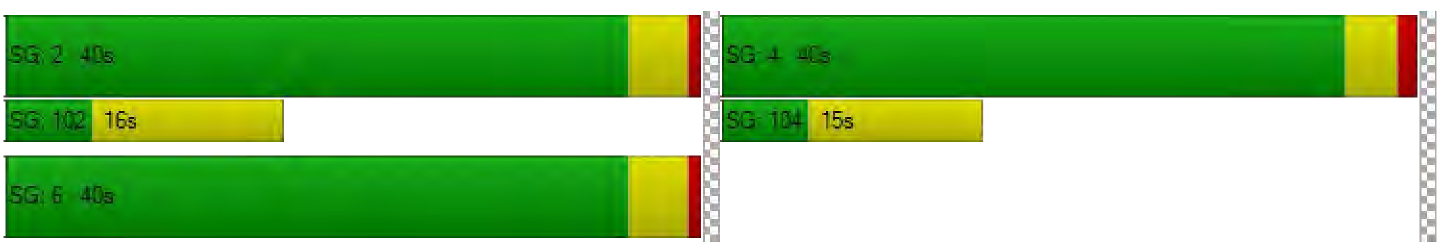
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 13.88 | 0.00 | 0.00 | 13.42 | 490.82 | 0.00 | 0.00 | 0.00 | 24.65 | 0.00 | 18.17 |
| Movement LOS | | B | | | B | F | | | | C | | B |
| d_A, Approach Delay [s/veh] | 13.88 | | | 210.37 | | | 0.00 | | | 22.84 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 99.40 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.727 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.030 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.331 | 2.780 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 128.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.569 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1827 | 740 | 0 | 1831 | 424 | 0 | 0 | 0 | 402 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1827 | 740 | 0 | 1831 | 424 | 0 | 0 | 0 | 402 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 471 | 191 | 0 | 472 | 106 | 0 | 0 | 0 | 101 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1884 | 763 | 0 | 1888 | 424 | 0 | 0 | 0 | 402 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.38 | 0.49 | 0.70 | | 0.11 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 19.38 | 21.54 | 21.97 | | 13.61 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.88 | 62.77 | 250.39 | | 0.08 | 113.57 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.84 | 1.09 | 1.55 | | 0.25 | 1.24 |
| d, Delay for Lane Group [s/veh] | 23.26 | 84.31 | 272.36 | | 13.70 | 135.28 |
| Lane Group LOS | C | F | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.20 | 23.74 | 35.18 | | 2.13 | 17.06 |
| 50th-Percentile Queue Length [ft/ln] | 254.90 | 593.49 | 879.52 | | 53.34 | 426.40 |
| 95th-Percentile Queue Length [veh/ln] | 15.43 | 33.85 | 57.06 | | 3.84 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 385.82 | 846.28 | 1426.42 | | 96.01 | 680.81 |

**Movement, Approach, & Intersection Results**

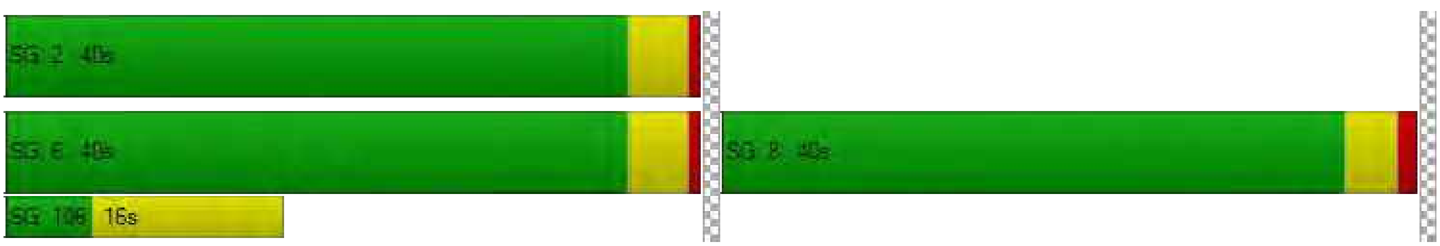
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 23.26 | 84.31 | 0.00 | 272.36 | 0.00 | 0.00 | 0.00 | 0.00 | 13.70 | 0.00 | 135.28 |
| Movement LOS | | C | F | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | | 40.86 | | | 272.36 | | | 0.00 | | | 97.07 | |
| Approach LOS | | D | | | F | | | A | | | F | |
| d_I, Intersection Delay [s/veh] | 128.40 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.569 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 3.015 | 2.598 | 4.132 | 1.560 |
| Bicycle LOS | C | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.064 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 284 | 283 | 1268 | 813 | 616 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 284 | 283 | 1268 | 813 | 616 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 75 | 74 | 334 | 214 | 162 | 517 |
| Total Analysis Volume [veh/h] | 299 | 298 | 1335 | 856 | 648 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 109 | 109 | 109 | 109 | 109 | 109 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 79 | 79 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.46 | 0.46 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.23 | 0.27 | 0.55 | 0.76 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 849 | 5020 |
| c, Capacity [veh/h] | 627 | 242 | 2278 | 710 | 635 | 3643 |
| d1, Uniform Delay [s] | 39.82 | 44.50 | 21.84 | 29.50 | 29.58 | 6.97 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.21 | 134.20 | 0.09 | 105.70 | 41.13 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.48 | 1.23 | 0.59 | 1.21 | 1.02 | 0.57 |
| d, Delay for Lane Group [s/veh] | 40.02 | 178.70 | 21.93 | 135.20 | 70.71 | 7.02 |
| Lane Group LOS | D | F | C | F | F | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.60 | 15.51 | 7.68 | 37.36 | 12.02 | 5.57 |
| 50th-Percentile Queue Length [ft/ln] | 89.89 | 387.75 | 192.11 | 933.97 | 300.51 | 139.13 |
| 95th-Percentile Queue Length [veh/ln] | 6.47 | 24.18 | 12.23 | 53.97 | 18.01 | 9.43 |
| 95th-Percentile Queue Length [ft/ln] | 161.81 | 604.44 | 305.76 | 1349.31 | 450.18 | 235.85 |

### Movement, Approach, & Intersection Results

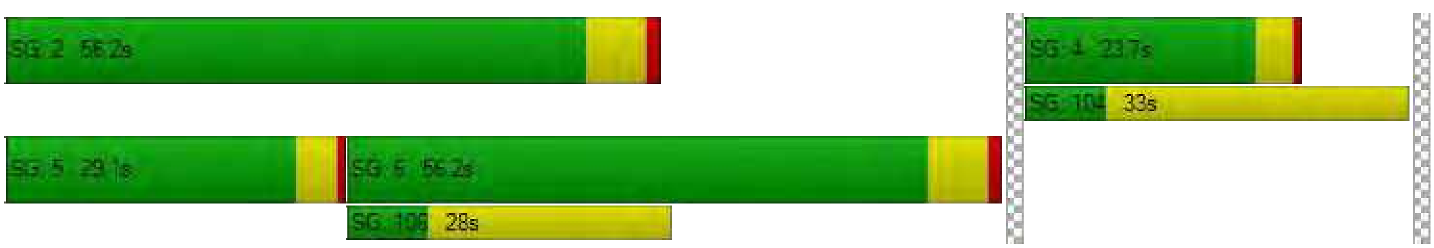
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 40.02 | 178.70 | 21.93 | 135.20 | 70.71 | 7.02 |
| Movement LOS | D | F | C | F | F | A |
| d_A, Approach Delay [s/veh] | 109.25 | | 66.18 | | 22.23 | |
| Approach LOS | F | | E | | C | |
| d_I, Intersection Delay [s/veh] | 49.17 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 1.064 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.06 | 44.06 | 44.06 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.243 | 3.660 | 3.511 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 367 | 917 | 917 |
| d_b, Bicycle Delay [s] | 36.33 | 15.97 | 15.97 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.765 | 3.052 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.762 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 442 | 93 | 1889 | 459 | 164 | 2299 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 442 | 93 | 1889 | 459 | 164 | 2299 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 114 | 24 | 487 | 118 | 42 | 593 |
| Total Analysis Volume [veh/h] | 456 | 96 | 1947 | 473 | 169 | 2370 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 52 | 52 | 52 | 52 | 52 | 52 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 9 | 9 | 22 | 22 | 6 | 32 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.42 | 0.42 | 0.12 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.06 | 0.39 | 0.32 | 0.09 | 0.47 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1493 | 1810 | 5024 |
| c, Capacity [veh/h] | 564 | 268 | 2071 | 623 | 215 | 3091 |
| d1, Uniform Delay [s] | 20.59 | 18.83 | 14.56 | 12.82 | 22.32 | 7.31 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.07 | 0.30 | 1.05 | 0.72 | 2.39 | 0.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.36 | 0.94 | 0.76 | 0.79 | 0.77 |
| d, Delay for Lane Group [s/veh] | 21.66 | 19.13 | 15.61 | 13.54 | 24.71 | 7.46 |
| Lane Group LOS | C | B | B | B | C | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.54 | 0.97 | 5.39 | 3.45 | 1.85 | 3.03 |
| 50th-Percentile Queue Length [ft/ln] | 63.50 | 24.20 | 134.72 | 86.36 | 46.29 | 75.86 |
| 95th-Percentile Queue Length [veh/ln] | 4.57 | 1.74 | 9.20 | 6.22 | 3.33 | 5.46 |
| 95th-Percentile Queue Length [ft/ln] | 114.30 | 43.56 | 229.90 | 155.44 | 83.32 | 136.55 |

**Movement, Approach, & Intersection Results**

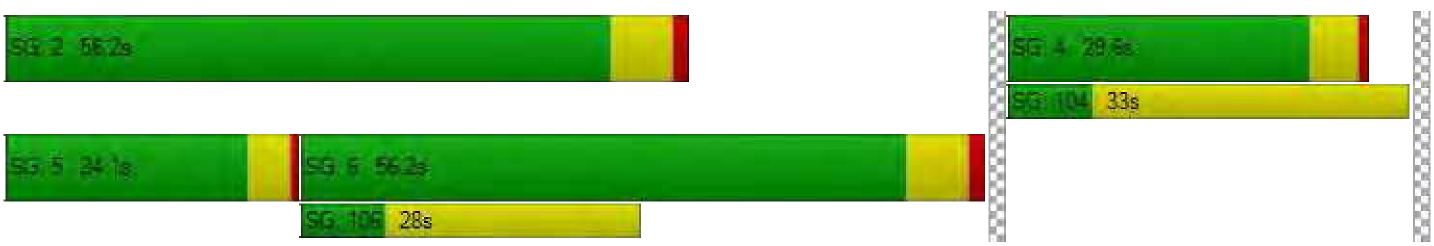
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.66 | 19.13 | 15.61 | 13.54 | 24.71 | 7.46 |
| Movement LOS | C | B | B | B | C | A |
| d_A, Approach Delay [s/veh] | 21.22 | | 15.21 | | 8.61 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 12.77 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.762 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 16.17 | 16.17 | 16.17 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.343 | 3.653 | 3.520 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 961 | 1922 | 1922 |
| d_b, Bicycle Delay [s] | 7.02 | 0.04 | 0.04 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.891 | 2.956 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.722 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 66 | 51 | 1135 | 396 | 247 | 2441 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 66 | 51 | 1135 | 396 | 247 | 2441 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 13 | 296 | 103 | 64 | 636 |
| Total Analysis Volume [veh/h] | 69 | 53 | 1182 | 413 | 257 | 2543 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 65 | 65 | 65 | 65 | 65 | 65 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 41 | 41 | 50 | 50 |
| g / C, Green / Cycle | 0.08 | 0.08 | 0.63 | 0.63 | 0.77 | 0.77 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.06 | 0.28 | 0.31 | 0.23 | 0.57 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1134 | 4496 |
| c, Capacity [veh/h] | 92 | 83 | 2656 | 829 | 953 | 3457 |
| d1, Uniform Delay [s] | 29.06 | 29.16 | 6.23 | 6.53 | 2.99 | 3.98 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.26 | 4.28 | 0.04 | 0.17 | 0.06 | 0.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.68 | 0.72 | 0.45 | 0.50 | 0.27 | 0.74 |
| d, Delay for Lane Group [s/veh] | 32.33 | 33.44 | 6.27 | 6.71 | 3.05 | 4.10 |
| Lane Group LOS | C | C | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.99 | 0.96 | 1.71 | 1.90 | 0.09 | 1.16 |
| 50th-Percentile Queue Length [ft/ln] | 24.64 | 24.06 | 42.69 | 47.62 | 2.21 | 29.03 |
| 95th-Percentile Queue Length [veh/ln] | 1.77 | 1.73 | 3.07 | 3.43 | 0.16 | 2.09 |
| 95th-Percentile Queue Length [ft/ln] | 44.35 | 43.30 | 76.84 | 85.72 | 3.97 | 52.26 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

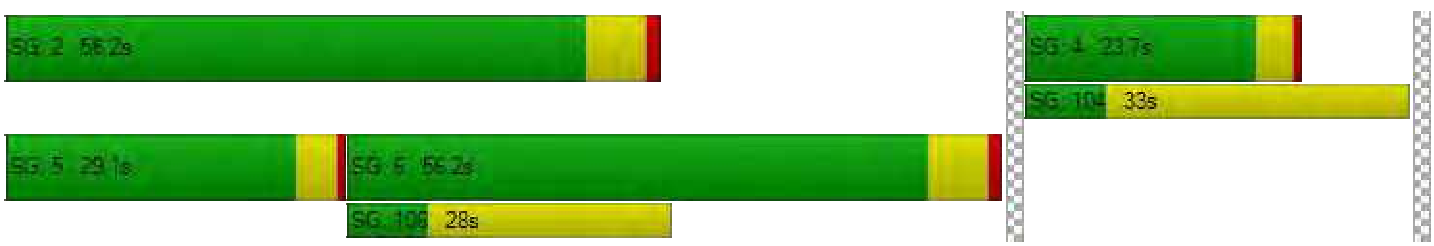
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.45 | 33.44 | 6.27 | 6.71 | 3.05 | 4.10 |
| Movement LOS | C | C | A | A | A | A |
| d_A, Approach Delay [s/veh] | 32.87 | | 6.39 | | 4.00 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.62 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.722 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 22.26 | 22.26 | 22.26 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.547 | 3.455 | 3.445 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 619 | 1547 | 1547 |
| d_b, Bicycle Delay [s] | 15.42 | 1.66 | 1.66 |
| I_b,int, Bicycle LOS Score for Intersection | 1.761 | 2.437 | 3.100 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 276.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.020 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 663 | 270 | 74 | 388 | 210 | 257 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 663 | 270 | 74 | 388 | 210 | 257 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 188 | 77 | 21 | 110 | 60 | 73 |
| Total Analysis Volume [veh/h] | 753 | 307 | 84 | 441 | 239 | 292 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 1060 | 525 | 531 |
| Degree of Utilization, x | 2.02 | 1.03 | 1.00 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 72.41 | 15.04 | 14.19 |
| 95th-Percentile Queue Length [ft] | 1810.26 | 376.02 | 354.77 |
| Approach Delay [s/veh] | 482.28 | 74.63 | 65.71 |
| Approach LOS | F | F | F |
| Intersection Delay [s/veh] | 276.60 | | |
| Intersection LOS | F | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.933 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 48 | 989 | 234 | 86 | 2729 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 48 | 989 | 234 | 86 | 2729 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 13 | 263 | 62 | 23 | 726 |
| Total Analysis Volume [veh/h] | 0 | 51 | 1052 | 249 | 91 | 2903 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 52 | 52 | 52 | 52 | 52 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 31 | 31 | 39 | 39 |
| g / C, Green / Cycle | 0.06 | 0.59 | 0.59 | 0.75 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.25 | 0.19 | 0.14 | 0.66 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 640 | 4426 |
| c, Capacity [veh/h] | 29 | 2485 | 775 | 611 | 3301 |
| d1, Uniform Delay [s] | 24.50 | 5.93 | 5.49 | 2.39 | 4.92 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 366.15 | 0.04 | 0.09 | 0.04 | 0.32 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.79 | 0.42 | 0.32 | 0.15 | 0.88 |
| d, Delay for Lane Group [s/veh] | 390.66 | 5.97 | 5.58 | 2.44 | 5.24 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.25 | 1.14 | 0.76 | 0.02 | 0.45 |
| 50th-Percentile Queue Length [ft/ln] | 81.16 | 28.55 | 19.08 | 0.48 | 11.25 |
| 95th-Percentile Queue Length [veh/ln] | 5.84 | 2.06 | 1.37 | 0.03 | 0.81 |
| 95th-Percentile Queue Length [ft/ln] | 146.10 | 51.39 | 34.35 | 0.86 | 20.25 |

**Movement, Approach, & Intersection Results**

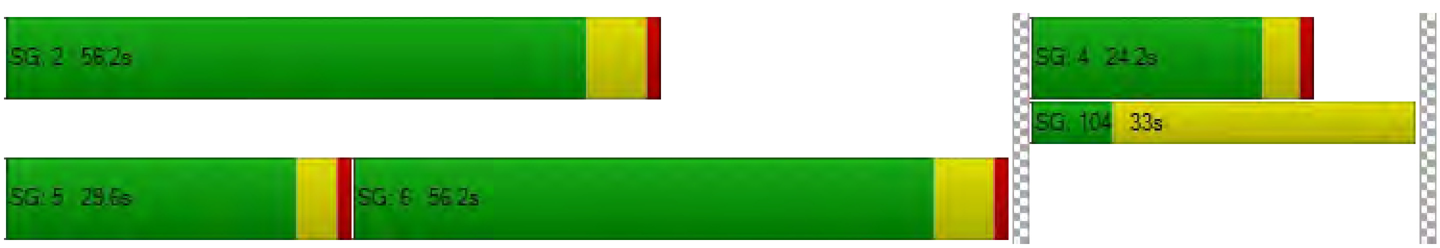
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 390.66 | 5.97 | 5.58 | 2.44 | 5.24 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 390.66 | | 5.90 | | 5.15 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 9.90 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.933 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 16.31 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.441 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 765 | 1912 | 1912 |
| d_b, Bicycle Delay [s] | 9.97 | 0.05 | 0.05 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.275 | 3.206 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 51.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.753 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 274 | 356 | 196 | 766 | 348 | 423 | 80 | 10 | 116 | 42 | 24 | 84 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 274 | 356 | 196 | 766 | 348 | 423 | 80 | 10 | 116 | 42 | 24 | 84 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 70 | 91 | 50 | 195 | 89 | 108 | 20 | 3 | 30 | 11 | 6 | 21 |
| Total Analysis Volume [veh/h] | 280 | 363 | 200 | 782 | 355 | 432 | 82 | 10 | 118 | 43 | 24 | 86 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 26 | 57 | 0 | 35 | 66 | 0 | 0 | 19 | 19 | 0 | 19 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 10 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 16 | 30 | 22 | 37 | 10 | 10 | 6 | 6 |
| g / C, Green / Cycle | 0.18 | 0.36 | 0.26 | 0.44 | 0.12 | 0.12 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.34 | 0.23 | 0.47 | 0.05 | 0.08 | 0.04 | 0.05 |
| s, saturation flow rate [veh/h] | 1767 | 1650 | 3431 | 1691 | 1776 | 1437 | 1760 | 1577 |
| c, Capacity [veh/h] | 327 | 585 | 911 | 735 | 211 | 170 | 127 | 114 |
| d1, Uniform Delay [s] | 33.36 | 26.74 | 29.56 | 23.91 | 34.66 | 35.52 | 38.11 | 38.20 |
| k, delay calibration | 0.11 | 0.42 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.38 | 26.15 | 2.50 | 53.73 | 1.43 | 4.96 | 4.85 | 6.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.96 | 0.86 | 1.07 | 0.44 | 0.69 | 0.62 | 0.65 |
| d, Delay for Lane Group [s/veh] | 39.74 | 52.89 | 32.06 | 77.64 | 36.08 | 40.49 | 42.96 | 44.32 |
| Lane Group LOS | D | D | C | F | D | D | D | D |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.98 | 14.70 | 7.59 | 24.44 | 1.81 | 2.50 | 1.73 | 1.66 |
| 50th-Percentile Queue Length [ft/ln] | 149.53 | 367.60 | 189.64 | 610.89 | 45.24 | 62.61 | 43.24 | 41.57 |
| 95th-Percentile Queue Length [veh/ln] | 9.99 | 20.99 | 12.10 | 34.20 | 3.26 | 4.51 | 3.11 | 2.99 |
| 95th-Percentile Queue Length [ft/ln] | 249.80 | 524.82 | 302.56 | 854.88 | 81.44 | 112.69 | 77.82 | 74.82 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 39.74 | 52.89 | 52.89 | 32.06 | 77.64 | 77.64 | 36.08 | 36.08 | 40.49 | 42.96 | 42.96 | 44.16 |
| Movement LOS | D | D | D | C | E | E | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 48.52 | | | 54.92 | | | 38.56 | | | 43.62 | | |
| Approach LOS | D | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 51.12 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.753 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.69 | 33.69 | 33.69 | 33.69 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.380 | 2.708 | 2.246 | 2.409 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1256 | 1469 | 355 | 355 |
| d_b, Bicycle Delay [s] | 5.85 | 2.98 | 28.54 | 28.54 |
| I_b,int, Bicycle LOS Score for Intersection | 2.951 | 4.148 | 1.906 | 1.812 |
| Bicycle LOS | C | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 345.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.631 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 181 | 332 | 115 | 192 | 314 | 346 | 39 | 34 | 190 | 0 | 255 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 181 | 332 | 115 | 192 | 314 | 346 | 39 | 34 | 190 | 0 | 255 | 25 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 50 | 92 | 32 | 53 | 87 | 96 | 11 | 9 | 53 | 0 | 71 | 7 |
| Total Analysis Volume [veh/h] | 201 | 369 | 128 | 213 | 349 | 384 | 43 | 38 | 211 | 0 | 283 | 28 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.88 | 0.16 | 0.47 | 0.28 | 0.12 | 0.12 |
| s, saturation flow rate [veh/h] | 797 | 1357 | 1552 | 1031 | 1371 | 1289 |
| c, Capacity [veh/h] | 280 | 399 | 457 | 302 | 439 | 380 |
| d1, Uniform Delay [s] | 42.84 | 30.09 | 35.94 | 35.49 | 28.43 | 28.75 |
| k, delay calibration | 0.50 | 0.11 | 0.50 | 0.42 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 681.49 | 1.11 | 281.92 | 39.71 | 0.50 | 0.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 2.49 | 0.53 | 1.60 | 0.97 | 0.36 | 0.40 |
| d, Delay for Lane Group [s/veh] | 724.34 | 31.19 | 317.86 | 75.19 | 28.93 | 29.43 |
| Lane Group LOS | F | C | F | E | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 60.17 | 4.44 | 46.86 | 10.31 | 3.11 | 3.02 |
| 50th-Percentile Queue Length [ft/ln] | 1504.30 | 111.08 | 1171.47 | 257.70 | 77.69 | 75.53 |
| 95th-Percentile Queue Length [veh/ln] | 98.67 | 7.90 | 72.91 | 15.57 | 5.59 | 5.44 |
| 95th-Percentile Queue Length [ft/ln] | 2466.74 | 197.51 | 1822.80 | 389.33 | 139.83 | 135.95 |

**Movement, Approach, & Intersection Results**

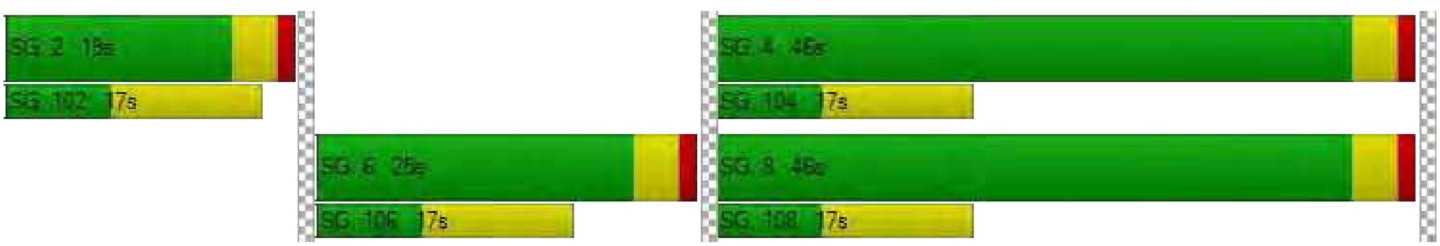
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 724.34 | 724.34 | 724.34 | 31.19 | 317.86 | 317.86 | 75.19 | 75.19 | 75.19 | 28.93 | 29.15 | 29.43 |
| Movement LOS | F | F | F | C | F | F | E | E | E | C | C | C |
| d_A, Approach Delay [s/veh] | 724.34 | | | 253.31 | | | 75.19 | | | 29.18 | | |
| Approach LOS | F | | | F | | | E | | | C | | |
| d_I, Intersection Delay [s/veh] | 345.46 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.631 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 40.56 | 40.56 | 40.56 | 40.56 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.403 | 2.307 | 2.431 | 2.306 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 824 | 412 | 294 | 824 |
| d_b, Bicycle Delay [s] | 17.62 | 32.13 | 37.07 | 17.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.711 | 3.121 | 2.041 | 1.816 |
| Bicycle LOS | B | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 373.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.075 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 72 | 155 | 353 | 762 | 112 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 72 | 155 | 353 | 762 | 112 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 23 | 50 | 115 | 247 | 36 |
| Total Analysis Volume [veh/h] | 43 | 94 | 201 | 458 | 990 | 145 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 1.08 | 0.35 | 0.33 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 373.37 | 296.80 | 13.90 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | B | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 10.17 | 10.17 | 1.45 | 1.45 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 254.27 | 254.27 | 36.33 | 36.33 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 320.83 | | 4.24 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 24.21 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.049 |

### Intersection Setup

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 192 | 42 | 60 | 128 | 13 | 69 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 192 | 42 | 60 | 128 | 13 | 69 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 56 | 12 | 18 | 38 | 4 | 20 |
| Total Analysis Volume [veh/h] | 226 | 49 | 71 | 151 | 15 | 81 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.18 | 0.00 | 0.00 | 0.00 | 0.05 | 0.10 |
| d_M, Delay for Movement [s/veh] | 8.39 | 0.00 | 0.00 | 0.00 | 17.81 | 10.54 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.64 | 0.64 | 0.00 | 0.00 | 0.53 | 0.53 |
| 95th-Percentile Queue Length [ft/ln] | 15.90 | 15.90 | 0.00 | 0.00 | 13.25 | 13.25 |
| d_A, Approach Delay [s/veh] | 6.90 | | 0.00 | | 11.67 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.09 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.521 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1052 | 368 | 54 | 1363 | 293 | 26 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1052 | 368 | 54 | 1363 | 293 | 26 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 263 | 92 | 14 | 341 | 73 | 7 |
| Total Analysis Volume [veh/h] | 1052 | 368 | 54 | 1363 | 293 | 26 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 90 | 0 | 10 | 100 | 60 | 0 |
| Amber [s] | 3.5 | 0.0 | 3.5 | 3.5 | 3.5 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 81 | 0 | 24 | 105 | 55 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 77 | 77 | 20 | 101 | 51 | 51 |
| g / C, Green / Cycle | 0.48 | 0.48 | 0.12 | 0.63 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.38 | 0.41 | 0.02 | 0.38 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1870 | 1713 | 3459 | 3560 | 1781 | 1746 |
| c, Capacity [veh/h] | 894 | 819 | 422 | 2236 | 562 | 551 |
| d1, Uniform Delay [s] | 35.12 | 37.21 | 62.67 | 17.93 | 41.19 | 41.20 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.20 | 11.92 | 0.63 | 1.25 | 1.28 | 1.31 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.79 | 0.87 | 0.13 | 0.61 | 0.29 | 0.29 |
| d, Delay for Lane Group [s/veh] | 42.33 | 49.13 | 63.29 | 19.17 | 42.47 | 42.51 |
| Lane Group LOS | D | D | E | B | D | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 24.52 | 26.79 | 1.02 | 14.95 | 5.07 | 4.99 |
| 50th-Percentile Queue Length [ft/ln] | 612.92 | 669.70 | 25.39 | 373.80 | 126.73 | 124.67 |
| 95th-Percentile Queue Length [veh/ln] | 32.64 | 35.28 | 1.83 | 21.29 | 8.76 | 8.65 |
| 95th-Percentile Queue Length [ft/ln] | 815.93 | 881.91 | 45.70 | 532.34 | 219.04 | 216.23 |

**Movement, Approach, & Intersection Results**

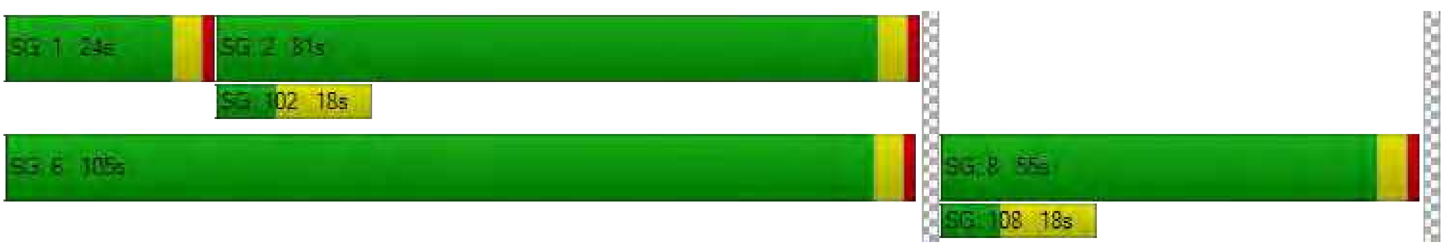
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.54 | 49.13 | 63.29 | 19.17 | 42.49 | 42.51 |
| Movement LOS | D | D | E | B | D | D |
| d_A, Approach Delay [s/veh] | 45.73 | | 20.85 | | 42.49 | |
| Approach LOS | D | | C | | D | |
| d_I, Intersection Delay [s/veh] | 34.23 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.521 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.38 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.158 | 3.021 | 2.339 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 956 | 1256 | 631 |
| d_b, Bicycle Delay [s] | 21.79 | 11.06 | 37.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.731 | 2.729 | 2.086 |
| Bicycle LOS | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 81 | 56 | 16 | 18 | 7 | 31 | 17 | 17 | 24 | 7 | 71 |
| Total Analysis Volume [veh/h] | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 261 | | | 138 | | | 232 | | | 473 | | |
| Exiting Flow Rate [veh/h] | 238 | | | 750 | | | 71 | | | 360 | | |
| Demand Flow Rate [veh/h] | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 |
| Adjusted Demand Flow Rate [veh/h] | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 573 | 166 | 268 | 415 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1058 | 1200 | 1090 | 852 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1037 | 1176 | 1069 | 835 |
| X, volume / capacity | 0.54 | 0.14 | 0.25 | 0.49 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | B | A | A | B |
| 95th-Percentile Queue Length [veh] | 3.35 | 0.48 | 0.97 | 2.70 |
| 95th-Percentile Queue Length [ft] | 83.75 | 11.94 | 24.14 | 67.59 |
| Approach Delay [s/veh] | 10.20 | 4.24 | 5.69 | 10.76 |
| Approach LOS | B | A | A | B |
| Intersection Delay [s/veh] | 8.82 | | | |
| Intersection LOS | A | | | |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro | Scenario 20 Cumulative AM (2040 vols)+Project
Report File: P:\...\Cumulative + P AM.pdf | 12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 1038 | 1462 | 1369 | 551 | 4420 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 42 | 1321 | 7 | 448 | 1225 | 346 | 13 | 4 | 68 | 355 | 20 | 0 | 3849 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 | 3805 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 839 | 82 | 425 | 755 | 47 | 338 | 69 | 2 | 48 | 57 | 339 | 3001 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 590 | 520 | 508 | 501 | 104 | 2310 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 686 | 211 | 301 | 756 | 56 | 2556 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 857 | 67 | 1319 | 2955 | 241 | 416 | 5855 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 253 | 596 | 277 | 38 | 76 | 72 | 391 | 439 | 235 | 1160 | 2513 | 72 | 6122 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 100 | 900 | 80 | 488 | 1351 | 48 | 47 | 16 | 48 | 18 | 6 | 161 | 3263 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 266 | 1221 | 1418 | 28 | 172 | 95 | 3200 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1323 | 995 | 42 | 1172 | 237 | 138 | 3907 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 | 5076 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1387 | 1216 | 627 | 469 | 60 | 3824 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 | 2559 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 37 | 783 | 7 | 4 | 878 | 181 | 280 | 6 | 64 | 1 | 2 | 6 | 2249 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 109 | 11 | 146 | 97 | 93 | 2283 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 300 | 153 | 374 | 136 | 452 | 132 | 462 | 170 | 344 | 341 | 20 | 2911 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1865 | 896 | 771 | 1256 | 4788 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 | 1146 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 535 | 296 | 2094 | 710 | 34 | 5302 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1360 | 623 | 1264 | 888 | 1188 | 415 | 5738 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1827 | 740 | 1831 | 424 | 402 | 789 | 6013 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 284 | 283 | 1268 | 813 | 616 | 1963 | 5227 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 442 | 93 | 1889 | 459 | 164 | 2299 | 5346 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 66 | 51 | 1135 | 396 | 247 | 2441 | 4336 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 663 | 270 | 74 | 388 | 210 | 257 | 1862 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 48 | 989 | 234 | 86 | 2729 | 4086 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 274 | 356 | 196 | 766 | 348 | 423 | 80 | 10 | 116 | 42 | 24 | 84 | 2719 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 181 | 332 | 115 | 192 | 314 | 346 | 39 | 34 | 190 | 0 | 255 | 25 | 2023 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 33 | 72 | 155 | 353 | 762 | 112 | 1487 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 192 | 42 | 60 | 128 | 13 | 69 | 504 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1052 | 368 | 54 | 1363 | 293 | 26 | 3156 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 | 1391 |

Vistro File: P:\...\Vistro_AllScenarios_AM - 12.9.2021.vistro
Report File: P:\...\Cumulative + P AM.pdf

Scenario 20 Cumulative AM (2040 vols)+Project
12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 1038 | 1462 | 1369 | 551 | 4420 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1038** | **1462** | **1369** | **551** | **4420** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 42 | 1321 | 7 | 448 | 1225 | 346 | 13 | 4 | 68 | 355 | 20 | 0 | 3849 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **42** | **1321** | **7** | **448** | **1225** | **346** | **13** | **4** | **68** | **355** | **20** | **0** | **3849** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 | 3805 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **228** | **974** | **126** | **29** | **1014** | **413** | **629** | **77** | **230** | **38** | **22** | **25** | **3805** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 839 | 82 | 425 | 755 | 47 | 338 | 69 | 2 | 48 | 57 | 339 | 3001 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **839** | **82** | **425** | **755** | **47** | **338** | **69** | **2** | **48** | **57** | **339** | **3001** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 590 | 520 | 508 | 501 | 104 | 2310 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **590** | **520** | **508** | **501** | **104** | **2310** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 686 | 211 | 301 | 756 | 56 | 2556 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **342** | **21** | **686** | **211** | **301** | **756** | **56** | **2556** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 857 | 67 | 1319 | 2955 | 241 | 416 | 5855 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **857** | **67** | **1319** | **2955** | **241** | **416** | **5855** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 253 | 596 | 277 | 38 | 76 | 72 | 391 | 439 | 235 | 1160 | 2513 | 72 | 6122 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **253** | **596** | **277** | **38** | **76** | **72** | **391** | **439** | **235** | **1160** | **2513** | **72** | **6122** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 100 | 900 | 80 | 488 | 1351 | 48 | 47 | 16 | 48 | 18 | 6 | 161 | 3263 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **100** | **900** | **80** | **488** | **1351** | **48** | **47** | **16** | **48** | **18** | **6** | **161** | **3263** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 266 | 1221 | 1418 | 28 | 172 | 95 | 3200 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **266** | **1221** | **1418** | **28** | **172** | **95** | **3200** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1323 | 995 | 42 | 1172 | 237 | 138 | 3907 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1323** | **995** | **42** | **1172** | **237** | **138** | **3907** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 | 5076 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1874** | **423** | **40** | **1370** | **7** | **17** | **93** | **421** | **262** | **121** | **305** | **5076** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1387 | 1216 | 627 | 469 | 60 | 3824 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1387** | **1216** | **627** | **469** | **60** | **3824** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 | 2559 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **909** | **7** | **36** | **928** | **108** | **68** | **15** | **32** | **59** | **12** | **363** | **2559** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 37 | 783 | 7 | 4 | 878 | 181 | 280 | 6 | 64 | 1 | 2 | 6 | 2249 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **37** | **783** | **7** | **4** | **878** | **181** | **280** | **6** | **64** | **1** | **2** | **6** | **2249** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 109 | 11 | 146 | 97 | 93 | 2283 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **686** | **148** | **52** | **914** | **0** | **20** | **109** | **11** | **146** | **97** | **93** | **2283** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 300 | 153 | 374 | 136 | 452 | 132 | 462 | 170 | 344 | 341 | 20 | 2911 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **300** | **153** | **374** | **136** | **452** | **132** | **462** | **170** | **344** | **341** | **20** | **2911** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1865 | 896 | 771 | 1256 | 4788 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1865** | **896** | **771** | **1256** | **4788** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 | 1146 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **472** | **10** | **81** | **221** | **45** | **37** | **41** | **22** | **22** | **51** | **131** | **1146** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 535 | 296 | 2094 | 710 | 34 | 5302 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1389** | **10** | **30** | **7** | **8** | **535** | **296** | **2094** | **710** | **34** | **5302** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1360 | 623 | 1264 | 888 | 1188 | 415 | 5738 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1360** | **623** | **1264** | **888** | **1188** | **415** | **5738** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1827 | 740 | 1831 | 424 | 402 | 789 | 6013 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1827** | **740** | **1831** | **424** | **402** | **789** | **6013** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 284 | 283 | 1268 | 813 | 616 | 1963 | 5227 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **284** | **283** | **1268** | **813** | **616** | **1963** | **5227** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 442 | 93 | 1889 | 459 | 164 | 2299 | 5346 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **442** | **93** | **1889** | **459** | **164** | **2299** | **5346** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 66 | 51 | 1135 | 396 | 247 | 2441 | 4336 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **66** | **51** | **1135** | **396** | **247** | **2441** | **4336** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 663 | 270 | 74 | 388 | 210 | 257 | 1862 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **663** | **270** | **74** | **388** | **210** | **257** | **1862** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 48 | 989 | 234 | 86 | 2729 | 4086 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **989** | **234** | **86** | **2729** | **4086** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 274 | 356 | 196 | 766 | 348 | 423 | 80 | 10 | 116 | 42 | 24 | 84 | 2719 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **274** | **356** | **196** | **766** | **348** | **423** | **80** | **10** | **116** | **42** | **24** | **84** | **2719** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 181 | 332 | 115 | 192 | 314 | 346 | 39 | 34 | 190 | 0 | 255 | 25 | 2023 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **181** | **332** | **115** | **192** | **314** | **346** | **39** | **34** | **190** | **0** | **255** | **25** | **2023** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 33 | 72 | 155 | 353 | 762 | 112 | 1487 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **33** | **72** | **155** | **353** | **762** | **112** | **1487** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 192 | 42 | 60 | 128 | 13 | 69 | 504 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **192** | **42** | **60** | **128** | **13** | **69** | **504** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1052 | 368 | 54 | 1363 | 293 | 26 | 3156 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1052** | **368** | **54** | **1363** | **293** | **26** | **3156** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 14 | 325 | 222 | 62 | 71 | 29 | 125 | 69 | 68 | 94 | 27 | 285 | 1391 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **14** | **325** | **222** | **62** | **71** | **29** | **125** | **69** | **68** | **94** | **27** | **285** | **1391** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 495 | 347 | 204 | 100 |
| 2 | 480 | 337 | 198 | 97 |
| 3 | 470 | 330 | 194 | 95 |
| 4 | 441 | 309 | 182 | 89 |
| 5 | 391 | 274 | 161 | 79 |
| 6 | 386 | 271 | 159 | 78 |
| 7 | 381 | 267 | 157 | 77 |
| 8 | 347 | 243 | 143 | 70 |
| 9 | 342 | 239 | 141 | 69 |
| 10 | 337 | 236 | 139 | 68 |
| 11 | 292 | 205 | 120 | 59 |
| 12 | 272 | 191 | 112 | 55 |
| 13 | 267 | 187 | 110 | 54 |
| 14 | 198 | 139 | 82 | 40 |
| 15 | 198 | 139 | 82 | 40 |
| 16 | 139 | 97 | 57 | 28 |
| 17 | 79 | 56 | 33 | 16 |
| 18 | 79 | 56 | 33 | 16 |
| 19 | 45 | 31 | 18 | 9 |
| 20 | 25 | 17 | 10 | 5 |
| 21 | 15 | 10 | 6 | 3 |
| 22 | 5 | 3 | 2 | 1 |
| 23 | 5 | 3 | 2 | 1 |
| 24 | 5 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 842 | 1 | 204 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 817 | 1 | 198 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 800 | 1 | 194 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 750 | 1 | 182 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 665 | 1 | 161 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 657 | 1 | 159 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 648 | 1 | 157 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 590 | 1 | 143 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 581 | 1 | 141 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 573 | 1 | 139 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 497 | 1 | 120 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 463 | 1 | 112 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 454 | 1 | 110 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 337 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 337 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 236 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 135 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 135 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 76 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 42 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 25 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 7 | 11 | 13 | 13 | 4 | 7 | 10 | 13 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 14.7 | 13.1 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:50 | 0:21 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 204 | 100 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1146 | 1146 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 462 | 933 | 467 |
| 2 | 448 | 905 | 453 |
| 3 | 439 | 886 | 444 |
| 4 | 411 | 830 | 416 |
| 5 | 365 | 737 | 369 |
| 6 | 360 | 728 | 364 |
| 7 | 356 | 718 | 360 |
| 8 | 323 | 653 | 327 |
| 9 | 319 | 644 | 322 |
| 10 | 314 | 634 | 318 |
| 11 | 273 | 550 | 276 |
| 12 | 254 | 513 | 257 |
| 13 | 249 | 504 | 252 |
| 14 | 185 | 373 | 187 |
| 15 | 185 | 373 | 187 |
| 16 | 129 | 261 | 131 |
| 17 | 74 | 149 | 75 |
| 18 | 74 | 149 | 75 |
| 19 | 42 | 84 | 42 |
| 20 | 23 | 47 | 23 |
| 21 | 14 | 28 | 14 |
| 22 | 5 | 9 | 5 |
| 23 | 5 | 9 | 5 |
| 24 | 5 | 9 | 5 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1395 | 1 | 467 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1353 | 1 | 453 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1325 | 1 | 444 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1241 | 1 | 416 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 1102 | 1 | 369 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 6 | 1 | 1088 | 1 | 364 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 7 | 1 | 1074 | 1 | 360 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 8 | 1 | 976 | 1 | 327 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 9 | 1 | 963 | 1 | 322 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 10 | 1 | 948 | 1 | 318 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 11 | 1 | 823 | 1 | 276 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 767 | 1 | 257 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 13 | 1 | 753 | 1 | 252 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 14 | 1 | 558 | 1 | 187 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 15 | 1 | 558 | 1 | 187 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 16 | 1 | 390 | 1 | 131 | No | No | Yes | Yes | No | No | No | No | No | No |
| 17 | 1 | 223 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 223 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 126 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 70 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 42 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 15 | 15 | 16 | 16 | 13 | 13 | 15 | 15 | 13 | 10 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 65.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 8:31 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 467 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1862 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 874 | 508 | 105 |
| 2 | 848 | 493 | 102 |
| 3 | 830 | 483 | 100 |
| 4 | 778 | 452 | 93 |
| 5 | 690 | 401 | 83 |
| 6 | 682 | 396 | 82 |
| 7 | 673 | 391 | 81 |
| 8 | 612 | 356 | 74 |
| 9 | 603 | 351 | 72 |
| 10 | 594 | 345 | 71 |
| 11 | 516 | 300 | 62 |
| 12 | 481 | 279 | 58 |
| 13 | 472 | 274 | 57 |
| 14 | 350 | 203 | 42 |
| 15 | 350 | 203 | 42 |
| 16 | 245 | 142 | 29 |
| 17 | 140 | 81 | 17 |
| 18 | 140 | 81 | 17 |
| 19 | 79 | 46 | 9 |
| 20 | 44 | 25 | 5 |
| 21 | 26 | 15 | 3 |
| 22 | 9 | 5 | 1 |
| 23 | 9 | 5 | 1 |
| 24 | 9 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1382 | 1 | 105 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1341 | 1 | 102 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1313 | 1 | 100 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1230 | 1 | 93 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 1091 | 1 | 83 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 6 | 1 | 1078 | 1 | 82 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 7 | 1 | 1064 | 1 | 81 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 8 | 1 | 968 | 1 | 74 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 954 | 1 | 72 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 10 | 1 | 939 | 1 | 71 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 11 | 1 | 816 | 1 | 62 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 760 | 1 | 58 | No | No | No | No | No | No | Yes | Yes | No | No |
| 13 | 1 | 746 | 1 | 57 | No | No | No | No | No | No | Yes | Yes | No | No |
| 14 | 1 | 553 | 1 | 42 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 553 | 1 | 42 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 387 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 221 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 221 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 125 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 69 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 41 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 14 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 14 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 14 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 1 | 4 | 7 | 11 | 13 | 15 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 320.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 9:21 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 105 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1487 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 234 | 188 | 82 |
| 2 | 227 | 182 | 80 |
| 3 | 222 | 179 | 78 |
| 4 | 208 | 167 | 73 |
| 5 | 185 | 149 | 65 |
| 6 | 183 | 147 | 64 |
| 7 | 180 | 145 | 63 |
| 8 | 164 | 132 | 57 |
| 9 | 161 | 130 | 57 |
| 10 | 159 | 128 | 56 |
| 11 | 138 | 111 | 48 |
| 12 | 129 | 103 | 45 |
| 13 | 126 | 102 | 44 |
| 14 | 94 | 75 | 33 |
| 15 | 94 | 75 | 33 |
| 16 | 66 | 53 | 23 |
| 17 | 37 | 30 | 13 |
| 18 | 37 | 30 | 13 |
| 19 | 21 | 17 | 7 |
| 20 | 12 | 9 | 4 |
| 21 | 7 | 6 | 2 |
| 22 | 2 | 2 | 1 |
| 23 | 2 | 2 | 1 |
| 24 | 2 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 422 | 1 | 82 | No | No | No | No | No | No | No | Yes | No | No |
| 2 | 1 | 409 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 401 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 375 | 1 | 73 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 334 | 1 | 65 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 330 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 325 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 296 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 291 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 287 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 249 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 232 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 228 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 169 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 169 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 119 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 67 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 67 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 38 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 21 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:15 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 82 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 504 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

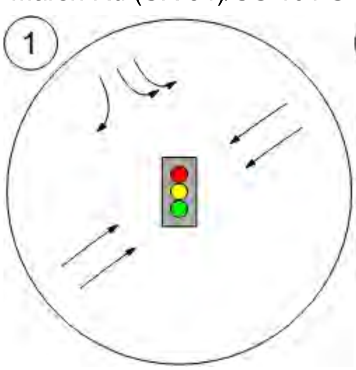
Generated with PTV VISTRO

Version 2021 (SP 0-6)

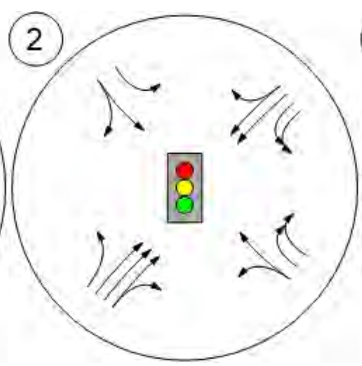
Study Intersections

Lane Configuration and Traffic Control

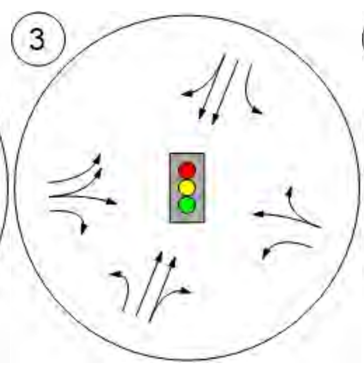

Marsh Rd (SR 84)/US 101 S



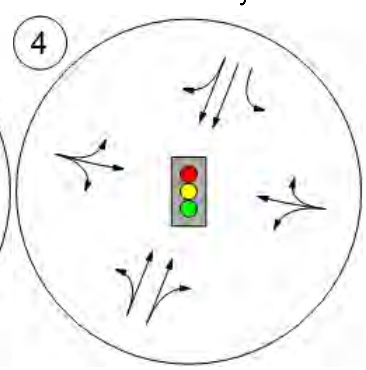

Marsh Rd/Rolison Rd-Scott D



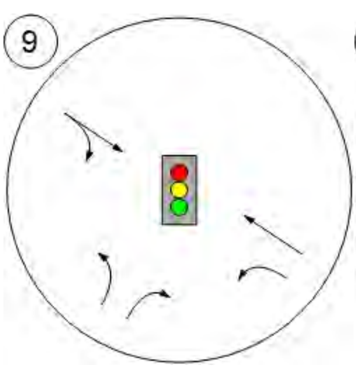

Marsh Rd/Florence St-Bohan



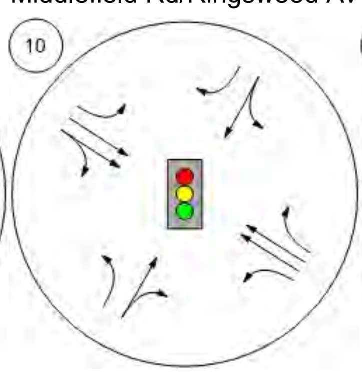

Marsh Rd/Bay Rd



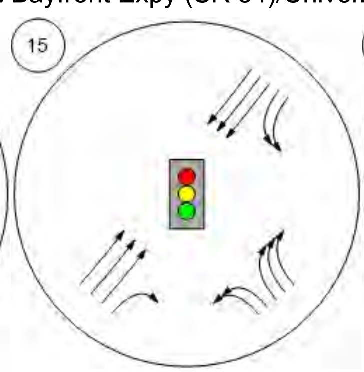

Middlefield Rd/Ravenswood



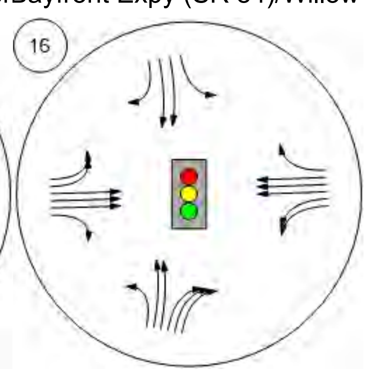

Middlefield Rd/Ringswood Av



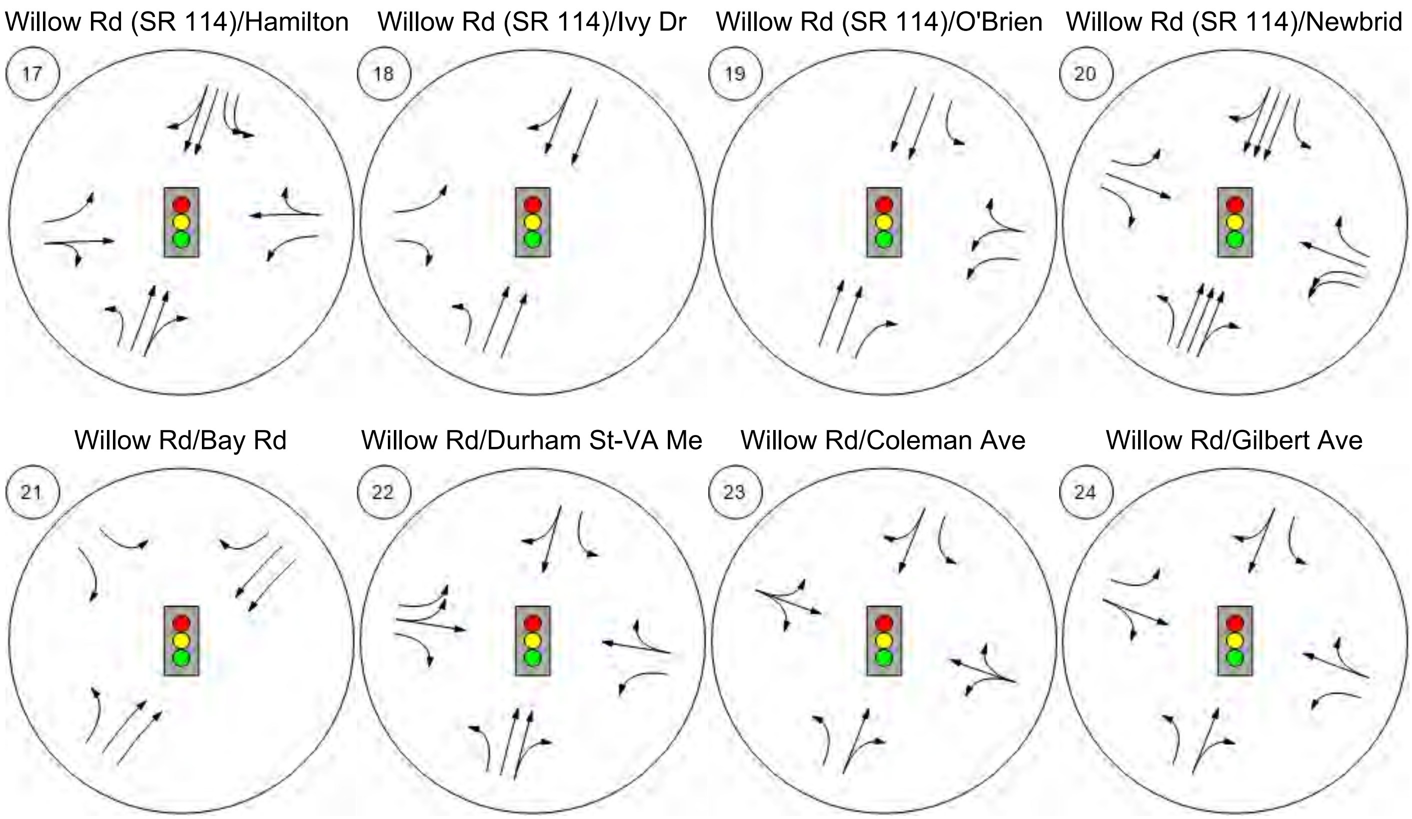

Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

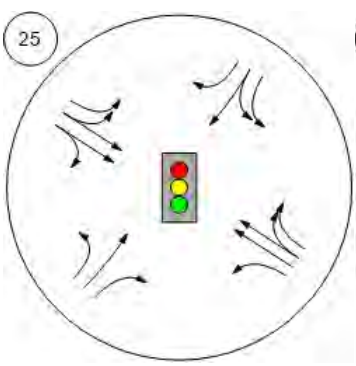


Lane Configuration and Traffic Control

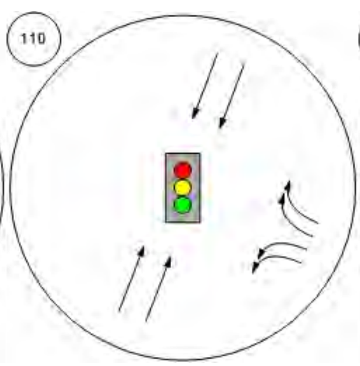



## Lane Configuration and Traffic Control

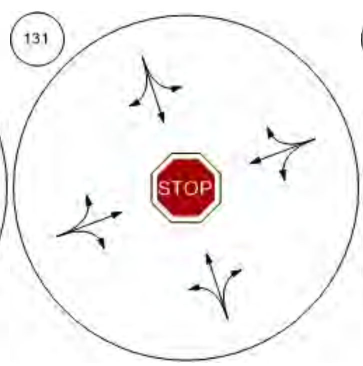

Middlefield Rd-Willow Rd



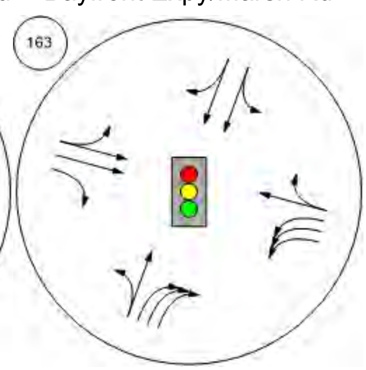

Marsh Road and US 101 NB



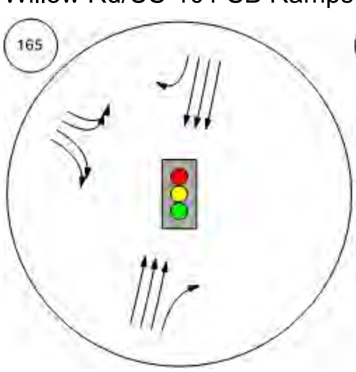

Chilco Street/Hamilton Avenu



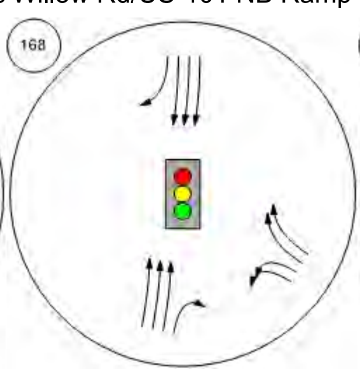

Bayfront Expy/Marsh Rd



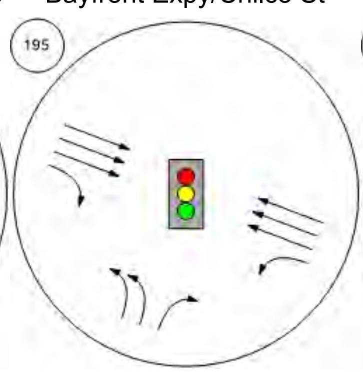

Willow Rd/US-101 SB Ramps



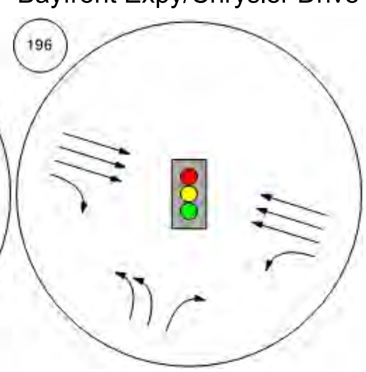

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

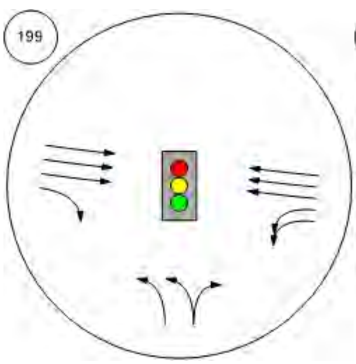



Bayfront Expy/Chrysler Drive

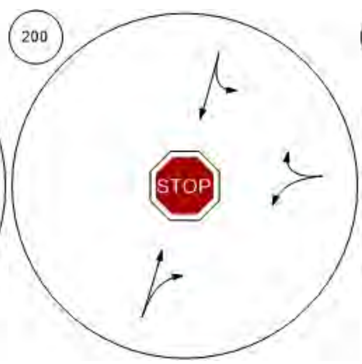


## Lane Configuration and Traffic Control

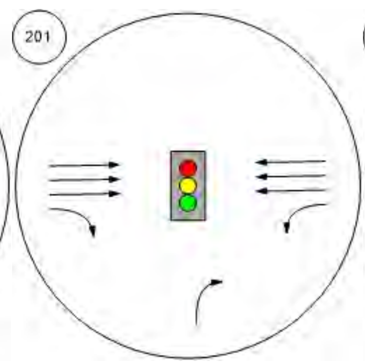

Bayfront Expwy/Bldg 21



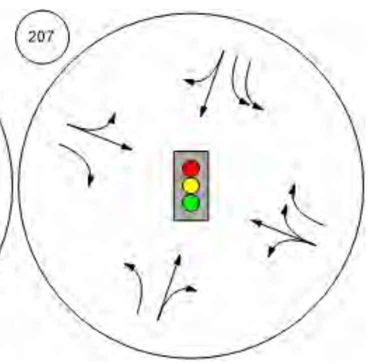

O'Brien Drive/Kavanaugh Dri



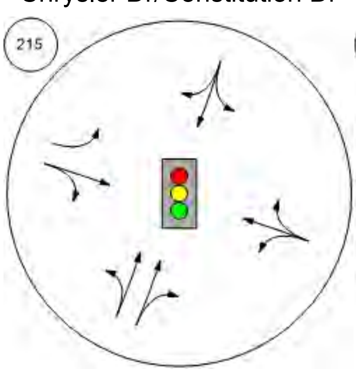

Bayfront Expwy/Bldg 20



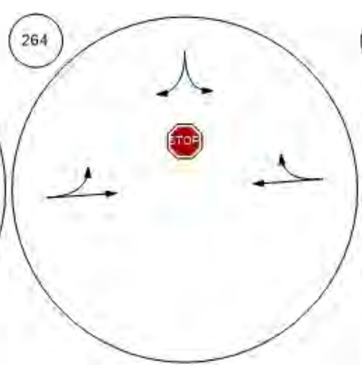

Chilco St/Constitution Dr



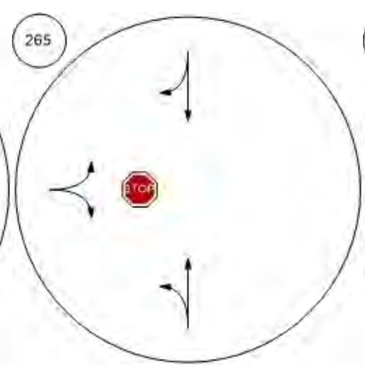

Chrysler Dr/Constitution Dr



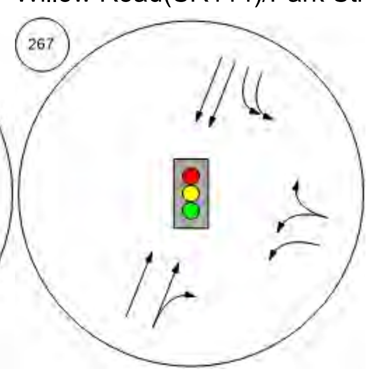

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

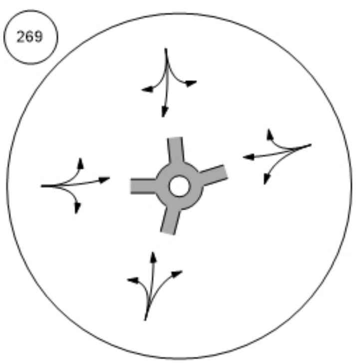


Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

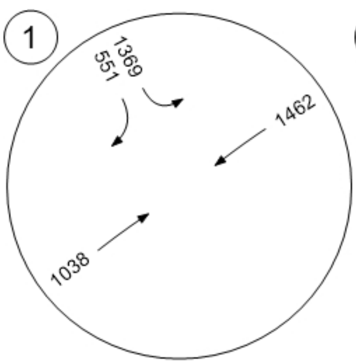


Generated with PTV VISTRO

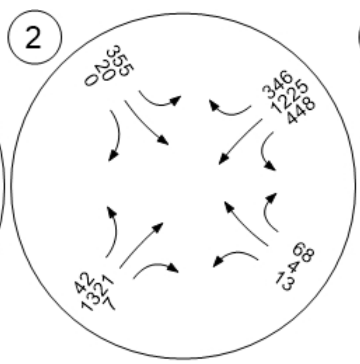
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

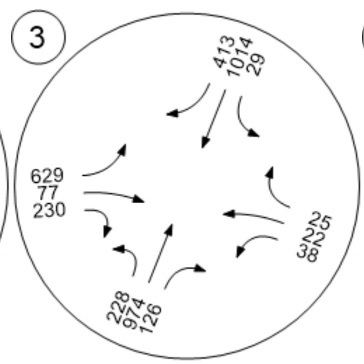

Marsh Rd (SR 84)/US 101 S



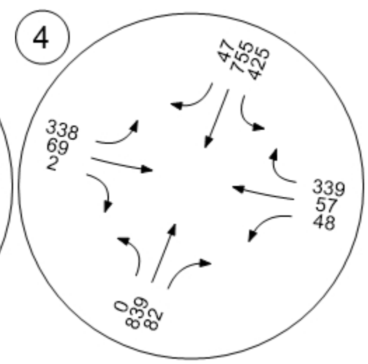

Marsh Rd/Rolison Rd-Scott D



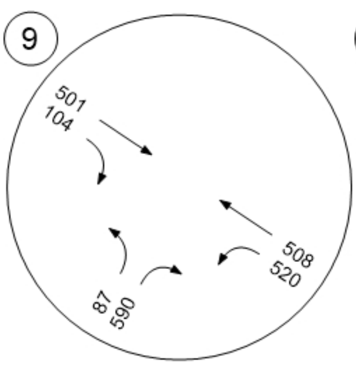

Marsh Rd/Florence St-Bohan



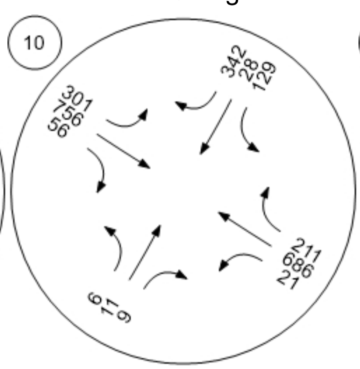

Marsh Rd/Bay Rd



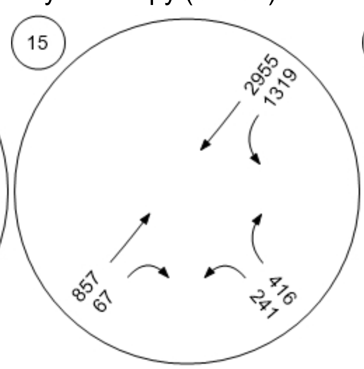

Middlefield Rd/Ravenswood



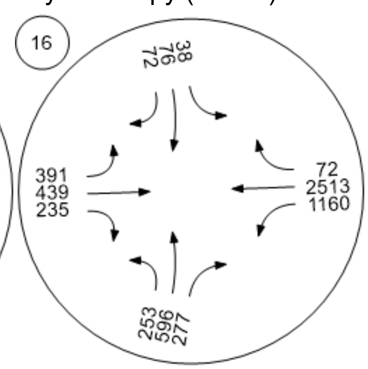

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-6)

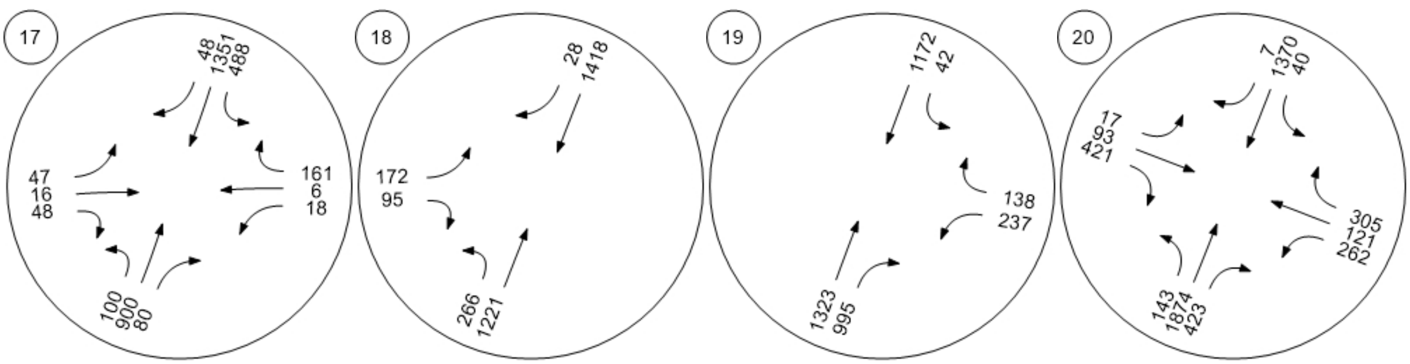
# Traffic Volume - Base Volume


Willow Rd (SR 114)/Hamilton

Willow Rd (SR 114)/Ivy Dr

Willow Rd (SR 114)/O'Brien

Willow Rd (SR 114)/Newbrid

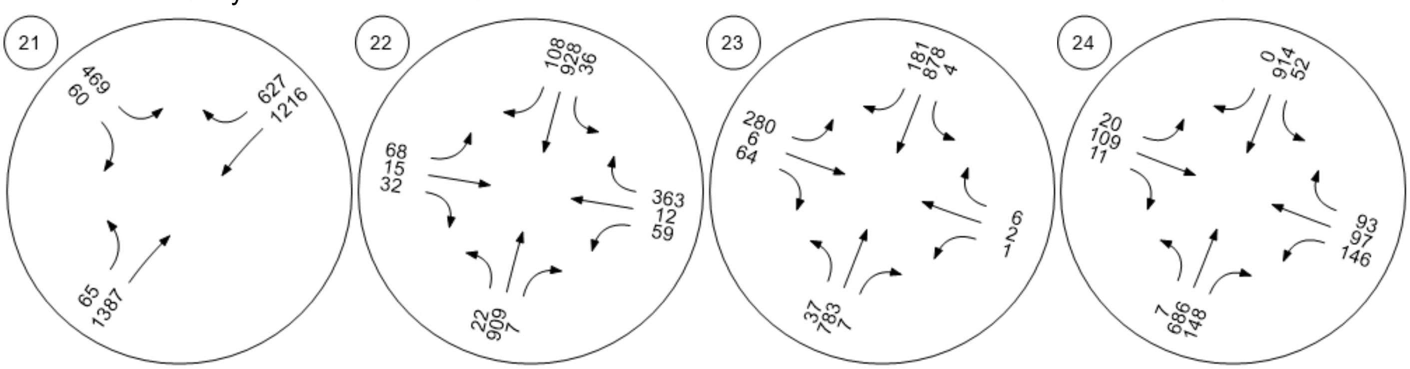



Willow Rd/Bay Rd

Willow Rd/Durham St-VA Me

Willow Rd/Coleman Ave

Willow Rd/Gilbert Ave

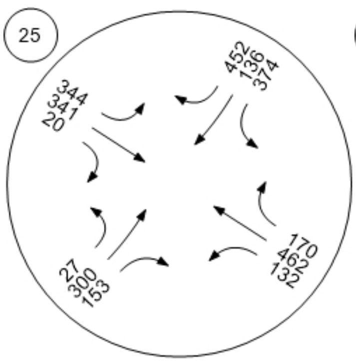


Generated with PTV VISTRO

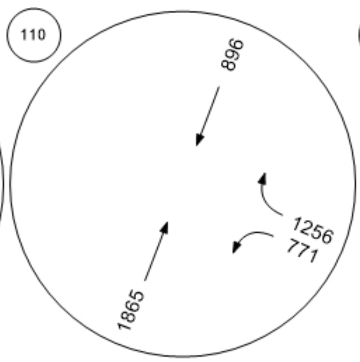
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

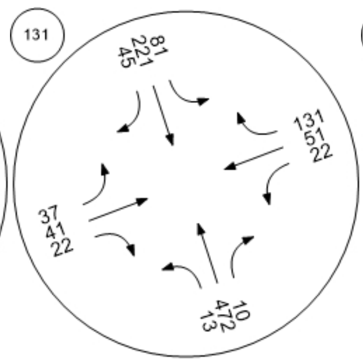

Middlefield Rd-Willow Rd



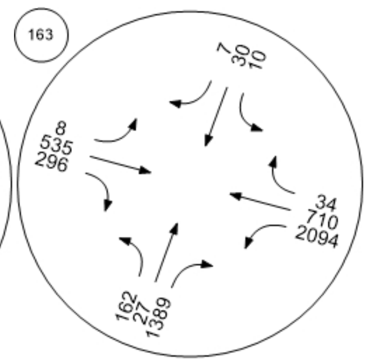

Marsh Road and US 101 NB



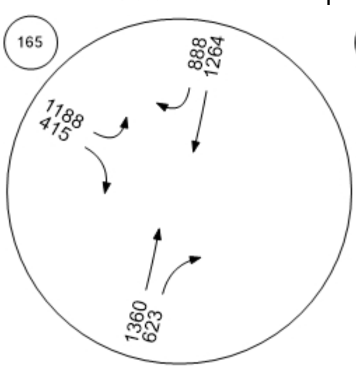

Chilco Street/Hamilton Avenu



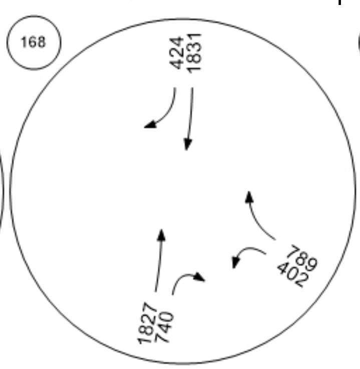

Bayfront Expy/Marsh Rd



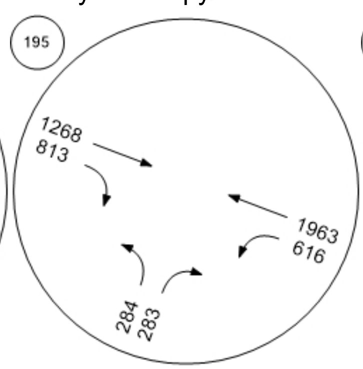

Willow Rd/US-101 SB Ramps



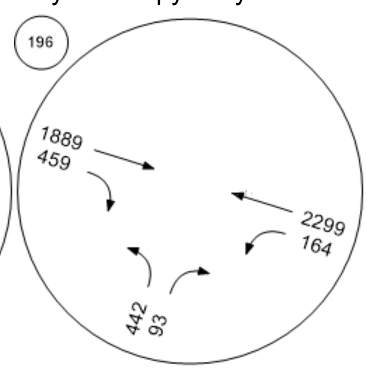

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

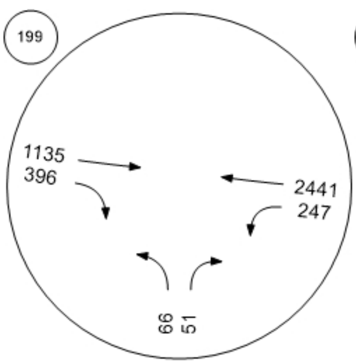



Bayfront Expy/Chrysler Drive

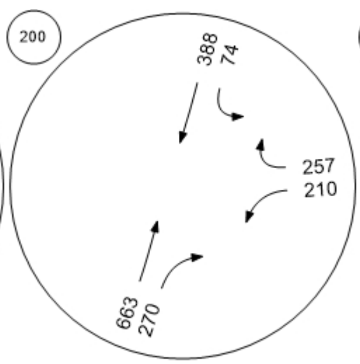


## Traffic Volume - Base Volume

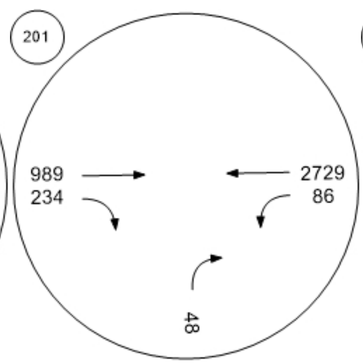

Bayfront Expwy/Bldg 21



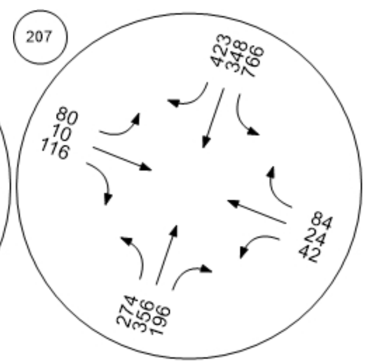

O'Brien Drive/Kavanaugh Dri



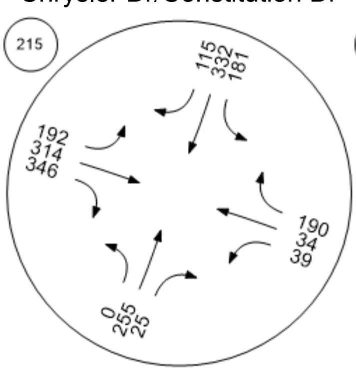

Bayfront Expwy/Bldg 20



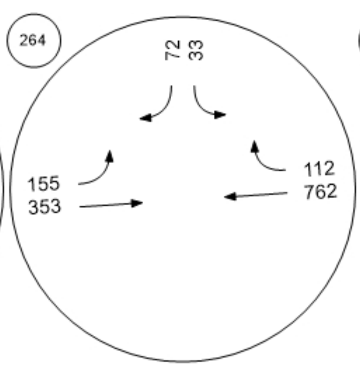

Chilco St/Constitution Dr



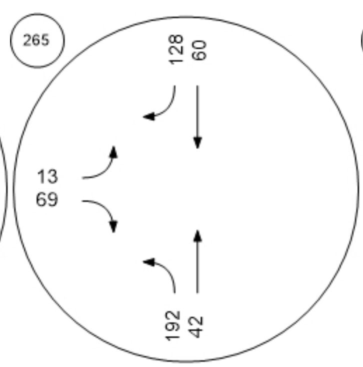

Chrysler Dr/Constitution Dr



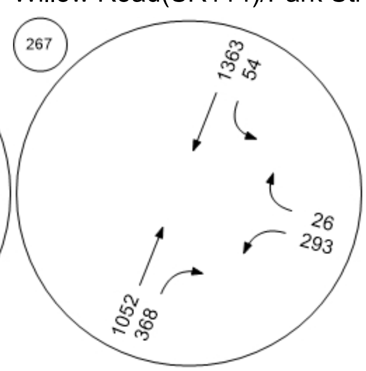

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

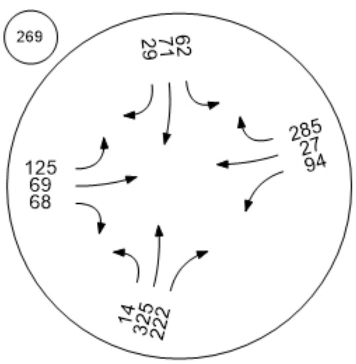


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Base Volume

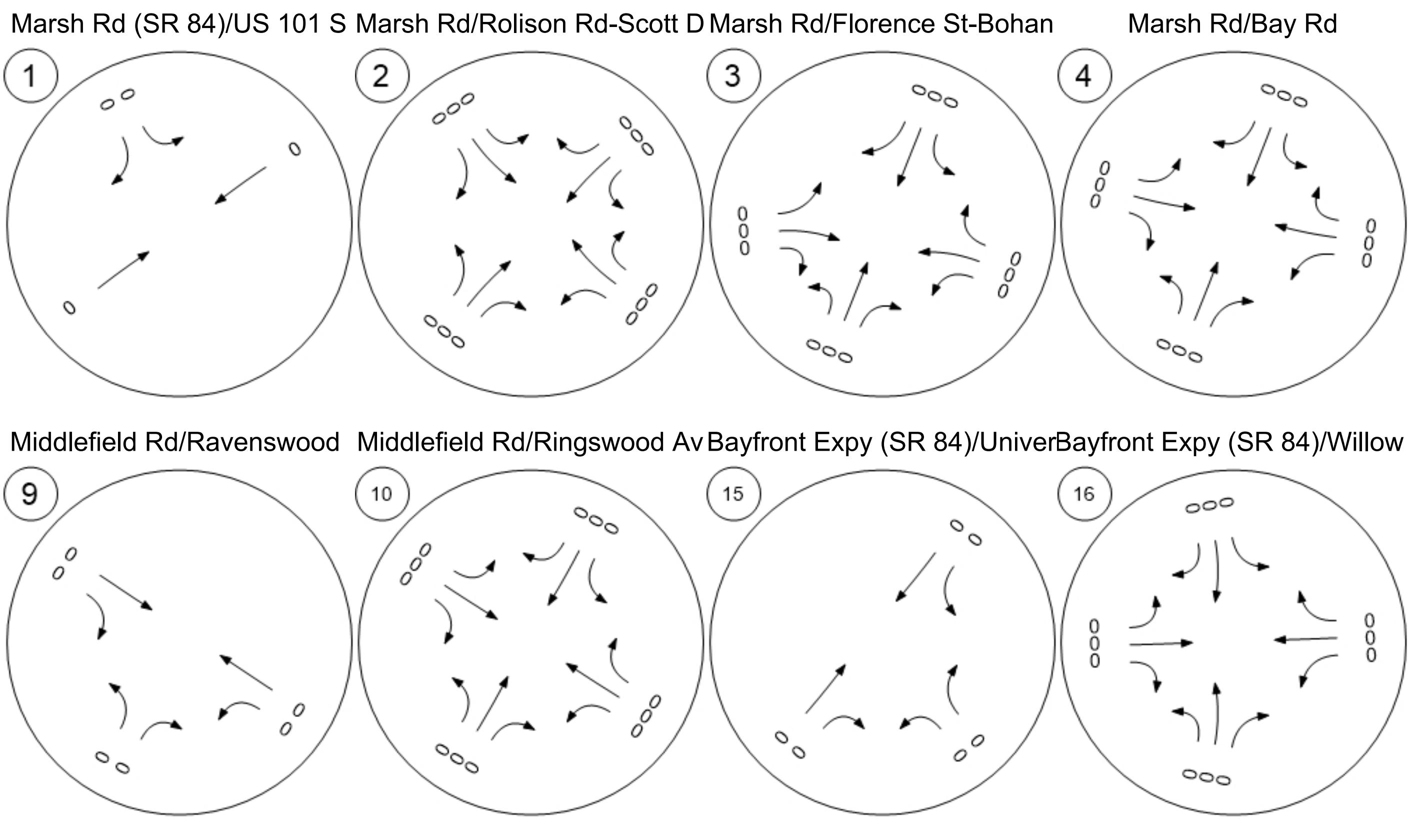

O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

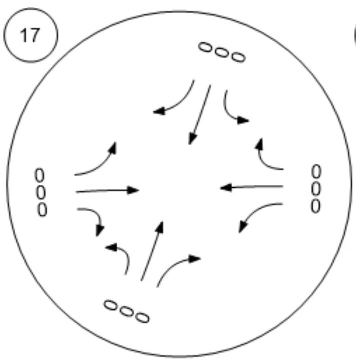
Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

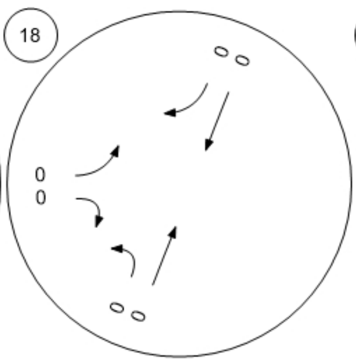

Willow Rd (SR 114)/Hamilton

17



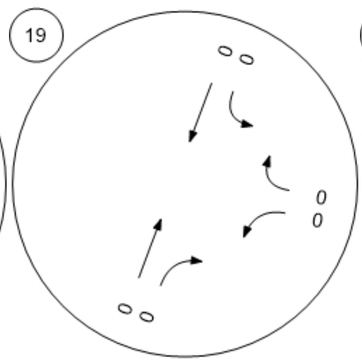
Willow Rd (SR 114)/Ivy Dr

18



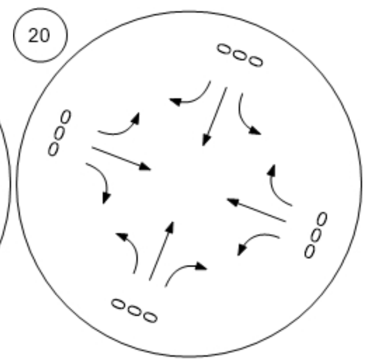
Willow Rd (SR 114)/O'Brien

19



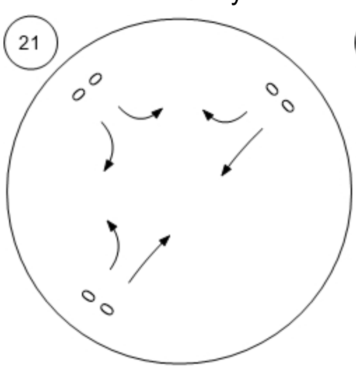
Willow Rd (SR 114)/Newbrid

20



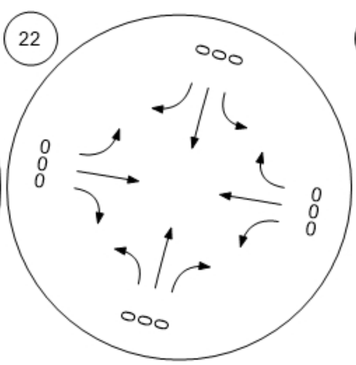
Willow Rd/Bay Rd

21



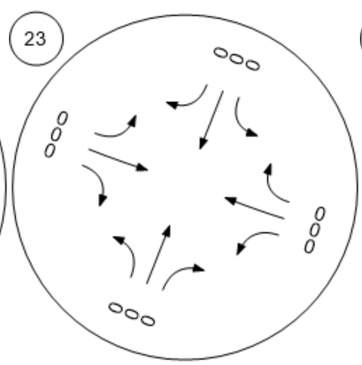
Willow Rd/Durham St-VA Me

22



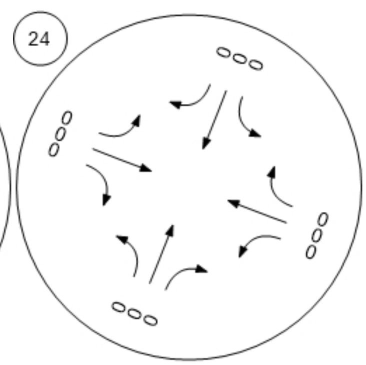
Willow Rd/Coleman Ave

23



Willow Rd/Gilbert Ave

24

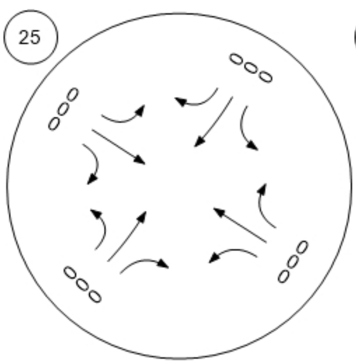


Generated with PTV VISTRO

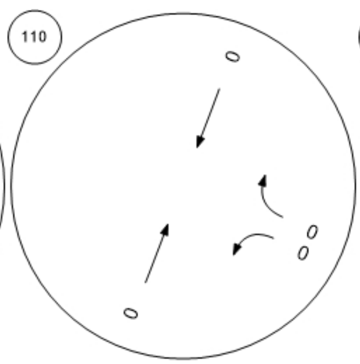
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

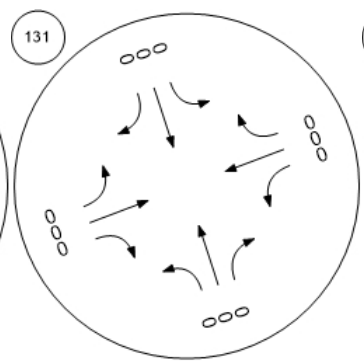

Middlefield Rd-Willow Rd



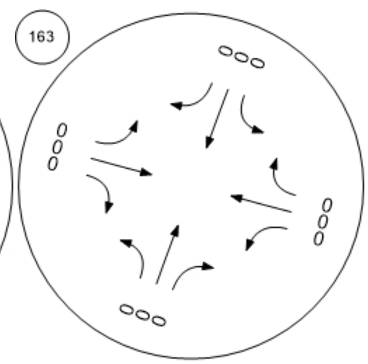

Marsh Road and US 101 NB



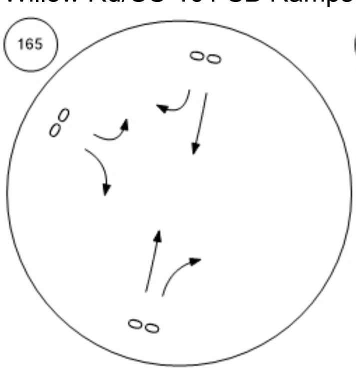

Chilco Street/Hamilton Avenu



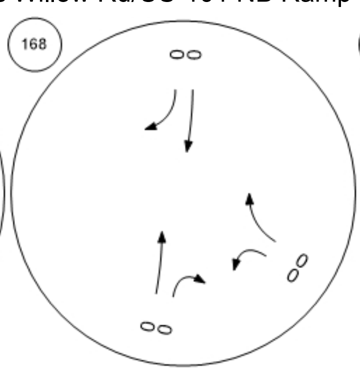

Bayfront Expy/Marsh Rd



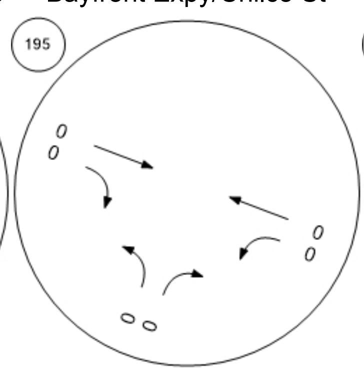

Willow Rd/US-101 SB Ramps



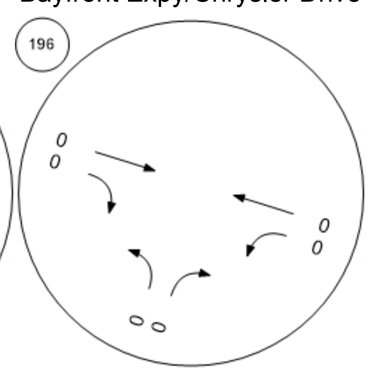

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

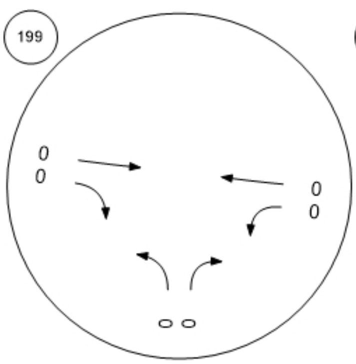


Generated with PTV VISTRO

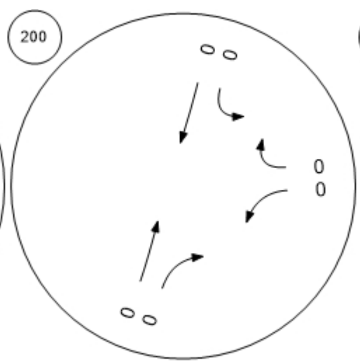
Version 2021 (SP 0-6)

## Traffic Volume - In-Process Volume

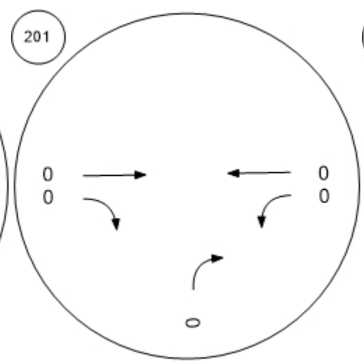

Bayfront Expwy/Bldg 21



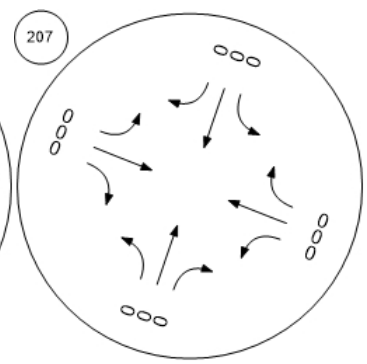

O'Brien Drive/Kavanaugh Dri



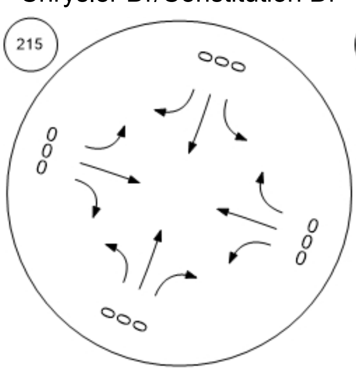

Bayfront Expwy/Bldg 20



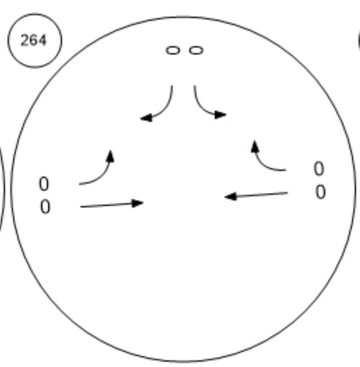

Chilco St/Constitution Dr



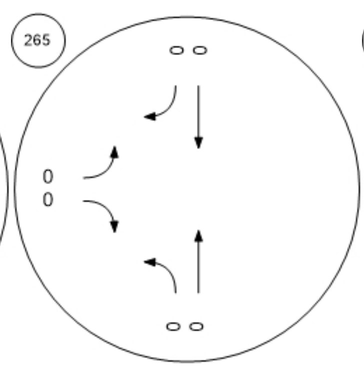

Chrysler Dr/Constitution Dr



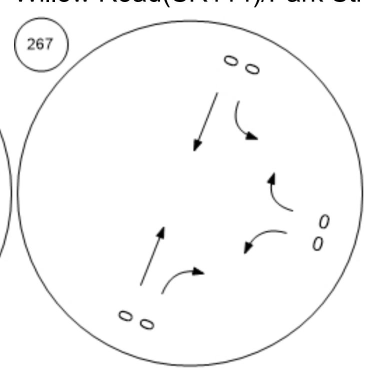

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

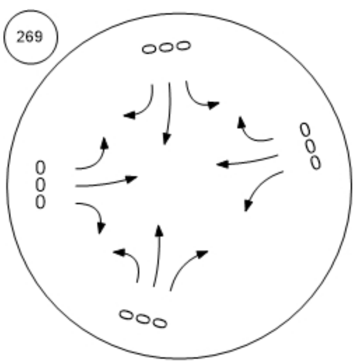



Willow Road(SR114)/Park Str



Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road



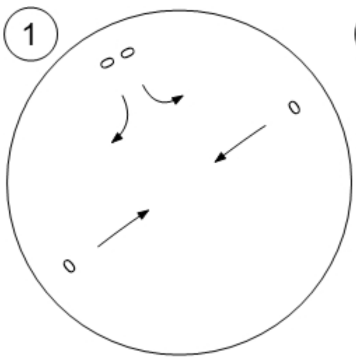
Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

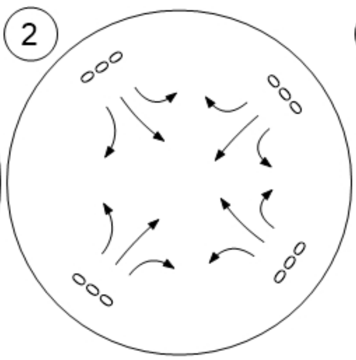

Marsh Rd (SR 84)/US 101 S

1



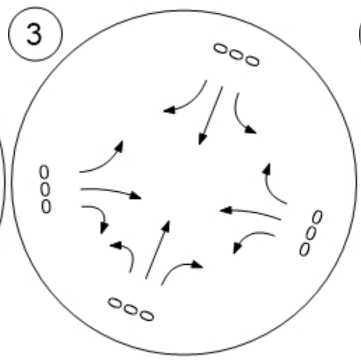

Marsh Rd/Rolison Rd-Scott D

2



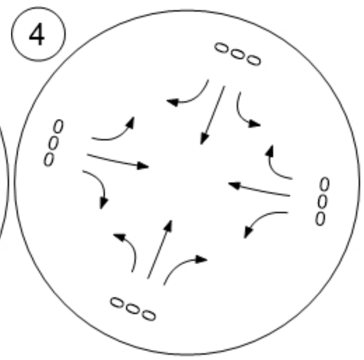

Marsh Rd/Florence St-Bohan

3



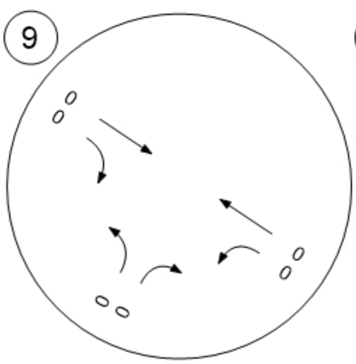

Marsh Rd/Bay Rd

4



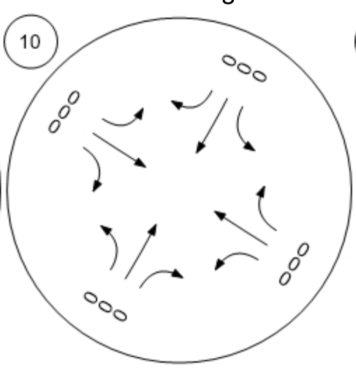

Middlefield Rd/Ravenswood

9



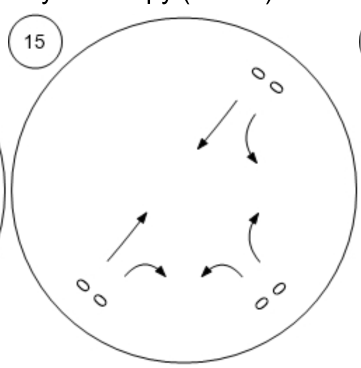

Middlefield Rd/Ringswood Av

10



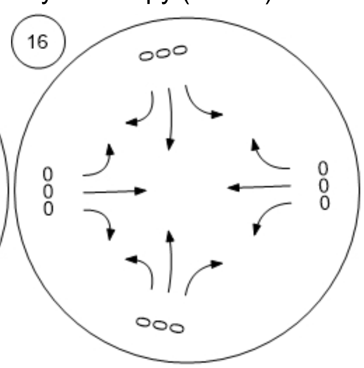

Bayfront Expy (SR 84)/Univer

15




Bayfront Expy (SR 84)/Willow

16



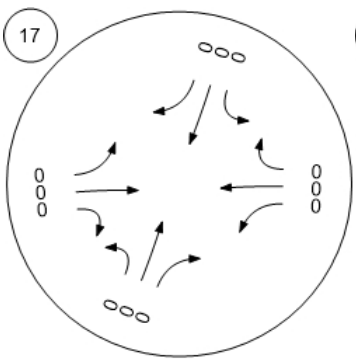
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

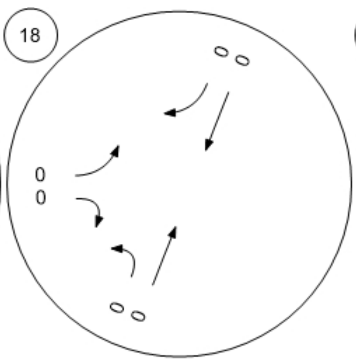

Willow Rd (SR 114)/Hamilton

17



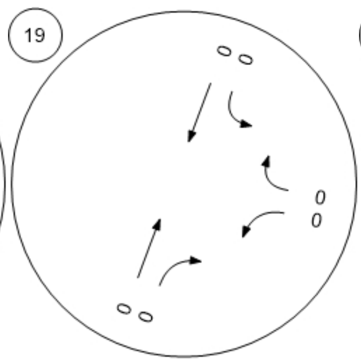
Willow Rd (SR 114)/Ivy Dr

18



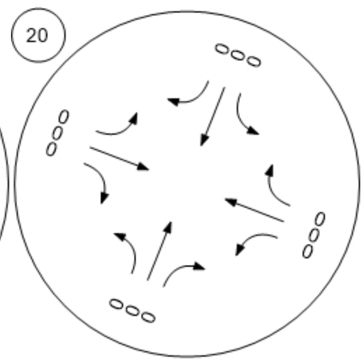
Willow Rd (SR 114)/O'Brien

19



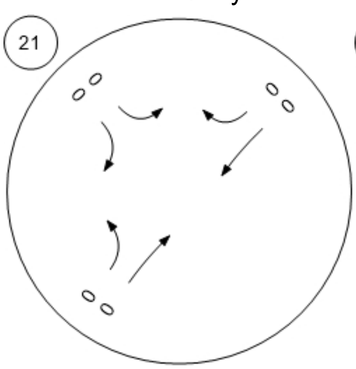
Willow Rd (SR 114)/Newbrid

20



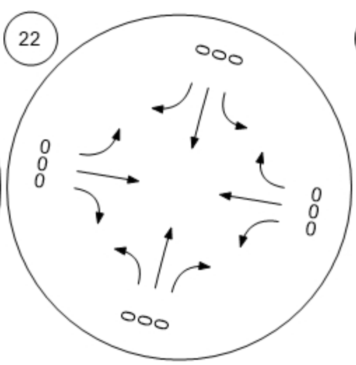
Willow Rd/Bay Rd

21



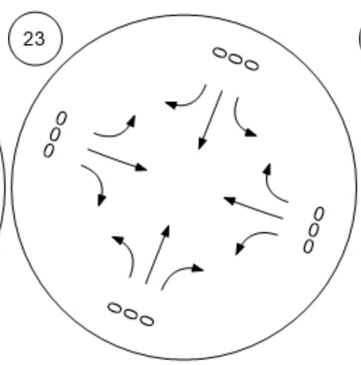
Willow Rd/Durham St-VA Me

22



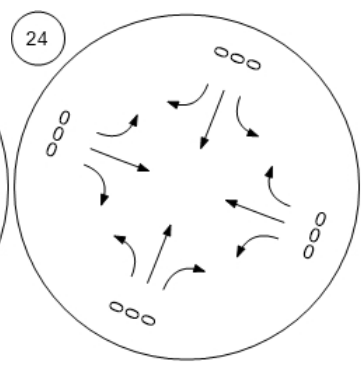
Willow Rd/Coleman Ave

23



Willow Rd/Gilbert Ave

24

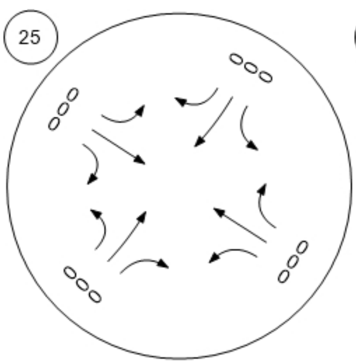


Generated with PTV VISTRO

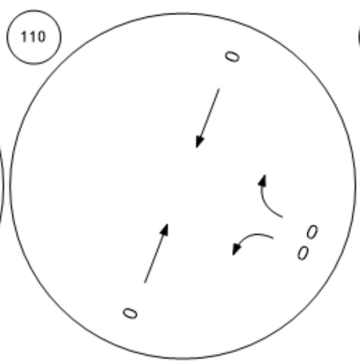
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

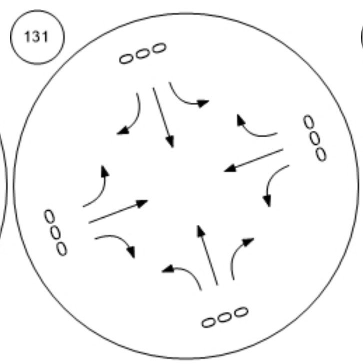

Middlefield Rd-Willow Rd



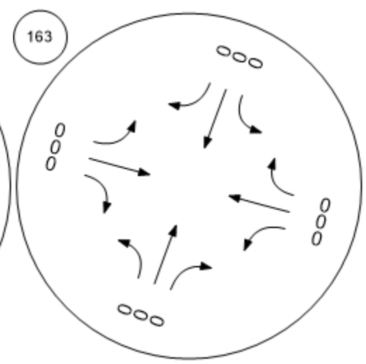

Marsh Road and US 101 NB



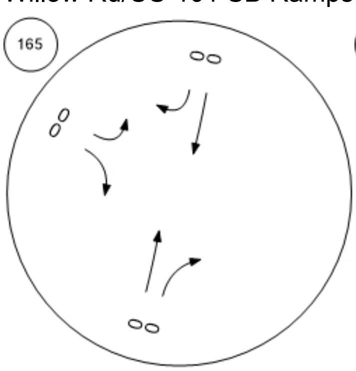

Chilco Street/Hamilton Avenu



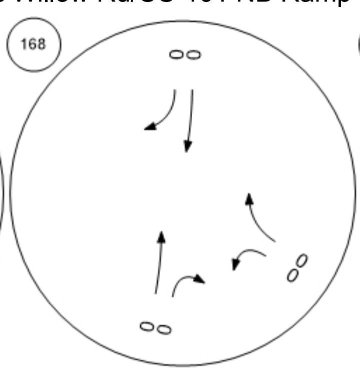

Bayfront Expy/Marsh Rd



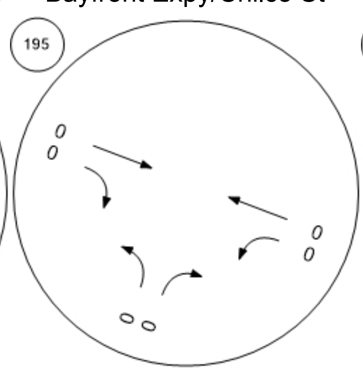

Willow Rd/US-101 SB Ramps



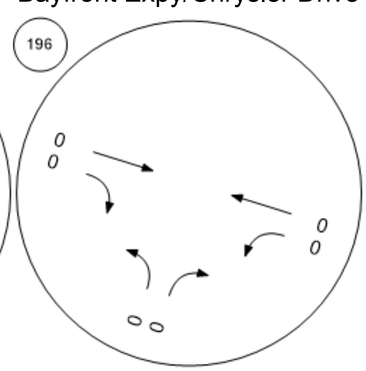

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

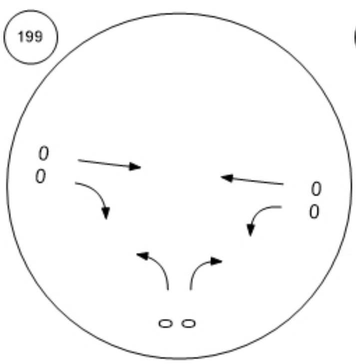


Generated with PTV VISTRO

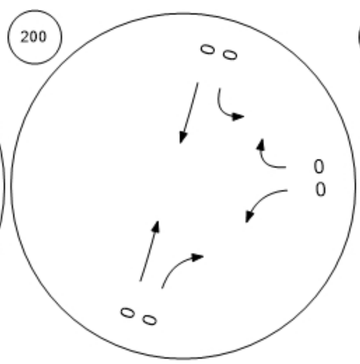
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

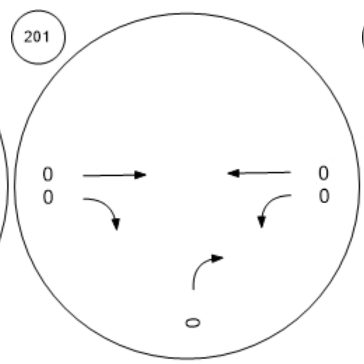

Bayfront Expwy/Bldg 21



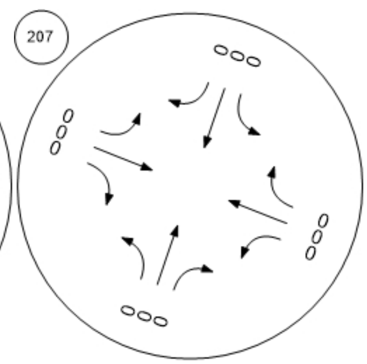

O'Brien Drive/Kavanaugh Dri



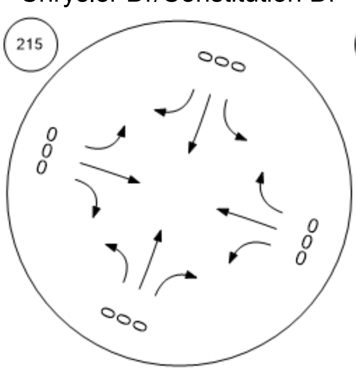

Bayfront Expwy/Bldg 20



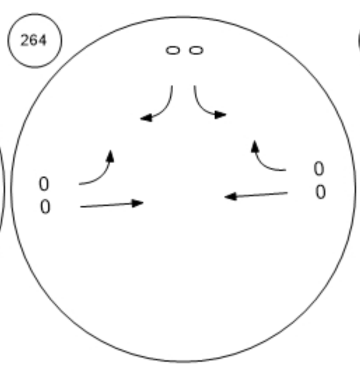

Chilco St/Constitution Dr



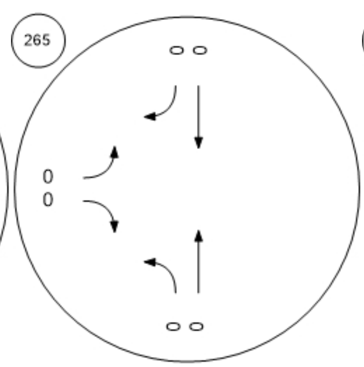

Chrysler Dr/Constitution Dr



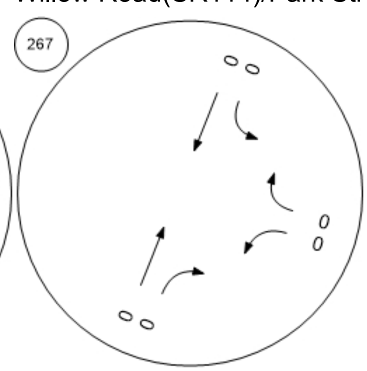

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

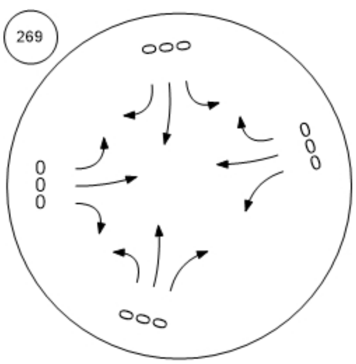



Willow Road(SR114)/Park Str



Traffic Volume - Net New Site Trips


O'Brien Drive/Loop Road

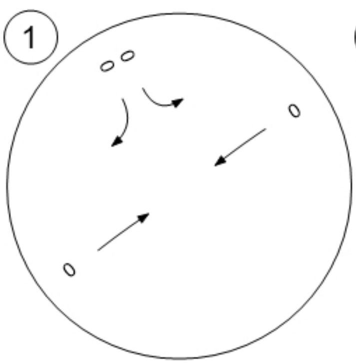


Generated with PTV VISTRO

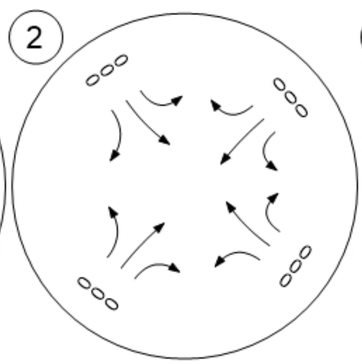
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

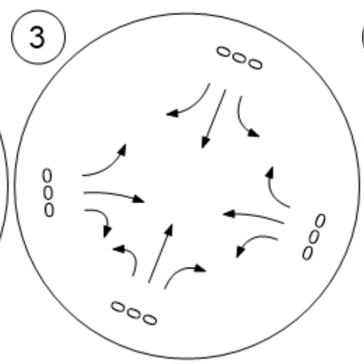

Marsh Rd (SR 84)/US 101 S



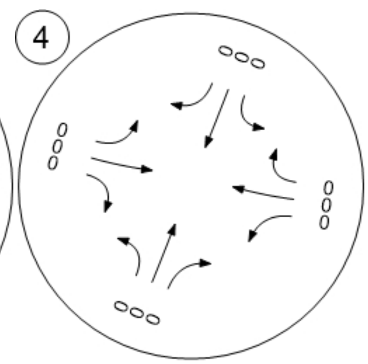

Marsh Rd/Rolison Rd-Scott D



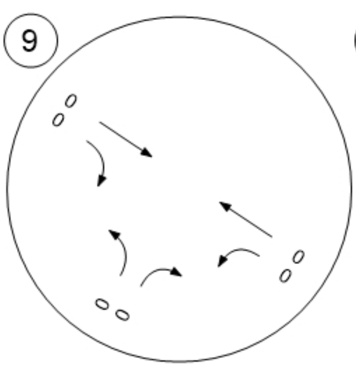

Marsh Rd/Florence St-Bohan



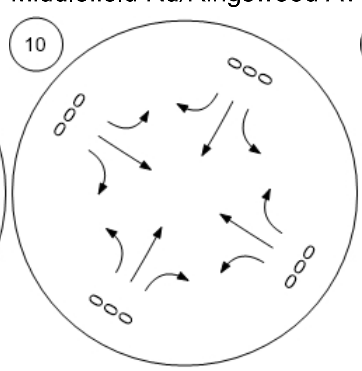

Marsh Rd/Bay Rd



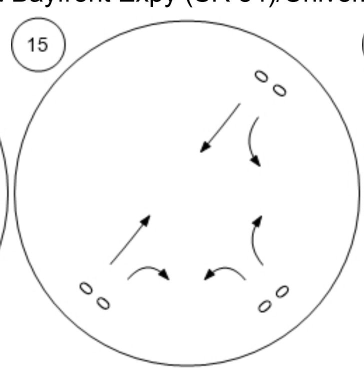

Middlefield Rd/Ravenswood



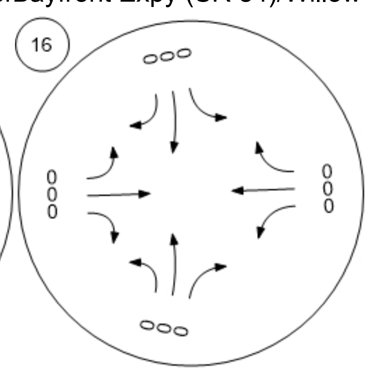

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

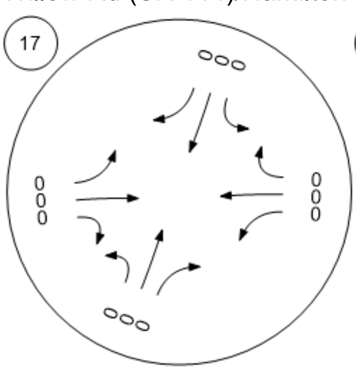


Generated with PTV VISTRO

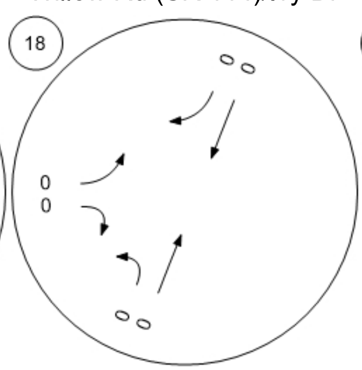
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

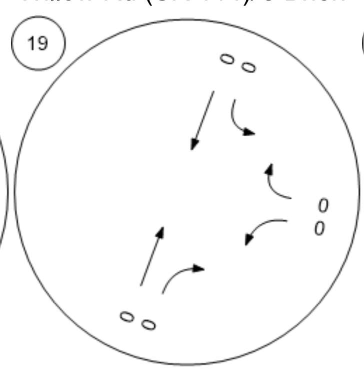

Willow Rd (SR 114)/Hamilton



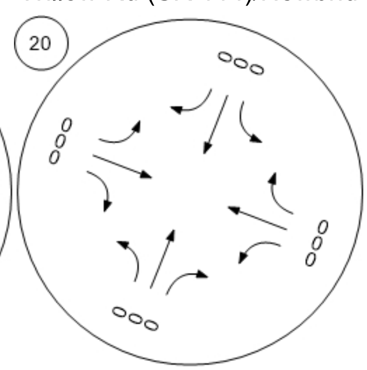

Willow Rd (SR 114)/Ivy Dr



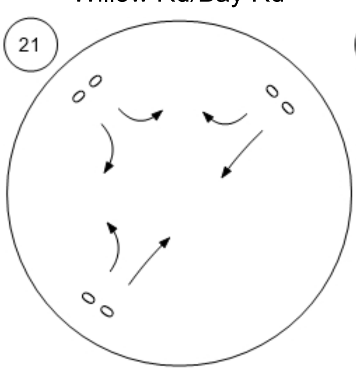

Willow Rd (SR 114)/O'Brien



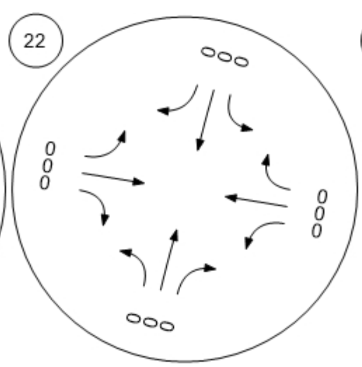

Willow Rd (SR 114)/Newbrid



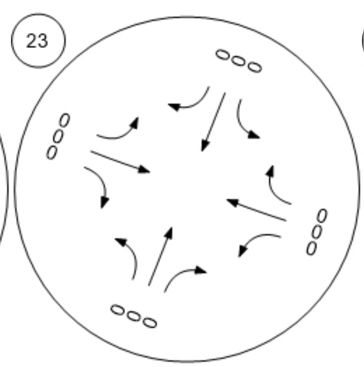

Willow Rd/Bay Rd



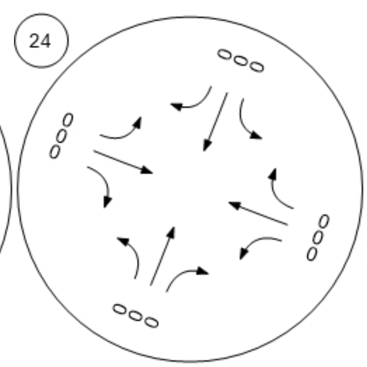

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

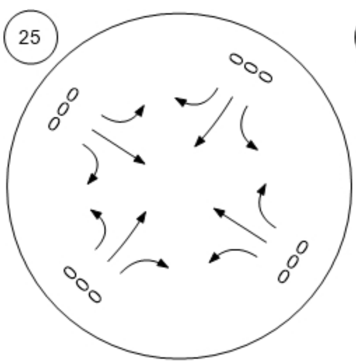


Generated with PTV VISTRO

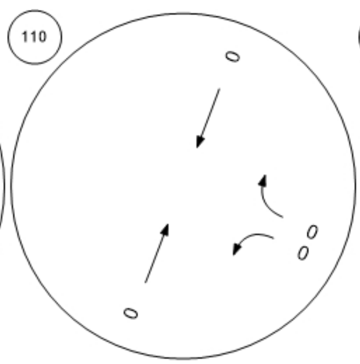
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

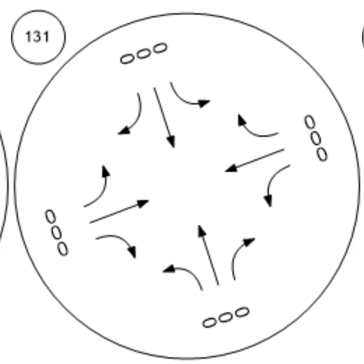

Middlefield Rd-Willow Rd



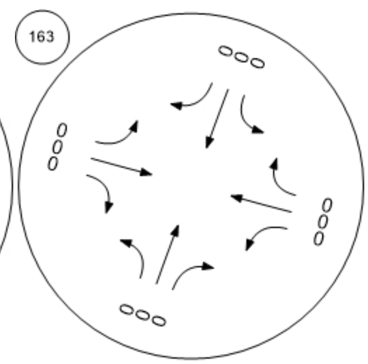

Marsh Road and US 101 NB



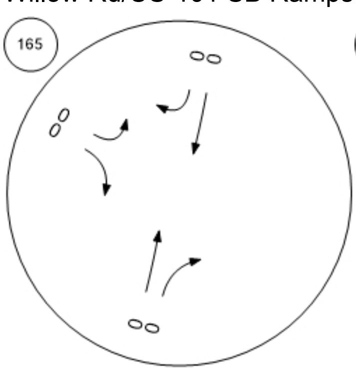

Chilco Street/Hamilton Avenu



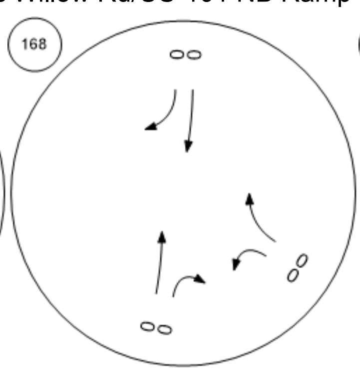

Bayfront Expy/Marsh Rd



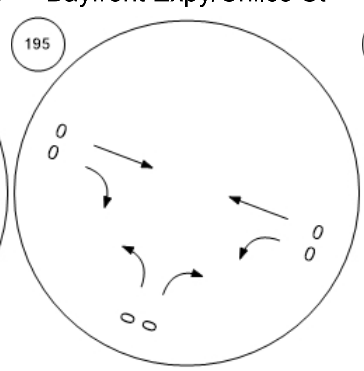

Willow Rd/US-101 SB Ramps



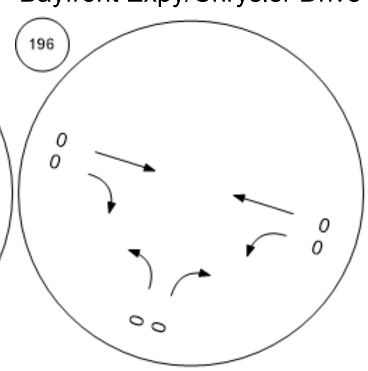

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

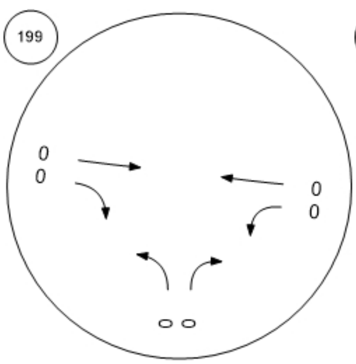


Generated with PTV VISTRO

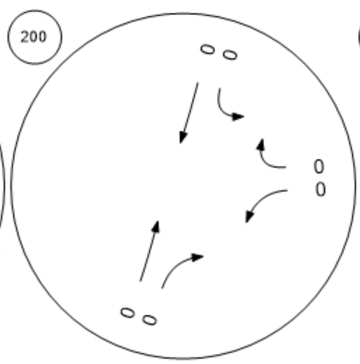
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

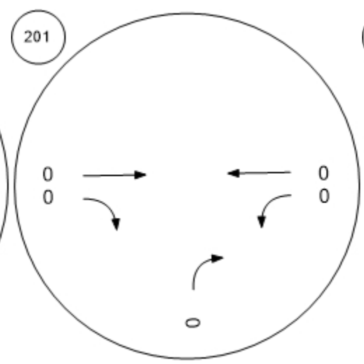

Bayfront Expwy/Bldg 21



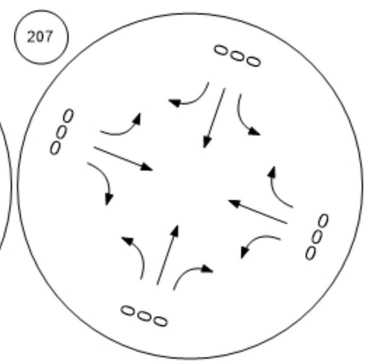

O'Brien Drive/Kavanaugh Dri



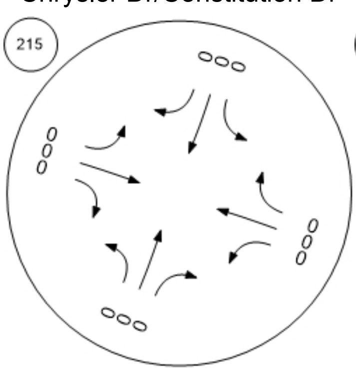

Bayfront Expwy/Bldg 20



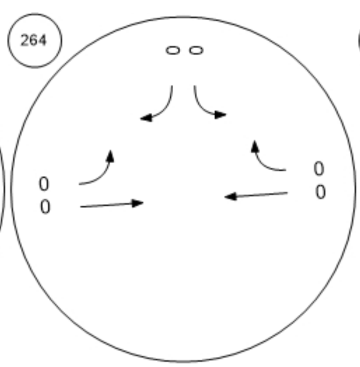

Chilco St/Constitution Dr



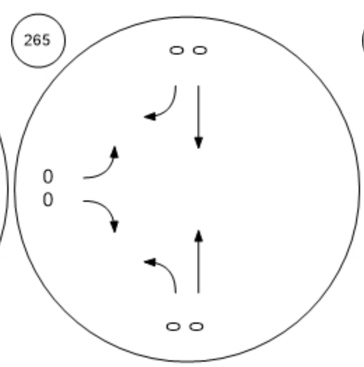

Chrysler Dr/Constitution Dr



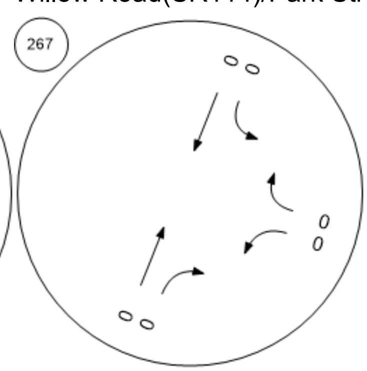

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

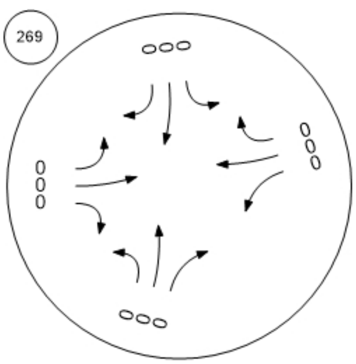


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume


O'Brien Drive/Loop Road

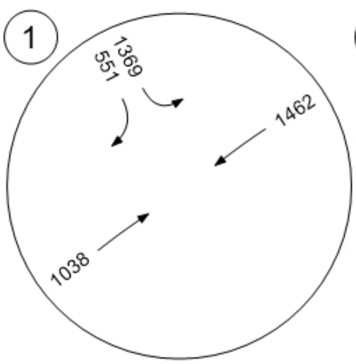


Generated with PTV VISTRO

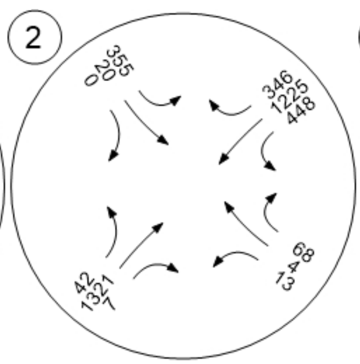
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

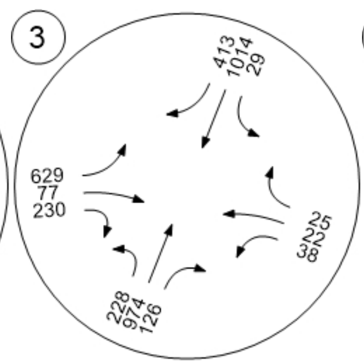

Marsh Rd (SR 84)/US 101 S



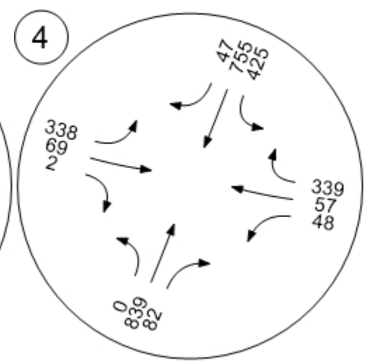

Marsh Rd/Rolison Rd-Scott D



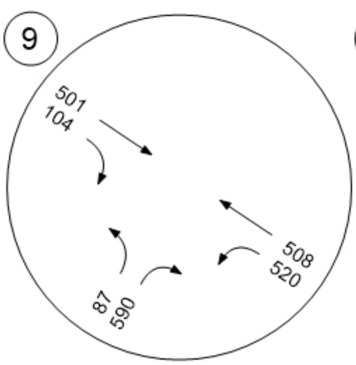

Marsh Rd/Florence St-Bohan



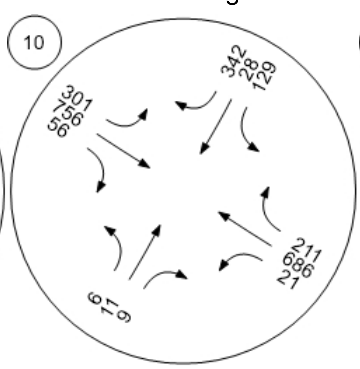

Marsh Rd/Bay Rd



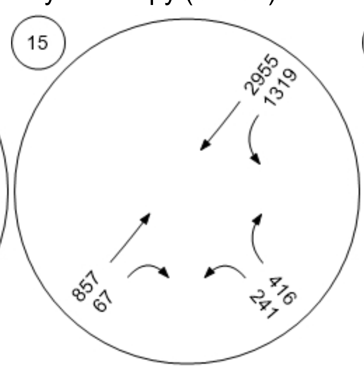

Middlefield Rd/Ravenswood



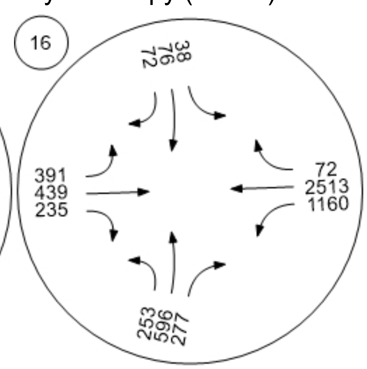

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow



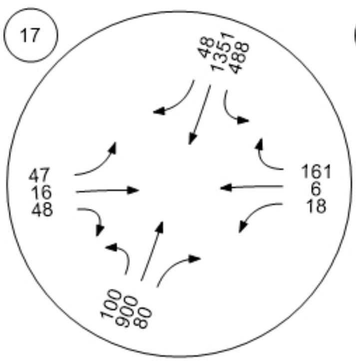
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

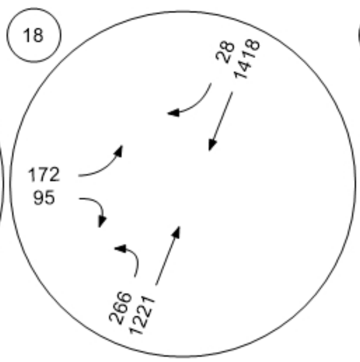

Willow Rd (SR 114)/Hamilton

17



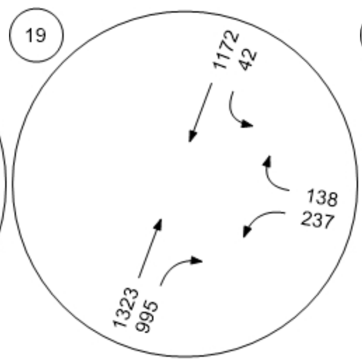

Willow Rd (SR 114)/Ivy Dr

18



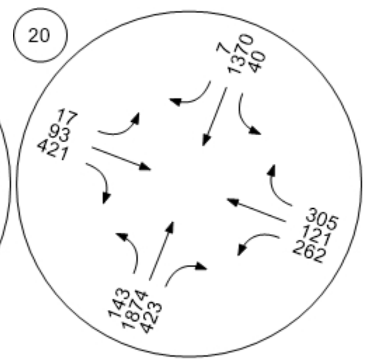

Willow Rd (SR 114)/O'Brien

19



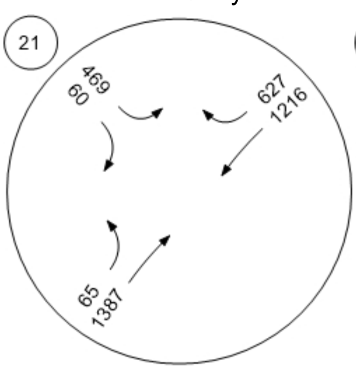

Willow Rd (SR 114)/Newbrid

20



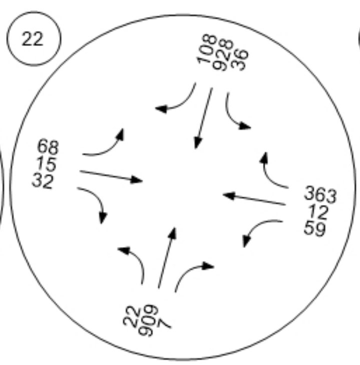

Willow Rd/Bay Rd

21



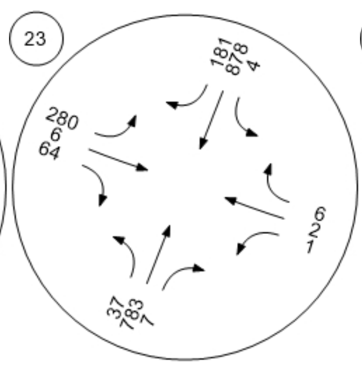

Willow Rd/Durham St-VA Me

22



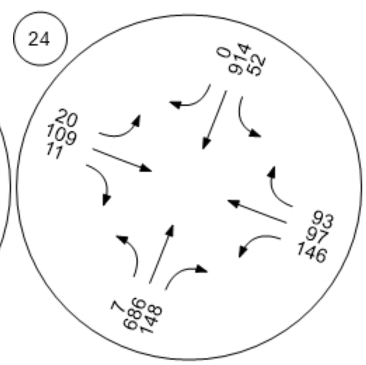

Willow Rd/Coleman Ave

23




Willow Rd/Gilbert Ave

24

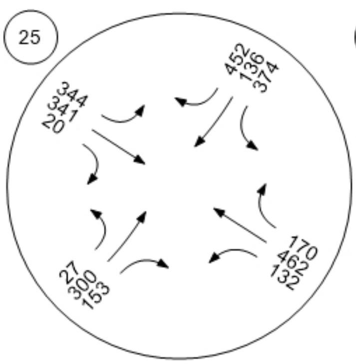


Generated with PTV VISTRO

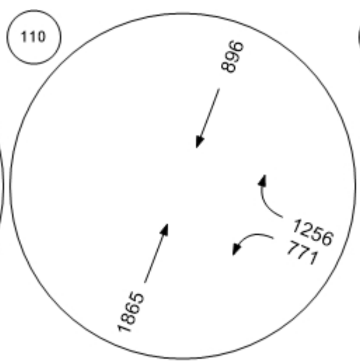
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

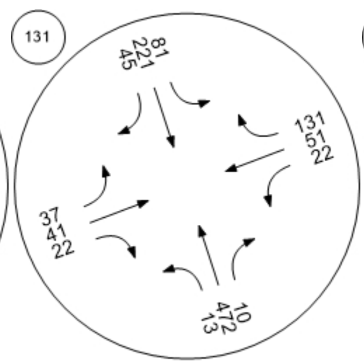

Middlefield Rd-Willow Rd



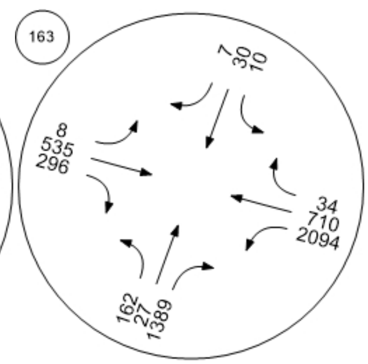

Marsh Road and US 101 NB



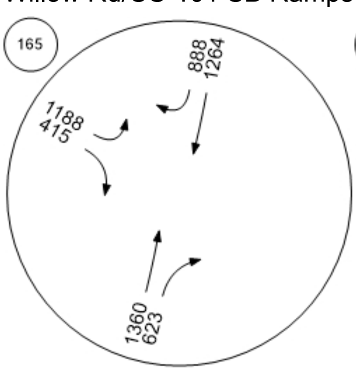

Chilco Street/Hamilton Avenu



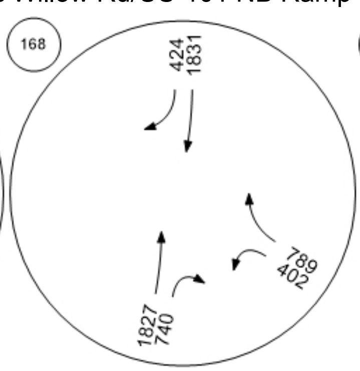

Bayfront Expy/Marsh Rd



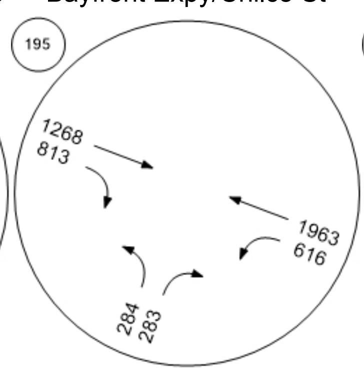

Willow Rd/US-101 SB Ramps



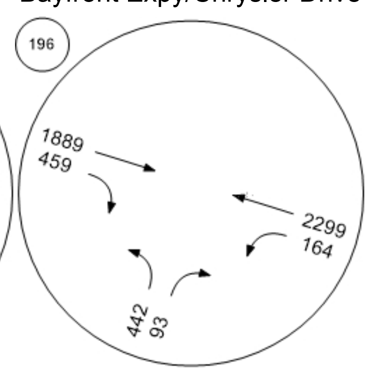

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

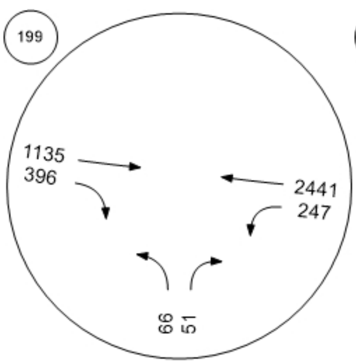



Bayfront Expy/Chrysler Drive

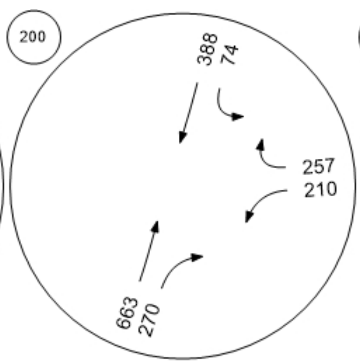


Traffic Volume - Future Total Volume

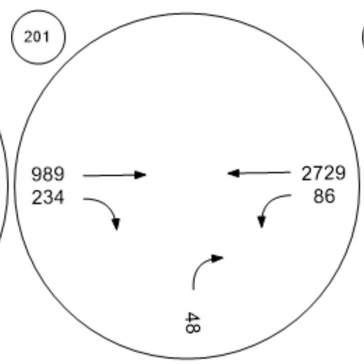

Bayfront Expwy/Bldg 21



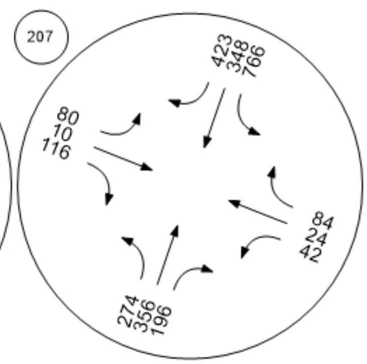

O'Brien Drive/Kavanaugh Dri



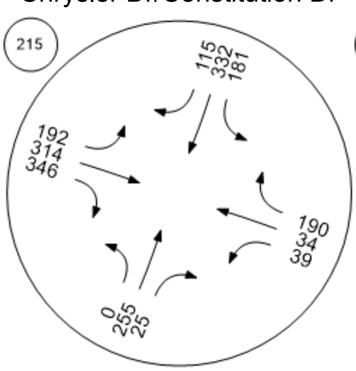

Bayfront Expwy/Bldg 20



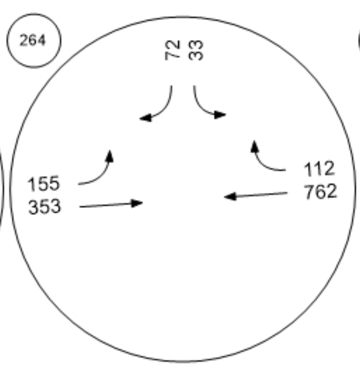

Chilco St/Constitution Dr



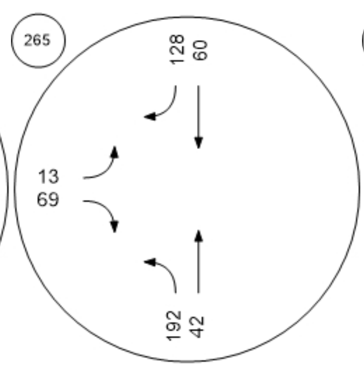

Chrysler Dr/Constitution Dr



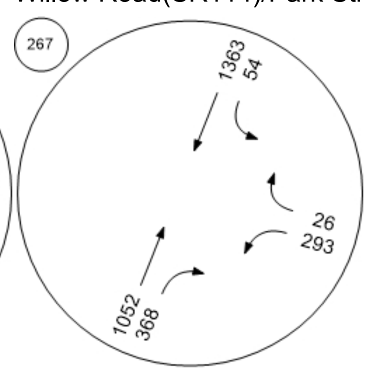

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

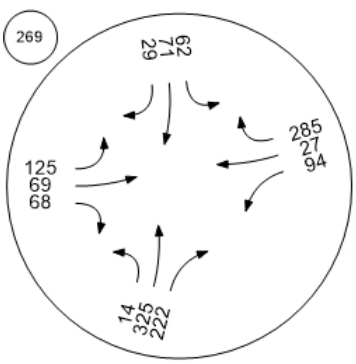


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume


O'Brien Drive/Loop Road

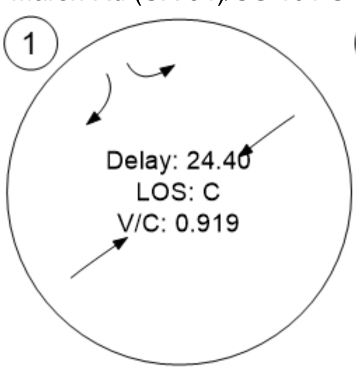


Generated with PTV VISTRO

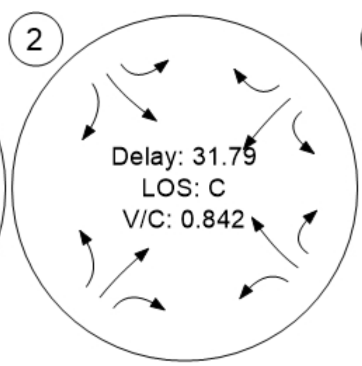
Version 2021 (SP 0-6)

Traffic Conditions

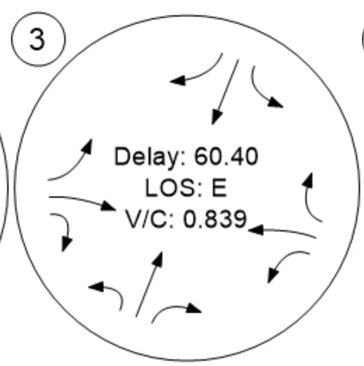

Marsh Rd (SR 84)/US 101 S



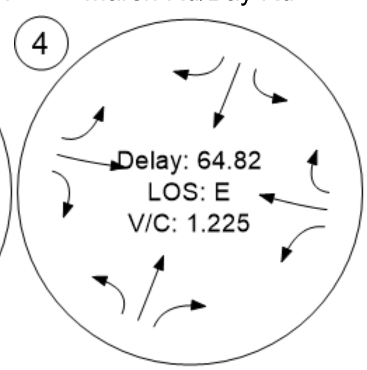

Marsh Rd/Rolison Rd-Scott D



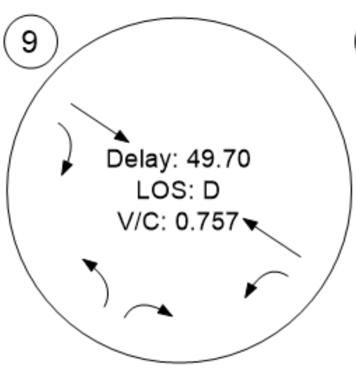

Marsh Rd/Florence St-Bohan



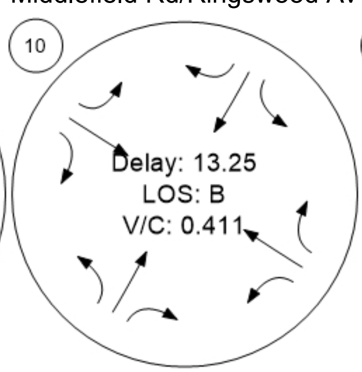

Marsh Rd/Bay Rd



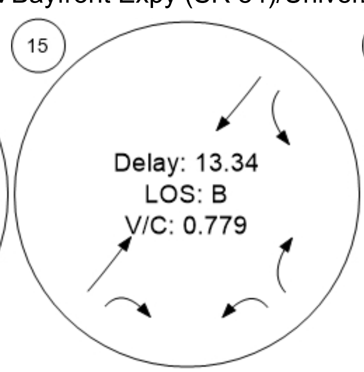

Middlefield Rd/Ravenswood



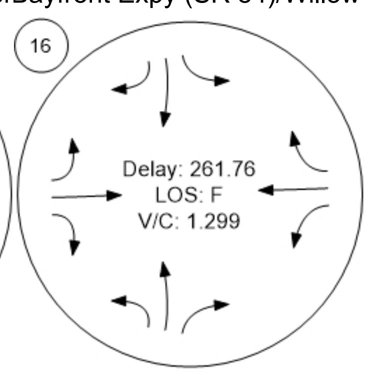

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

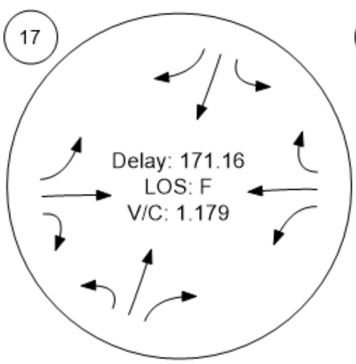


Generated with PTV VISTRO

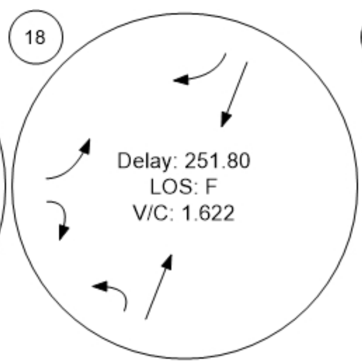
Version 2021 (SP 0-6)

## Traffic Conditions

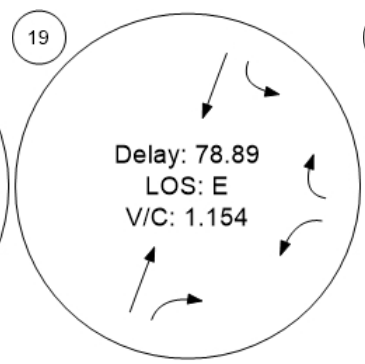

Willow Rd (SR 114)/Hamilton



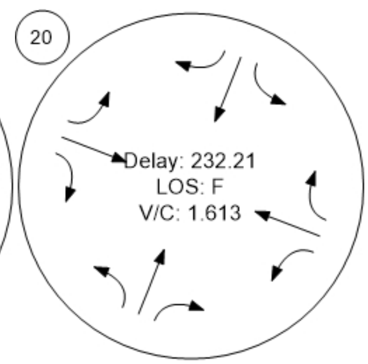

Willow Rd (SR 114)/Ivy Dr



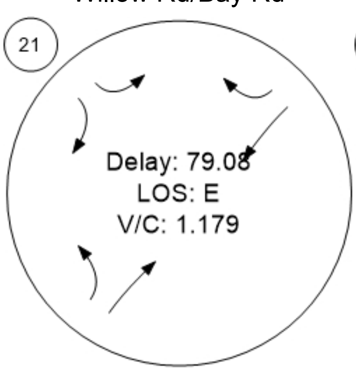

Willow Rd (SR 114)/O'Brien



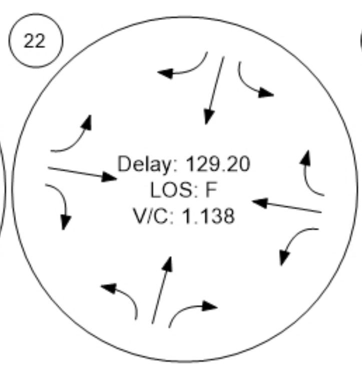

Willow Rd (SR 114)/Newbrid



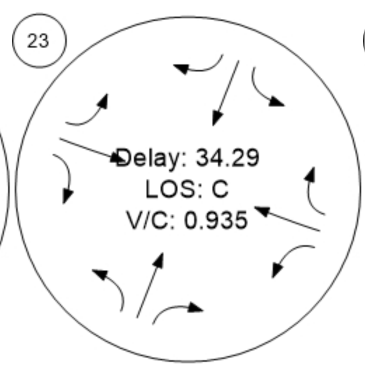

Willow Rd/Bay Rd



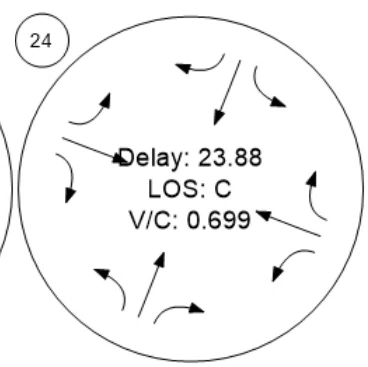

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

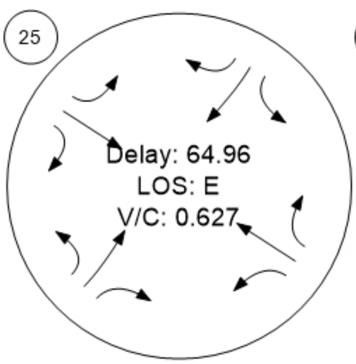


Generated with PTV VISTRO

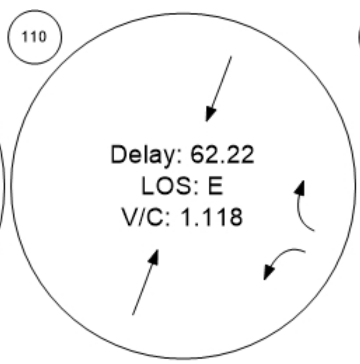
Version 2021 (SP 0-6)

## Traffic Conditions

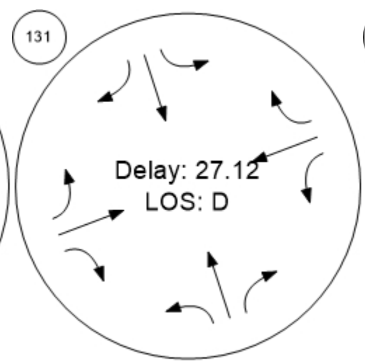

Middlefield Rd-Willow Rd



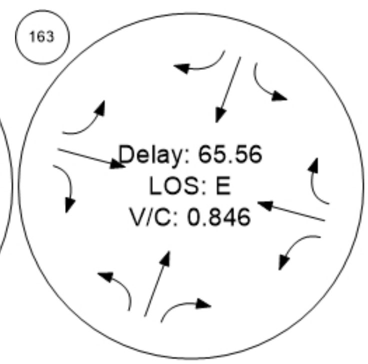

Marsh Road and US 101 NB



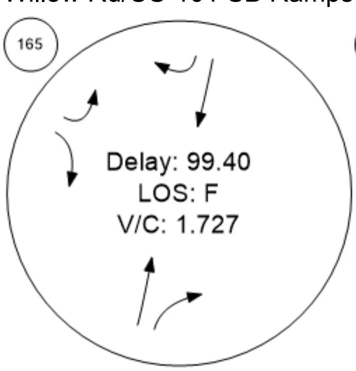

Chilco Street/Hamilton Avenu



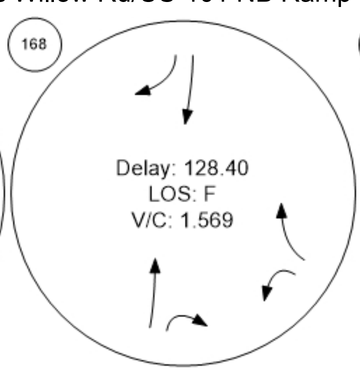

Bayfront Expy/Marsh Rd



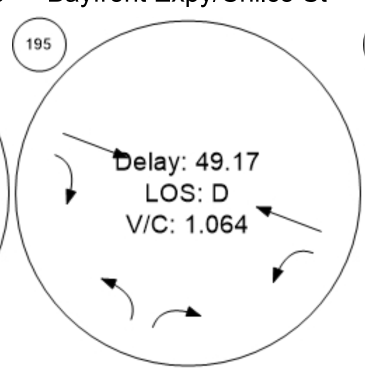

Willow Rd/US-101 SB Ramps



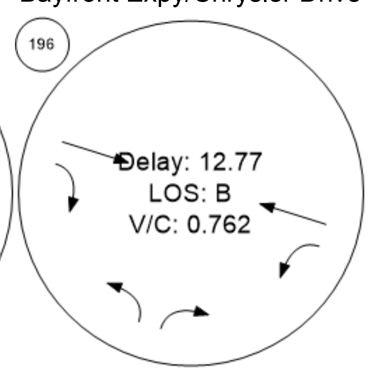

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

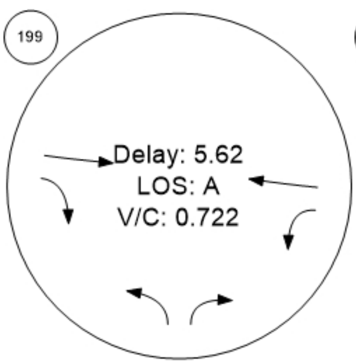



Bayfront Expy/Chrysler Drive

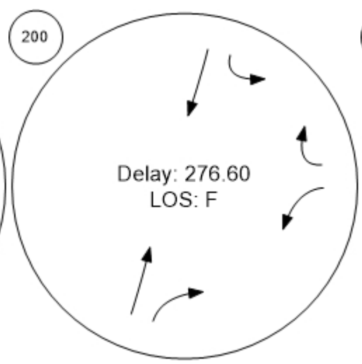


## Traffic Conditions

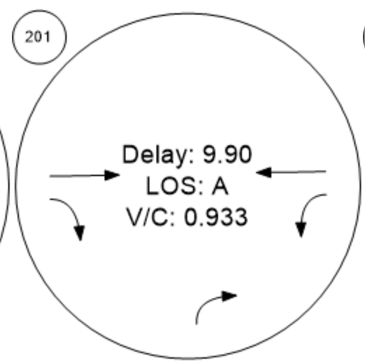

Bayfront Expwy/Bldg 21



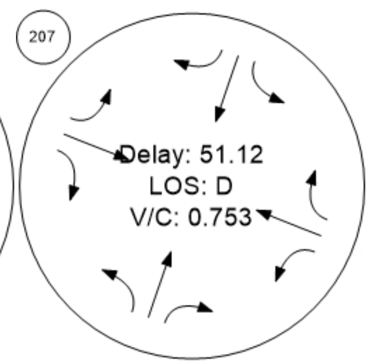

O'Brien Drive/Kavanaugh Dri



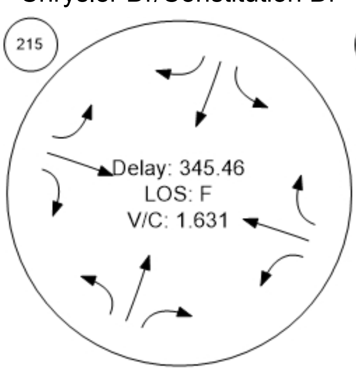

Bayfront Expwy/Bldg 20



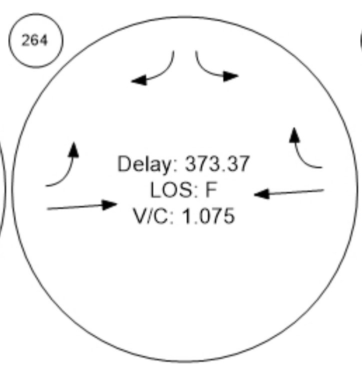

Chilco St/Constitution Dr



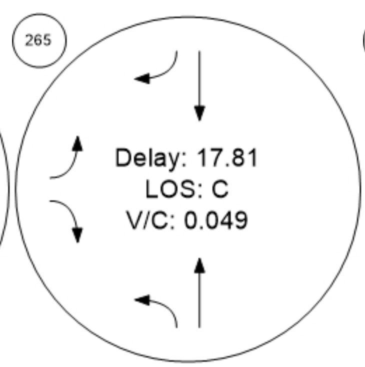

Chrysler Dr/Constitution Dr



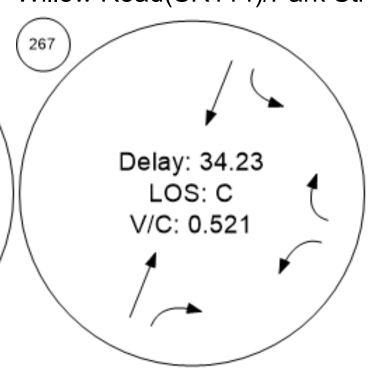

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

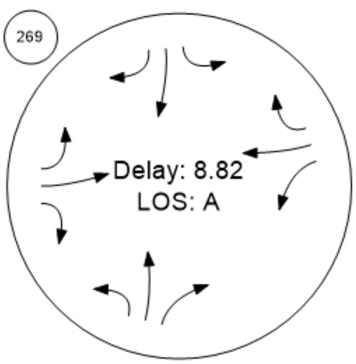



Willow Road(SR114)/Park Str



Traffic Conditions


O'Brien Drive/Loop Road

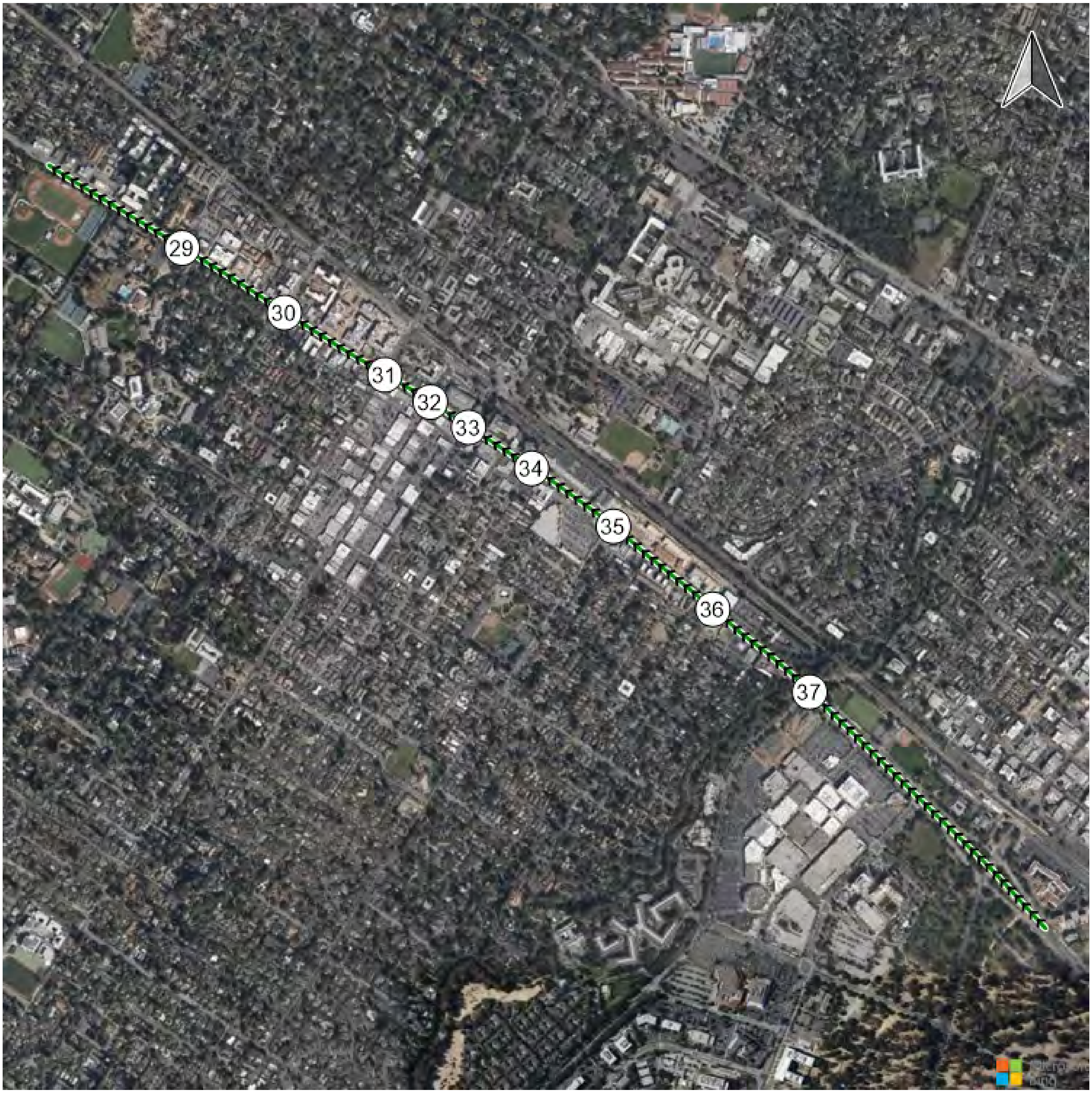


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 1: ECR NB



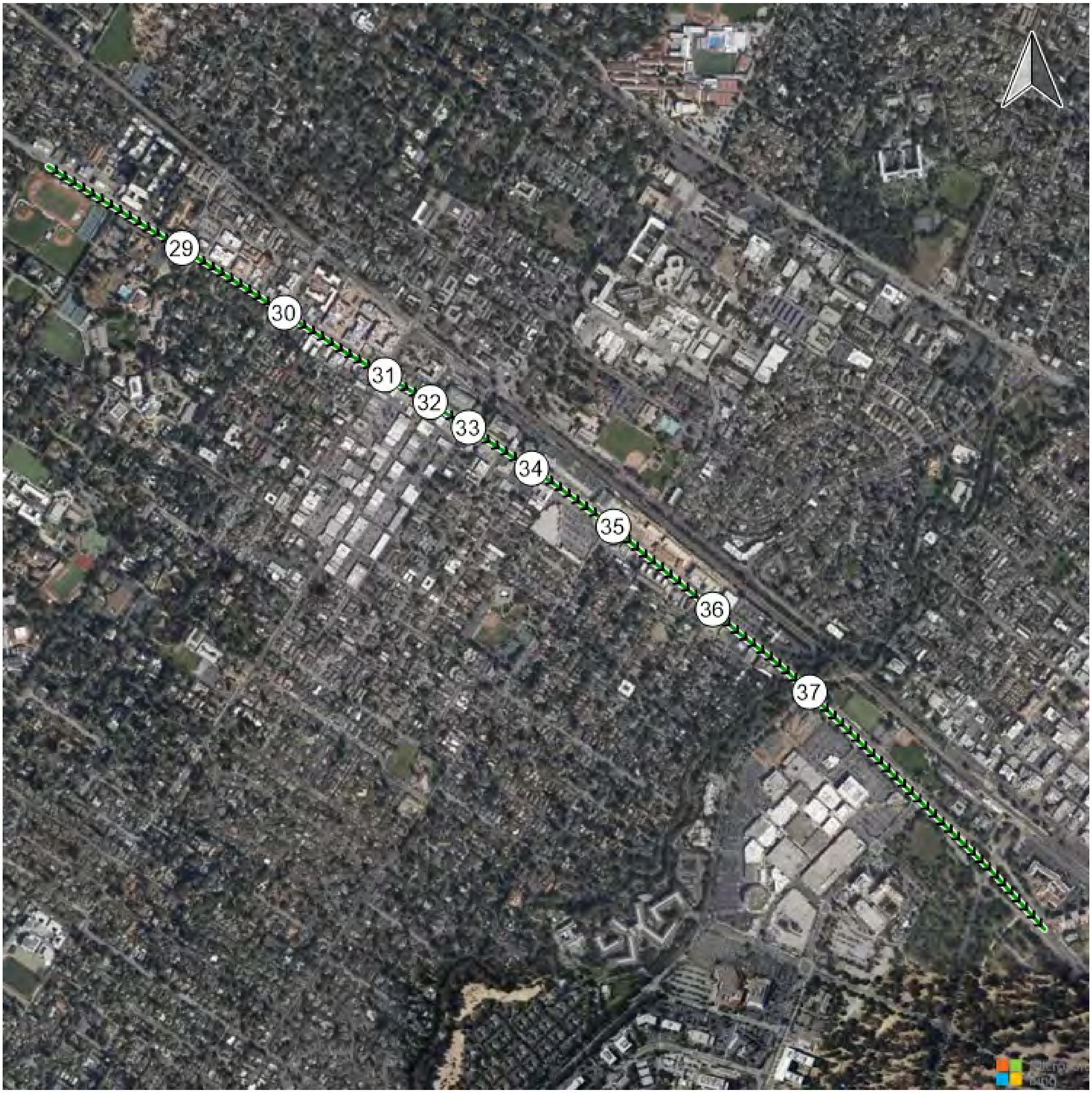
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

Route 2: ECR SB



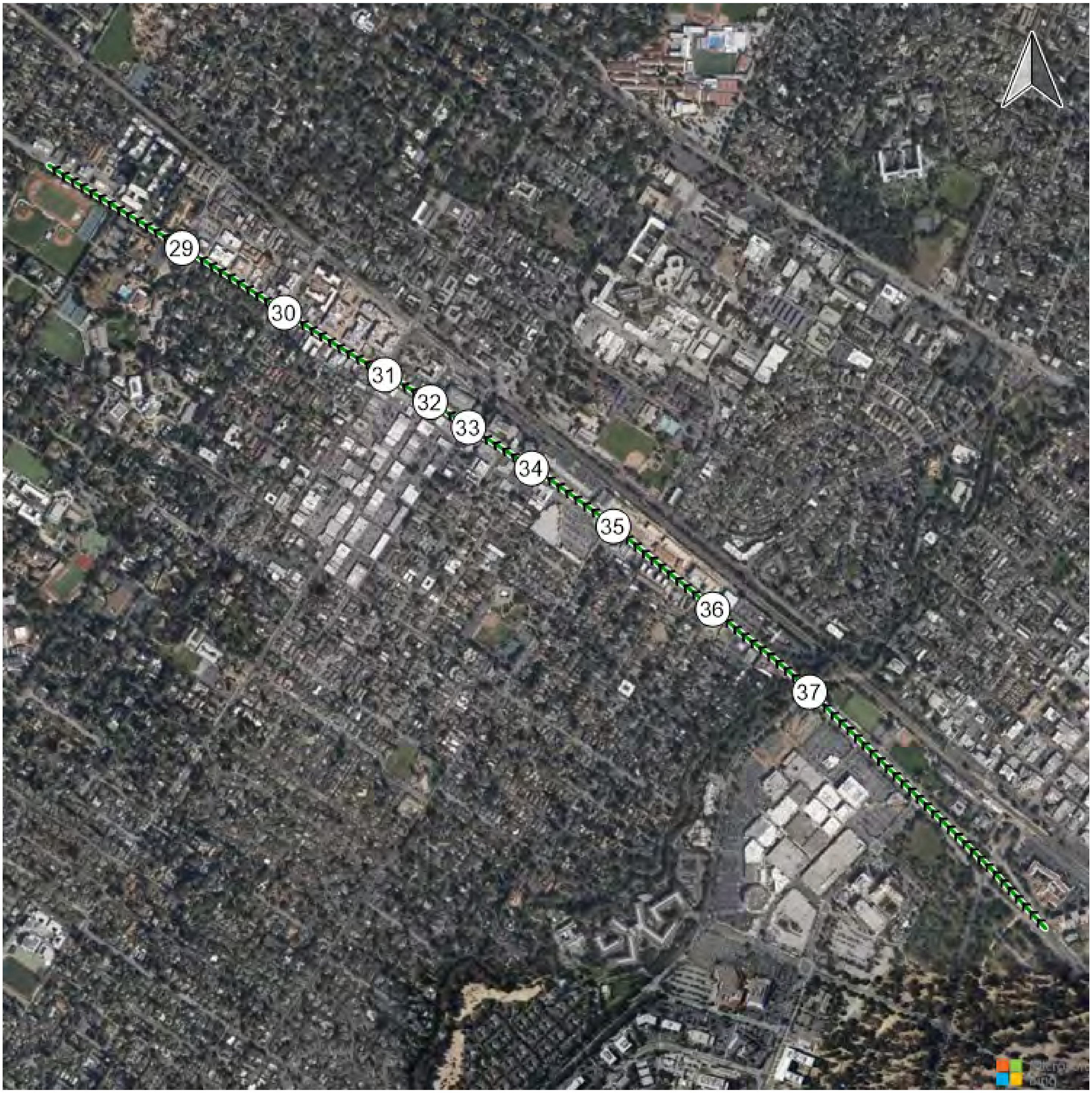
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 1: ECR NB



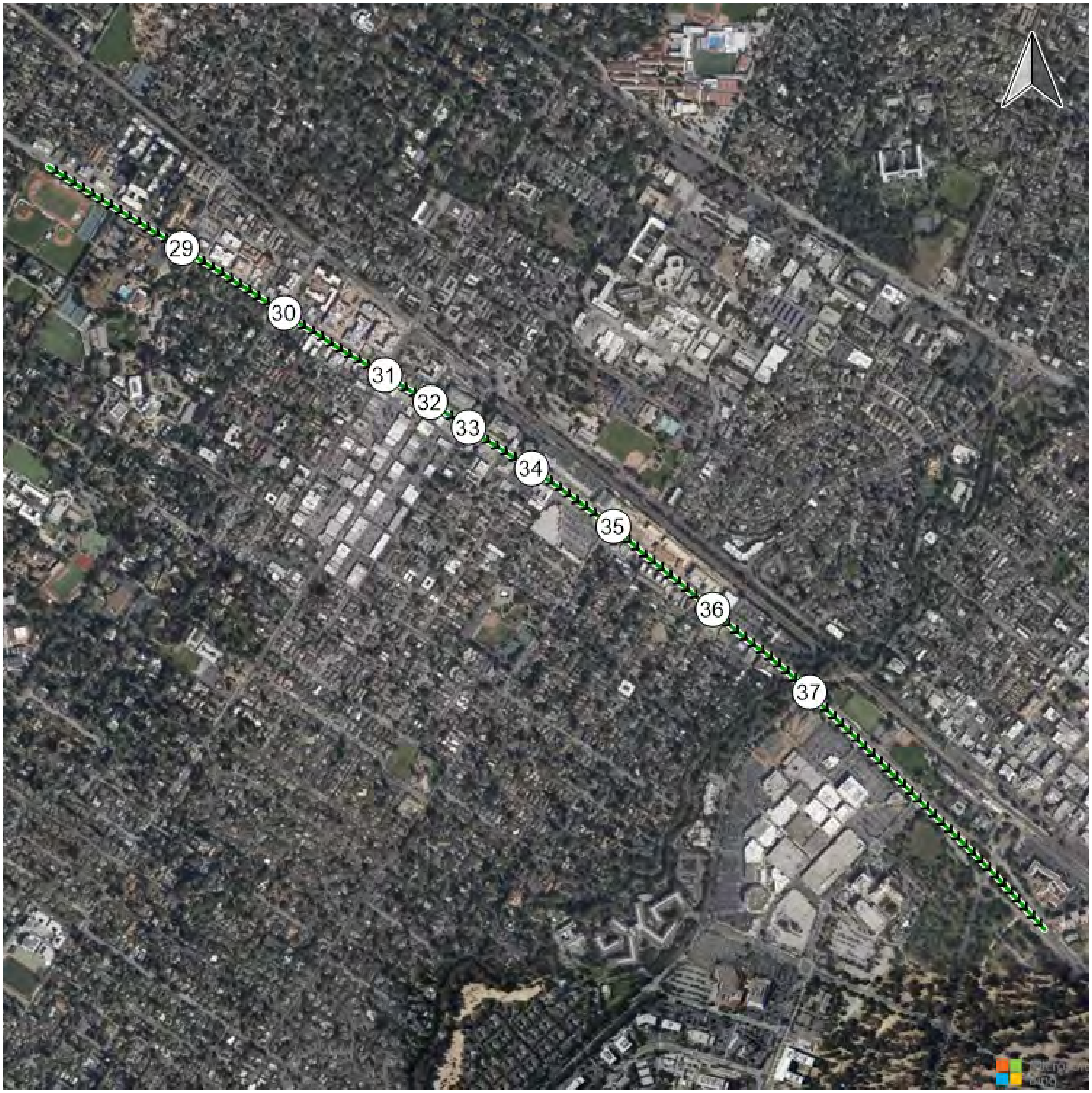
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Cumulative + P PM.pdf

Scenario 20 Cumulative PM (2040 vols)+Project
12/30/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.809 | 18.8 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.602 | 18.1 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.857 | 53.6 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.894 | 54.9 | D |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.313 | 19.5 | B |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.544 | 21.1 | C |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NEB Thru | 1.168 | 141.8 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | SB Thru | 1.367 | 238.9 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | EB Left | 1.673 | 447.6 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.485 | 212.1 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 1.716 | 279.8 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.477 | 210.2 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.412 | 223.5 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.281 | 224.2 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.696 | 13.2 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.560 | 14.1 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.711 | 42.4 | D |
| | | | HCM 6th | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.988 | 22.8 | C |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 1.599 | 175.8 | F |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | WB Thru | 1.094 | 77.9 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 2.058 | 155.8 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.237 | 231.3 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.102 | 66.9 | E |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | NB Left | 0.970 | 36.3 | D |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.941 | 36.1 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.656 | 181.3 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.888 | 18.8 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.191 | 101.8 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.368 | 141.8 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 2.707 | 966.6 | F |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.076 | 12.7 | B |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.694 | 17.2 | B |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | SB Thru | | 11.0 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.809 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | ǁ | | ǁ | | ┓┓┏ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 969 | 1201 | 279 | 1311 | 427 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 969 | 1201 | 279 | 1311 | 427 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 247 | 306 | 70 | 334 | 109 |
| Total Analysis Volume [veh/h] | 0 | 989 | 1226 | 279 | 1338 | 436 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.35 | 0.39 | 0.27 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2122 | 1785 | 1411 | 665 |
| d1, Uniform Delay [s] | 11.68 | 15.00 | 22.59 | 18.84 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.20 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.74 | 2.18 | 1.75 | 2.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.47 | 0.69 | 0.95 | 0.66 |
| d, Delay for Lane Group [s/veh] | 12.42 | 17.18 | 24.34 | 20.90 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.01 | 7.93 | 11.50 | 6.45 |
| 50th-Percentile Queue Length [ft/ln] | 125.33 | 198.31 | 287.61 | 161.19 |
| 95th-Percentile Queue Length [veh/ln] | 8.69 | 12.55 | 17.07 | 10.61 |
| 95th-Percentile Queue Length [ft/ln] | 217.13 | 313.79 | 426.68 | 265.30 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.42 | 17.18 | 0.00 | 24.34 | 20.90 |
| Movement LOS | | B | B | | C | C |
| d_A, Approach Delay [s/veh] | 12.42 | | 17.18 | | 23.49 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 18.81 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.809 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.45 | 0.00 | 29.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.881 | 0.000 | 2.510 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 774 |
| d_b, Bicycle Delay [s] | 9.79 | 9.76 | 15.02 |
| I_b,int, Bicycle LOS Score for Intersection | 2.376 | 2.571 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.602 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 50 | 1326 | 7 | 76 | 1048 | 268 | 15 | 6 | 414 | 307 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 50 | 1326 | 7 | 76 | 1048 | 268 | 15 | 6 | 88 | 307 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 345 | 2 | 20 | 273 | 70 | 4 | 2 | 23 | 80 | 2 | 1 |
| Total Analysis Volume [veh/h] | 52 | 1381 | 7 | 79 | 1092 | 279 | 16 | 6 | 92 | 320 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 99 | 99 | 98 | 98 | 98 | 9 | 9 | 18 | 18 |
| g / C, Green / Cycle | 0.05 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.06 | 0.06 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.26 | 0.26 | 0.09 | 0.38 | 0.39 | 0.01 | 0.03 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 900 | 1877 | 1731 | 1833 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 91 | 2513 | 1317 | 648 | 1310 | 1208 | 115 | 178 | 233 | 221 |
| d1, Uniform Delay [s] | 64.78 | 8.01 | 8.01 | 8.40 | 10.21 | 10.38 | 62.16 | 63.48 | 58.48 | 58.48 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.15 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.08 | 0.41 | 0.78 | 0.11 | 1.58 | 1.82 | 0.59 | 1.73 | 3.23 | 3.41 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.36 | 0.36 | 0.12 | 0.54 | 0.55 | 0.19 | 0.52 | 0.73 | 0.73 |
| d, Delay for Lane Group [s/veh] | 68.86 | 8.42 | 8.79 | 8.52 | 11.79 | 12.20 | 62.75 | 65.21 | 61.72 | 61.89 |
| Lane Group LOS | E | A | A | A | B | B | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.91 | 5.18 | 5.57 | 0.39 | 10.30 | 9.97 | 0.77 | 1.65 | 6.04 | 5.74 |
| 50th-Percentile Queue Length [ft/ln] | 47.79 | 129.61 | 139.16 | 9.82 | 257.49 | 249.20 | 19.27 | 41.21 | 150.99 | 143.39 |
| 95th-Percentile Queue Length [veh/ln] | 3.44 | 8.92 | 9.44 | 0.71 | 15.56 | 15.15 | 1.39 | 2.97 | 10.07 | 9.66 |
| 95th-Percentile Queue Length [ft/ln] | 86.03 | 222.96 | 235.90 | 17.67 | 389.07 | 378.65 | 34.69 | 74.19 | 251.75 | 241.58 |

**Movement, Approach, & Intersection Results**

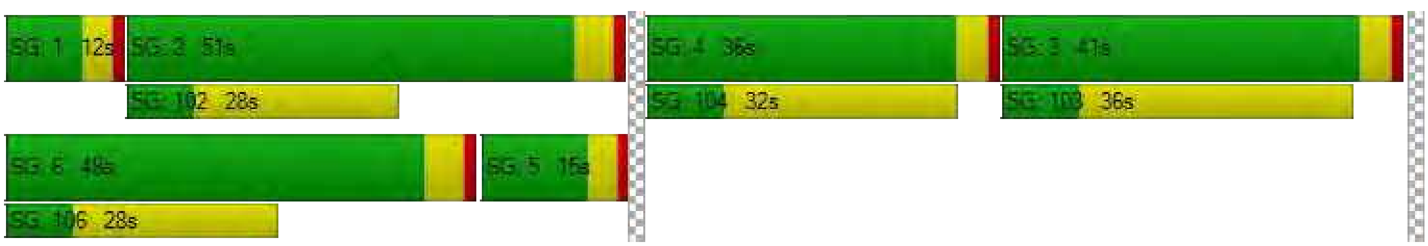
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 68.86 | 8.55 | 8.79 | 8.52 | 11.94 | 12.20 | 62.75 | 62.75 | 65.21 | 61.80 | 61.89 | 61.89 |
| Movement LOS | E | A | A | A | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 10.72 | | | 11.80 | | | 64.74 | | | 61.80 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 18.09 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.602 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.957 | 3.194 | 2.945 | 2.142 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.352 | 2.756 | 2.286 | 2.104 |
| Bicycle LOS | B | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 53.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.857 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 61 | 126 | 87 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 80 | 181 | 15 | 3 | 272 | 95 | 127 | 9 | 16 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 318 | 726 | 58 | 14 | 1089 | 381 | 510 | 37 | 66 | 135 | 94 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 86 | 86 | 4 | 70 | 70 | 26 | 26 | 26 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.50 | 0.50 | 0.19 | 0.19 | 0.19 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.41 | 0.42 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 1867 | 1678 | 1774 | 1821 | 1572 | 1751 | 1788 |
| c, Capacity [veh/h] | 253 | 1141 | 1108 | 45 | 933 | 839 | 332 | 341 | 294 | 198 | 202 |
| d1, Uniform Delay [s] | 59.96 | 13.11 | 13.12 | 66.87 | 29.49 | 30.35 | 54.49 | 54.49 | 48.18 | 59.62 | 59.59 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 144.34 | 0.84 | 0.87 | 1.45 | 7.72 | 10.34 | 3.61 | 3.52 | 0.28 | 3.06 | 2.94 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 1.26 | 0.35 | 0.35 | 0.31 | 0.81 | 0.85 | 0.81 | 0.81 | 0.22 | 0.68 | 0.68 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 204.30 | 13.95 | 13.99 | 68.31 | 37.21 | 40.68 | 58.10 | 58.00 | 48.46 | 62.68 | 62.53 |
| Lane Group LOS | F | B | B | E | D | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 19.03 | 6.24 | 6.10 | 0.51 | 22.93 | 22.57 | 9.54 | 9.78 | 2.01 | 4.82 | 4.89 |
| 50th-Percentile Queue Length [ft/ln] | 475.84 | 156.05 | 152.48 | 12.71 | 573.32 | 564.15 | 238.57 | 244.59 | 50.35 | 120.54 | 122.13 |
| 95th-Percentile Queue Length [veh/ln] | 28.92 | 10.34 | 10.15 | 0.92 | 30.79 | 30.36 | 14.61 | 14.91 | 3.63 | 8.42 | 8.51 |
| 95th-Percentile Queue Length [ft/ln] | 723.01 | 258.49 | 253.73 | 22.88 | 769.66 | 758.92 | 365.23 | 372.83 | 90.63 | 210.57 | 212.75 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 204.30 | 13.97 | 13.99 | 68.31 | 38.26 | 40.68 | 58.05 | 58.00 | 48.46 | 62.68 | 62.53 | 62.53 |
| Movement LOS | F | B | B | E | D | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 68.89 | | | 39.17 | | | 57.02 | | | 62.60 | | |
| Approach LOS | E | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 53.59 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.857 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.40 | 59.40 | 59.40 | 59.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.960 | 3.064 | 2.721 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 720 | 577 | 457 | 469 |
| d_b, Bicycle Delay [s] | 28.66 | 35.44 | 41.69 | 41.03 |
| I_b,int, Bicycle LOS Score for Intersection | 2.469 | 2.784 | 2.858 | 2.008 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 54.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.894 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 61 | 441 | 723 | 56 | 100 | 26 | 2 | 65 | 114 | 310 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 61 | 441 | 723 | 56 | 100 | 26 | 2 | 65 | 114 | 310 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 17 | 124 | 203 | 16 | 28 | 7 | 1 | 18 | 32 | 87 |
| Total Analysis Volume [veh/h] | 2 | 837 | 69 | 496 | 812 | 63 | 112 | 29 | 2 | 73 | 128 | 348 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 29 | 29 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.20 | 0.58 | 0.58 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.28 | 0.23 | 0.24 | 0.25 | 0.31 |
| s, saturation flow rate [veh/h] | 1858 | 1644 | 1795 | 1885 | 1830 | 569 | 1750 |
| c, Capacity [veh/h] | 675 | 557 | 361 | 1088 | 1056 | 288 | 691 |
| d1, Uniform Delay [s] | 23.64 | 23.70 | 32.07 | 9.38 | 9.40 | 21.99 | 23.52 |
| k, delay calibration | 0.50 | 0.50 | 0.28 | 0.50 | 0.50 | 0.32 | 0.41 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.31 | 9.71 | 178.49 | 1.13 | 1.18 | 3.91 | 7.69 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.77 | 1.38 | 0.41 | 0.41 | 0.50 | 0.80 |
| d, Delay for Lane Group [s/veh] | 29.95 | 33.41 | 210.56 | 10.50 | 10.58 | 25.89 | 31.21 |
| Lane Group LOS | C | C | F | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.69 | 8.19 | 24.51 | 3.98 | 3.91 | 2.59 | 10.42 |
| 50th-Percentile Queue Length [ft/ln] | 217.30 | 204.72 | 612.72 | 99.40 | 97.86 | 64.83 | 260.48 |
| 95th-Percentile Queue Length [veh/ln] | 13.53 | 12.88 | 37.77 | 7.16 | 7.05 | 4.67 | 15.71 |
| 95th-Percentile Queue Length [ft/ln] | 338.18 | 322.05 | 944.29 | 178.92 | 176.14 | 116.70 | 392.83 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.95 | 31.43 | 33.41 | 210.56 | 10.54 | 10.58 | 25.89 | 25.89 | 25.89 | 31.21 | 31.21 | 31.21 |
| Movement LOS | C | C | C | F | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | | 31.58 | | | 82.90 | | | 25.89 | | | 31.21 | |
| Approach LOS | | C | | | F | | | C | | | C | |
| d_I, Intersection Delay [s/veh] | 54.92 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.894 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.82 | 29.82 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.060 | 1.848 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.74 | 8.66 | 17.46 | 17.43 |
| I_b,int, Bicycle LOS Score for Intersection | 2.309 | 2.691 | 1.796 | 2.465 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.313 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 541 | 468 | 640 | 469 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 468 | 640 | 469 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 121 | 165 | 121 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 482 | 660 | 484 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 26 | 63 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.32 | 0.77 | 0.46 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.27 | 0.35 | 0.33 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1806 |
| c, Capacity [veh/h] | 269 | 240 | 569 | 1454 | 827 |
| d1, Uniform Delay [s] | 32.13 | 0.00 | 26.13 | 3.37 | 17.91 |
| k, delay calibration | 0.08 | 0.08 | 0.21 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.18 | 0.00 | 6.71 | 0.22 | 5.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 0.85 | 0.45 | 0.71 |
| d, Delay for Lane Group [s/veh] | 33.31 | 0.00 | 32.83 | 3.60 | 23.15 |
| Lane Group LOS | C | A | C | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.61 | 0.00 | 9.26 | 2.27 | 9.29 |
| 50th-Percentile Queue Length [ft/ln] | 65.16 | 0.00 | 231.38 | 56.68 | 232.16 |
| 95th-Percentile Queue Length [veh/ln] | 4.69 | 0.00 | 14.24 | 4.08 | 14.28 |
| 95th-Percentile Queue Length [ft/ln] | 117.29 | 0.00 | 356.11 | 102.02 | 357.11 |

### Movement, Approach, & Intersection Results

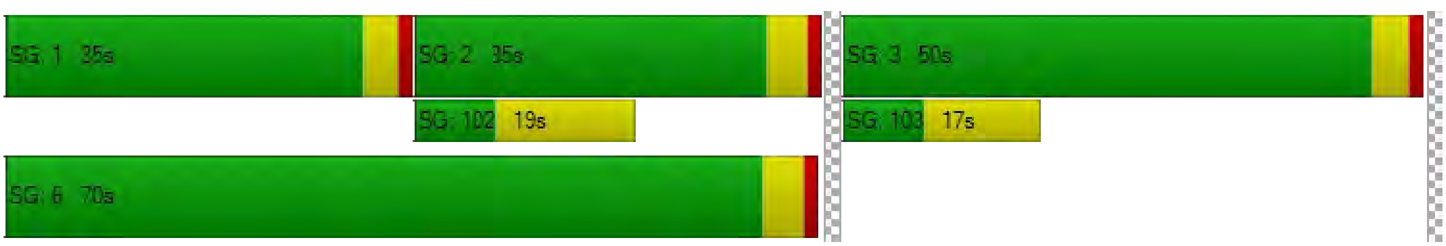
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.31 | 0.00 | 32.83 | 3.60 | 23.15 | 23.15 |
| Movement LOS | C | A | C | A | C | C |
| d_A, Approach Delay [s/veh] | 33.31 | | 15.94 | | 23.15 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 19.52 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 2.313 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 30.70 | 30.70 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.920 | 2.872 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1118 | 1597 | 742 |
| d_b, Bicycle Delay [s] | 8.01 | 1.69 | 16.28 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.444 | 2.535 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.544 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 775 | 138 | 323 | 713 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 224 | 0 | 263 | 2 | 775 | 81 | 323 | 713 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 59 | 0 | 69 | 1 | 204 | 21 | 85 | 188 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 236 | 0 | 277 | 2 | 816 | 85 | 340 | 751 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 34 | 34 | 34 | 34 | 82 | 65 | 65 | 79 | 75 | 75 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.68 | 0.54 | 0.54 | 0.66 | 0.62 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.21 | 0.18 | 0.00 | 0.23 | 0.05 | 0.39 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1421 | 1719 | 1136 | 1540 | 752 | 3569 | 1558 | 880 | 1873 | 1871 |
| c, Capacity [veh/h] | 156 | 493 | 386 | 442 | 531 | 1920 | 838 | 575 | 1166 | 1165 |
| d1, Uniform Delay [s] | 53.53 | 31.78 | 41.75 | 36.98 | 7.59 | 16.61 | 13.52 | 11.07 | 10.69 | 10.69 |
| k, delay calibration | 0.10 | 0.10 | 0.27 | 0.20 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 0.12 | 3.90 | 2.64 | 0.00 | 0.69 | 0.24 | 4.42 | 0.73 | 0.74 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.14 | 0.61 | 0.63 | 0.00 | 0.43 | 0.10 | 0.59 | 0.32 | 0.32 |
| d, Delay for Lane Group [s/veh] | 54.25 | 31.90 | 45.66 | 39.62 | 7.59 | 17.30 | 13.77 | 15.49 | 11.42 | 11.42 |
| Lane Group LOS | D | C | D | D | A | B | B | B | B | B |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.53 | 6.82 | 7.34 | 0.02 | 6.67 | 1.16 | 4.18 | 4.69 | 4.69 |
| 50th-Percentile Queue Length [ft/ln] | 27.24 | 38.21 | 170.60 | 183.45 | 0.42 | 166.82 | 28.93 | 104.54 | 117.37 | 117.27 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 2.75 | 11.11 | 11.78 | 0.03 | 10.91 | 2.08 | 7.53 | 8.25 | 8.24 |
| 95th-Percentile Queue Length [ft/ln] | 49.03 | 68.78 | 277.70 | 294.52 | 0.76 | 272.74 | 52.07 | 188.17 | 206.20 | 206.07 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.25 | 31.90 | 31.90 | 45.66 | 45.66 | 39.62 | 7.59 | 17.30 | 13.77 | 15.49 | 11.42 | 11.42 |
| Movement LOS | D | C | C | D | D | D | A | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 39.64 | | | 42.40 | | | 16.95 | | | 12.69 | | |
| Approach LOS | D | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 21.07 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.544 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.979 | 2.560 | 3.259 | 2.872 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.419 | 2.352 | 2.461 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 141.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.168 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3775 | 20 | 359 | 970 | 68 | 1893 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3775 | 20 | 359 | 970 | 68 | 1893 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 963 | 5 | 92 | 247 | 17 | 483 |
| Total Analysis Volume [veh/h] | 3852 | 20 | 366 | 990 | 69 | 1932 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 156 | 156 | 156 | 156 | 156 | 156 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 38 | 129 | 15 | 57 |
| g / C, Green / Cycle | 0.58 | 0.58 | 0.24 | 0.83 | 0.10 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.76 | 0.01 | 0.11 | 0.20 | 0.02 | 0.46 |
| s, saturation flow rate [veh/h] | 5077 | 1399 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2926 | 806 | 815 | 4159 | 314 | 1538 |
| d1, Uniform Delay [s] | 33.09 | 14.22 | 50.42 | 2.86 | 65.19 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 143.07 | 0.01 | 0.14 | 0.04 | 0.13 | 115.90 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.32 | 0.02 | 0.45 | 0.24 | 0.22 | 1.26 |
| d, Delay for Lane Group [s/veh] | 176.16 | 14.24 | 50.56 | 2.90 | 65.32 | 165.65 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 71.77 | 0.29 | 5.95 | 1.42 | 1.28 | 36.23 |
| 50th-Percentile Queue Length [ft/ln] | 1794.15 | 7.36 | 148.67 | 35.52 | 31.93 | 905.79 |
| 95th-Percentile Queue Length [veh/ln] | 104.62 | 0.53 | 9.95 | 2.56 | 2.30 | 53.13 |
| 95th-Percentile Queue Length [ft/ln] | 2615.50 | 13.24 | 248.65 | 63.94 | 57.48 | 1328.30 |

**Movement, Approach, & Intersection Results**

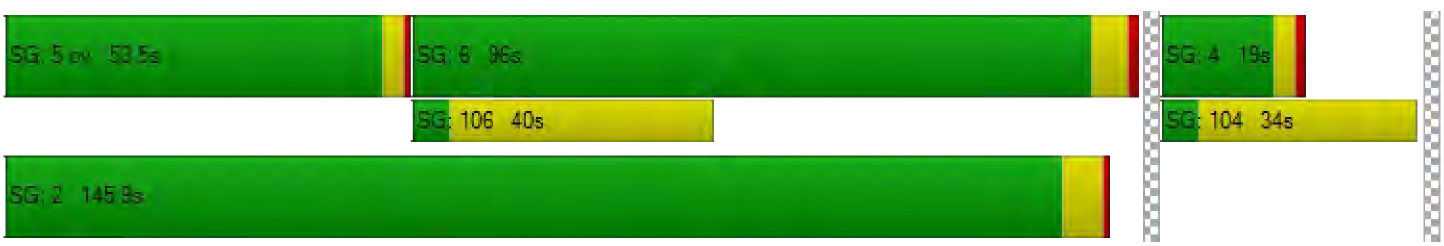
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 176.16 | 14.24 | 50.56 | 2.90 | 65.32 | 165.65 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 175.32 | | 15.76 | | 162.19 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 141.75 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.168 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.31 | 0.00 | 69.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.880 | 0.000 | 3.092 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 538 | 564 | 192 |
| d_b, Bicycle Delay [s] | 41.70 | 40.27 | 63.77 |
| I_b,int, Bicycle LOS Score for Intersection | 3.689 | 2.305 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 238.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.367 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 204 | 95 | 1142 | 159 | 332 | 146 | 76 | 2280 | 407 | 559 | 862 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 204 | 95 | 1142 | 159 | 332 | 76 | 76 | 2280 | 362 | 559 | 862 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 53 | 24 | 294 | 41 | 86 | 20 | 20 | 588 | 93 | 144 | 222 | 9 |
| Total Analysis Volume [veh/h] | 210 | 98 | 1177 | 164 | 342 | 78 | 78 | 2351 | 373 | 576 | 889 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 15 | 13 | 40 | 9 | 9 | 9 | 67 | 40 | 40 | 67 | 58 | 58 |
| g / C, Green / Cycle | 0.14 | 0.13 | 0.38 | 0.09 | 0.09 | 0.09 | 0.64 | 0.38 | 0.38 | 0.64 | 0.55 | 0.55 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.07 | 0.28 | 0.09 | 0.21 | 0.05 | 0.08 | 0.76 | 0.42 | 0.41 | 0.18 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4141 | 1748 | 1606 | 1446 | 941 | 3084 | 889 | 1420 | 4959 | 1615 |
| c, Capacity [veh/h] | 245 | 190 | 1584 | 150 | 141 | 127 | 610 | 1177 | 339 | 929 | 2729 | 889 |
| d1, Uniform Delay [s] | 44.08 | 42.67 | 27.82 | 47.95 | 47.86 | 45.91 | 7.83 | 32.43 | 32.43 | 24.03 | 12.92 | 10.83 |
| k, delay calibration | 0.13 | 0.11 | 0.16 | 0.35 | 0.48 | 0.11 | 0.11 | 0.19 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.23 | 2.16 | 1.07 | 89.04 | 664.29 | 4.79 | 0.09 | 449.88 | 78.35 | 0.68 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.52 | 0.74 | 1.09 | 2.43 | 0.62 | 0.13 | 2.00 | 1.10 | 0.62 | 0.33 | 0.04 |
| d, Delay for Lane Group [s/veh] | 54.31 | 44.82 | 28.89 | 137.00 | 712.15 | 50.70 | 7.92 | 482.31 | 110.78 | 24.71 | 12.99 | 10.85 |
| Lane Group LOS | D | D | C | F | F | D | A | F | F | C | B | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.88 | 1.21 | 8.15 | 7.67 | 14.84 | 2.15 | 0.32 | 58.62 | 15.67 | 2.76 | 3.70 | 0.36 |
| 50th-Percentile Queue Length [ft/ln] | 146.89 | 30.32 | 203.87 | 191.86 | 370.88 | 53.63 | 8.08 | 1465.52 | 391.69 | 68.88 | 92.51 | 8.96 |
| 95th-Percentile Queue Length [veh/ln] | 9.85 | 2.18 | 12.84 | 12.61 | 25.39 | 3.86 | 0.58 | 96.08 | 23.55 | 4.96 | 6.66 | 0.65 |
| 95th-Percentile Queue Length [ft/ln] | 246.28 | 54.57 | 320.95 | 315.28 | 634.85 | 96.53 | 14.54 | 2402.07 | 588.78 | 123.98 | 166.52 | 16.14 |

**Movement, Approach, & Intersection Results**

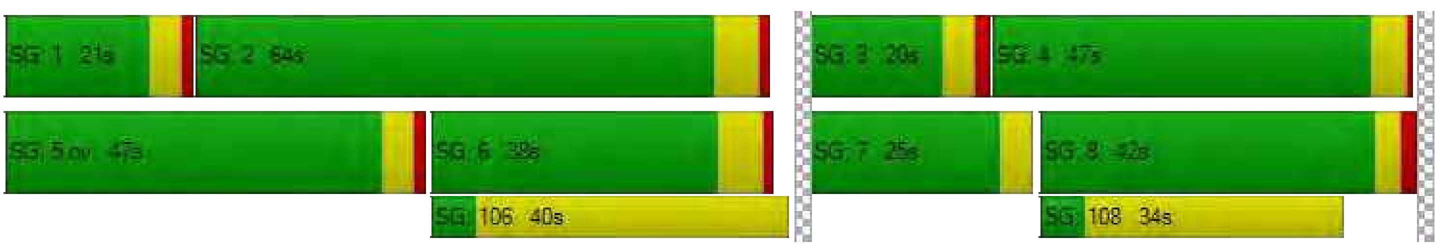
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.31 | 44.82 | 28.89 | 137.00 | 712.15 | 50.70 | 7.92 | 482.31 | 110.78 | 24.71 | 12.99 | 10.85 |
| Movement LOS | D | D | C | F | F | D | A | F | F | C | B | B |
| d_A, Approach Delay [s/veh] | 33.53 | | | 462.29 | | | 419.65 | | | 17.44 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 238.90 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.367 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 43.77 | 0.00 | 43.77 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.478 | 0.000 | 3.253 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 813 | 716 | 611 | 1107 |
| d_b, Bicycle Delay [s] | 18.46 | 21.63 | 25.27 | 10.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.785 | 2.099 | 3.125 | 2.385 |
| Bicycle LOS | C | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 447.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.673 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 44 | 1292 | 23 | 284 | 1103 | 54 | 123 | 9 | 35 | 75 | 16 | 334 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 44 | 1292 | 23 | 284 | 1103 | 54 | 123 | 9 | 35 | 75 | 16 | 334 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 367 | 7 | 81 | 313 | 15 | 35 | 3 | 10 | 21 | 5 | 95 |
| Total Analysis Volume [veh/h] | 50 | 1468 | 26 | 323 | 1253 | 61 | 140 | 10 | 40 | 85 | 18 | 380 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 8 | 67 | 66 | 7 | 66 | 67 | 66 | 66 | 66 | 66 | 66 | 66 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 70 | 63 | 63 | 70 | 63 | 63 | 63 | 63 | 63 | 63 |
| g / C, Green / Cycle | 0.50 | 0.45 | 0.45 | 0.50 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.91 | 0.91 | 0.45 | 0.80 | 0.81 | 0.14 | 0.09 | 0.06 | 0.61 |
| s, saturation flow rate [veh/h] | 521 | 826 | 820 | 711 | 826 | 807 | 997 | 573 | 1351 | 656 |
| c, Capacity [veh/h] | 149 | 373 | 370 | 133 | 371 | 362 | 51 | 256 | 549 | 295 |
| d1, Uniform Delay [s] | 32.87 | 38.42 | 38.42 | 43.11 | 38.57 | 38.57 | 70.00 | 23.41 | 28.81 | 38.58 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.98 | 462.89 | 465.96 | 665.96 | 360.85 | 373.03 | 786.77 | 0.14 | 0.13 | 178.62 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.34 | 2.01 | 2.01 | 2.43 | 1.78 | 1.80 | 2.72 | 0.20 | 0.15 | 1.35 |
| d, Delay for Lane Group [s/veh] | 38.86 | 501.31 | 504.38 | 709.07 | 399.41 | 411.60 | 856.77 | 23.55 | 28.94 | 217.20 |
| Lane Group LOS | D | F | F | F | F | F | F | C | C | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.08 | 60.18 | 60.06 | 13.50 | 49.71 | 49.76 | 13.10 | 1.04 | 1.79 | 24.65 |
| 50th-Percentile Queue Length [ft/ln] | 26.88 | 1504.56 | 1501.39 | 337.50 | 1242.63 | 1244.08 | 327.57 | 26.00 | 44.65 | 616.15 |
| 95th-Percentile Queue Length [veh/ln] | 1.94 | 99.99 | 99.85 | 24.30 | 81.60 | 81.98 | 23.59 | 1.87 | 3.21 | 39.24 |
| 95th-Percentile Queue Length [ft/ln] | 48.38 | 2499.87 | 2496.33 | 607.49 | 2040.12 | 2049.46 | 589.63 | 46.80 | 80.37 | 980.88 |

**Movement, Approach, & Intersection Results**

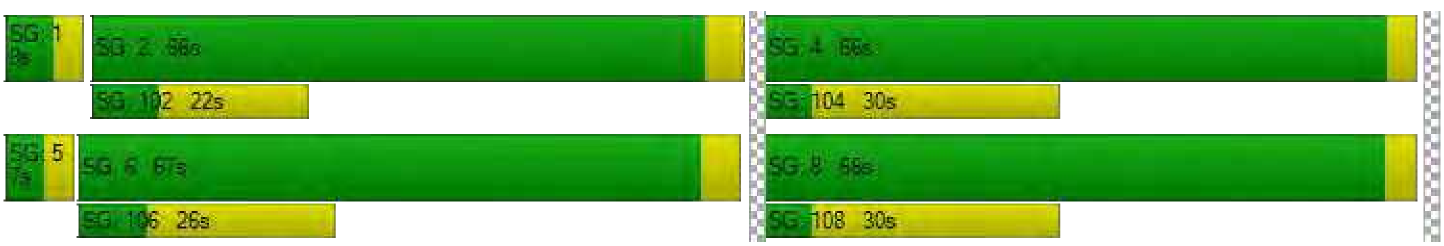
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 38.86 | 502.82 | 504.38 | 709.07 | 405.18 | 411.60 | 856.77 | 23.55 | 23.55 | 28.94 | 217.20 | 217.20 |
| Movement LOS | D | F | F | F | F | F | F | C | C | C | F | F |
| d_A, Approach Delay [s/veh] | 487.82 | | | 465.38 | | | 637.50 | | | 184.07 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 447.60 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.673 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 61.29 | 61.29 | 59.43 | 59.43 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.278 | 3.320 | 2.081 | 2.678 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 900 | 886 | 897 | 900 |
| d_b, Bicycle Delay [s] | 21.19 | 21.93 | 21.36 | 21.33 |
| I_b,int, Bicycle LOS Score for Intersection | 2.833 | 2.910 | 1.873 | 2.357 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 212.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.485 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 269 | 933 | 1447 | 52 | 163 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 269 | 933 | 1447 | 52 | 163 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 251 | 389 | 14 | 44 | 31 |
| Total Analysis Volume [veh/h] | 289 | 1003 | 1556 | 56 | 175 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 21 | 99 | 75 | 75 | 24 | 24 |
| g / C, Green / Cycle | 0.16 | 0.76 | 0.58 | 0.58 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.64 | 0.97 | 0.98 | 0.17 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 819 | 1026 | 899 |
| c, Capacity [veh/h] | 206 | 1199 | 479 | 472 | 190 | 167 |
| d1, Uniform Delay [s] | 54.41 | 10.23 | 27.54 | 27.54 | 51.92 | 49.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.26 | 0.12 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 209.25 | 7.02 | 316.93 | 327.98 | 30.53 | 7.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.41 | 0.84 | 1.68 | 1.71 | 0.92 | 0.74 |
| d, Delay for Lane Group [s/veh] | 263.65 | 17.25 | 344.47 | 355.52 | 82.45 | 56.85 |
| Lane Group LOS | F | B | F | F | F | E |
| Critical Lane Group | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 18.55 | 8.50 | 55.64 | 56.29 | 7.20 | 4.09 |
| 50th-Percentile Queue Length [ft/ln] | 463.63 | 212.42 | 1391.03 | 1407.15 | 180.09 | 102.31 |
| 95th-Percentile Queue Length [veh/ln] | 29.43 | 13.28 | 91.23 | 92.60 | 11.61 | 7.37 |
| 95th-Percentile Queue Length [ft/ln] | 735.67 | 331.93 | 2280.76 | 2315.12 | 290.13 | 184.16 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 263.65 | 17.25 | 349.80 | 355.52 | 82.45 | 56.85 |
| Movement LOS | F | B | F | F | F | E |
| d_A, Approach Delay [s/veh] | 72.36 | | 350.00 | | 71.88 | |
| Approach LOS | E | | F | | E | |
| d_I, Intersection Delay [s/veh] | 212.09 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.485 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.091 | 3.057 | 2.167 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.626 | 2.890 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 279.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.716 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 524 | 57 | 1184 | 274 | 237 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 524 | 57 | 1184 | 274 | 237 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 141 | 15 | 318 | 74 | 64 |
| Total Analysis Volume [veh/h] | 1075 | 563 | 61 | 1273 | 295 | 255 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 1.04 | 0.09 | 0.99 | 0.46 | 0.46 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 555 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 97 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 286.31 | 43.45 | 136.99 | 742.76 | 757.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 1.61 | 0.97 | 1.29 | 2.60 | 2.62 |
| d, Delay for Lane Group [s/veh] | 158.87 | 307.97 | 101.91 | 151.99 | 796.32 | 810.64 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 36.70 | 2.73 | 29.51 | 27.16 | 23.66 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 917.49 | 68.17 | 737.80 | 678.96 | 591.38 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 61.75 | 4.91 | 46.41 | 45.61 | 40.28 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 1543.73 | 122.71 | 1160.34 | 1140.29 | 1006.93 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 307.97 | 101.91 | 151.99 | 797.17 | 810.64 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 210.12 | | 149.70 | | 802.96 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 279.81 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.716 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.339 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 2.911 | 2.660 | 2.467 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 210.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.477 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 462 | 369 | 285 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 382 | 98 | 21 | 372 | 7 | 7 | 55 | 127 | 101 | 78 | 3 |
| Total Analysis Volume [veh/h] | 295 | 1526 | 390 | 86 | 1488 | 29 | 30 | 221 | 508 | 405 | 313 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 56 | 56 | 8 | 51 | 51 | 35 | 35 | 35 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.06 | 0.39 | 0.39 | 0.27 | 0.27 | 0.27 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.52 | 0.54 | 0.09 | 0.54 | 0.54 | 0.02 | 0.23 | 0.33 | 0.12 | 0.24 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1171 | 952 | 1853 | 961 | 1810 | 965 | 1547 | 3409 | 1303 | 1416 |
| c, Capacity [veh/h] | 127 | 1072 | 506 | 59 | 730 | 378 | 485 | 258 | 414 | 420 | 160 | 174 |
| d1, Uniform Delay [s] | 58.50 | 36.91 | 36.91 | 61.00 | 39.41 | 39.41 | 35.44 | 45.20 | 46.94 | 56.72 | 57.00 | 50.36 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.25 | 0.50 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 617.13 | 100.13 | 123.25 | 223.20 | 174.23 | 183.34 | 0.02 | 16.30 | 121.54 | 6.70 | 450.13 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 2.32 | 1.20 | 1.24 | 1.47 | 1.37 | 1.37 | 0.06 | 0.86 | 1.23 | 0.97 | 1.95 | 0.07 |
| d, Delay for Lane Group [s/veh] | 675.63 | 137.03 | 160.15 | 284.20 | 213.63 | 222.75 | 35.46 | 61.50 | 168.48 | 63.42 | 507.13 | 50.42 |
| Lane Group LOS | F | F | F | F | F | F | D | E | F | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 25.94 | 31.15 | 32.66 | 5.58 | 29.25 | 31.29 | 0.72 | 7.91 | 27.11 | 7.00 | 25.32 | 0.35 |
| 50th-Percentile Queue Length [ft/ln] | 648.43 | 778.85 | 816.39 | 139.60 | 731.19 | 782.36 | 18.01 | 197.82 | 677.82 | 175.11 | 632.93 | 8.77 |
| 95th-Percentile Queue Length [veh/ln] | 41.90 | 45.62 | 48.36 | 10.05 | 45.68 | 48.62 | 1.30 | 12.53 | 39.97 | 11.34 | 40.86 | 0.63 |
| 95th-Percentile Queue Length [ft/ln] | 1047.48 | 1140.39 | 1209.05 | 251.29 | 1141.95 | 1215.46 | 32.41 | 313.16 | 999.33 | 283.62 | 1021.50 | 15.79 |

**Movement, Approach, & Intersection Results**

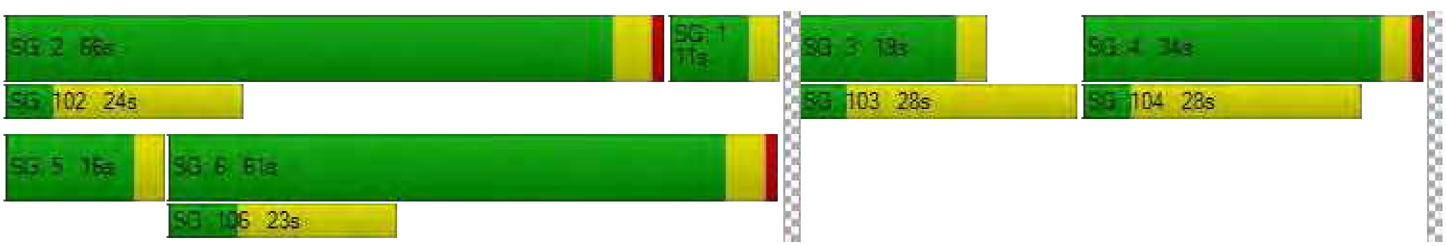
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 675.63 | 140.62 | 160.15 | 284.20 | 216.63 | 222.75 | 35.46 | 61.50 | 168.48 | 63.42 | 507.13 | 50.42 |
| Movement LOS | F | F | F | F | F | F | D | E | F | E | F | D |
| d_A, Approach Delay [s/veh] | 215.45 | | | 220.37 | | | 132.07 | | | 253.46 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 210.23 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.477 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.502 | 2.986 | 2.781 | 2.775 |
| Crosswalk LOS | D | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.54 | 50.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.776 | 2.441 | 3.101 | 2.838 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 223.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.412 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1319 | 809 | 294 | 350 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 40 | 1319 | 809 | 71 | 350 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 340 | 209 | 18 | 90 | 0 |
| Total Analysis Volume [veh/h] | 41 | 1360 | 834 | 73 | 361 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 3 | 42 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.03 | 0.48 | 0.41 | 0.41 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.81 | 0.50 | 0.05 | 0.42 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1574 | 850 | 1596 |
| c, Capacity [veh/h] | 54 | 805 | 690 | 645 | 348 | 654 |
| d1, Uniform Delay [s] | 42.28 | 22.85 | 25.92 | 16.02 | 25.92 | 0.00 |
| k, delay calibration | 0.04 | 0.43 | 0.19 | 0.15 | 0.48 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.54 | 314.68 | 99.28 | 0.11 | 56.73 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 1.69 | 1.21 | 0.11 | 1.04 | 0.00 |
| d, Delay for Lane Group [s/veh] | 49.82 | 337.53 | 125.20 | 16.13 | 82.66 | 0.00 |
| Lane Group LOS | D | F | F | B | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.99 | 42.79 | 16.11 | 0.88 | 12.28 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 24.65 | 1069.64 | 402.65 | 22.04 | 307.08 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.77 | 70.48 | 25.45 | 1.59 | 18.46 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 44.37 | 1761.89 | 636.35 | 39.67 | 461.49 | 0.00 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 49.82 | 337.53 | 125.20 | 16.13 | 82.66 | 0.00 |
| Movement LOS | D | F | F | B | F | A |
| d_A, Approach Delay [s/veh] | 329.11 | | 116.42 | | 82.66 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 223.50 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.412 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 33.58 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.247 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 820 | 820 | 820 |
| d_b, Bicycle Delay [s] | 15.35 | 15.32 | 15.30 |
| I_b,int, Bicycle LOS Score for Intersection | 2.715 | 2.492 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 224.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.281 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 21 | 21 | 10 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 292 | 1 | 8 | 150 | 5 | 40 | 9 | 6 | 6 | 3 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1169 | 4 | 32 | 601 | 20 | 159 | 37 | 23 | 23 | 11 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 154 | 154 | 154 | 154 | 154 | 154 | 154 | 154 | 154 | 154 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 4 | 102 | 13 | 13 | 13 | 19 | 19 |
| g / C, Green / Cycle | 0.01 | 0.65 | 0.65 | 0.02 | 0.66 | 0.08 | 0.08 | 0.08 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.92 | 0.92 | 0.02 | 1.05 | 0.05 | 0.05 | 0.05 | 0.01 | 0.11 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1842 | 444 | 1810 | 558 |
| c, Capacity [veh/h] | 10 | 447 | 383 | 43 | 394 | 145 | 153 | 37 | 230 | 71 |
| d1, Uniform Delay [s] | 76.23 | 26.99 | 26.99 | 74.72 | 25.90 | 68.47 | 68.44 | 67.96 | 59.44 | 66.15 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.14 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 119.99 | 198.97 | 201.23 | 22.85 | 271.58 | 5.00 | 4.68 | 15.87 | 0.19 | 33.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 1.41 | 1.41 | 0.75 | 1.58 | 0.66 | 0.66 | 0.62 | 0.10 | 0.89 |
| d, Delay for Lane Group [s/veh] | 196.22 | 225.96 | 228.21 | 97.57 | 297.48 | 73.46 | 73.13 | 83.83 | 59.63 | 99.35 |
| Lane Group LOS | F | F | F | F | F | E | E | F | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.75 | 40.39 | 34.80 | 1.54 | 43.39 | 3.97 | 4.15 | 1.06 | 0.82 | 3.11 |
| 50th-Percentile Queue Length [ft/ln] | 18.65 | 1009.74 | 870.07 | 38.58 | 1084.82 | 99.20 | 103.64 | 26.54 | 20.49 | 77.87 |
| 95th-Percentile Queue Length [veh/ln] | 1.34 | 64.13 | 55.97 | 2.78 | 71.73 | 7.14 | 7.46 | 1.91 | 1.47 | 5.61 |
| 95th-Percentile Queue Length [ft/ln] | 33.56 | 1603.34 | 1399.15 | 69.45 | 1793.29 | 178.55 | 186.55 | 47.76 | 36.87 | 140.16 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 196.22 | 226.99 | 228.21 | 97.57 | 297.48 | 297.48 | 73.33 | 73.13 | 83.83 | 59.63 | 99.35 | 99.35 |
| Movement LOS | F | F | F | F | F | F | E | E | F | E | F | F |
| d_A, Approach Delay [s/veh] | | 226.74 | | | 287.68 | | | 74.40 | | | 88.73 | |
| Approach LOS | | F | | | F | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 224.20 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.281 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 66.31 | 66.31 | 66.31 | 66.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.532 | 2.754 | 2.205 | 2.009 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 260 | 260 | 390 | 390 |
| d_b, Bicycle Delay [s] | 58.30 | 58.48 | 49.86 | 49.86 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.637 | 1.951 | 1.702 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.696 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┓┣ | | | ┓┣ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 693 | 5 | 2 | 695 | 109 | 147 | 2 | 49 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 693 | 5 | 2 | 695 | 109 | 147 | 2 | 49 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 190 | 1 | 1 | 191 | 30 | 40 | 1 | 13 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 23 | 762 | 5 | 2 | 764 | 120 | 162 | 2 | 54 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 19 | | | 15 | | | 19 | | | 15 | |
| v_di, Inbound Pedestrian Volume crossing m | | 19 | | | 15 | | | 19 | | | 15 | |
| v_co, Outbound Pedestrian Volume crossing | | 10 | | | 8 | | | 8 | | | 11 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 11 | | | 8 | | | 8 | | | 10 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 8 | | | 4 | | | 4 | | | 4 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 73 | 73 | 73 | 73 | 19 | 19 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.73 | 0.73 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.41 | 0.00 | 0.49 | 0.15 | 0.02 |
| s, saturation flow rate [veh/h] | 638 | 1851 | 712 | 1792 | 1413 | 1536 |
| c, Capacity [veh/h] | 354 | 1352 | 438 | 1309 | 327 | 345 |
| d1, Uniform Delay [s] | 16.13 | 6.19 | 11.83 | 7.16 | 38.60 | 33.49 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.18 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.35 | 1.73 | 0.02 | 2.81 | 3.82 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.57 | 0.00 | 0.68 | 0.67 | 0.08 |
| d, Delay for Lane Group [s/veh] | 16.48 | 7.92 | 11.85 | 9.96 | 42.42 | 33.59 |
| Lane Group LOS | B | A | B | A | D | C |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.34 | 6.95 | 0.02 | 9.02 | 5.40 | 0.56 |
| 50th-Percentile Queue Length [ft/ln] | 8.51 | 173.80 | 0.59 | 225.53 | 135.06 | 13.88 |
| 95th-Percentile Queue Length [veh/ln] | 0.61 | 11.28 | 0.04 | 13.95 | 9.21 | 1.00 |
| 95th-Percentile Queue Length [ft/ln] | 15.32 | 281.90 | 1.06 | 348.67 | 230.36 | 24.98 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.48 | 7.92 | 7.92 | 11.85 | 9.96 | 9.96 | 42.42 | 42.42 | 42.42 | 33.59 | 33.59 | 33.59 |
| Movement LOS | B | A | A | B | A | A | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 8.17 | | | 9.97 | | | 42.42 | | | 33.59 | | |
| Approach LOS | A | | | A | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 13.24 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.696 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.57 | 39.57 | 39.57 | 39.57 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.408 | 2.766 | 1.930 | 1.737 |
| Crosswalk LOS | B | C | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1379 | 1379 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.84 | 4.83 | 29.75 | 29.75 |
| I_b,int, Bicycle LOS Score for Intersection | 2.863 | 3.022 | 1.919 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.560 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 123 | 5 | 84 | 53 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 123 | 5 | 84 | 53 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 31 | 14 | 183 | 3 | 11 | 32 | 1 | 22 | 14 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 124 | 56 | 732 | 10 | 46 | 128 | 5 | 88 | 55 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 74 | 74 | 74 | 74 | 18 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.74 | 0.74 | 0.18 | 0.18 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.45 | 0.08 | 0.40 | 0.04 | 0.07 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 729 | 1796 | 686 | 1854 | 1258 | 1855 | 1272 | 1682 |
| c, Capacity [veh/h] | 470 | 1324 | 421 | 1367 | 195 | 335 | 193 | 304 |
| d1, Uniform Delay [s] | 10.32 | 6.26 | 13.17 | 5.75 | 42.21 | 36.16 | 43.99 | 36.03 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 2.10 | 0.66 | 1.55 | 0.61 | 0.76 | 1.68 | 0.78 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.61 | 0.13 | 0.54 | 0.24 | 0.40 | 0.46 | 0.38 |
| d, Delay for Lane Group [s/veh] | 10.34 | 8.36 | 13.83 | 7.30 | 42.82 | 36.93 | 45.68 | 36.81 |
| Lane Group LOS | B | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 7.58 | 0.75 | 6.34 | 1.10 | 2.95 | 2.21 | 2.55 |
| 50th-Percentile Queue Length [ft/ln] | 0.83 | 189.54 | 18.71 | 158.41 | 27.54 | 73.74 | 55.36 | 63.64 |
| 95th-Percentile Queue Length [veh/ln] | 0.06 | 12.10 | 1.35 | 10.46 | 1.98 | 5.31 | 3.99 | 4.58 |
| 95th-Percentile Queue Length [ft/ln] | 1.49 | 302.44 | 33.68 | 261.61 | 49.58 | 132.73 | 99.64 | 114.56 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.34 | 8.36 | 8.36 | 13.83 | 7.30 | 7.30 | 42.82 | 36.93 | 36.93 | 45.68 | 36.81 | 36.81 |
| Movement LOS | B | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 8.36 | | | 7.75 | | | 38.44 | | | 40.65 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 14.12 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.560 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.513 | 2.524 | 2.016 | 2.163 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.896 | 2.876 | 1.855 | 1.895 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 42.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.711 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 281 | 271 | 372 | 129 | 301 | 136 | 478 | 184 | 277 | 684 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 281 | 151 | 372 | 129 | 0 | 136 | 478 | 184 | 277 | 684 | 22 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 74 | 40 | 98 | 34 | 0 | 36 | 126 | 48 | 73 | 180 | 6 |
| Total Analysis Volume [veh/h] | 32 | 296 | 159 | 392 | 136 | 0 | 143 | 503 | 194 | 292 | 720 | 23 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 18 | 18 | 18 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.16 | 0.11 | 0.15 | 0.15 | 0.00 | 0.08 | 0.13 | 0.14 | 0.13 | 0.17 | 0.22 | 0.20 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1452 | 1785 | 1854 | 1584 | 1794 | 1892 | 1892 | 1541 | 1718 | 1900 | 1699 |
| c, Capacity [veh/h] | 349 | 370 | 285 | 345 | 359 | 306 | 322 | 340 | 340 | 277 | 430 | 475 | 425 |
| d1, Uniform Delay [s] | 33.50 | 39.03 | 36.49 | 38.76 | 38.76 | 0.00 | 37.25 | 39.39 | 39.68 | 39.06 | 34.52 | 36.56 | 35.61 |
| k, delay calibration | 0.11 | 0.28 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.13 | 0.24 | 0.19 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 9.82 | 1.71 | 3.29 | 3.16 | 0.00 | 0.96 | 2.90 | 3.47 | 3.22 | 2.30 | 10.20 | 5.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.80 | 0.56 | 0.75 | 0.75 | 0.00 | 0.44 | 0.72 | 0.76 | 0.70 | 0.68 | 0.87 | 0.78 |
| d, Delay for Lane Group [s/veh] | 33.61 | 48.85 | 38.20 | 42.05 | 41.92 | 0.00 | 38.21 | 42.29 | 43.15 | 42.27 | 36.82 | 46.76 | 41.14 |
| Lane Group LOS | C | D | D | D | D | A | D | D | D | D | D | D | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.66 | 7.96 | 3.63 | 6.41 | 6.65 | 0.00 | 3.24 | 5.99 | 6.38 | 4.73 | 6.71 | 10.95 | 8.20 |
| 50th-Percentile Queue Length [ft/ln] | 16.40 | 199.03 | 90.67 | 160.32 | 166.18 | 0.00 | 80.96 | 149.8 | 159.4 | 118.3 | 167.80 | 273.64 | 205.04 |
| 95th-Percentile Queue Length [veh/ln] | 1.18 | 12.59 | 6.53 | 10.57 | 10.88 | 0.00 | 5.83 | 10.01 | 10.52 | 8.30 | 10.96 | 16.37 | 12.90 |
| 95th-Percentile Queue Length [ft/ln] | 29.52 | 314.71 | 163.21 | 264.14 | 271.88 | 0.00 | 145.7 | 250.2 | 262.9 | 207.4 | 274.02 | 409.29 | 322.45 |

**Movement, Approach, & Intersection Results**

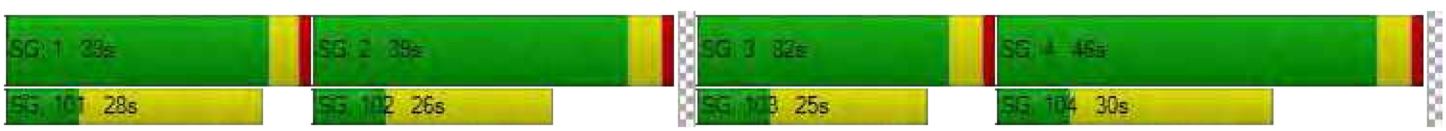
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.61 | 48.85 | 38.20 | 42.00 | 41.92 | 0.00 | 38.21 | 42.73 | 42.27 | 36.82 | 44.35 | 41.14 |
| Movement LOS | C | D | D | D | D | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 44.37 | | | 41.98 | | | 41.86 | | | 42.15 | | |
| Approach LOS | D | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 42.41 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.711 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.54 | 39.54 | 39.54 | 39.54 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.528 | 4.265 | 4.405 | 2.806 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 565 | 813 | 537 | 675 |
| d_b, Bicycle Delay [s] | 26.85 | 18.09 | 27.25 | 22.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.561 | 4.081 | 3.078 | 2.413 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.988 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1912 | 0 | 0 | 1595 | 570 | 891 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1912 | 0 | 0 | 1595 | 570 | 891 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 483 | 0 | 0 | 403 | 144 | 225 |
| Total Analysis Volume [veh/h] | 1931 | 0 | 0 | 1611 | 576 | 900 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.55 | 0.46 | 0.17 | 0.35 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2071 | 2095 | 1182 | 906 |
| d1, Uniform Delay [s] | 14.79 | 12.16 | 20.33 | 25.85 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.07 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.19 | 2.78 | 0.12 | 9.91 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.93 | 0.77 | 0.49 | 0.99 |
| d, Delay for Lane Group [s/veh] | 23.98 | 14.94 | 20.44 | 35.76 |
| Lane Group LOS | C | B | C | D |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 15.91 | 9.91 | 4.03 | 9.22 |
| 50th-Percentile Queue Length [ft/ln] | 397.83 | 247.74 | 100.73 | 230.42 |
| 95th-Percentile Queue Length [veh/ln] | 22.46 | 15.07 | 7.25 | 14.20 |
| 95th-Percentile Queue Length [ft/ln] | 561.38 | 376.81 | 181.31 | 354.89 |

**Movement, Approach, & Intersection Results**

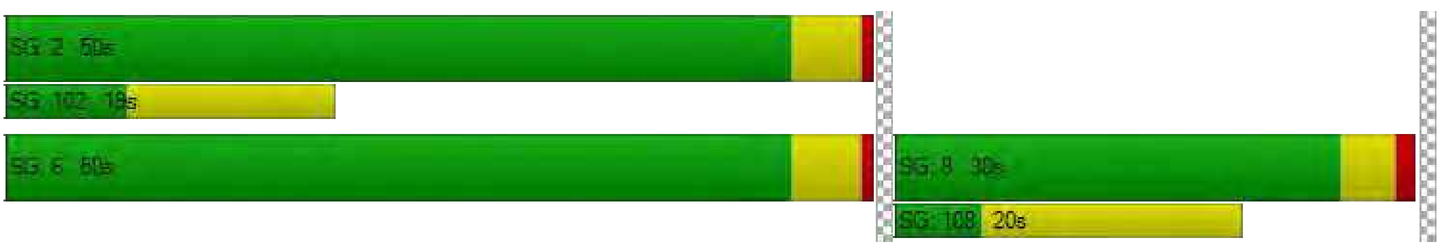
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.98 | 0.00 | 0.00 | 14.94 | 20.44 | 35.76 |
| Movement LOS | C | | | B | C | D |
| d_A, Approach Delay [s/veh] | 23.98 | | 14.94 | | 29.78 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 22.78 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.988 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.209 | 2.484 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.46 | 7.49 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.153 | 2.889 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 175.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.599 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 109 | 5 | 21 | 216 | 10 | 6 | 35 | 7 | 2 | 4 | 16 |
| Total Analysis Volume [veh/h] | 24 | 434 | 19 | 82 | 863 | 39 | 24 | 140 | 26 | 8 | 17 | 64 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 600 | 984 | 506 | 500 |
| Degree of Utilization, x | 0.79 | 1.60 | 0.38 | 0.18 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 7.74 | 53.05 | 1.73 | 0.64 |
| 95th-Percentile Queue Length [ft] | 193.42 | 1326.26 | 43.19 | 16.07 |
| Approach Delay [s/veh] | 28.24 | 293.37 | 14.33 | 11.77 |
| Approach LOS | D | F | B | B |
| Intersection Delay [s/veh] | 175.81 | | | |
| Intersection LOS | F | | | |

**Intersection Level Of Service Report**
**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 77.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.094 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 196 | 40 | 1730 | 12 | 31 | 5 | 9 | 763 | 232 | 2687 | 845 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 196 | 40 | 1730 | 12 | 31 | 5 | 9 | 763 | 232 | 2687 | 845 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 10 | 451 | 3 | 8 | 1 | 2 | 199 | 60 | 700 | 220 | 4 |
| Total Analysis Volume [veh/h] | 204 | 42 | 1802 | 13 | 32 | 5 | 9 | 795 | 242 | 2799 | 880 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 26 | 116 | 10 | 10 | 38 | 38 | 38 | 76 | 76 |
| g / C, Green / Cycle | 0.16 | 0.73 | 0.06 | 0.06 | 0.24 | 0.24 | 0.24 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.43 | 0.02 | 0.01 | 0.22 | 0.22 | 0.16 | 0.54 | 0.53 |
| s, saturation flow rate [veh/h] | 1824 | 4190 | 1707 | 1588 | 1892 | 1724 | 1556 | 5150 | 1679 |
| c, Capacity [veh/h] | 299 | 2942 | 137 | 97 | 453 | 413 | 373 | 2449 | 798 |
| d1, Uniform Delay [s] | 64.63 | 12.45 | 71.59 | 71.56 | 59.48 | 59.48 | 54.58 | 41.96 | 41.96 |
| k, delay calibration | 0.43 | 0.50 | 0.04 | 0.04 | 0.15 | 0.15 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 19.15 | 0.96 | 0.27 | 0.45 | 11.63 | 12.51 | 0.71 | 69.72 | 70.64 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.61 | 0.20 | 0.23 | 0.93 | 0.93 | 0.65 | 1.14 | 1.12 |
| d, Delay for Lane Group [s/veh] | 83.79 | 13.41 | 71.86 | 72.01 | 71.11 | 71.99 | 55.29 | 111.68 | 112.60 |
| Lane Group LOS | F | B | E | E | E | E | E | F | F |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 11.34 | 11.17 | 1.10 | 0.89 | 18.19 | 16.67 | 8.90 | 47.57 | 46.72 |
| 50th-Percentile Queue Length [ft/ln] | 283.59 | 279.28 | 27.52 | 22.30 | 454.68 | 416.74 | 222.49 | 1189.18 | 1167.92 |
| 95th-Percentile Queue Length [veh/ln] | 16.87 | 16.65 | 1.98 | 1.61 | 25.18 | 23.37 | 13.79 | 65.13 | 63.24 |
| 95th-Percentile Queue Length [ft/ln] | 421.67 | 416.31 | 49.54 | 40.15 | 629.53 | 584.13 | 344.81 | 1628.27 | 1581.09 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 83.79 | 83.79 | 13.41 | 71.86 | 71.94 | 72.01 | 71.11 | 71.53 | 55.29 | 111.68 | 112.60 | 112.60 |
| Movement LOS | F | F | B | E | E | E | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | 21.86 | | | 71.93 | | | 67.77 | | | 111.90 | | |
| Approach LOS | C | | | E | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 77.89 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.094 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.680 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 4.939 | 1.601 | 2.423 | 7.655 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 155.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.058 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1036 | 199 | 0 | 1150 | 863 | 0 | 0 | 0 | 0 | 824 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1036 | 199 | 0 | 1150 | 863 | 0 | 0 | 0 | 0 | 824 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 278 | 50 | 0 | 309 | 232 | 0 | 0 | 0 | 0 | 206 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1114 | 199 | 0 | 1237 | 928 | 0 | 0 | 0 | 0 | 824 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.25 | 1.34 | | 0.23 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2744 | 2700 | 374 | | 1269 | 459 |
| d1, Uniform Delay [s] | 10.87 | 11.27 | 17.85 | | 21.28 | 23.52 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.45 | 0.56 | 676.00 | | 0.57 | 4.56 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.41 | 0.46 | 2.48 | | 0.65 | 0.85 |
| d, Delay for Lane Group [s/veh] | 11.32 | 11.84 | 693.84 | | 21.84 | 28.08 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.62 | 4.17 | 75.92 | | 6.17 | 3.47 |
| 50th-Percentile Queue Length [ft/ln] | 90.41 | 104.37 | 1898.06 | | 154.24 | 86.87 |
| 95th-Percentile Queue Length [veh/ln] | 6.51 | 7.51 | 129.87 | | 10.24 | 6.25 |
| 95th-Percentile Queue Length [ft/ln] | 162.73 | 187.87 | 3246.80 | | 256.08 | 156.36 |

**Movement, Approach, & Intersection Results**

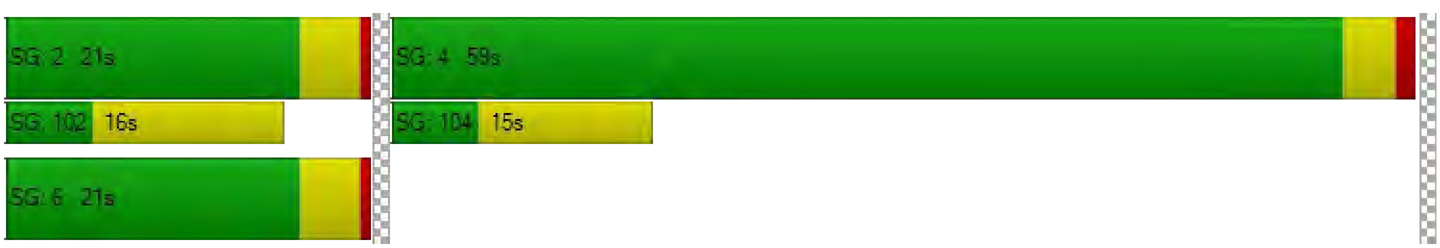
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.32 | 0.00 | 0.00 | 11.84 | 693.84 | 0.00 | 0.00 | 0.00 | 0.00 | 21.84 | 28.08 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | | 11.32 | | | 304.17 | | | 0.00 | | | 23.85 | |
| Approach LOS | | B | | | F | | | A | | | C | |
| d_I, Intersection Delay [s/veh] | | | | | | 155.79 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 2.058 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.971 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.172 | 2.750 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 231.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.237 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1382 | 470 | 0 | 1637 | 849 | 0 | 0 | 0 | 377 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1382 | 470 | 0 | 1637 | 849 | 0 | 0 | 0 | 377 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 353 | 120 | 0 | 418 | 212 | 0 | 0 | 0 | 94 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1410 | 480 | 0 | 1670 | 849 | 0 | 0 | 0 | 377 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.46 | 0.30 | 0.55 | | 0.11 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 911 | 472 | 911 | | 2113 | 1013 |
| d1, Uniform Delay [s] | 28.02 | 27.75 | 28.02 | | 7.12 | 14.64 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 251.79 | 46.06 | 379.02 | | 0.04 | 5.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.55 | 1.02 | 1.83 | | 0.18 | 0.94 |
| d, Delay for Lane Group [s/veh] | 279.81 | 73.82 | 407.04 | | 7.16 | 19.82 |
| Lane Group LOS | F | F | F | | A | B |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 26.74 | 14.49 | 37.48 | | 1.27 | 7.29 |
| 50th-Percentile Queue Length [ft/ln] | 668.55 | 362.19 | 936.92 | | 31.79 | 182.23 |
| 95th-Percentile Queue Length [veh/ln] | 43.29 | 20.96 | 61.29 | | 2.29 | 11.72 |
| 95th-Percentile Queue Length [ft/ln] | 1082.24 | 524.05 | 1532.35 | | 57.22 | 292.92 |

**Movement, Approach, & Intersection Results**

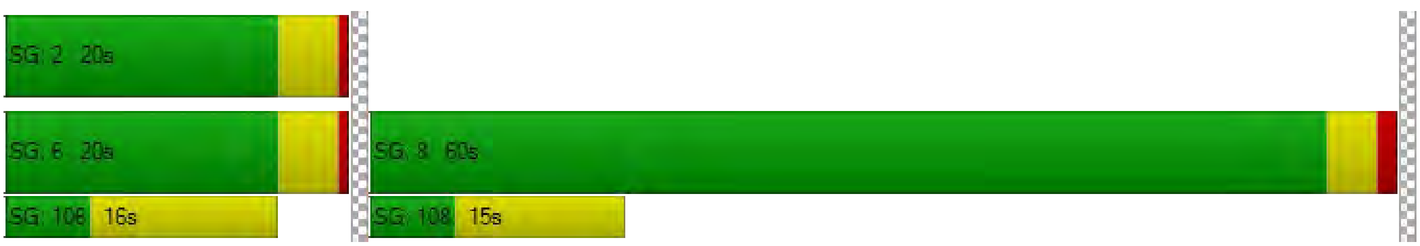
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 279.81 | 73.82 | 0.00 | 407.04 | 0.00 | 0.00 | 0.00 | 0.00 | 7.16 | 0.00 | 19.82 |
| Movement LOS | | F | F | | F | | | | | A | | B |
| d_A, Approach Delay [s/veh] | 227.49 | | | 407.04 | | | 0.00 | | | 16.24 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 231.31 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.237 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.151 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.599 | 2.478 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 66.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.102 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 782 | 555 | 2535 | 280 | 219 | 1966 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 782 | 555 | 2535 | 280 | 219 | 1966 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 210 | 149 | 681 | 75 | 59 | 528 |
| Total Analysis Volume [veh/h] | 841 | 597 | 2726 | 301 | 235 | 2114 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 94 | 94 | 94 | 94 | 94 | 94 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 64 | 64 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.53 | 0.53 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.39 | 0.54 | 0.19 | 0.68 | 0.42 |
| s, saturation flow rate [veh/h] | 3361 | 1543 | 5049 | 1579 | 347 | 4979 |
| c, Capacity [veh/h] | 719 | 330 | 2700 | 844 | 298 | 3387 |
| d1, Uniform Delay [s] | 36.75 | 36.55 | 21.75 | 12.47 | 28.34 | 8.31 |
| k, delay calibration | 0.08 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 78.88 | 375.54 | 7.55 | 0.09 | 18.75 | 0.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 1.81 | 1.01 | 0.36 | 0.79 | 0.62 |
| d, Delay for Lane Group [s/veh] | 115.63 | 412.08 | 29.30 | 12.56 | 47.10 | 8.38 |
| Lane Group LOS | F | F | F | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 15.90 | 41.76 | 19.68 | 3.43 | 3.06 | 6.66 |
| 50th-Percentile Queue Length [ft/ln] | 397.38 | 1044.07 | 492.09 | 85.84 | 76.56 | 166.52 |
| 95th-Percentile Queue Length [veh/ln] | 24.29 | 65.95 | 27.17 | 6.18 | 5.51 | 10.89 |
| 95th-Percentile Queue Length [ft/ln] | 607.28 | 1648.86 | 679.17 | 154.51 | 137.82 | 272.34 |

**Movement, Approach, & Intersection Results**

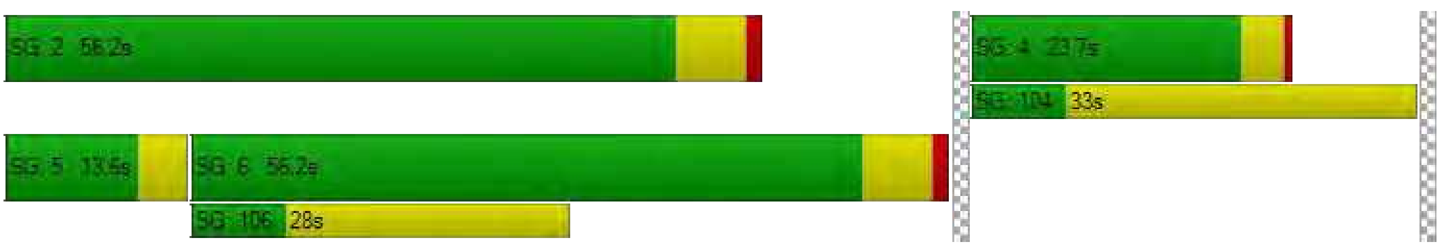
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 115.63 | 412.08 | 29.30 | 12.56 | 47.10 | 8.38 |
| Movement LOS | F | F | F | B | D | A |
| d_A, Approach Delay [s/veh] | 238.70 | | 27.64 | | 12.25 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 66.88 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.102 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.40 | 36.40 | 36.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.961 | 3.429 | 3.385 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 428 | 1070 | 1070 |
| d_b, Bicycle Delay [s] | 29.01 | 10.12 | 10.12 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.224 | 2.852 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.970 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1029 | 89 | 2657 | 93 | 69 | 2437 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1029 | 89 | 2657 | 93 | 69 | 2437 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 263 | 23 | 678 | 24 | 18 | 622 |
| Total Analysis Volume [veh/h] | 1050 | 91 | 2711 | 95 | 70 | 2487 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 95 | 95 | 95 | 95 | 95 | 95 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 25 | 25 | 50 | 50 | 5 | 59 |
| g / C, Green / Cycle | 0.26 | 0.26 | 0.53 | 0.53 | 0.05 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.06 | 0.54 | 0.06 | 0.04 | 0.50 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 914 | 426 | 2670 | 846 | 93 | 3096 |
| d1, Uniform Delay [s] | 34.88 | 27.21 | 22.38 | 11.24 | 44.36 | 13.52 |
| k, delay calibration | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 68.75 | 0.09 | 9.44 | 0.02 | 4.57 | 0.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.15 | 0.21 | 1.02 | 0.11 | 0.75 | 0.80 |
| d, Delay for Lane Group [s/veh] | 103.63 | 27.30 | 31.82 | 11.26 | 48.93 | 13.71 |
| Lane Group LOS | F | C | F | B | D | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 19.09 | 1.62 | 19.01 | 0.90 | 1.68 | 10.63 |
| 50th-Percentile Queue Length [ft/ln] | 477.33 | 40.54 | 475.30 | 22.47 | 41.92 | 265.72 |
| 95th-Percentile Queue Length [veh/ln] | 28.40 | 2.92 | 26.47 | 1.62 | 3.02 | 15.98 |
| 95th-Percentile Queue Length [ft/ln] | 710.00 | 72.96 | 661.85 | 40.44 | 75.45 | 399.38 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

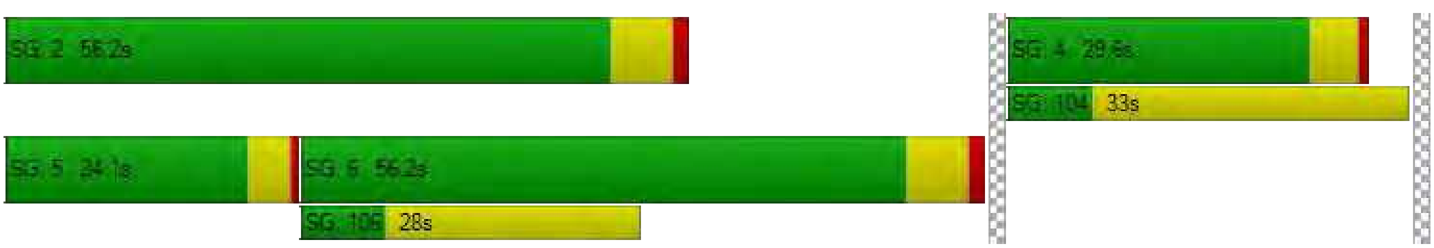
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 103.63 | 27.30 | 31.82 | 11.26 | 48.93 | 13.71 |
| Movement LOS | F | C | F | B | D | B |
| d_A, Approach Delay [s/veh] | 97.54 | | 31.12 | | 14.68 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 36.31 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.970 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.99 | 36.99 | 36.99 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.398 | 3.887 | 3.716 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 528 | 1056 | 1056 |
| d_b, Bicycle Delay [s] | 25.65 | 10.55 | 10.55 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.103 | 2.966 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bafront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.941 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 581 | 164 | 2490 | 60 | 48 | 1306 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 581 | 164 | 2490 | 60 | 48 | 1306 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 148 | 42 | 635 | 15 | 12 | 333 |
| Total Analysis Volume [veh/h] | 593 | 167 | 2541 | 61 | 49 | 1333 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 87 | 87 | 87 | 87 | 87 | 87 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.57 | 0.57 | 0.66 | 0.66 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.56 | 0.04 | 0.10 | 0.30 |
| s, saturation flow rate [veh/h] | 1438 | 1365 | 4507 | 1406 | 471 | 4470 |
| c, Capacity [veh/h] | 330 | 313 | 2588 | 807 | 342 | 2936 |
| d1, Uniform Delay [s] | 33.54 | 33.54 | 18.10 | 8.26 | 20.44 | 7.31 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 104.70 | 112.89 | 2.35 | 0.01 | 0.07 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 1.19 | 0.98 | 0.08 | 0.14 | 0.45 |
| d, Delay for Lane Group [s/veh] | 138.25 | 146.43 | 20.45 | 8.27 | 20.51 | 7.35 |
| Lane Group LOS | F | F | C | A | C | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 16.35 | 16.23 | 14.93 | 0.48 | 0.14 | 3.44 |
| 50th-Percentile Queue Length [ft/ln] | 408.81 | 405.70 | 373.36 | 11.88 | 3.46 | 86.09 |
| 95th-Percentile Queue Length [veh/ln] | 24.96 | 24.97 | 21.27 | 0.86 | 0.25 | 6.20 |
| 95th-Percentile Queue Length [ft/ln] | 624.01 | 624.28 | 531.80 | 21.39 | 6.23 | 154.96 |

**Movement, Approach, & Intersection Results**

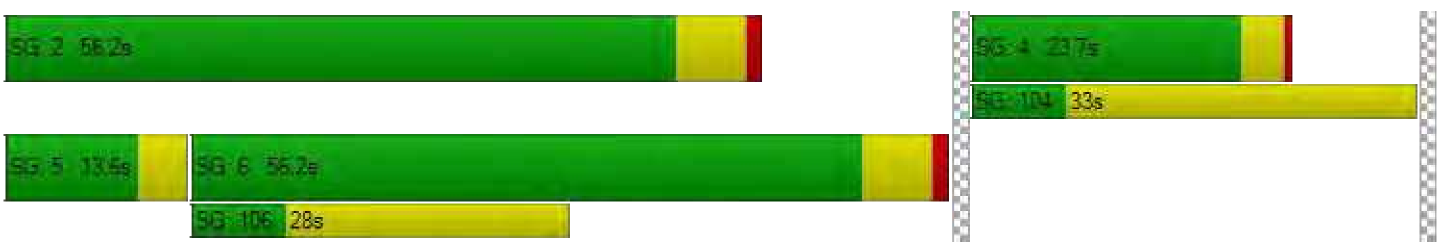
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 141.12 | 146.43 | 20.45 | 8.27 | 20.51 | 7.35 |
| Movement LOS | F | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 142.26 | | 20.17 | | 7.82 | |
| Approach LOS | F | | C | | A | |
| d_I, Intersection Delay [s/veh] | 36.13 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.941 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.21 | 33.21 | 33.21 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.383 | 3.222 | 3.222 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 460 | 1149 | 1149 |
| d_b, Bicycle Delay [s] | 25.81 | 7.88 | 7.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.814 | 2.991 | 2.320 |
| Bicycle LOS | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 181.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.656 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 397 | 386 | 167 | 285 | 101 | 336 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 397 | 386 | 167 | 285 | 101 | 336 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 114 | 111 | 48 | 82 | 29 | 97 |
| Total Analysis Volume [veh/h] | 456 | 444 | 192 | 328 | 116 | 386 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 900 | 520 | 542 |
| Degree of Utilization, x | 1.66 | 1.01 | 0.93 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 51.15 | 14.30 | 11.49 |
| 95th-Percentile Queue Length [ft] | 1278.69 | 357.41 | 287.16 |
| Approach Delay [s/veh] | 320.51 | 68.72 | 48.50 |
| Approach LOS | F | F | E |
| Intersection Delay [s/veh] | 181.35 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.888 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 179 | 2541 | 24 | 49 | 1374 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 179 | 2541 | 24 | 49 | 1374 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 49 | 698 | 7 | 13 | 377 |
| Total Analysis Volume [veh/h] | 0 | 197 | 2792 | 26 | 54 | 1510 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 15 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.18 | 0.61 | 0.61 | 0.70 | 0.70 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.62 | 0.02 | 0.25 | 0.35 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 214 | 4342 |
| c, Capacity [veh/h] | 222 | 2761 | 862 | 224 | 3035 |
| d1, Uniform Delay [s] | 32.75 | 15.91 | 6.31 | 20.33 | 5.68 |
| k, delay calibration | 0.13 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.61 | 8.03 | 0.01 | 0.20 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 1.01 | 0.03 | 0.24 | 0.50 |
| d, Delay for Lane Group [s/veh] | 46.36 | 23.94 | 6.31 | 20.53 | 5.73 |
| Lane Group LOS | D | F | A | C | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.53 | 16.08 | 0.16 | 0.23 | 3.05 |
| 50th-Percentile Queue Length [ft/ln] | 113.26 | 402.00 | 3.96 | 5.83 | 76.29 |
| 95th-Percentile Queue Length [veh/ln] | 8.02 | 22.86 | 0.28 | 0.42 | 5.49 |
| 95th-Percentile Queue Length [ft/ln] | 200.53 | 571.56 | 7.12 | 10.49 | 137.32 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Movement, Approach, & Intersection Results**

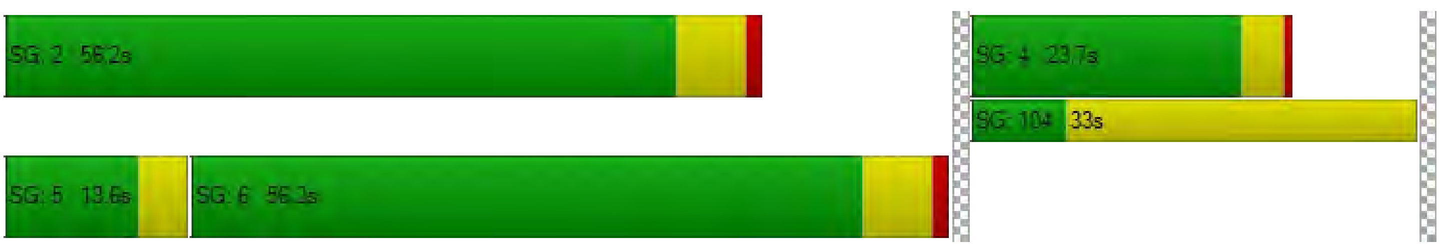
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 46.36 | 23.94 | 6.31 | 20.53 | 5.73 |
| Movement LOS | | D | F | A | C | A |
| d_A, Approach Delay [s/veh] | 46.36 | | 23.78 | | 6.24 | |
| Approach LOS | D | | C | | A | |
| d_I, Intersection Delay [s/veh] | 18.76 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.888 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.30 | 30.60 | 30.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.911 | 3.191 | 3.223 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 489 | 1224 | 1224 |
| d_b, Bicycle Delay [s] | 23.31 | 6.16 | 6.16 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.110 | 2.420 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 101.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.191 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 95 | 484 | 27 | 131 | 346 | 51 | 325 | 21 | 605 | 270 | 18 | 678 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 95 | 484 | 27 | 131 | 346 | 51 | 325 | 21 | 605 | 270 | 18 | 678 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 138 | 8 | 37 | 98 | 14 | 92 | 6 | 172 | 77 | 5 | 193 |
| Total Analysis Volume [veh/h] | 108 | 550 | 31 | 149 | 393 | 58 | 369 | 24 | 688 | 307 | 20 | 770 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Overlap | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 3 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 1,3 | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 24 | 47 | 0 | 10 | 33 | 0 | 0 | 31 | 31 | 0 | 42 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 20 | 20 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | No | | No | |
| Maximum Recall | No | No | | No | No | | | No | No | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 115 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 11 | 34 | 7 | 30 | 28 | 77 | 30 | 30 |
| g / C, Green / Cycle | 0.10 | 0.29 | 0.06 | 0.26 | 0.24 | 0.67 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.32 | 0.04 | 0.26 | 0.22 | 0.45 | 0.36 | 0.35 |
| s, saturation flow rate [veh/h] | 1767 | 1838 | 3431 | 1766 | 1772 | 1540 | 1505 | 1577 |
| c, Capacity [veh/h] | 171 | 540 | 216 | 459 | 434 | 1032 | 440 | 410 |
| d1, Uniform Delay [s] | 50.14 | 40.75 | 52.97 | 42.44 | 42.30 | 11.10 | 44.19 | 42.70 |
| k, delay calibration | 0.11 | 0.50 | 0.11 | 0.44 | 0.34 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.82 | 60.80 | 3.91 | 35.17 | 19.01 | 3.41 | 128.86 | 167.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 1.08 | 0.69 | 0.98 | 0.91 | 0.67 | 1.25 | 1.34 |
| d, Delay for Lane Group [s/veh] | 53.96 | 101.55 | 56.89 | 77.61 | 61.31 | 14.51 | 173.05 | 210.65 |
| Lane Group LOS | D | F | E | E | E | B | F | F |
| Critical Lane Group | No | No | No | Yes | Yes | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.18 | 24.20 | 2.23 | 17.09 | 13.05 | 10.34 | 28.57 | 30.65 |
| 50th-Percentile Queue Length [ft/ln] | 79.46 | 605.11 | 55.76 | 427.20 | 326.32 | 258.54 | 714.19 | 766.14 |
| 95th-Percentile Queue Length [veh/ln] | 5.72 | 33.81 | 4.01 | 23.87 | 18.98 | 15.62 | 42.15 | 46.25 |
| 95th-Percentile Queue Length [ft/ln] | 143.03 | 845.35 | 100.36 | 596.68 | 474.45 | 390.39 | 1053.87 | 1156.30 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 53.96 | 101.55 | 101.55 | 56.89 | 77.61 | 77.61 | 61.31 | 61.31 | 14.51 | 173.05 | 173.05 | 199.83 |
| Movement LOS | D | F | F | E | E | E | E | E | B | F | F | F |
| d_A, Approach Delay [s/veh] | 94.09 | | | 72.46 | | | 31.53 | | | 191.85 | | |
| Approach LOS | F | | | E | | | C | | | F | | |
| d_I, Intersection Delay [s/veh] | 101.77 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.191 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.17 | 47.17 | 47.17 | 47.17 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.064 | 2.758 | 2.364 | 2.460 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 746 | 503 | 468 | 659 |
| d_b, Bicycle Delay [s] | 22.66 | 32.29 | 33.81 | 25.91 |
| I_b,int, Bicycle LOS Score for Intersection | 2.696 | 2.550 | 3.343 | 3.370 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 141.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.368 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Volumes**

| Name | | Chrysler Drive | | | | | | Constitution Drive | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 349 | 49 | 39 | 344 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 349 | 49 | 39 | 344 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 87 | 12 | 10 | 86 | 38 | 1 | 15 | 2 | 60 | 0 | 123 | 20 |
| Total Analysis Volume [veh/h] | 349 | 49 | 39 | 344 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 8 | | | 7 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 0 | | | 7 | | | 8 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 0 | | | 0 | | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 0 | | | 0 | | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 38 | 22 | 22 | 18 | 38 | 38 |
| g / C, Green / Cycle | 0.42 | 0.24 | 0.24 | 0.20 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.81 | 0.21 | 0.09 | 0.34 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 537 | 1609 | 1680 | 902 | 1628 | 1472 |
| c, Capacity [veh/h] | 299 | 391 | 408 | 182 | 728 | 622 |
| d1, Uniform Delay [s] | 36.05 | 32.89 | 28.45 | 36.00 | 18.20 | 18.45 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.47 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 226.22 | 6.54 | 0.57 | 330.50 | 1.69 | 2.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.46 | 0.88 | 0.38 | 1.69 | 0.41 | 0.44 |
| d, Delay for Lane Group [s/veh] | 262.27 | 39.43 | 29.02 | 366.50 | 19.89 | 20.68 |
| Lane Group LOS | F | D | C | F | B | C |
| Critical Lane Group | Yes | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 25.37 | 7.75 | 2.77 | 20.61 | 4.48 | 4.24 |
| 50th-Percentile Queue Length [ft/ln] | 634.29 | 193.68 | 69.30 | 515.15 | 112.12 | 105.91 |
| 95th-Percentile Queue Length [veh/ln] | 41.44 | 12.31 | 4.99 | 34.17 | 7.96 | 7.61 |
| 95th-Percentile Queue Length [ft/ln] | 1035.95 | 307.80 | 124.75 | 854.33 | 198.95 | 190.30 |

**Movement, Approach, & Intersection Results**

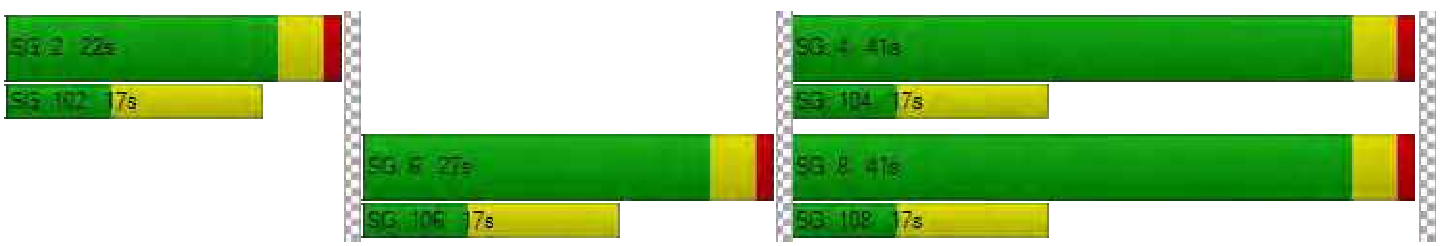
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 262.27 | 262.27 | 262.27 | 39.43 | 29.02 | 29.02 | 366.50 | 366.50 | 366.50 | 19.89 | 20.20 | 20.68 |
| Movement LOS | F | F | F | D | C | C | F | F | F | B | C | C |
| d_A, Approach Delay [s/veh] | 262.27 | | | 36.23 | | | 366.50 | | | 20.27 | | |
| Approach LOS | F | | | D | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 141.80 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.368 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.72 | 34.72 | 34.72 | 34.72 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.430 | 2.117 | 2.642 | 2.161 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 821 | 511 | 400 | 821 |
| d_b, Bicycle Delay [s] | 15.64 | 24.98 | 28.85 | 15.64 |
| I_b,int, Bicycle LOS Score for Intersection | 2.281 | 2.380 | 2.066 | 2.029 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-6)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 966.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.707 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 118 | 76 | 232 | 669 | 299 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 118 | 76 | 232 | 669 | 299 | 22 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 23 | 70 | 202 | 90 | 7 |
| Total Analysis Volume [veh/h] | 142 | 92 | 280 | 806 | 360 | 27 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 2.71 | 0.14 | 0.24 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 966.63 | 903.42 | 9.13 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 22.82 | 22.82 | 0.95 | 0.95 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 570.38 | 570.38 | 23.87 | 23.87 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 941.78 | | 2.35 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 130.60 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/ Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.076 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 43 | 209 | 35 | 15 | 34 | 106 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 209 | 35 | 15 | 34 | 106 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 65 | 11 | 5 | 10 | 33 |
| Total Analysis Volume [veh/h] | 53 | 258 | 43 | 19 | 42 | 131 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.00 | 0.00 | 0.00 | 0.08 | 0.13 |
| d_M, Delay for Movement [s/veh] | 7.48 | 0.00 | 0.00 | 0.00 | 12.73 | 9.88 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.00 | 0.00 | 0.80 | 0.80 |
| 95th-Percentile Queue Length [ft/ln] | 2.74 | 2.74 | 0.00 | 0.00 | 19.88 | 19.88 |
| d_A, Approach Delay [s/veh] | 1.27 | | 0.00 | | 10.57 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 4.07 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.694 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1188 | 338 | 150 | 1063 | 521 | 199 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1188 | 338 | 150 | 1063 | 521 | 199 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 297 | 85 | 38 | 266 | 130 | 50 |
| Total Analysis Volume [veh/h] | 1188 | 338 | 150 | 1063 | 521 | 199 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 57 | 0 | 16 | 73 | 67 | 0 |
| Amber [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 74 | 0 | 13 | 87 | 53 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 68 | 68 | 68 | 68 | 68 | 68 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 34 | 34 | 5 | 43 | 18 | 18 |
| g / C, Green / Cycle | 0.50 | 0.50 | 0.07 | 0.63 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.41 | 0.44 | 0.04 | 0.30 | 0.21 | 0.21 |
| s, saturation flow rate [veh/h] | 1870 | 1734 | 3459 | 3560 | 1781 | 1667 |
| c, Capacity [veh/h] | 929 | 862 | 246 | 2231 | 457 | 428 |
| d1, Uniform Delay [s] | 14.63 | 15.46 | 30.86 | 6.80 | 23.86 | 23.95 |
| k, delay calibration | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.88 | 3.51 | 2.43 | 0.16 | 3.45 | 3.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.89 | 0.61 | 0.48 | 0.81 | 0.82 |
| d, Delay for Lane Group [s/veh] | 16.51 | 18.97 | 33.29 | 6.96 | 27.31 | 27.90 |
| Lane Group LOS | B | B | C | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.49 | 9.30 | 1.20 | 2.89 | 5.67 | 5.45 |
| 50th-Percentile Queue Length [ft/ln] | 212.19 | 232.44 | 30.07 | 72.24 | 141.66 | 136.31 |
| 95th-Percentile Queue Length [veh/ln] | 13.27 | 14.30 | 2.17 | 5.20 | 9.57 | 9.28 |
| 95th-Percentile Queue Length [ft/ln] | 331.64 | 357.46 | 54.13 | 130.03 | 239.26 | 232.04 |

**Movement, Approach, & Intersection Results**

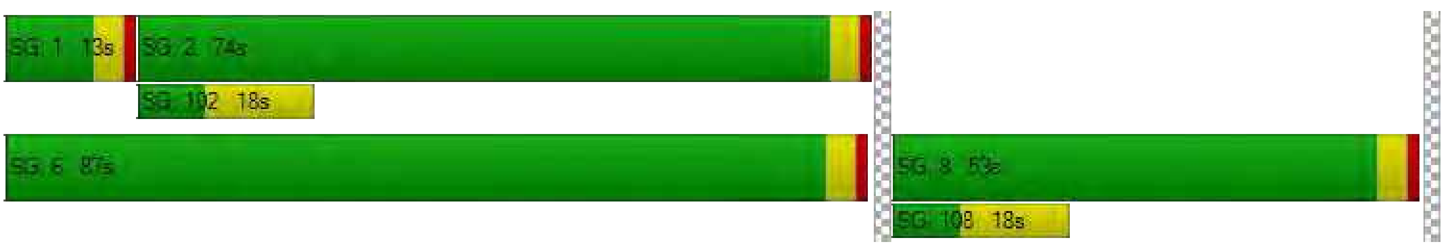
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.39 | 18.97 | 33.29 | 6.96 | 27.48 | 27.90 |
| Movement LOS | B | B | C | A | C | C |
| d_A, Approach Delay [s/veh] | 17.74 | | 10.22 | | 27.60 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 17.15 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.694 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 24.03 | 24.03 | 24.03 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.127 | 3.001 | 2.410 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 2050 | 2431 | 1435 |
| d_b, Bicycle Delay [s] | 0.02 | 1.58 | 2.72 |
| I_b,int, Bicycle LOS Score for Intersection | 2.819 | 2.560 | 2.748 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 11.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ✛ | | | ✛ | | | ✛ | | | ✛ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 23 | 14 | 67 | 77 | 30 | 10 | 14 | 26 | 41 | 22 | 20 |
| Total Analysis Volume [veh/h] | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 370 | | | 306 | | | 750 | | | 184 | | |
| Exiting Flow Rate [veh/h] | 582 | | | 214 | | | 262 | | | 389 | | |
| Demand Flow Rate [veh/h] | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 |
| Adjusted Demand Flow Rate [veh/h] | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 202 | 706 | 203 | 337 |
| Capacity of Entry and Bypass Lanes [veh/h] | 946 | 1011 | 643 | 1145 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 928 | 991 | 630 | 1122 |
| X, volume / capacity | 0.21 | 0.70 | 0.32 | 0.29 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | C | A | A |
| 95th-Percentile Queue Length [veh] | 0.81 | 6.00 | 1.35 | 1.23 |
| 95th-Percentile Queue Length [ft] | 20.18 | 149.92 | 33.80 | 30.87 |
| Approach Delay [s/veh] | 6.00 | 15.10 | 9.91 | 6.01 |
| Approach LOS | A | C | A | A |
| Intersection Delay [s/veh] | 10.99 | | | |
| Intersection LOS | B | | | |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Cumulative + P PM.pdf

Scenario 20 Cumulative PM (2040 vols)+Project

12/30/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 969 | 1201 | 1311 | 427 | 3908 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 50 | 1326 | 7 | 76 | 1048 | 268 | 15 | 6 | 414 | 307 | 6 | 4 | 3527 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 | 3401 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 61 | 441 | 723 | 56 | 100 | 26 | 2 | 65 | 114 | 310 | 2645 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 541 | 468 | 640 | 469 | 104 | 2359 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 775 | 138 | 323 | 713 | 2 | 2546 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3775 | 20 | 359 | 970 | 68 | 1893 | 7085 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 204 | 95 | 1142 | 159 | 332 | 146 | 76 | 2280 | 407 | 559 | 862 | 34 | 6296 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 44 | 1292 | 23 | 284 | 1103 | 54 | 123 | 9 | 35 | 75 | 16 | 334 | 3392 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 269 | 933 | 1447 | 52 | 163 | 114 | 2978 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 524 | 57 | 1184 | 274 | 237 | 3276 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 | 5045 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 40 | 1319 | 809 | 294 | 350 | 40 | 2852 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 | 1946 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 21 | 693 | 5 | 2 | 695 | 109 | 147 | 2 | 49 | 15 | 4 | 6 | 1748 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 123 | 5 | 84 | 53 | 58 | 1912 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 281 | 271 | 372 | 129 | 301 | 136 | 478 | 184 | 277 | 684 | 22 | 3165 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1912 | 1595 | 570 | 891 | 4968 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 | 1601 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 196 | 40 | 1730 | 12 | 31 | 5 | 9 | 763 | 232 | 2687 | 845 | 14 | 6564 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1036 | 199 | 1150 | 863 | 824 | 352 | 4424 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1382 | 470 | 1637 | 849 | 377 | 859 | 5574 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 782 | 555 | 2535 | 280 | 219 | 1966 | 6337 |

Generated with PTV VISTRO
Version 2021 (SP 0-6)

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 1029 | 89 | 2657 | 93 | 69 | 2437 | 6374 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 581 | 164 | 2490 | 60 | 48 | 1306 | 4649 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 397 | 386 | 167 | 285 | 101 | 336 | 1672 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 179 | 2541 | 24 | 49 | 1374 | 4167 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 95 | 484 | 27 | 131 | 346 | 51 | 325 | 21 | 605 | 270 | 18 | 678 | 3051 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 349 | 49 | 39 | 344 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 | 1810 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 118 | 76 | 232 | 669 | 299 | 22 | 1416 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 43 | 209 | 35 | 15 | 34 | 106 | 442 |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1188 | 338 | 150 | 1063 | 521 | 199 | 3459 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 | 1419 |

Vistro File: P:\...\Vistro_AllScenarios_PM_2021-12-29_ChilconConstitution_OZ.vistro
Report File: P:\...\Cumulative + P PM.pdf

Scenario 20 Cumulative PM (2040 vols)+Project

12/30/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 969 | 1201 | 1311 | 427 | 3908 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **969** | **1201** | **1311** | **427** | **3908** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 50 | 1326 | 7 | 76 | 1048 | 268 | 15 | 6 | 414 | 307 | 6 | 4 | 3527 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **50** | **1326** | **7** | **76** | **1048** | **268** | **15** | **6** | **414** | **307** | **6** | **4** | **3527** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 | 3401 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **296** | **675** | **54** | **13** | **1013** | **354** | **474** | **34** | **235** | **126** | **87** | **40** | **3401** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 61 | 441 | 723 | 56 | 100 | 26 | 2 | 65 | 114 | 310 | 2645 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **61** | **441** | **723** | **56** | **100** | **26** | **2** | **65** | **114** | **310** | **2645** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 541 | 468 | 640 | 469 | 104 | 2359 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **541** | **468** | **640** | **469** | **104** | **2359** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 775 | 138 | 323 | 713 | 2 | 2546 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **224** | **0** | **271** | **2** | **775** | **138** | **323** | **713** | **2** | **2546** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3775 | 20 | 359 | 970 | 68 | 1893 | 7085 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3775** | **20** | **359** | **970** | **68** | **1893** | **7085** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 204 | 95 | 1142 | 159 | 332 | 146 | 76 | 2280 | 407 | 559 | 862 | 34 | 6296 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **204** | **95** | **1142** | **159** | **332** | **146** | **76** | **2280** | **407** | **559** | **862** | **34** | **6296** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 44 | 1292 | 23 | 284 | 1103 | 54 | 123 | 9 | 35 | 75 | 16 | 334 | 3392 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **44** | **1292** | **23** | **284** | **1103** | **54** | **123** | **9** | **35** | **75** | **16** | **334** | **3392** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 269 | 933 | 1447 | 52 | 163 | 114 | 2978 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **269** | **933** | **1447** | **52** | **163** | **114** | **2978** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 524 | 57 | 1184 | 274 | 237 | 3276 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **524** | **57** | **1184** | **274** | **237** | **3276** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 | 5045 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1389** | **355** | **78** | **1354** | **26** | **27** | **201** | **637** | **369** | **285** | **56** | **5045** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 40 | 1319 | 809 | 294 | 350 | 40 | 2852 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1319** | **809** | **294** | **350** | **40** | **2852** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 | 1946 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1052** | **4** | **29** | **541** | **18** | **143** | **33** | **39** | **21** | **10** | **47** | **1946** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 21 | 693 | 5 | 2 | 695 | 109 | 147 | 2 | 49 | 15 | 4 | 6 | 1748 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **21** | **693** | **5** | **2** | **695** | **109** | **147** | **2** | **49** | **15** | **4** | **6** | **1748** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 123 | 5 | 84 | 53 | 58 | 1912 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **119** | **54** | **703** | **10** | **44** | **123** | **5** | **84** | **53** | **58** | **1912** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 281 | 271 | 372 | 129 | 301 | 136 | 478 | 184 | 277 | 684 | 22 | 3165 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **281** | **271** | **372** | **129** | **301** | **136** | **478** | **184** | **277** | **684** | **22** | **3165** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1912 | 1595 | 570 | 891 | 4968 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1912** | **1595** | **570** | **891** | **4968** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 | 1601 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **402** | **18** | **76** | **797** | **36** | **21** | **124** | **23** | **7** | **16** | **59** | **1601** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 196 | 40 | 1730 | 12 | 31 | 5 | 9 | 763 | 232 | 2687 | 845 | 14 | 6564 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **196** | **40** | **1730** | **12** | **31** | **5** | **9** | **763** | **232** | **2687** | **845** | **14** | **6564** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1036 | 199 | 1150 | 863 | 824 | 352 | 4424 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1036** | **199** | **1150** | **863** | **824** | **352** | **4424** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1382 | 470 | 1637 | 849 | 377 | 859 | 5574 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1382** | **470** | **1637** | **849** | **377** | **859** | **5574** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 782 | 555 | 2535 | 280 | 219 | 1966 | 6337 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **782** | **555** | **2535** | **280** | **219** | **1966** | **6337** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 1029 | 89 | 2657 | 93 | 69 | 2437 | 6374 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1029** | **89** | **2657** | **93** | **69** | **2437** | **6374** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 581 | 164 | 2490 | 60 | 48 | 1306 | 4649 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **581** | **164** | **2490** | **60** | **48** | **1306** | **4649** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 397 | 386 | 167 | 285 | 101 | 336 | 1672 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **397** | **386** | **167** | **285** | **101** | **336** | **1672** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 179 | 2541 | 24 | 49 | 1374 | 4167 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **2541** | **24** | **49** | **1374** | **4167** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 95 | 484 | 27 | 131 | 346 | 51 | 325 | 21 | 605 | 270 | 18 | 678 | 3051 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **95** | **484** | **27** | **131** | **346** | **51** | **325** | **21** | **605** | **270** | **18** | **678** | **3051** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 349 | 49 | 39 | 344 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 | 1810 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **349** | **49** | **39** | **344** | **150** | **3** | **60** | **9** | **238** | **0** | **490** | **79** | **1810** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 118 | 76 | 232 | 669 | 299 | 22 | 1416 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **118** | **76** | **232** | **669** | **299** | **22** | **1416** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 43 | 209 | 35 | 15 | 34 | 106 | 442 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **43** | **209** | **35** | **15** | **34** | **106** | **442** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1188 | 338 | 150 | 1063 | 521 | 199 | 3459 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1188** | **338** | **150** | **1063** | **521** | **199** | **3459** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 50 | 91 | 57 | 267 | 306 | 119 | 39 | 57 | 103 | 162 | 88 | 80 | 1419 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **50** | **91** | **57** | **267** | **306** | **119** | **39** | **57** | **103** | **162** | **88** | **80** | **1419** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 442 | 909 | 82 | 168 |
| 2 | 429 | 882 | 80 | 163 |
| 3 | 420 | 864 | 78 | 160 |
| 4 | 393 | 809 | 73 | 150 |
| 5 | 349 | 718 | 65 | 133 |
| 6 | 345 | 709 | 64 | 131 |
| 7 | 340 | 700 | 63 | 129 |
| 8 | 309 | 636 | 57 | 118 |
| 9 | 305 | 627 | 57 | 116 |
| 10 | 301 | 618 | 56 | 114 |
| 11 | 261 | 536 | 48 | 99 |
| 12 | 243 | 500 | 45 | 92 |
| 13 | 239 | 491 | 44 | 91 |
| 14 | 177 | 364 | 33 | 67 |
| 15 | 177 | 364 | 33 | 67 |
| 16 | 124 | 255 | 23 | 47 |
| 17 | 71 | 145 | 13 | 27 |
| 18 | 71 | 145 | 13 | 27 |
| 19 | 40 | 82 | 7 | 15 |
| 20 | 22 | 45 | 4 | 8 |
| 21 | 13 | 27 | 2 | 5 |
| 22 | 4 | 9 | 1 | 2 |
| 23 | 4 | 9 | 1 | 2 |
| 24 | 4 | 9 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1351 | 1 | 168 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1311 | 1 | 163 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1284 | 1 | 160 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1202 | 1 | 150 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 1067 | 1 | 133 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 1054 | 1 | 131 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 1040 | 1 | 129 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 945 | 1 | 118 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 932 | 1 | 116 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 919 | 1 | 114 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 797 | 1 | 99 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 12 | 1 | 743 | 1 | 92 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 730 | 1 | 91 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 541 | 1 | 67 | No | No | No | No | No | No | Yes | Yes | No | No |
| 15 | 1 | 541 | 1 | 67 | No | No | No | No | No | No | Yes | Yes | No | No |
| 16 | 1 | 379 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 216 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 216 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 122 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 67 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 40 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 7 | 10 | 13 | 11 | 13 | 15 | 15 | 9 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.8 | 14.3 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:16 | 0:40 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 82 | 168 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1601 | 1601 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 452 | 783 | 437 |
| 2 | 438 | 760 | 424 |
| 3 | 429 | 744 | 415 |
| 4 | 402 | 697 | 389 |
| 5 | 357 | 619 | 345 |
| 6 | 353 | 611 | 341 |
| 7 | 348 | 603 | 336 |
| 8 | 316 | 548 | 306 |
| 9 | 312 | 540 | 302 |
| 10 | 307 | 532 | 297 |
| 11 | 267 | 462 | 258 |
| 12 | 249 | 431 | 240 |
| 13 | 244 | 423 | 236 |
| 14 | 181 | 313 | 175 |
| 15 | 181 | 313 | 175 |
| 16 | 127 | 219 | 122 |
| 17 | 72 | 125 | 70 |
| 18 | 72 | 125 | 70 |
| 19 | 41 | 70 | 39 |
| 20 | 23 | 39 | 22 |
| 21 | 14 | 23 | 13 |
| 22 | 5 | 8 | 4 |
| 23 | 5 | 8 | 4 |
| 24 | 5 | 8 | 4 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1235 | 1 | 437 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1198 | 1 | 424 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1173 | 1 | 415 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1099 | 1 | 389 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 976 | 1 | 345 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 6 | 1 | 964 | 1 | 341 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 7 | 1 | 951 | 1 | 336 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 8 | 1 | 864 | 1 | 306 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 852 | 1 | 302 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 839 | 1 | 297 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 729 | 1 | 258 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 680 | 1 | 240 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 13 | 1 | 667 | 1 | 236 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 14 | 1 | 494 | 1 | 175 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 494 | 1 | 175 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 346 | 1 | 122 | No | No | No | Yes | No | No | No | No | No | No |
| 17 | 1 | 197 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 197 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 111 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 62 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 37 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 15 | 15 | 16 | 10 | 13 | 13 | 15 | 13 | 7 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 48.5 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 5:53 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 437 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1672 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 321 | 901 | 194 |
| 2 | 311 | 874 | 188 |
| 3 | 305 | 856 | 184 |
| 4 | 286 | 802 | 173 |
| 5 | 254 | 712 | 153 |
| 6 | 250 | 703 | 151 |
| 7 | 247 | 694 | 149 |
| 8 | 225 | 631 | 136 |
| 9 | 221 | 622 | 134 |
| 10 | 218 | 613 | 132 |
| 11 | 189 | 532 | 114 |
| 12 | 177 | 496 | 107 |
| 13 | 173 | 487 | 105 |
| 14 | 128 | 360 | 78 |
| 15 | 128 | 360 | 78 |
| 16 | 90 | 252 | 54 |
| 17 | 51 | 144 | 31 |
| 18 | 51 | 144 | 31 |
| 19 | 29 | 81 | 17 |
| 20 | 16 | 45 | 10 |
| 21 | 10 | 27 | 6 |
| 22 | 3 | 9 | 2 |
| 23 | 3 | 9 | 2 |
| 24 | 3 | 9 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1222 | 1 | 194 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1185 | 1 | 188 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1161 | 1 | 184 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1088 | 1 | 173 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 966 | 1 | 153 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 953 | 1 | 151 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 941 | 1 | 149 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 856 | 1 | 136 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 843 | 1 | 134 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 831 | 1 | 132 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 721 | 1 | 114 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 673 | 1 | 107 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 660 | 1 | 105 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 488 | 1 | 78 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 488 | 1 | 78 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 342 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 195 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 195 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 110 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 61 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 37 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 6 | 10 | 13 | 13 | 10 | 13 | 13 | 15 | 8 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 941.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 50:45 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 194 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1416 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 252 | 50 | 140 |
| 2 | 244 | 49 | 136 |
| 3 | 239 | 48 | 133 |
| 4 | 224 | 45 | 125 |
| 5 | 199 | 40 | 111 |
| 6 | 197 | 39 | 109 |
| 7 | 194 | 39 | 108 |
| 8 | 176 | 35 | 98 |
| 9 | 174 | 35 | 97 |
| 10 | 171 | 34 | 95 |
| 11 | 149 | 30 | 83 |
| 12 | 139 | 28 | 77 |
| 13 | 136 | 27 | 76 |
| 14 | 101 | 20 | 56 |
| 15 | 101 | 20 | 56 |
| 16 | 71 | 14 | 39 |
| 17 | 40 | 8 | 22 |
| 18 | 40 | 8 | 22 |
| 19 | 23 | 5 | 13 |
| 20 | 13 | 3 | 7 |
| 21 | 8 | 2 | 4 |
| 22 | 3 | 1 | 1 |
| 23 | 3 | 1 | 1 |
| 24 | 3 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 302 | 1 | 140 | No | No | No | Yes | No | No | No | No | No | No |
| 2 | 1 | 293 | 1 | 136 | No | No | No | Yes | No | No | No | No | No | No |
| 3 | 1 | 287 | 1 | 133 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 269 | 1 | 125 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 239 | 1 | 111 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 236 | 1 | 109 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 233 | 1 | 108 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 211 | 1 | 98 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 209 | 1 | 97 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 205 | 1 | 95 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 179 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 167 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 163 | 1 | 76 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 121 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 121 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 85 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 48 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 48 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 28 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 16 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 10 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:24 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 140 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 442 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-6)

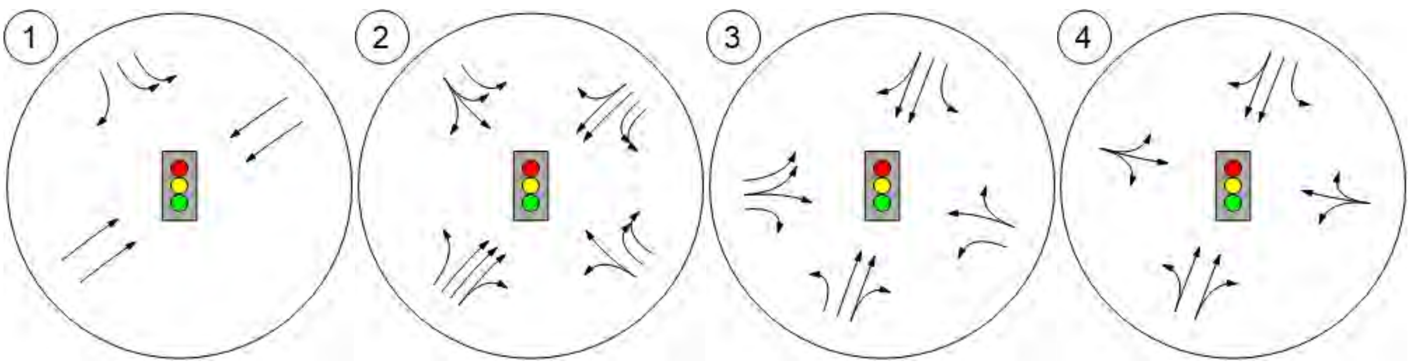
Study Intersections

Generated with PTV VISTRO

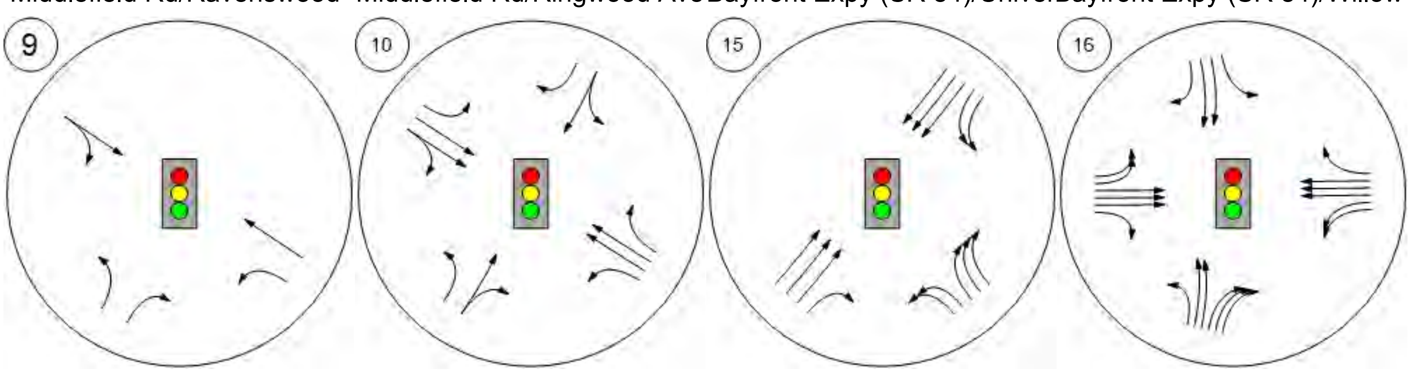
Version 2021 (SP 0-6)

Lane Configuration and Traffic Control


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd



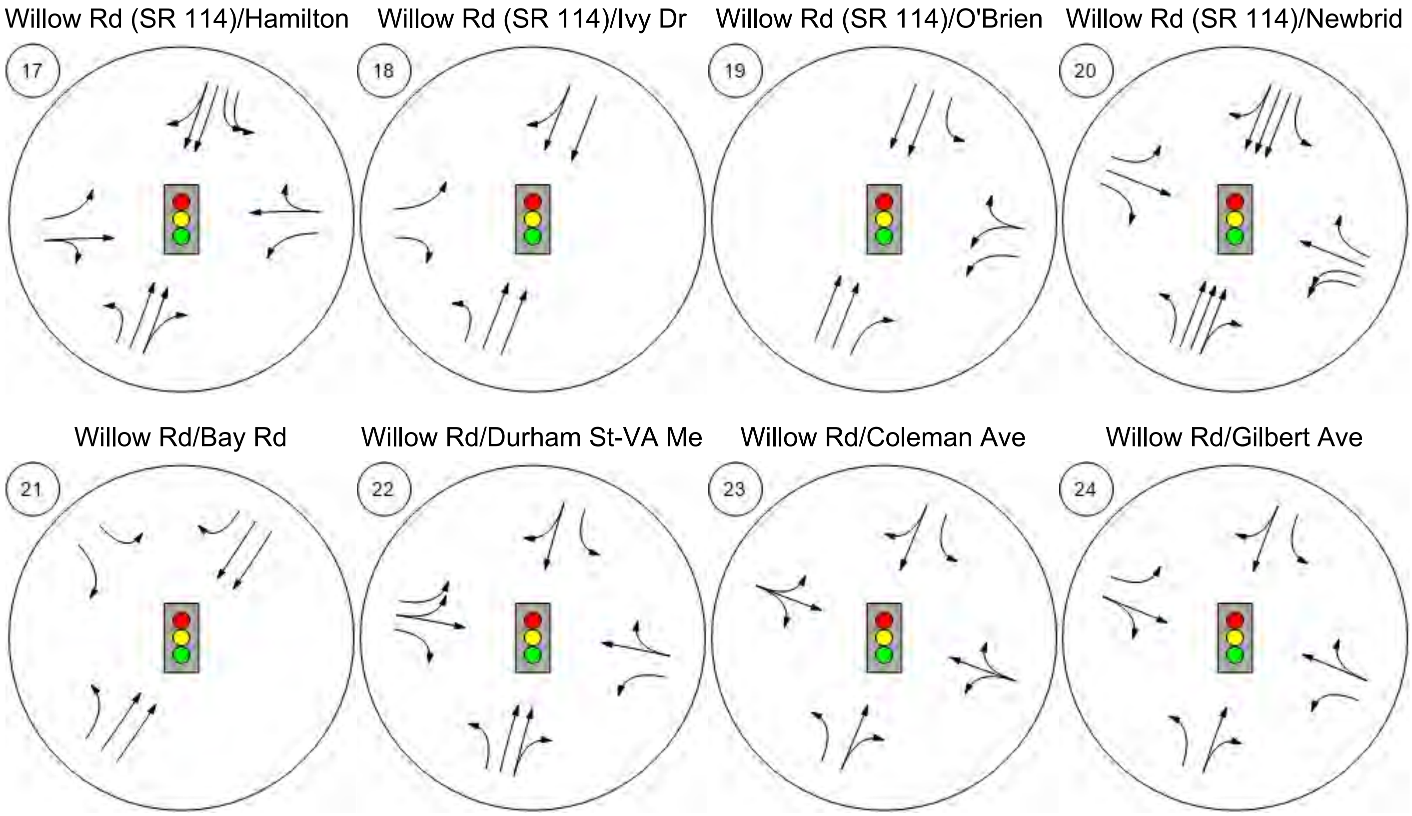

Middlefield Rd/Ravenswood | Middlefield Rd/Ringwood Ave | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Lane Configuration and Traffic Control

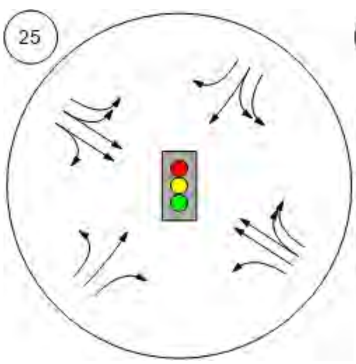



Generated with PTV VISTRO

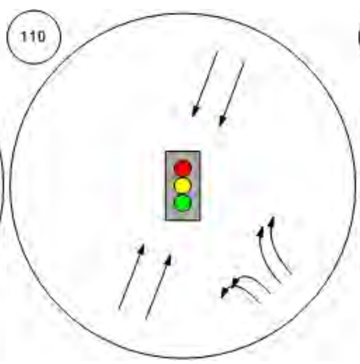
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

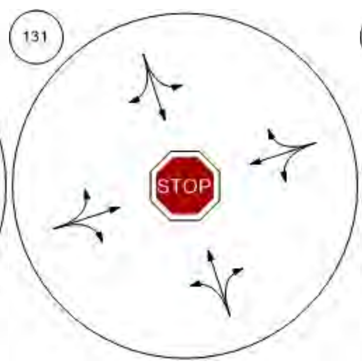

Middlefield Rd-Willow Rd



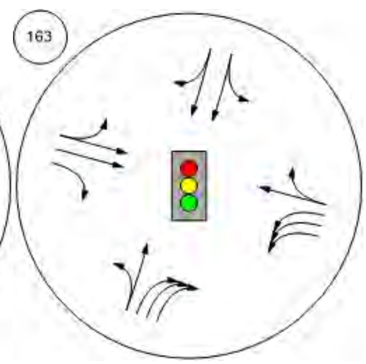

Marsh Road/101 NB Ramps



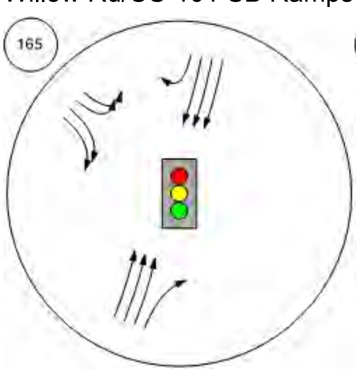

Chilco Street/Hamilton Avenu



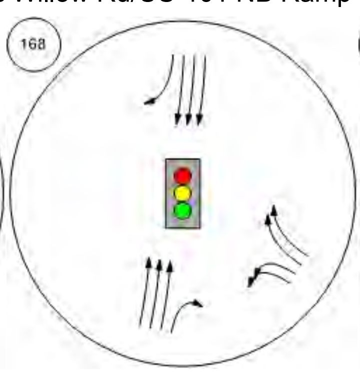

Bayfront Expy/Marsh Rd



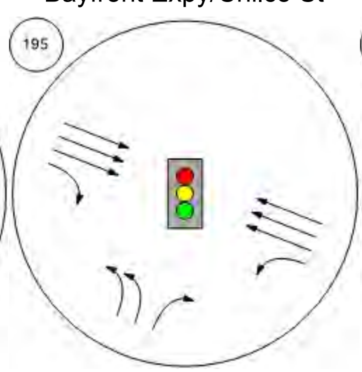

Willow Rd/US-101 SB Ramps



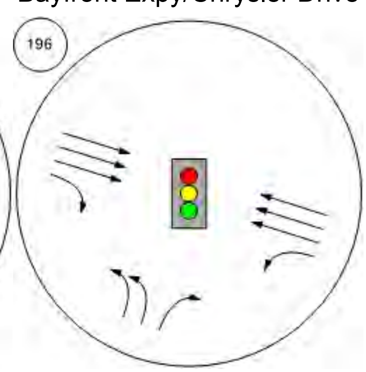

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

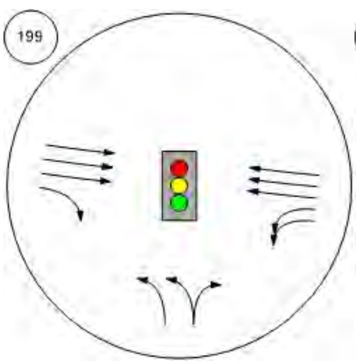


Generated with PTV VISTRO

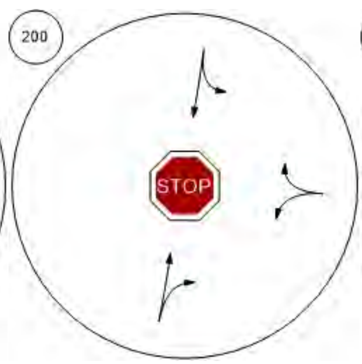
Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control

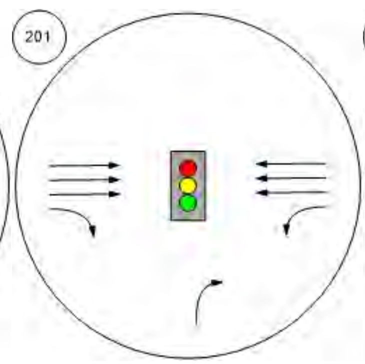

Bafront Expwy/Bldg 21



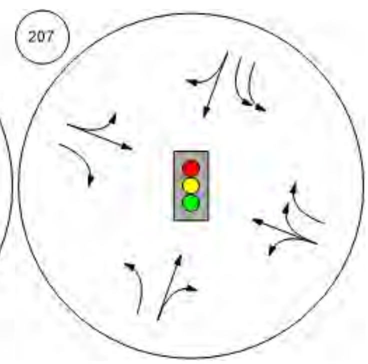

O'Brien Drive/Kavanaugh Dri



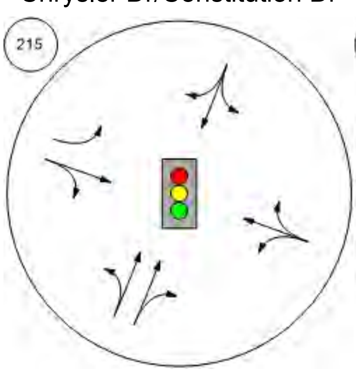

Bayfront Expwy/Bldg 20



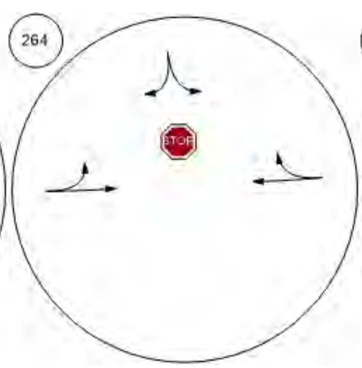

Chilco St/Constitution Dr



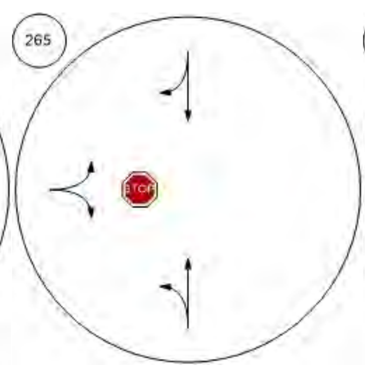

Chrysler Dr/Constitution Dr



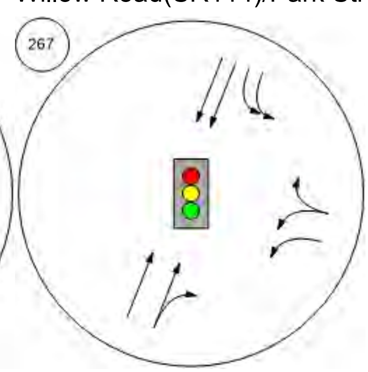

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



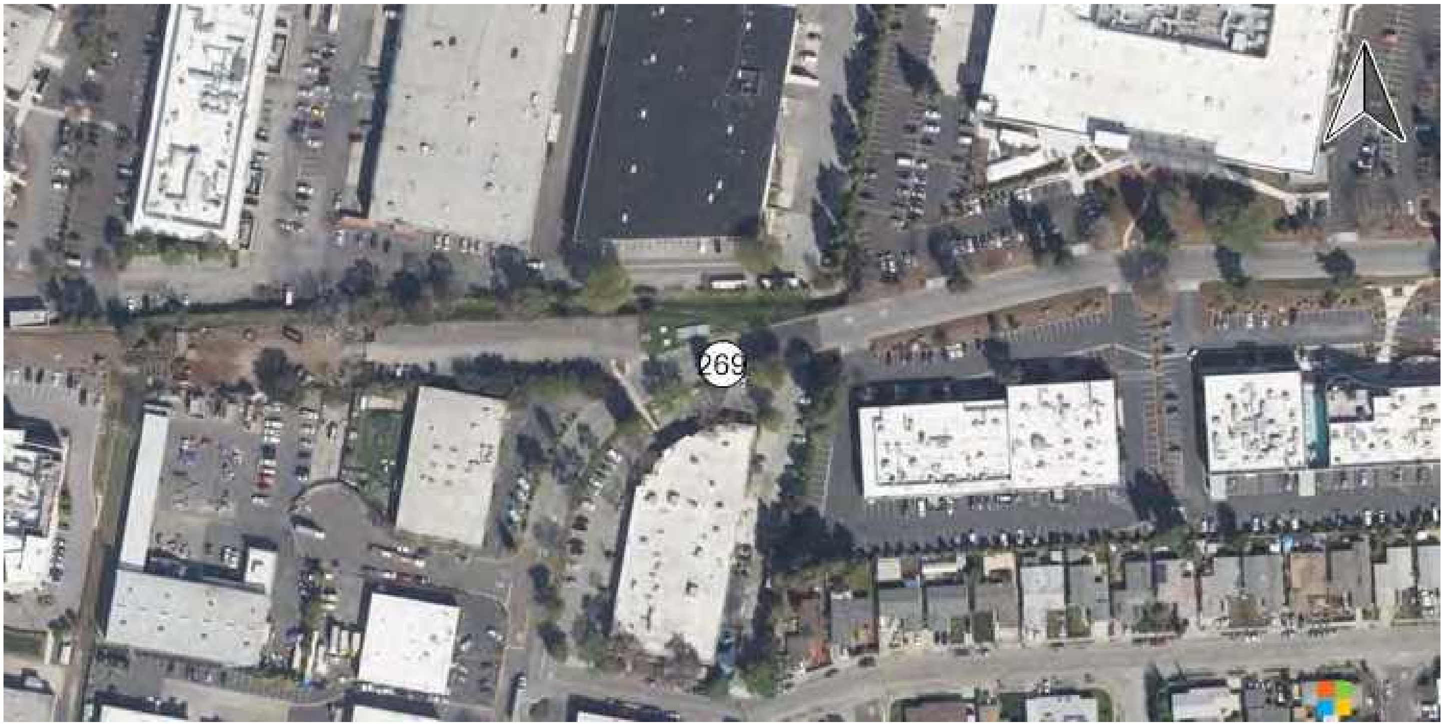

Willow Road(SR114)/Park Str



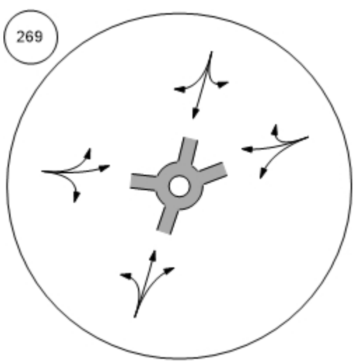
Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Lane Configuration and Traffic Control



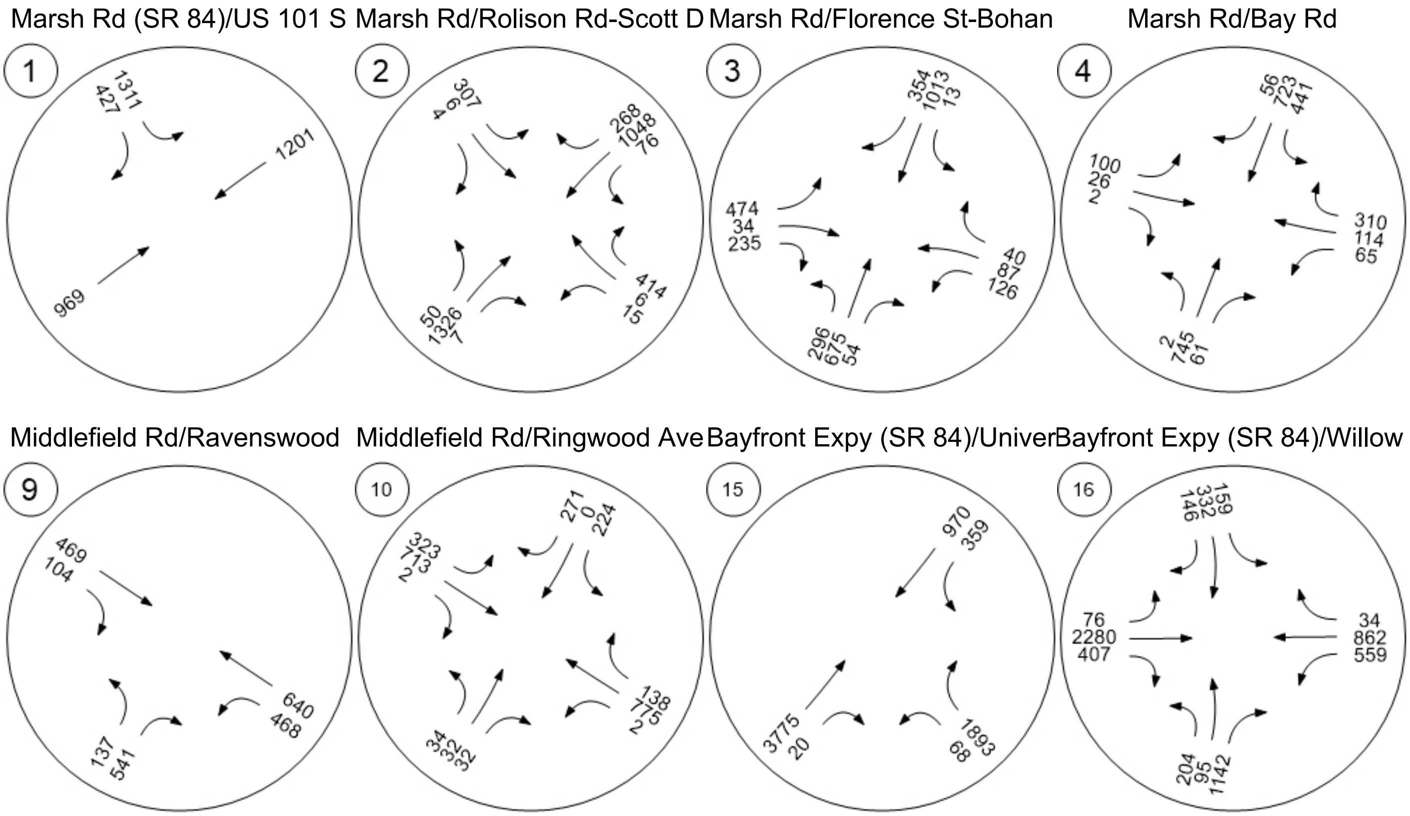

O'Brien Drive/Loop Road



Generated with PTV VISTRO

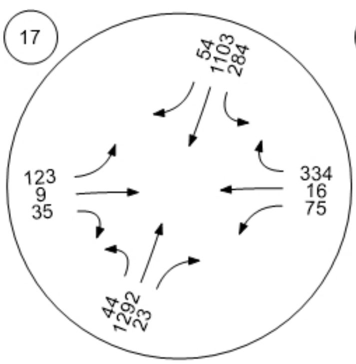
Version 2021 (SP 0-6)

Traffic Volume - Base Volume

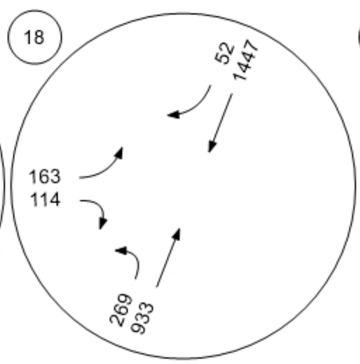



Traffic Volume - Base Volume

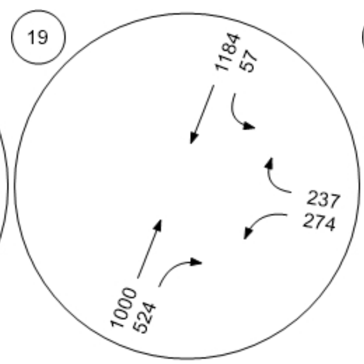

Willow Rd (SR 114)/Hamilton



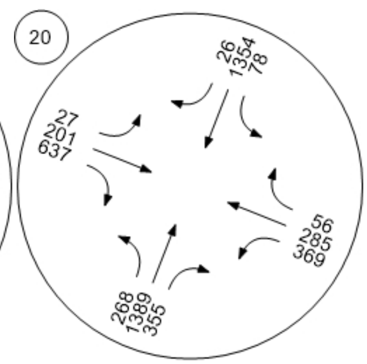

Willow Rd (SR 114)/Ivy Dr



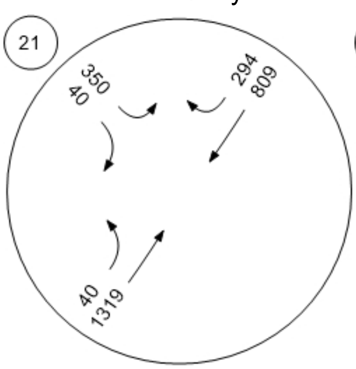

Willow Rd (SR 114)/O'Brien



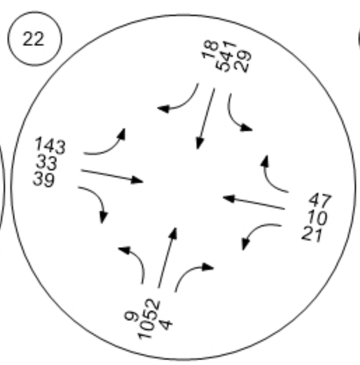

Willow Rd (SR 114)/Newbrid



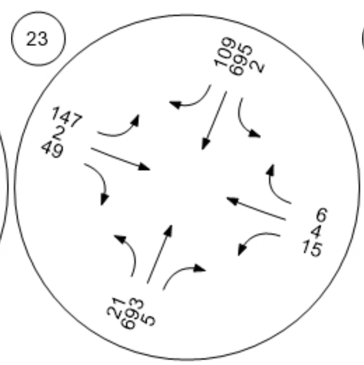

Willow Rd/Bay Rd



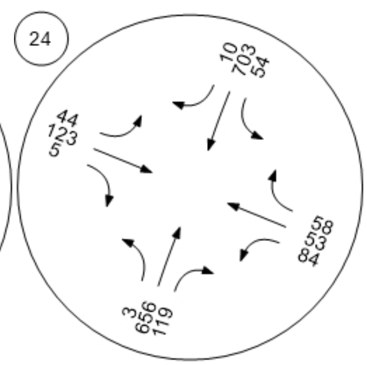

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

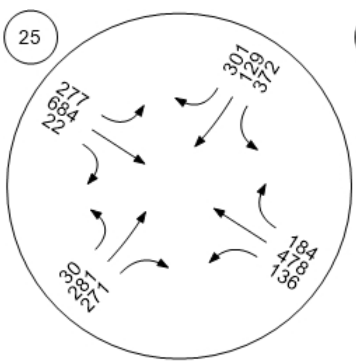


Generated with PTV VISTRO

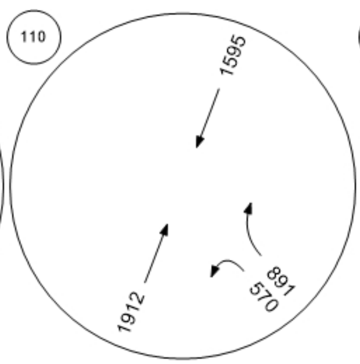
Version 2021 (SP 0-6)

## Traffic Volume - Base Volume

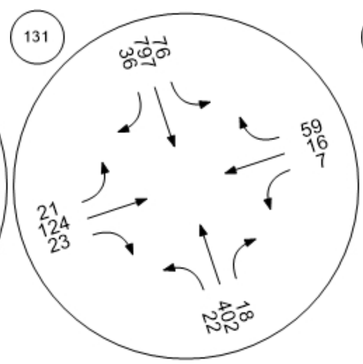

Middlefield Rd-Willow Rd



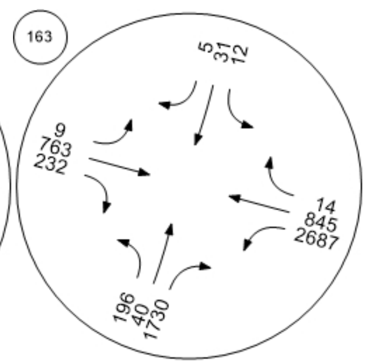

Marsh Road/101 NB Ramps



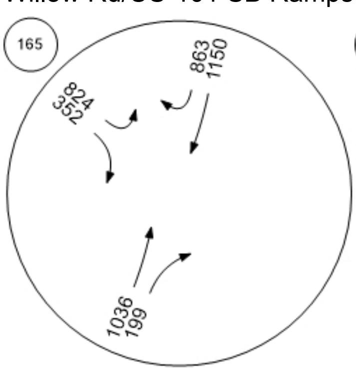

Chilco Street/Hamilton Avenu



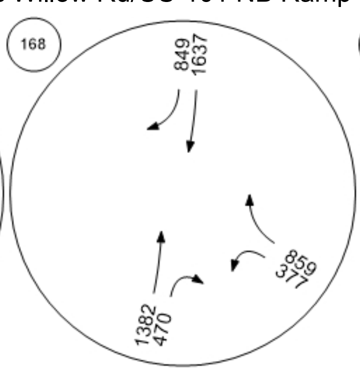

Bayfront Expy/Marsh Rd



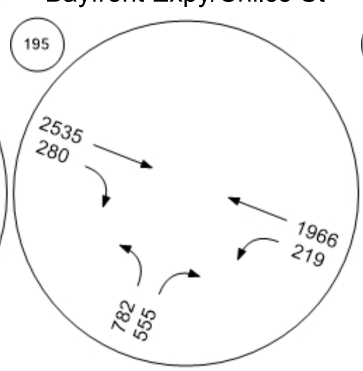

Willow Rd/US-101 SB Ramps



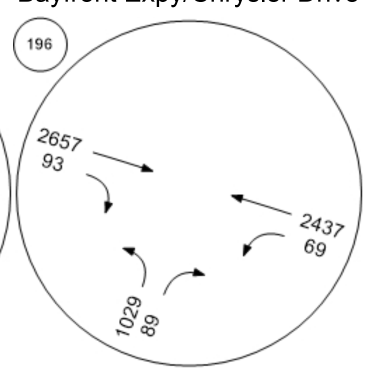

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

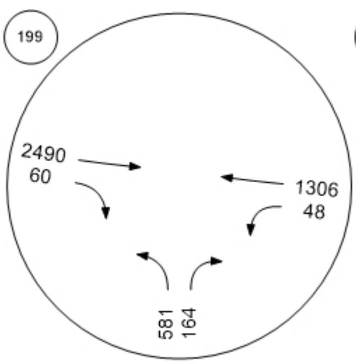



Bayfront Expy/Chrysler Drive

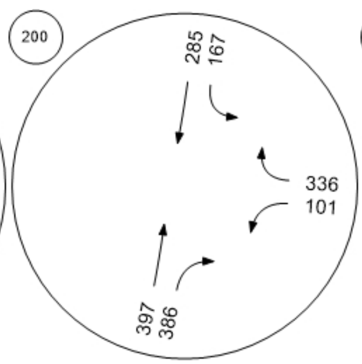


## Traffic Volume - Base Volume

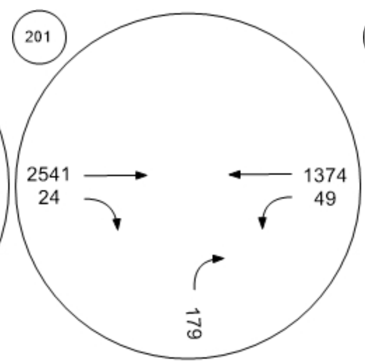

Bafront Expwy/Bldg 21



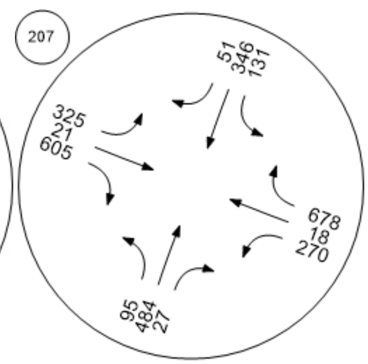

O'Brien Drive/Kavanaugh Dri



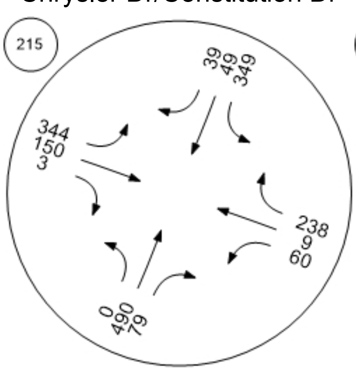

Bayfront Expwy/Bldg 20



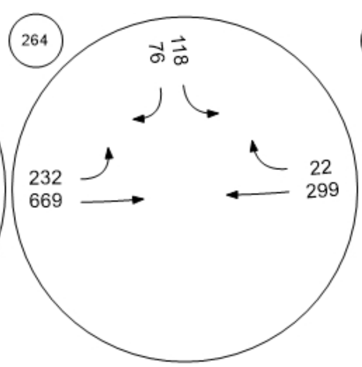

Chilco St/Constitution Dr



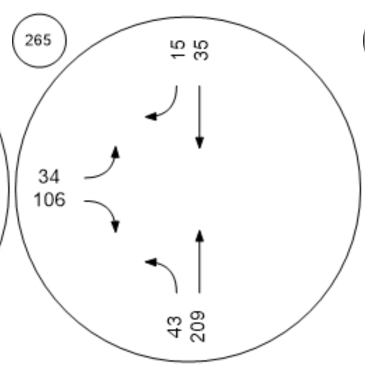

Chrysler Dr/Constitution Dr



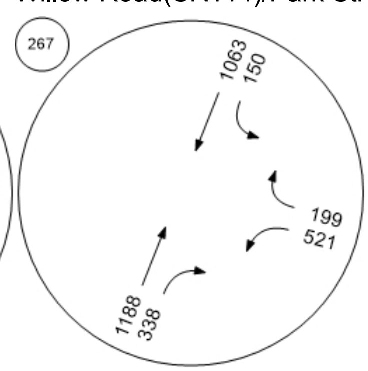

Adams Drive/O'Brien Drive



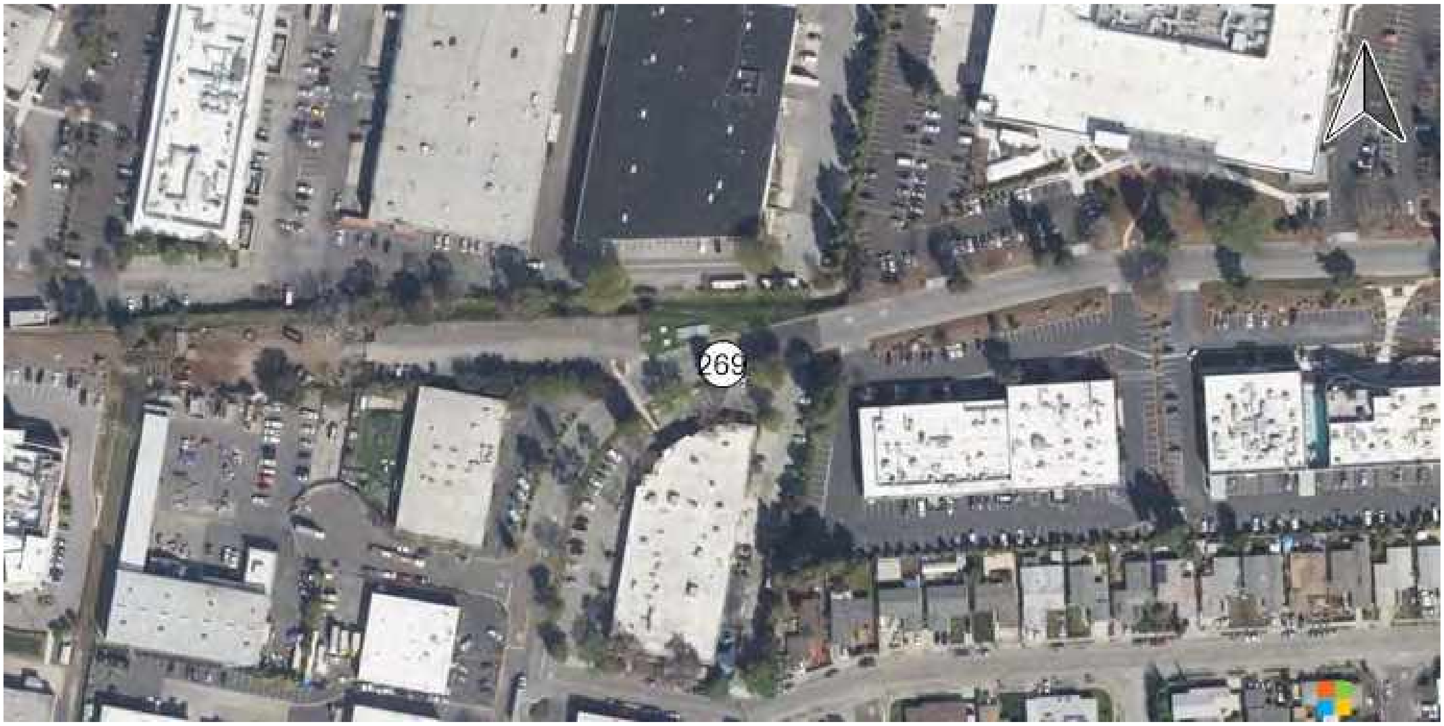

Adam Court/ Adams Drive



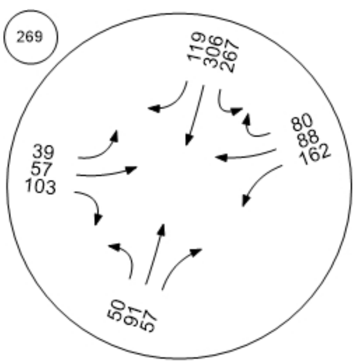

Willow Road(SR114)/Park Str



Traffic Volume - Base Volume




O'Brien Drive/Loop Road

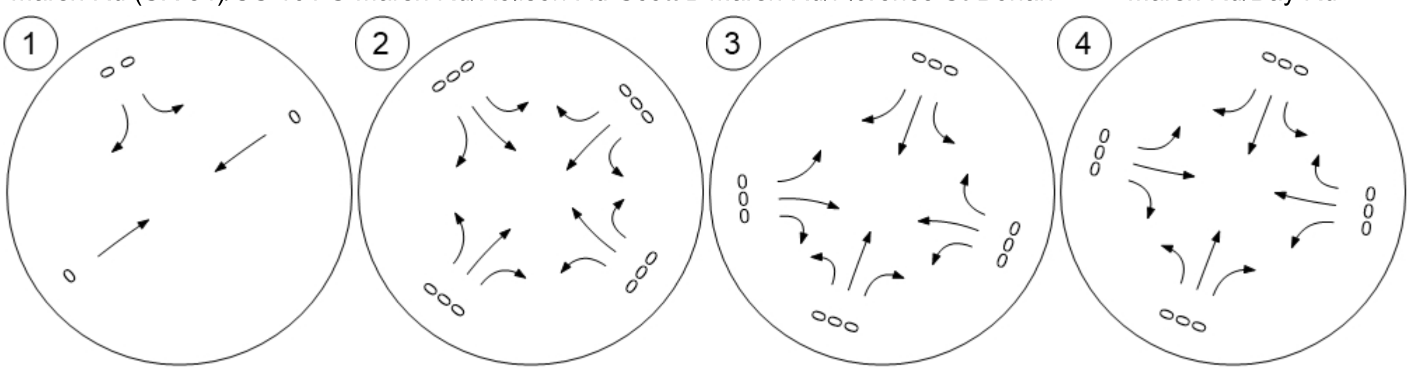


Generated with PTV VISTRO

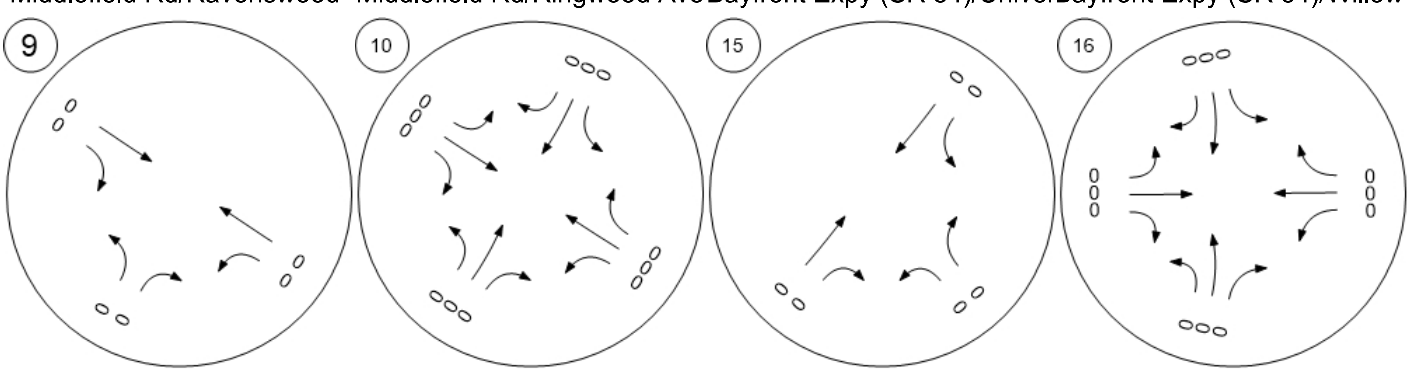
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume


Marsh Rd (SR 84)/US 101 S   Marsh Rd/Rolison Rd-Scott D   Marsh Rd/Florence St-Bohan   Marsh Rd/Bay Rd

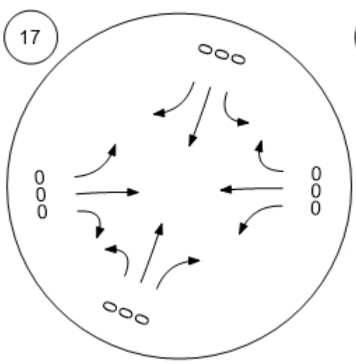



Middlefield Rd/Ravenswood   Middlefield Rd/Ringwood Ave   Bayfront Expy (SR 84)/Univer   Bayfront Expy (SR 84)/Willow

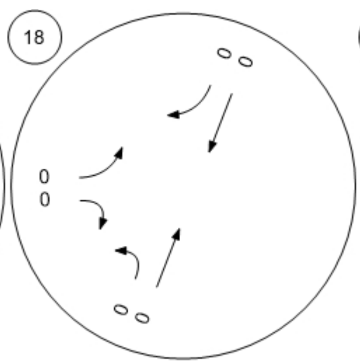


Traffic Volume - In-Process Volume

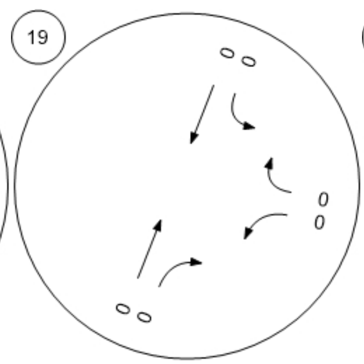

Willow Rd (SR 114)/Hamilton



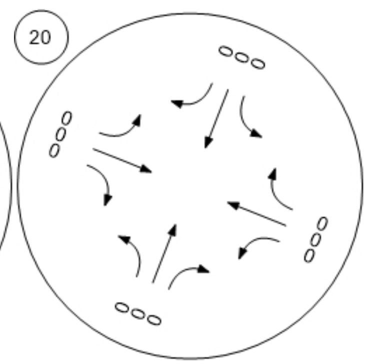

Willow Rd (SR 114)/Ivy Dr



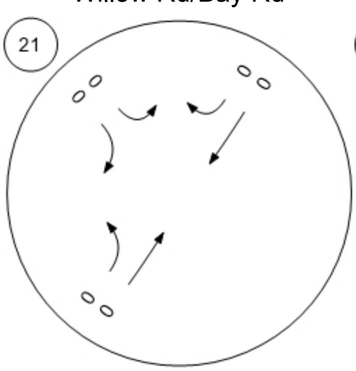

Willow Rd (SR 114)/O'Brien



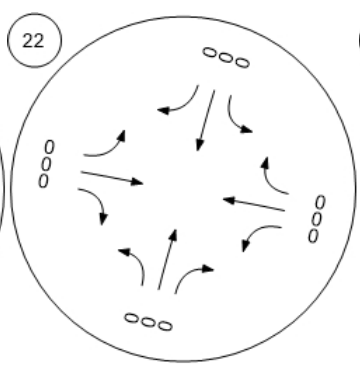

Willow Rd (SR 114)/Newbrid



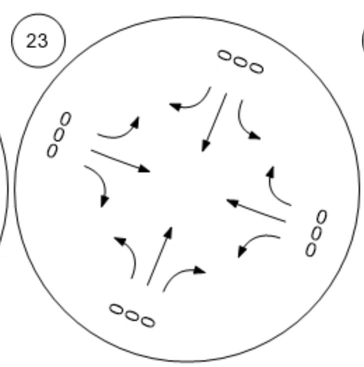

Willow Rd/Bay Rd



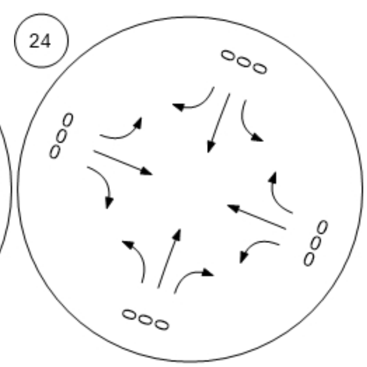

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

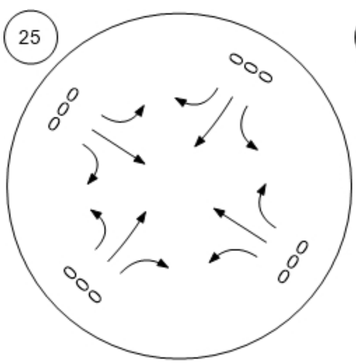


Generated with PTV VISTRO

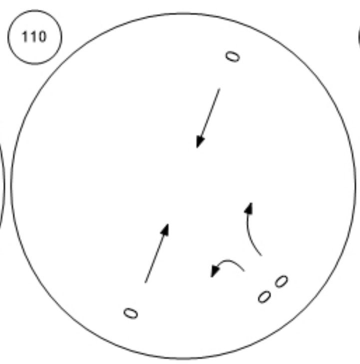
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

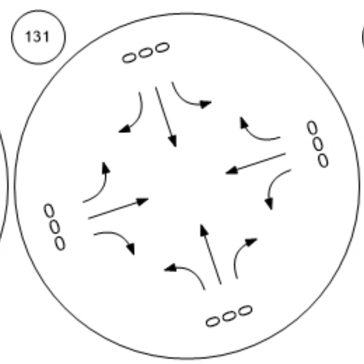

Middlefield Rd-Willow Rd



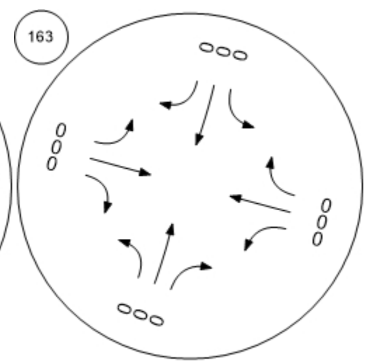

Marsh Road/101 NB Ramps



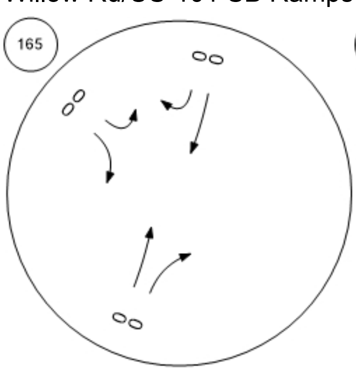

Chilco Street/Hamilton Avenu



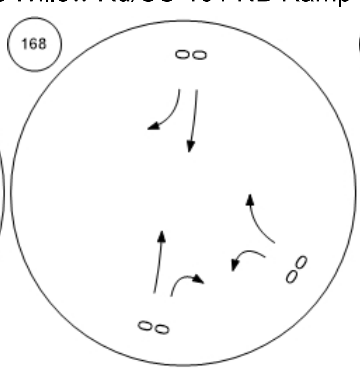

Bayfront Expy/Marsh Rd



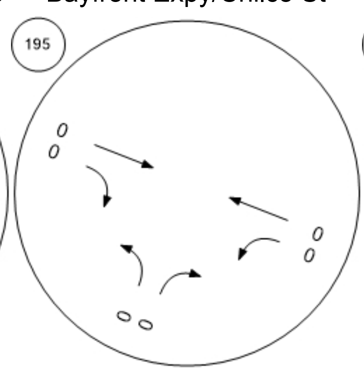

Willow Rd/US-101 SB Ramps



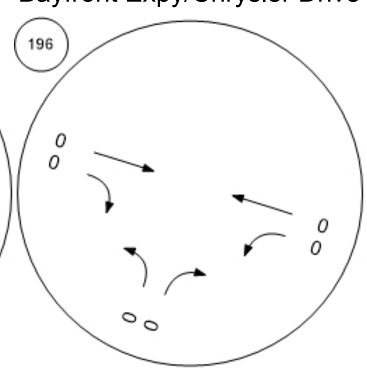

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

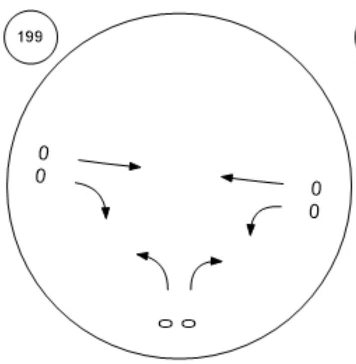


Generated with PTV VISTRO

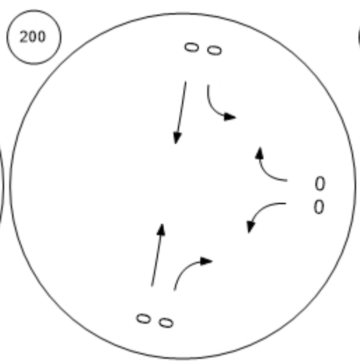
Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

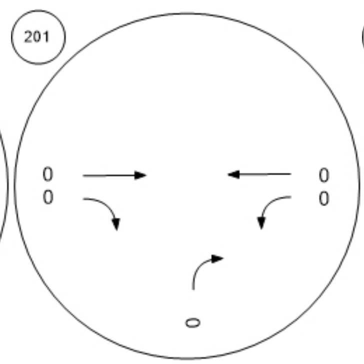

Bafront Expwy/Bldg 21



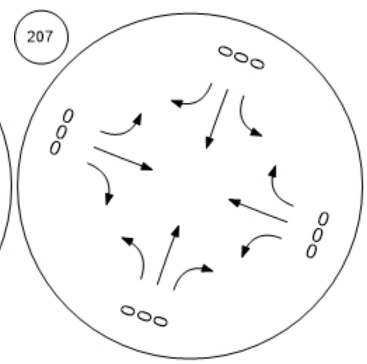

O'Brien Drive/Kavanaugh Dri



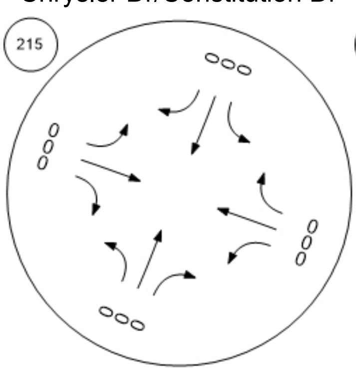

Bayfront Expwy/Bldg 20



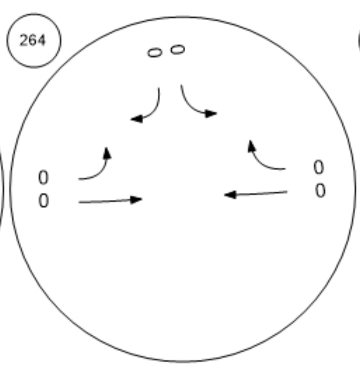

Chilco St/Constitution Dr



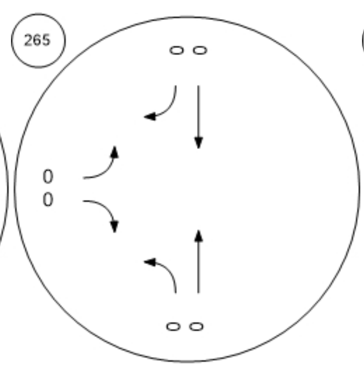

Chrysler Dr/Constitution Dr



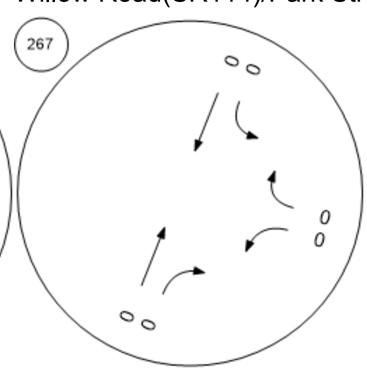

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



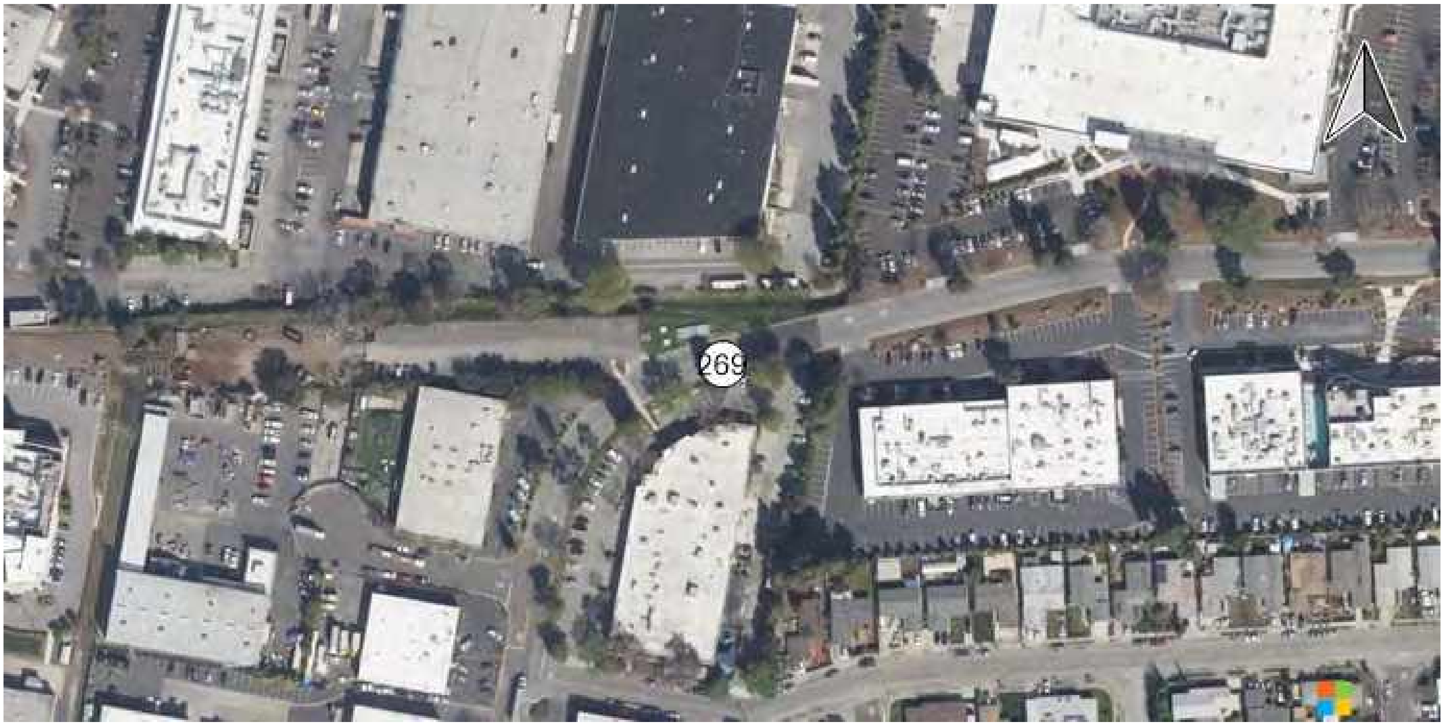

Willow Road(SR114)/Park Str



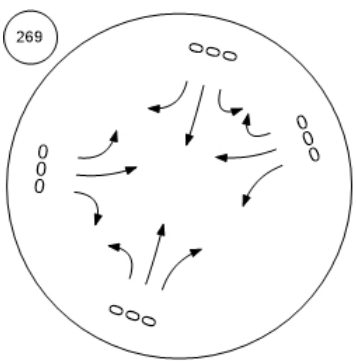
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - In-Process Volume

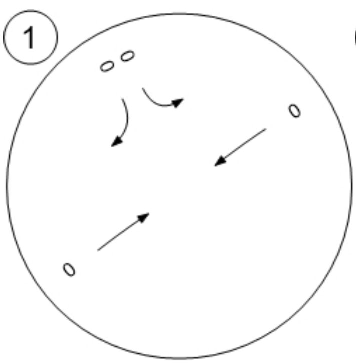



O'Brien Drive/Loop Road

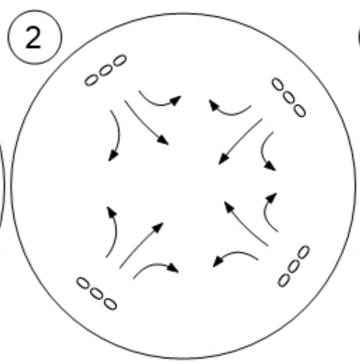


Traffic Volume - Net New Site Trips

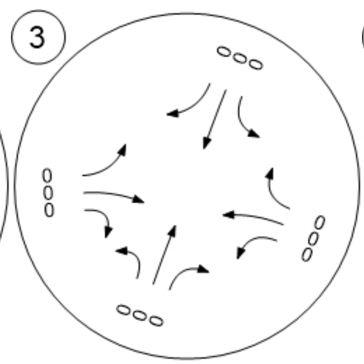

Marsh Rd (SR 84)/US 101 S



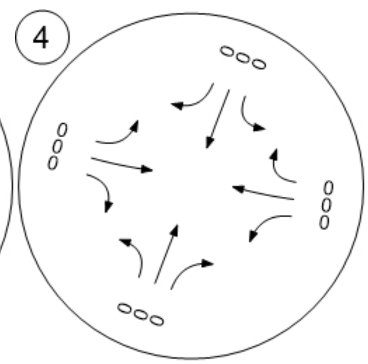
Marsh Rd/Rolison Rd-Scott D



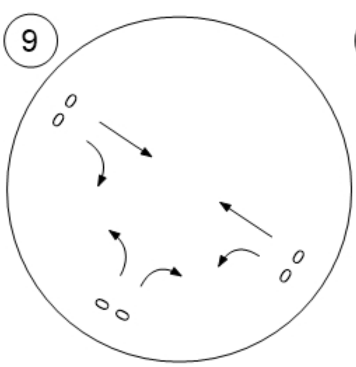
Marsh Rd/Florence St-Bohan



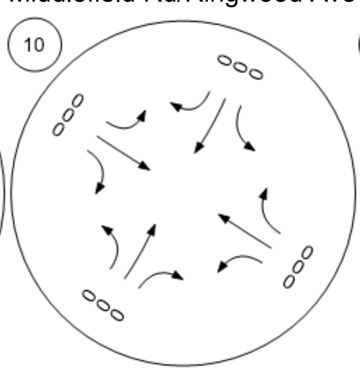
Marsh Rd/Bay Rd



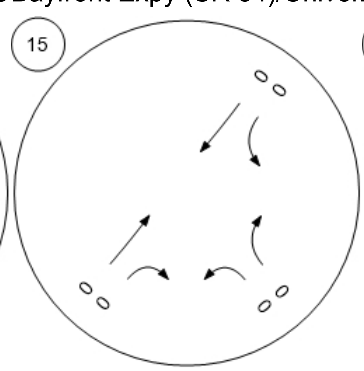
Middlefield Rd/Ravenswood



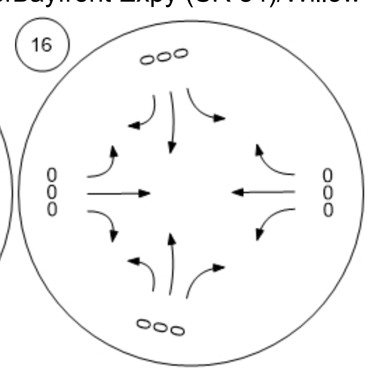
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer



Bayfront Expy (SR 84)/Willow

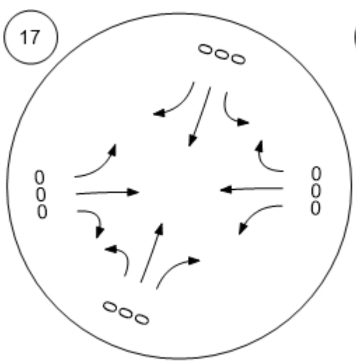


Generated with PTV VISTRO

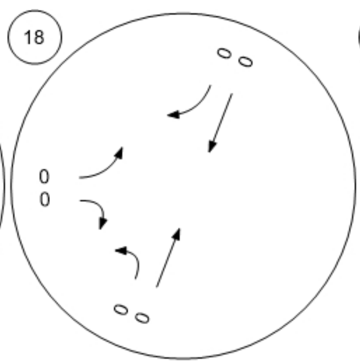
Version 2021 (SP 0-6)

Traffic Volume - Net New Site Trips

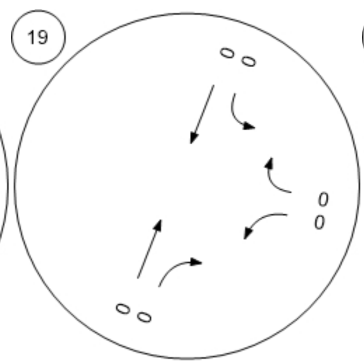

Willow Rd (SR 114)/Hamilton



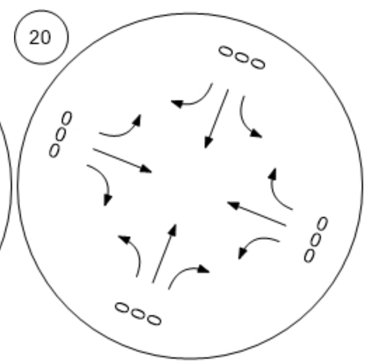

Willow Rd (SR 114)/Ivy Dr



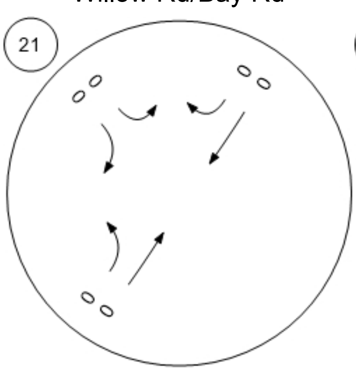

Willow Rd (SR 114)/O'Brien



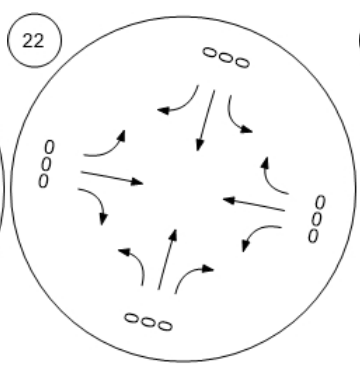

Willow Rd (SR 114)/Newbrid



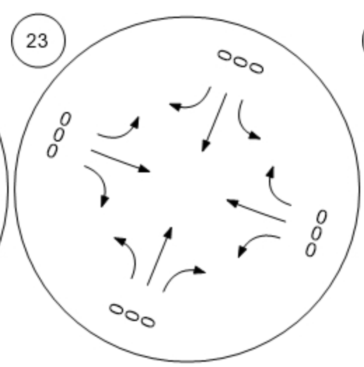

Willow Rd/Bay Rd



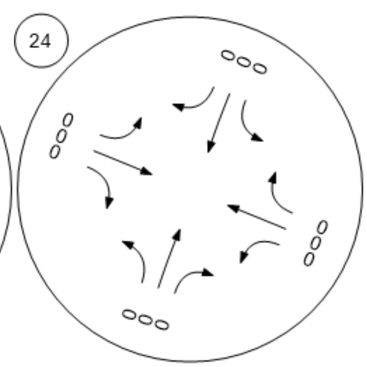

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

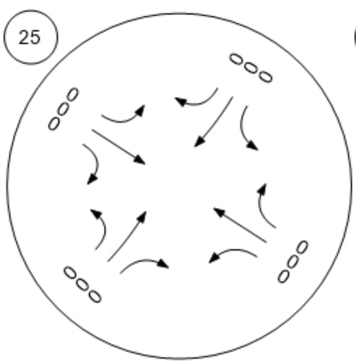


Generated with PTV VISTRO

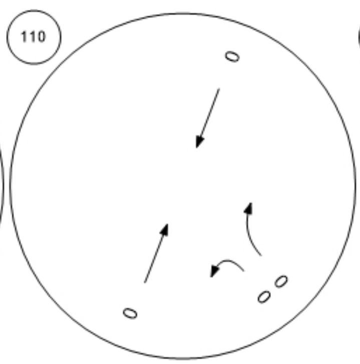
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

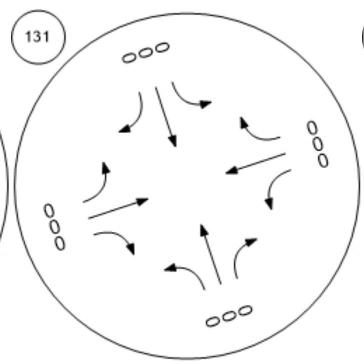

Middlefield Rd-Willow Rd



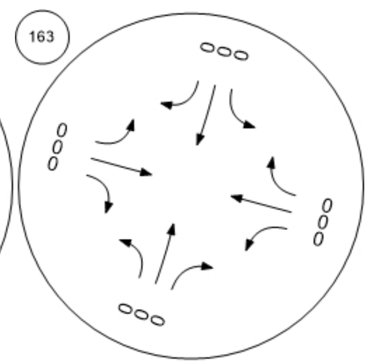

Marsh Road/101 NB Ramps



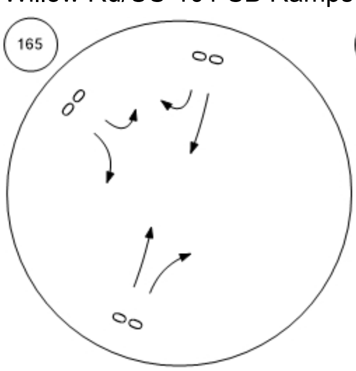

Chilco Street/Hamilton Avenu



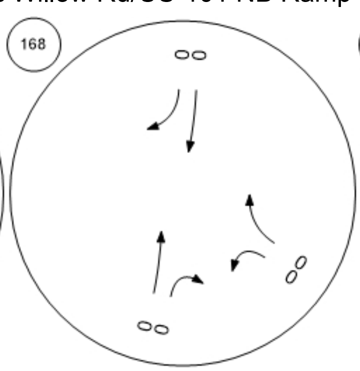

Bayfront Expy/Marsh Rd



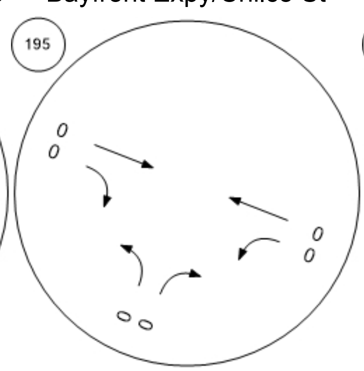

Willow Rd/US-101 SB Ramps



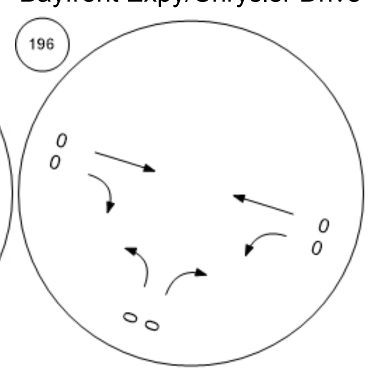

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

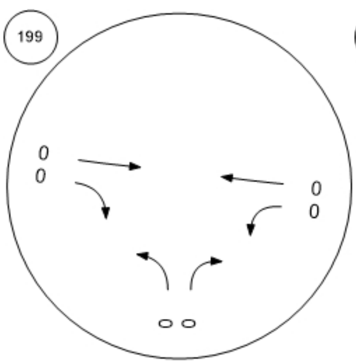


Generated with PTV VISTRO

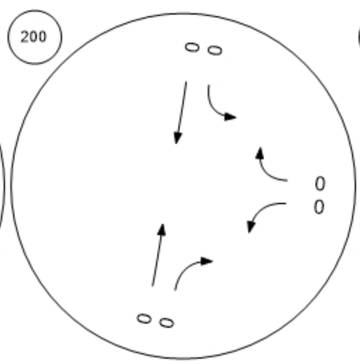
Version 2021 (SP 0-6)

## Traffic Volume - Net New Site Trips

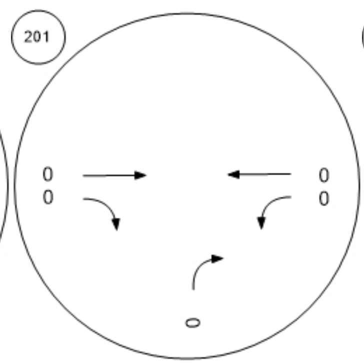

Bafront Expwy/Bldg 21



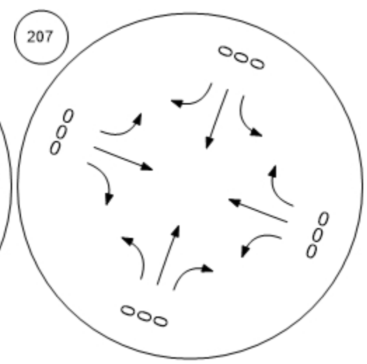

O'Brien Drive/Kavanaugh Dri



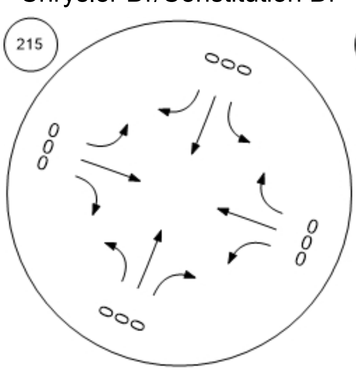

Bayfront Expwy/Bldg 20



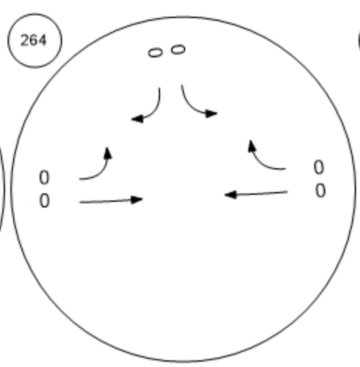

Chilco St/Constitution Dr



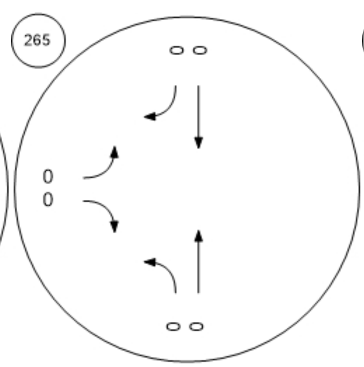

Chrysler Dr/Constitution Dr



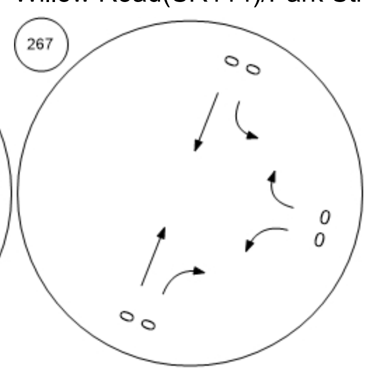

Adams Drive/O'Brien Drive



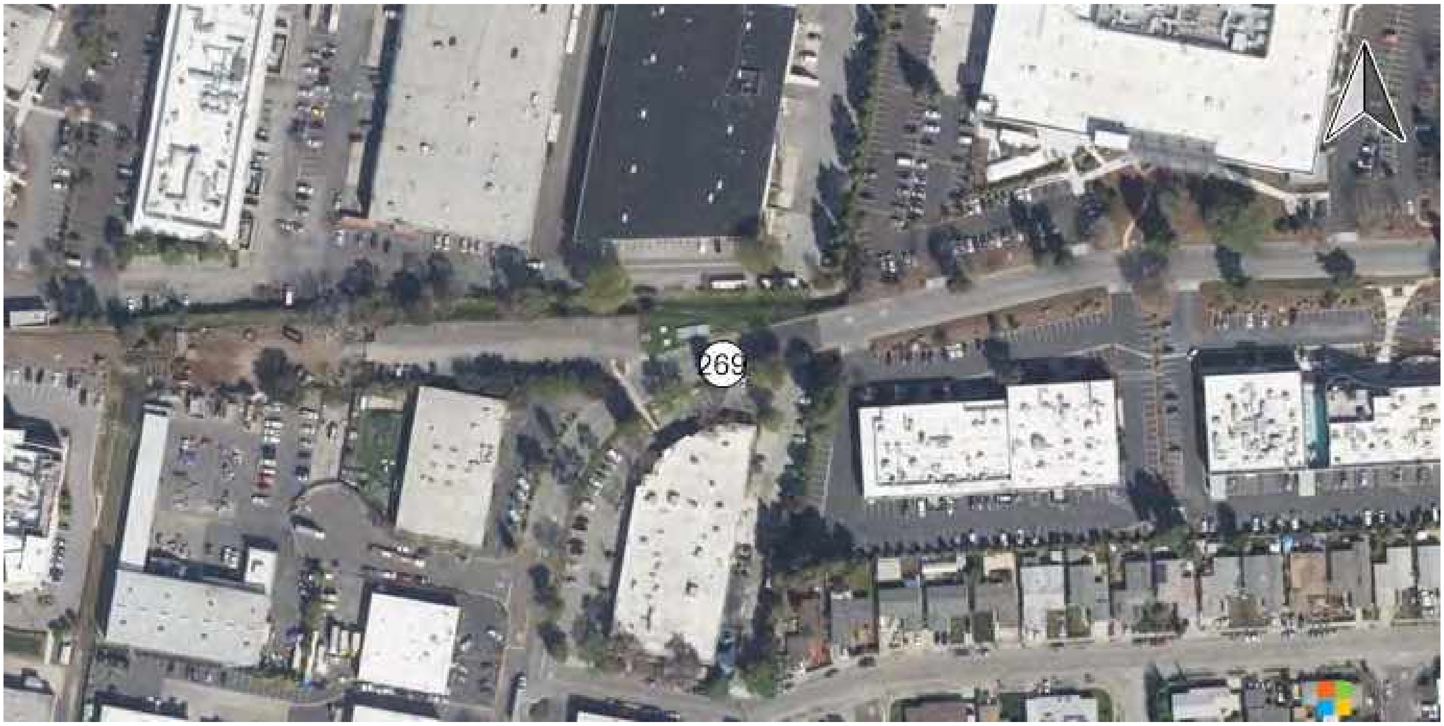

Adam Court/ Adams Drive



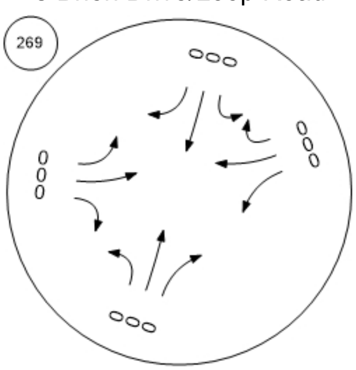

Willow Road(SR114)/Park Str



Traffic Volume - Net New Site Trips




O'Brien Drive/Loop Road

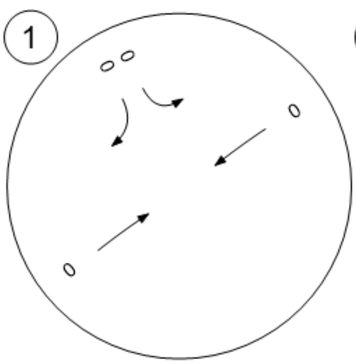


Generated with PTV VISTRO

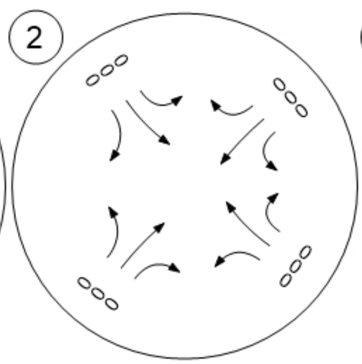
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

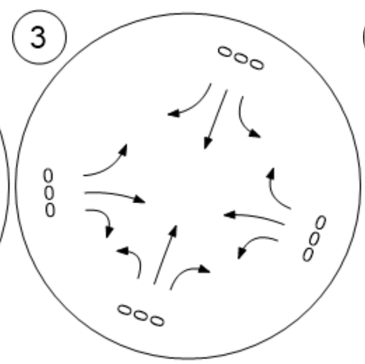

Marsh Rd (SR 84)/US 101 S



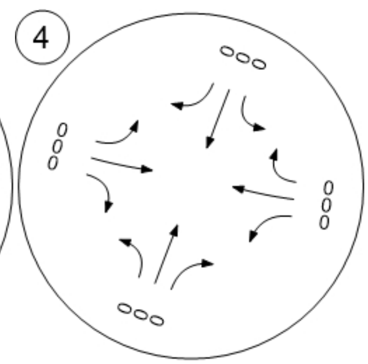

Marsh Rd/Rolison Rd-Scott D



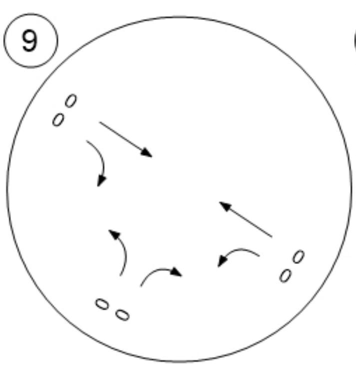

Marsh Rd/Florence St-Bohan



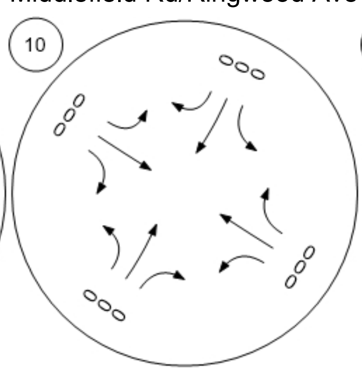

Marsh Rd/Bay Rd



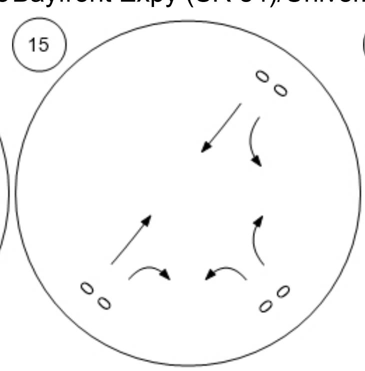

Middlefield Rd/Ravenswood



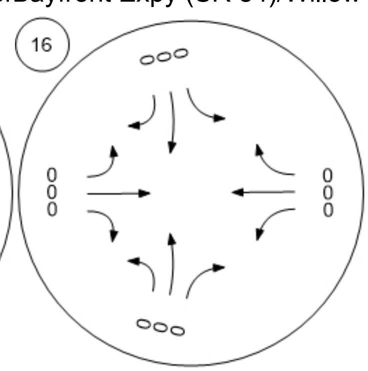

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

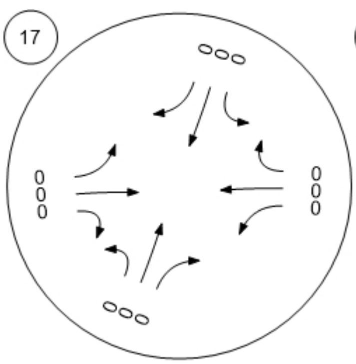


Generated with PTV VISTRO

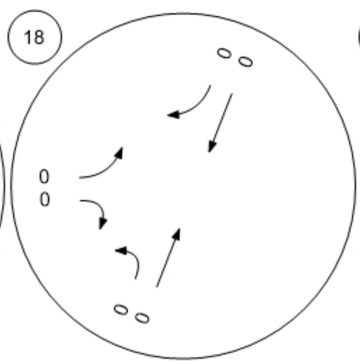
Version 2021 (SP 0-6)

Traffic Volume - Other Volume

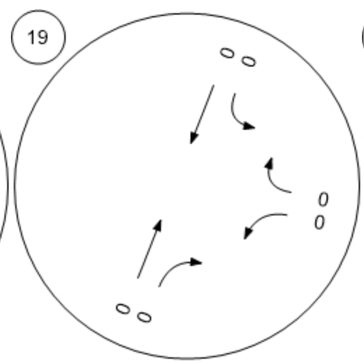

Willow Rd (SR 114)/Hamilton



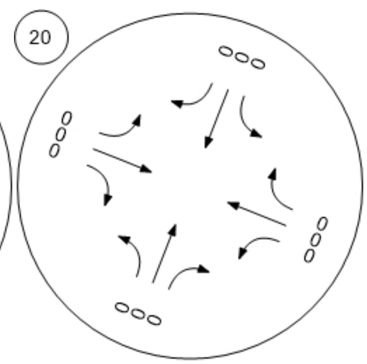
Willow Rd (SR 114)/Ivy Dr



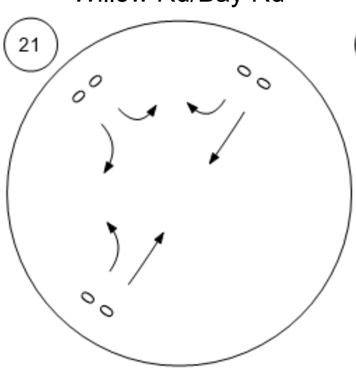
Willow Rd (SR 114)/O'Brien



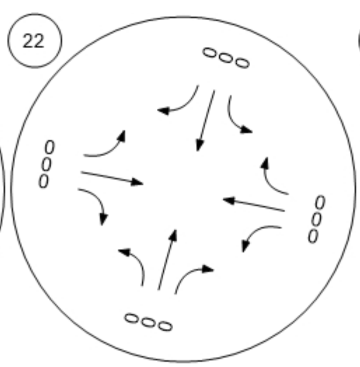
Willow Rd (SR 114)/Newbrid



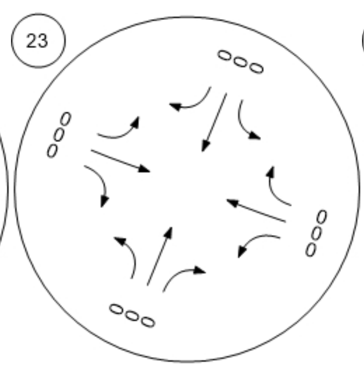
Willow Rd/Bay Rd



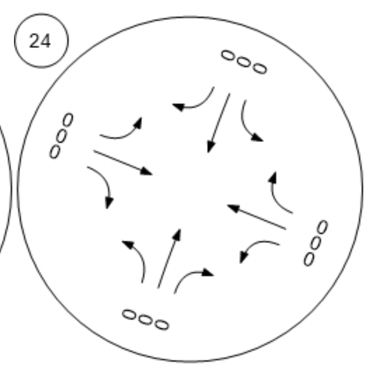
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave



Willow Rd/Gilbert Ave

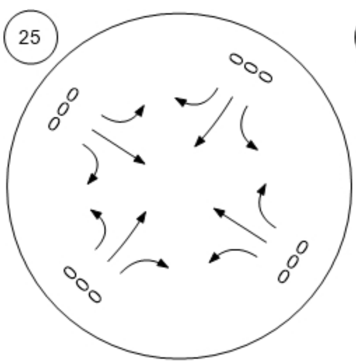


Generated with PTV VISTRO

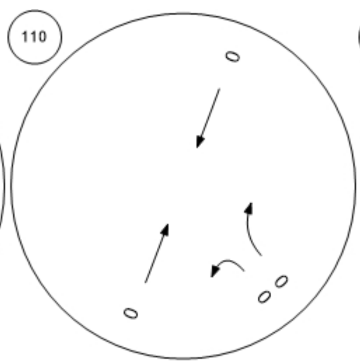
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

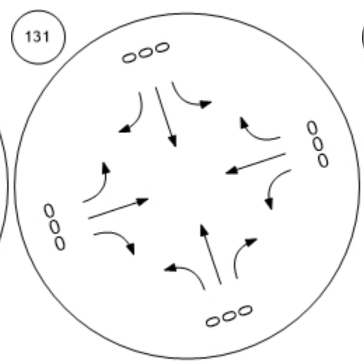

Middlefield Rd-Willow Rd



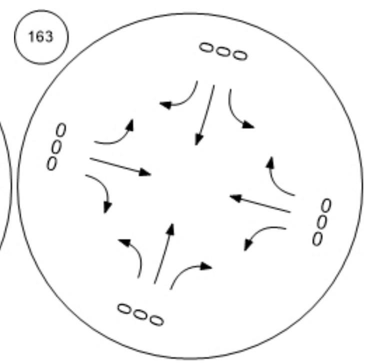

Marsh Road/101 NB Ramps



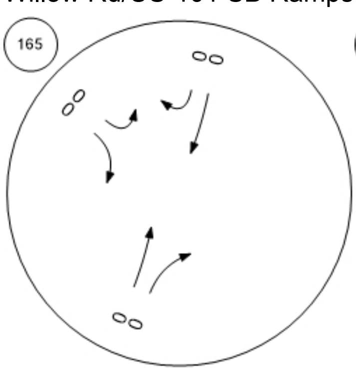

Chilco Street/Hamilton Avenu



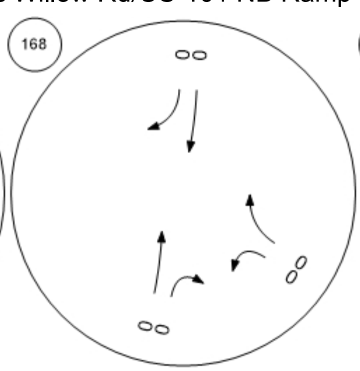

Bayfront Expy/Marsh Rd



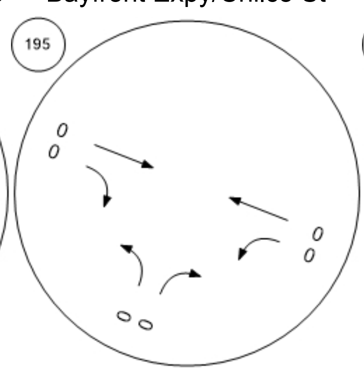

Willow Rd/US-101 SB Ramps



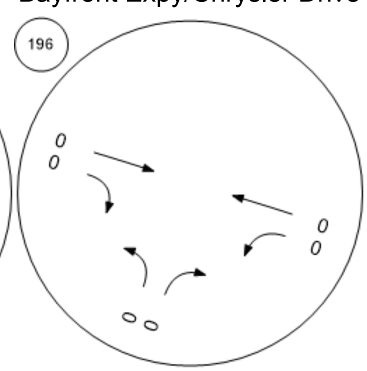

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

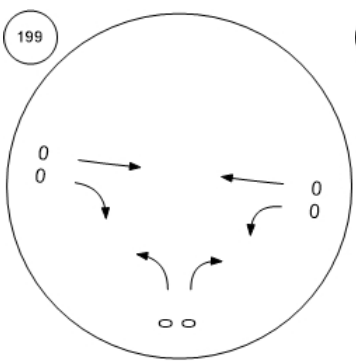


Generated with PTV VISTRO

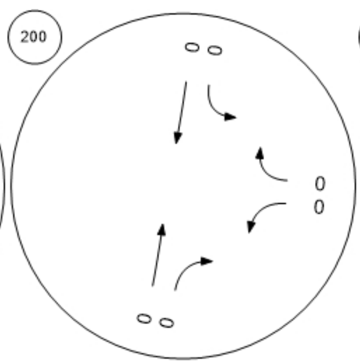
Version 2021 (SP 0-6)

## Traffic Volume - Other Volume

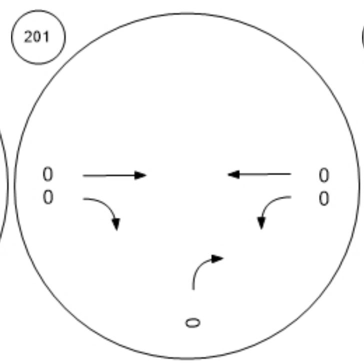

Bafront Expwy/Bldg 21



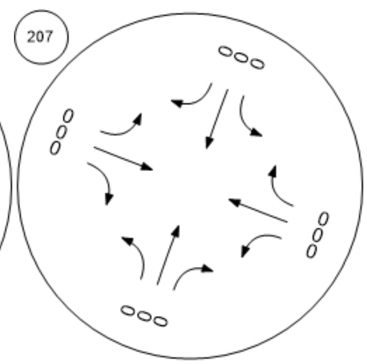

O'Brien Drive/Kavanaugh Dri



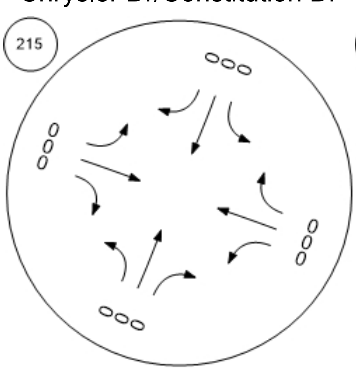

Bayfront Expwy/Bldg 20



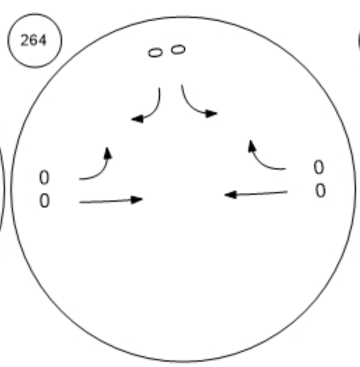

Chilco St/Constitution Dr



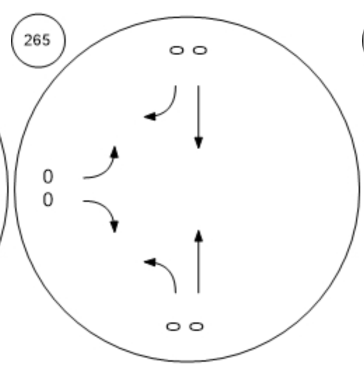

Chrysler Dr/Constitution Dr



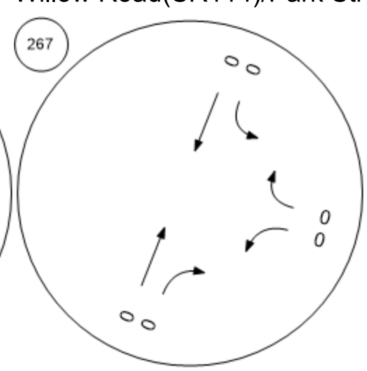

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



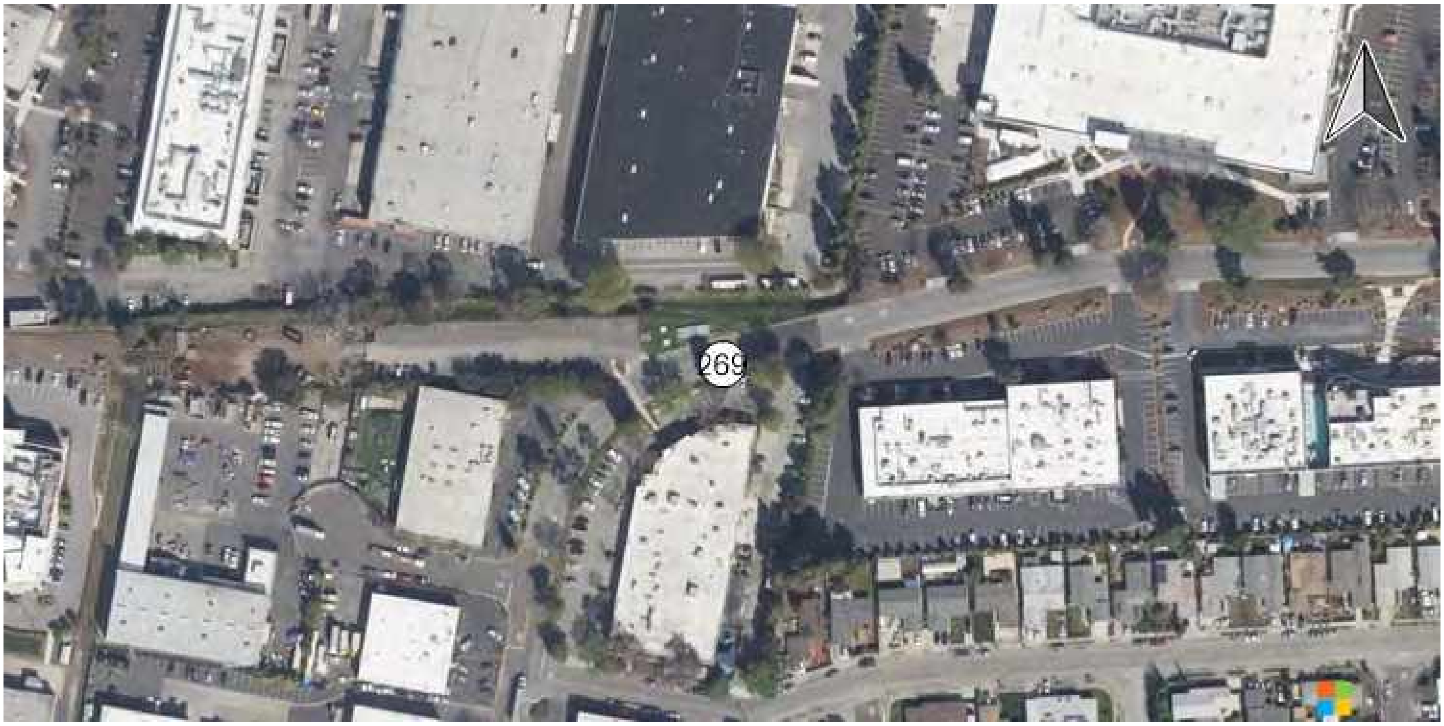

Willow Road(SR114)/Park Str



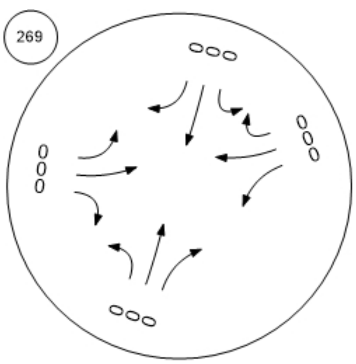
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Other Volume




O'Brien Drive/Loop Road

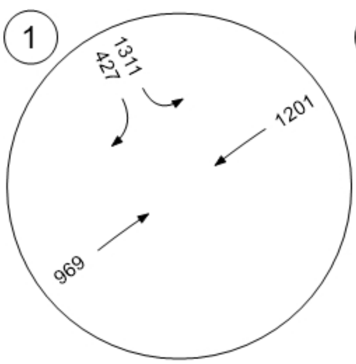


Generated with PTV VISTRO

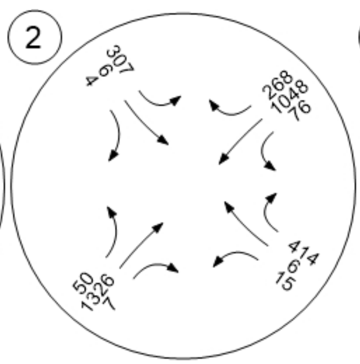
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

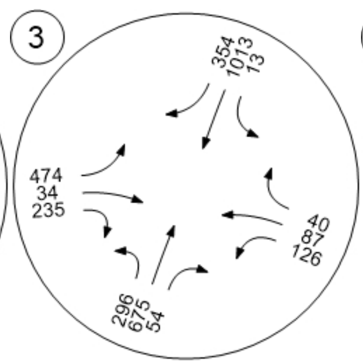

Marsh Rd (SR 84)/US 101 S



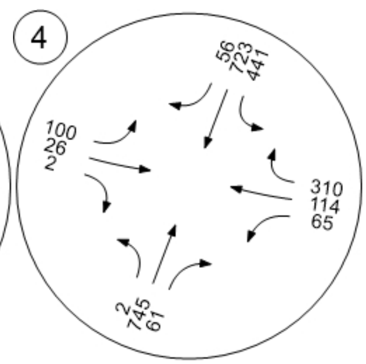

Marsh Rd/Rolison Rd-Scott D



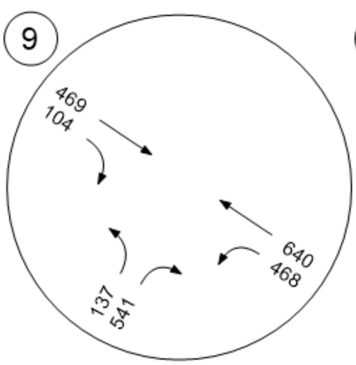

Marsh Rd/Florence St-Bohan



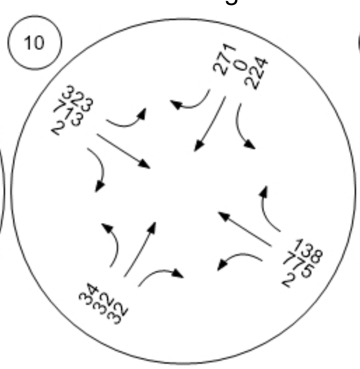

Marsh Rd/Bay Rd



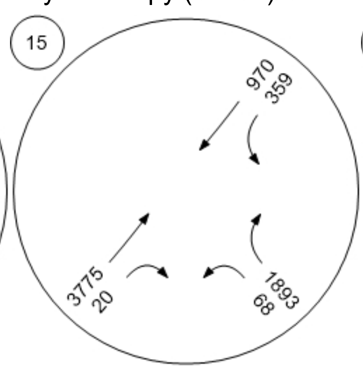

Middlefield Rd/Ravenswood



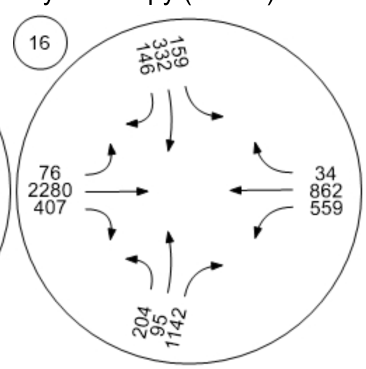

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer



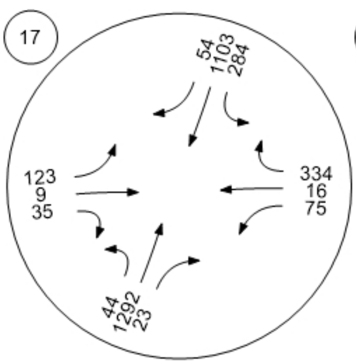

Bayfront Expy (SR 84)/Willow



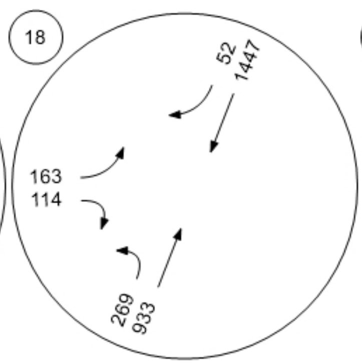
Generated with PTV VISTRO
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

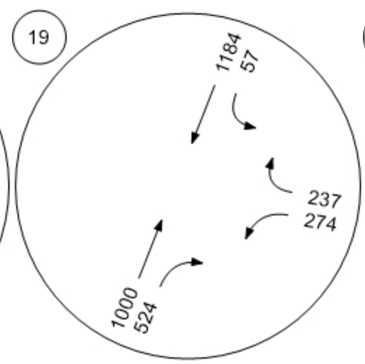

Willow Rd (SR 114)/Hamilton



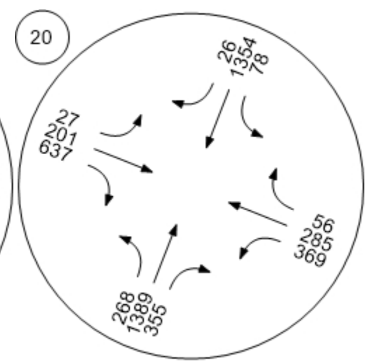

Willow Rd (SR 114)/Ivy Dr



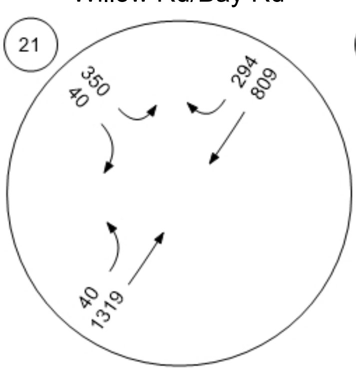

Willow Rd (SR 114)/O'Brien



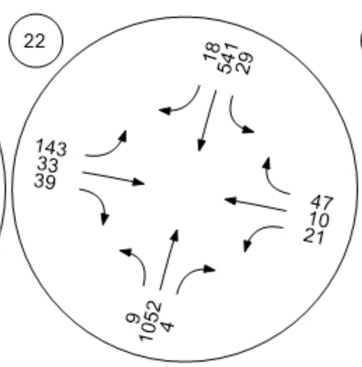

Willow Rd (SR 114)/Newbrid



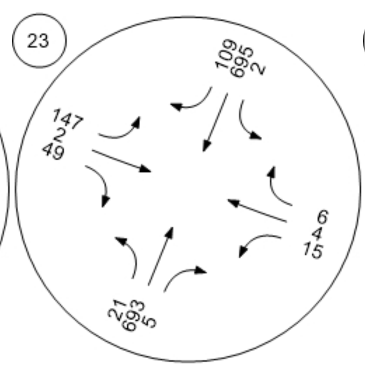

Willow Rd/Bay Rd



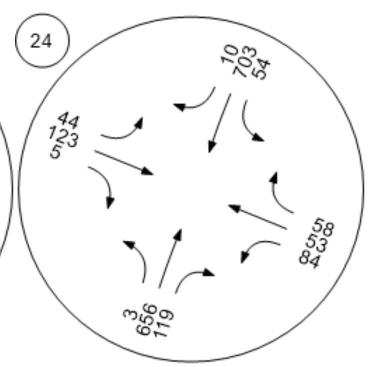

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

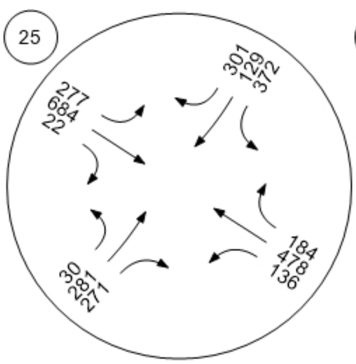


Generated with PTV VISTRO

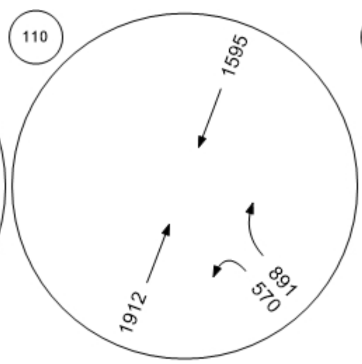
Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume

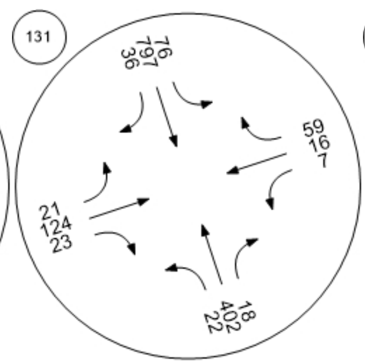

Middlefield Rd-Willow Rd



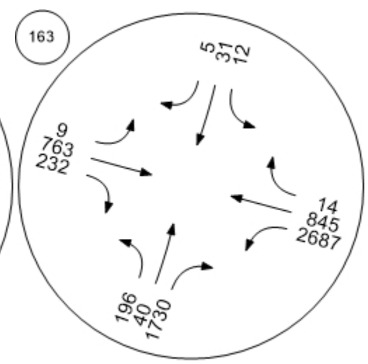

Marsh Road/101 NB Ramps



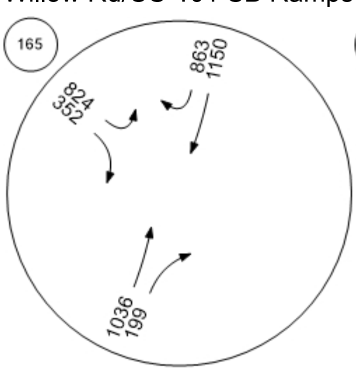

Chilco Street/Hamilton Avenu



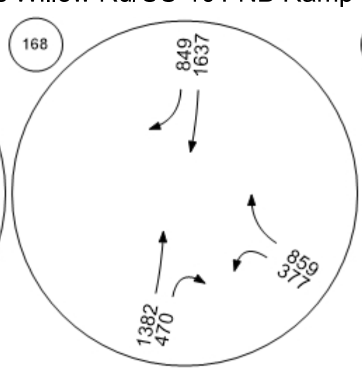

Bayfront Expy/Marsh Rd



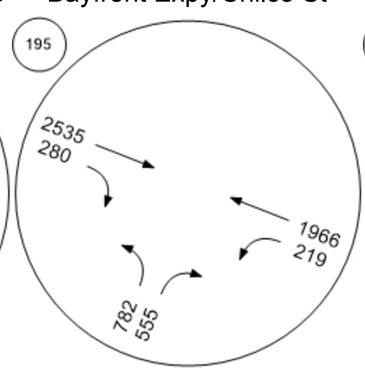

Willow Rd/US-101 SB Ramps



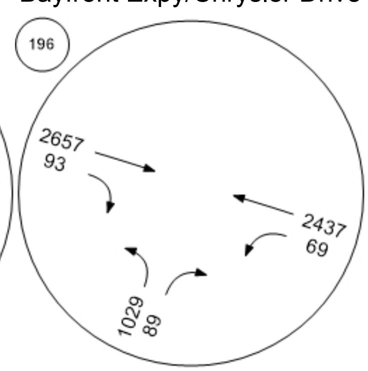

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

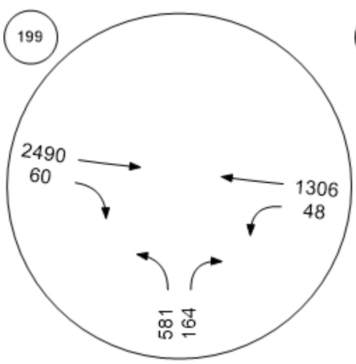


Generated with PTV VISTRO

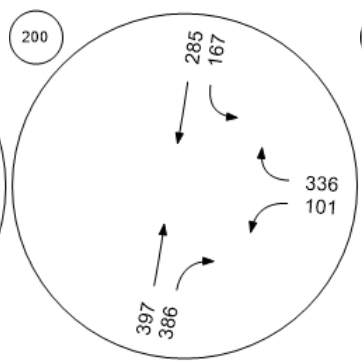
Version 2021 (SP 0-6)

## Traffic Volume - Future Total Volume

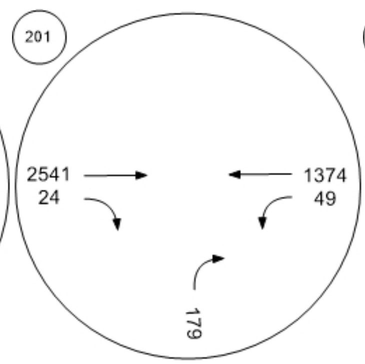

### Bafront Expwy/Bldg 21



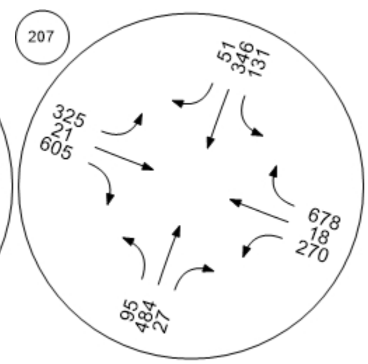

### O'Brien Drive/Kavanaugh Dri



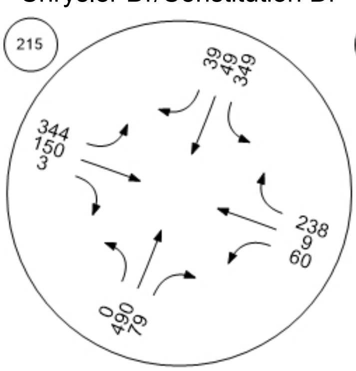

### Bayfront Expwy/Bldg 20



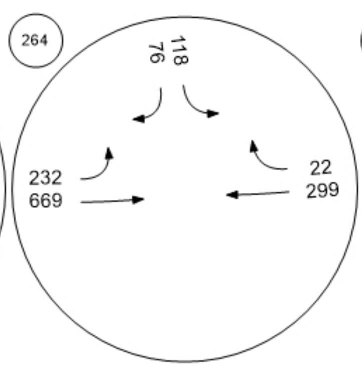

### Chilco St/Constitution Dr



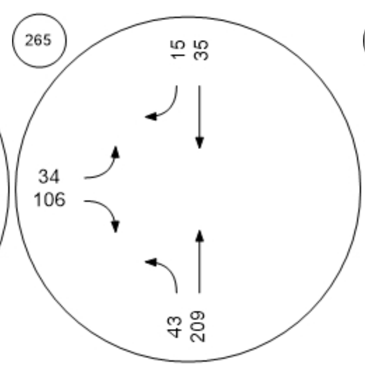

### Chrysler Dr/Constitution Dr



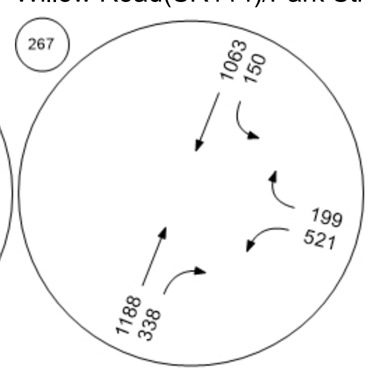

### Adams Drive/O'Brien Drive




### Adam Court/ Adams Drive



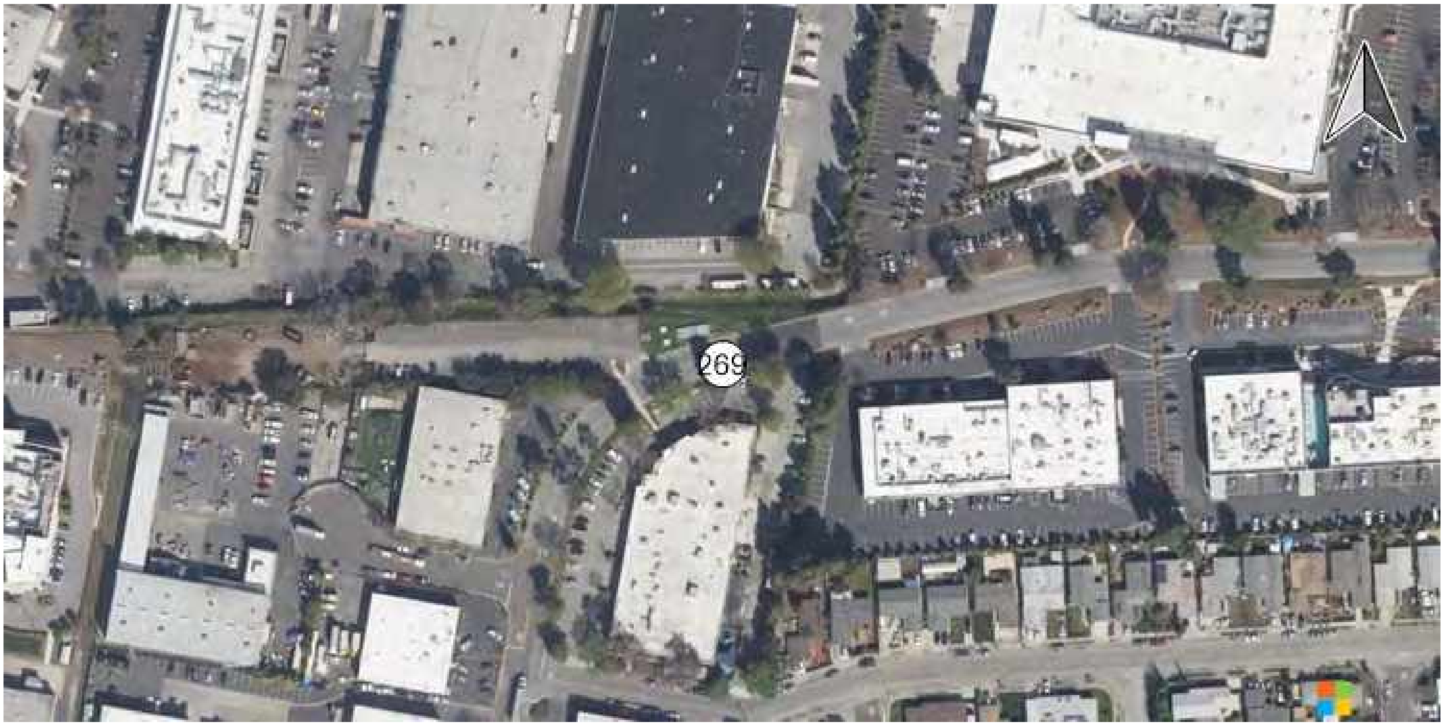

### Willow Road(SR114)/Park Str



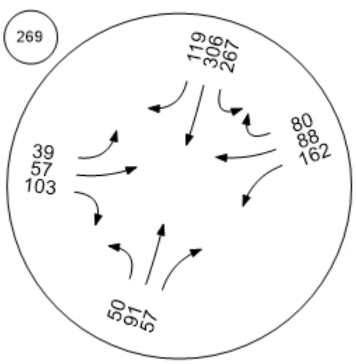
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Volume - Future Total Volume




O'Brien Drive/Loop Road



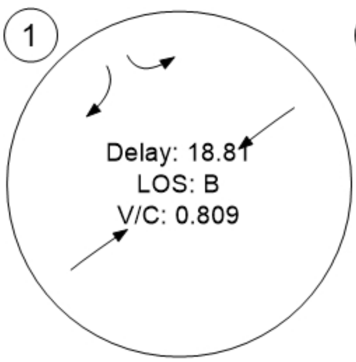
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions

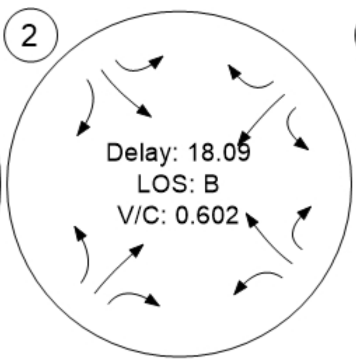

Marsh Rd (SR 84)/US 101 S

1



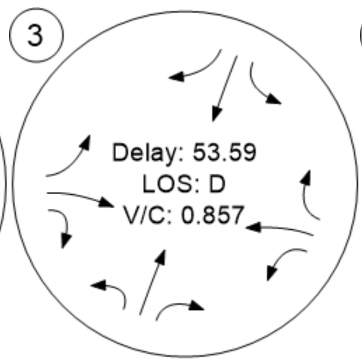

Marsh Rd/Rolison Rd-Scott D

2



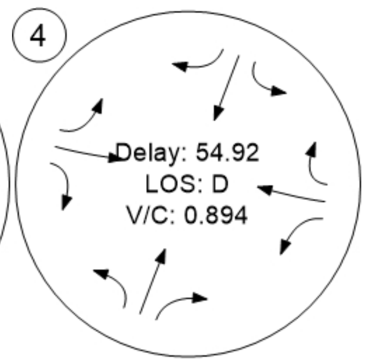

Marsh Rd/Florence St-Bohan

3



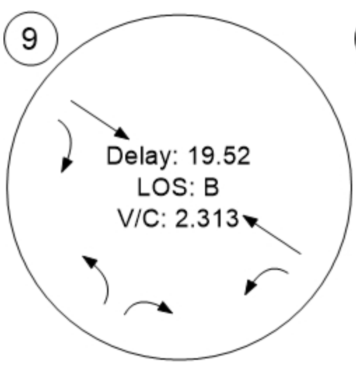

Marsh Rd/Bay Rd

4



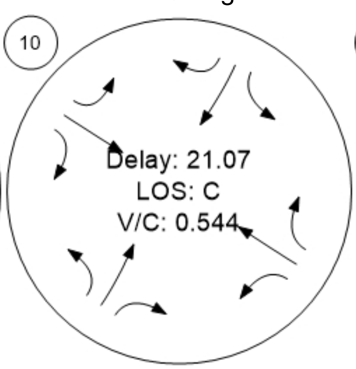

Middlefield Rd/Ravenswood

9



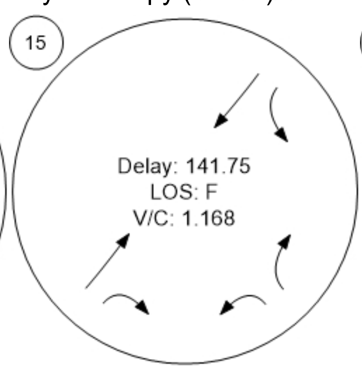

Middlefield Rd/Ringwood Ave

10



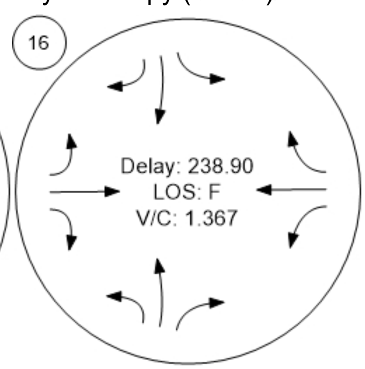

Bayfront Expy (SR 84)/Univer

15



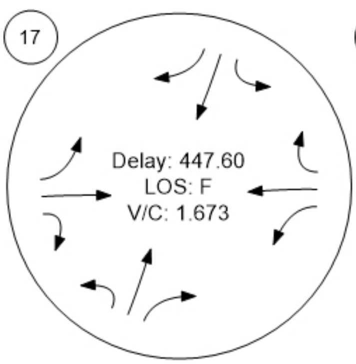

Bayfront Expy (SR 84)/Willow

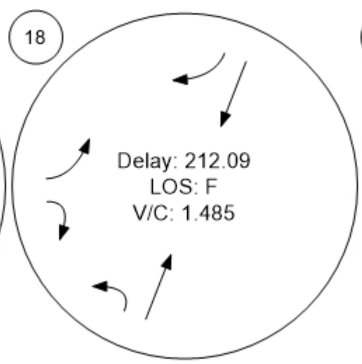
16

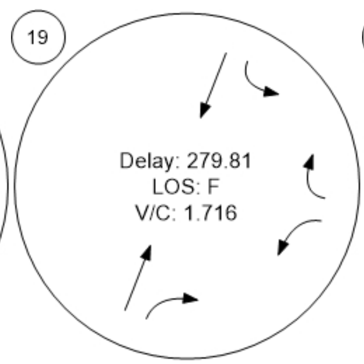


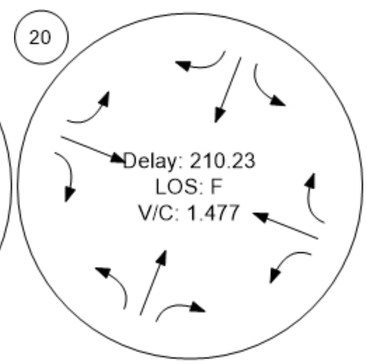
## Traffic Conditions


| Willow Rd (SR 114)/Hamilton | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/O'Brien | Willow Rd (SR 114)/Newbrid |
|---|---|---|---|

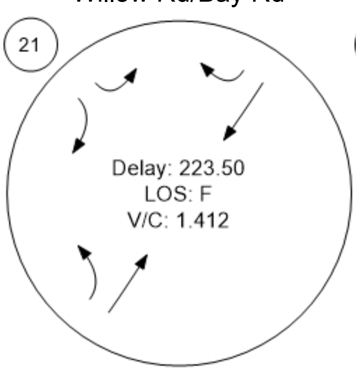


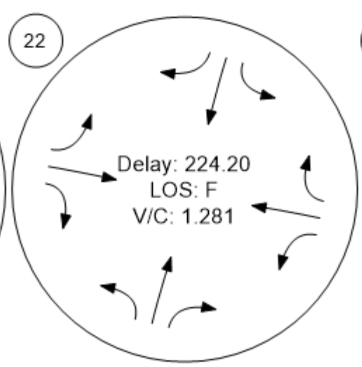



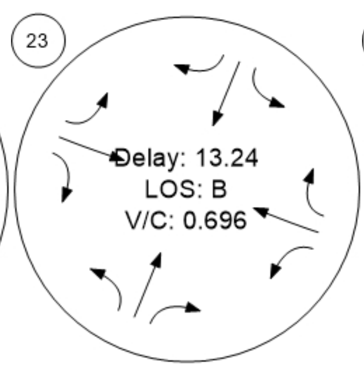



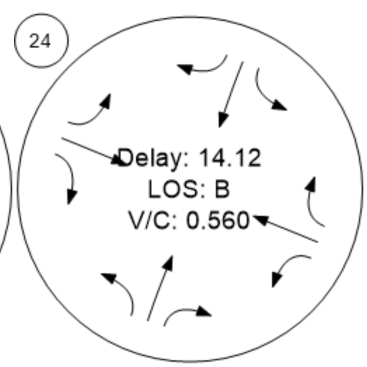




| Willow Rd/Bay Rd | Willow Rd/Durham St-VA Me | Willow Rd/Coleman Ave | Willow Rd/Gilbert Ave |
|---|---|---|---|



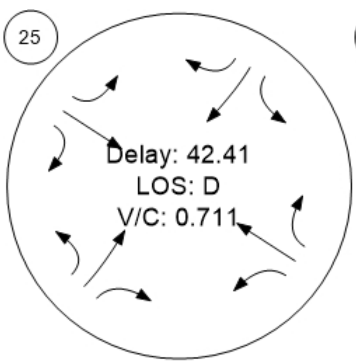



Generated with PTV VISTRO

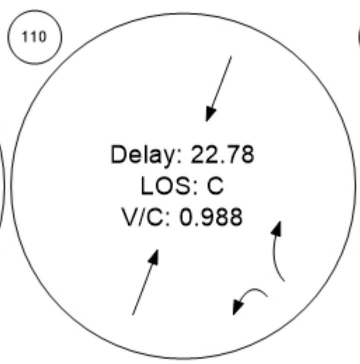
Version 2021 (SP 0-6)

Traffic Conditions

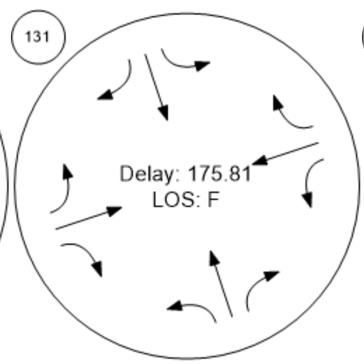

Middlefield Rd-Willow Rd



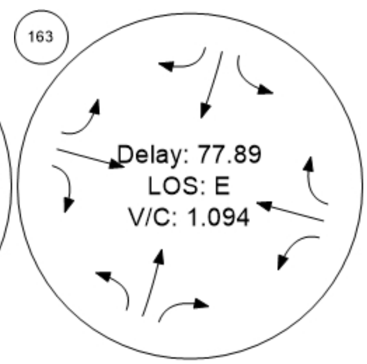

Marsh Road/101 NB Ramps



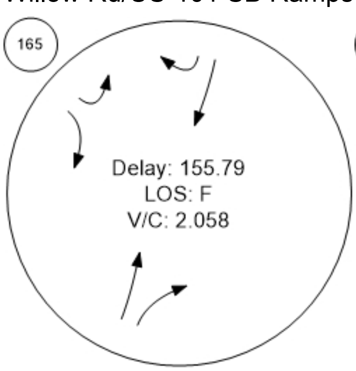

Chilco Street/Hamilton Avenu



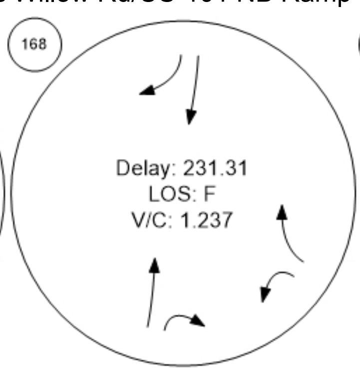

Bayfront Expy/Marsh Rd



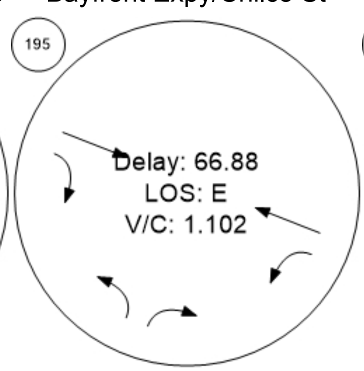

Willow Rd/US-101 SB Ramps



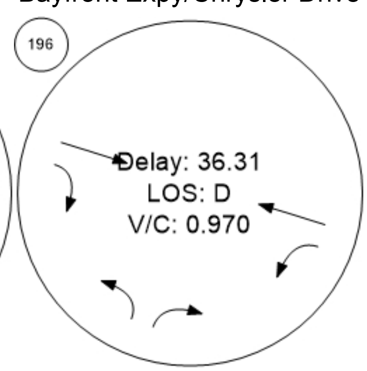

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

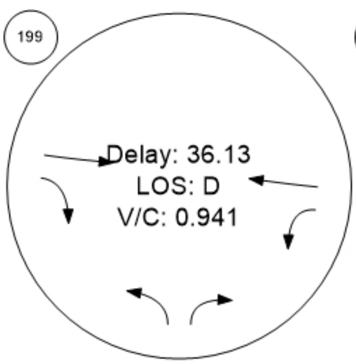



Bayfront Expy/Chrysler Drive

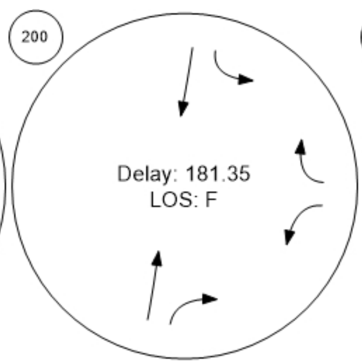


Traffic Conditions

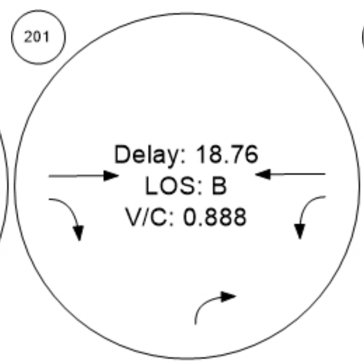

Bafront Expwy/Bldg 21



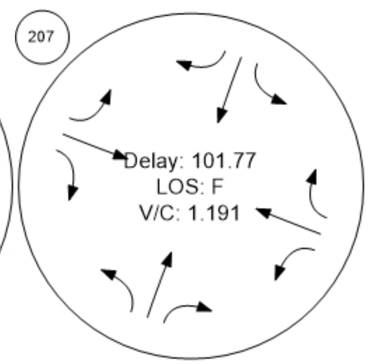

O'Brien Drive/Kavanaugh Dri



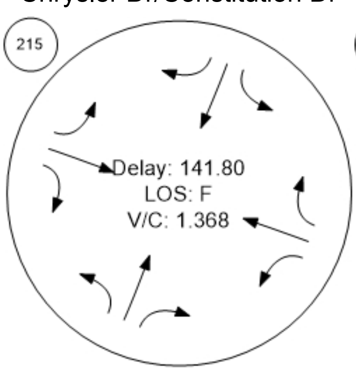

Bayfront Expwy/Bldg 20



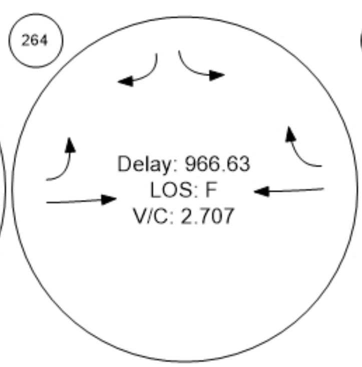

Chilco St/Constitution Dr



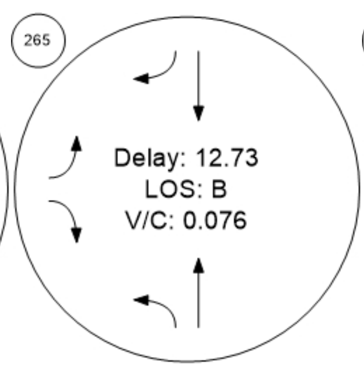

Chrysler Dr/Constitution Dr



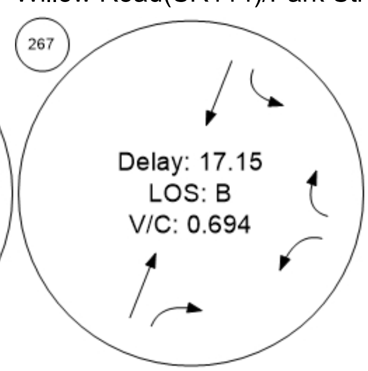

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



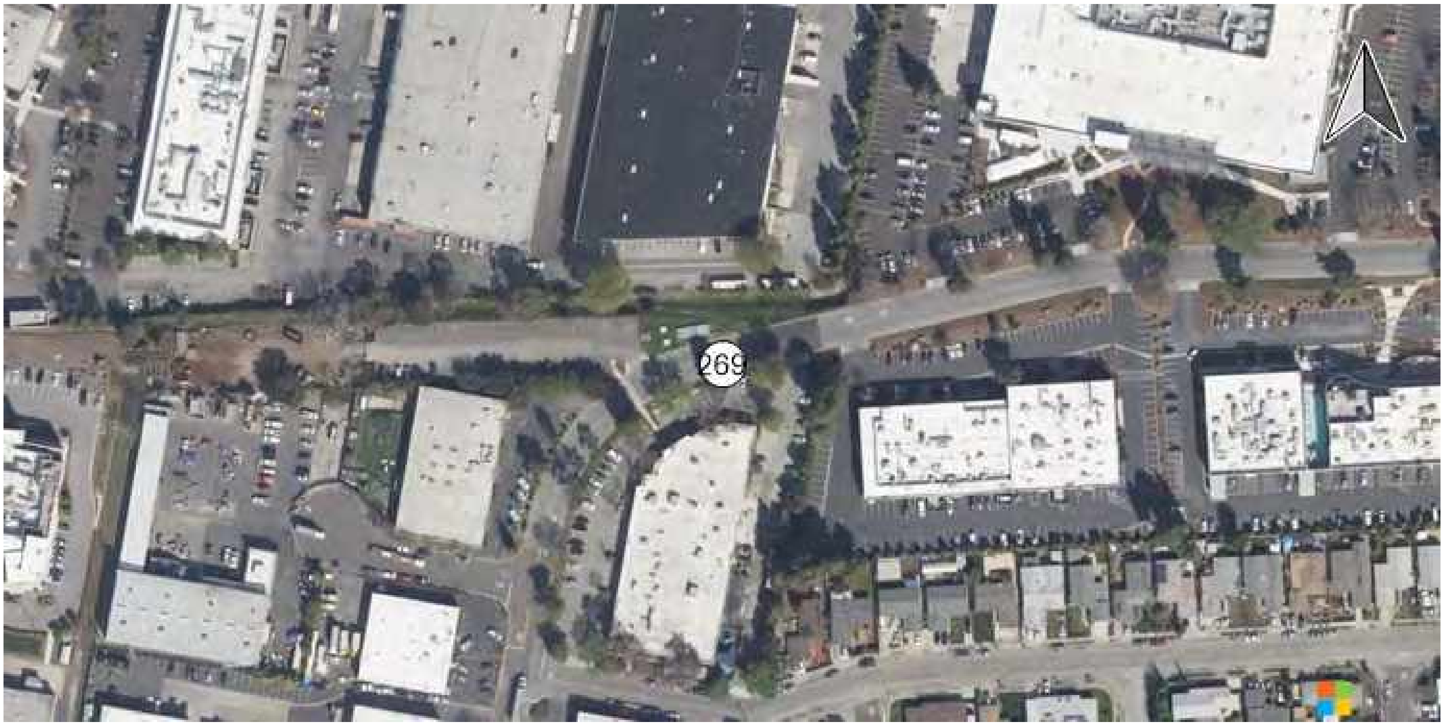

Willow Road(SR114)/Park Str



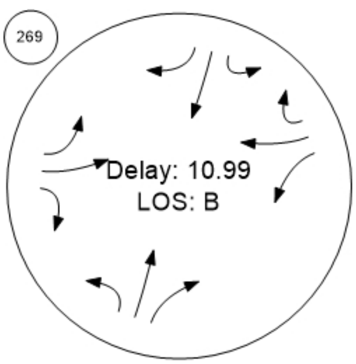
Generated with PTV VISTRO

Version 2021 (SP 0-6)

Traffic Conditions




O'Brien Drive/Loop Road

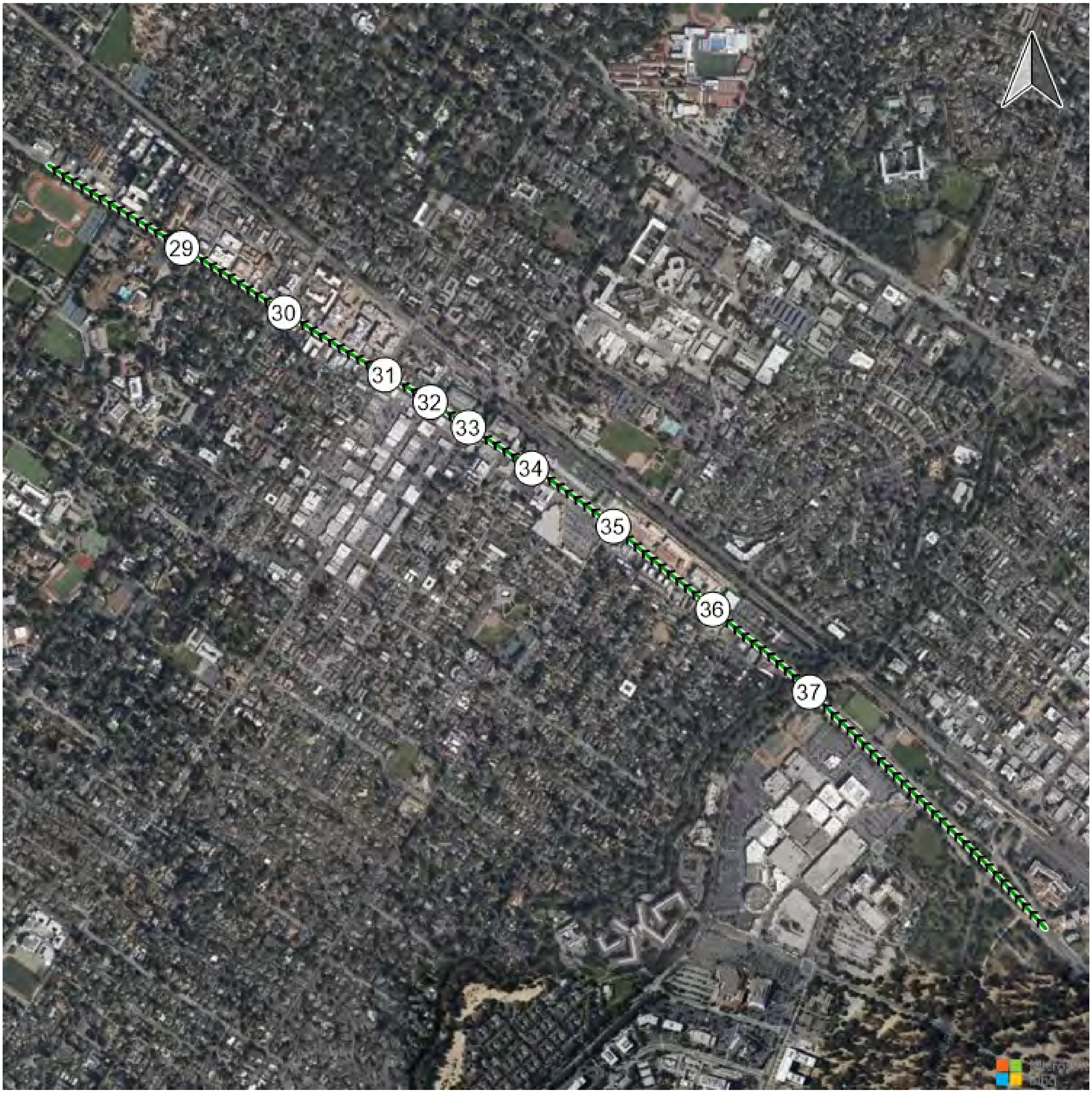


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

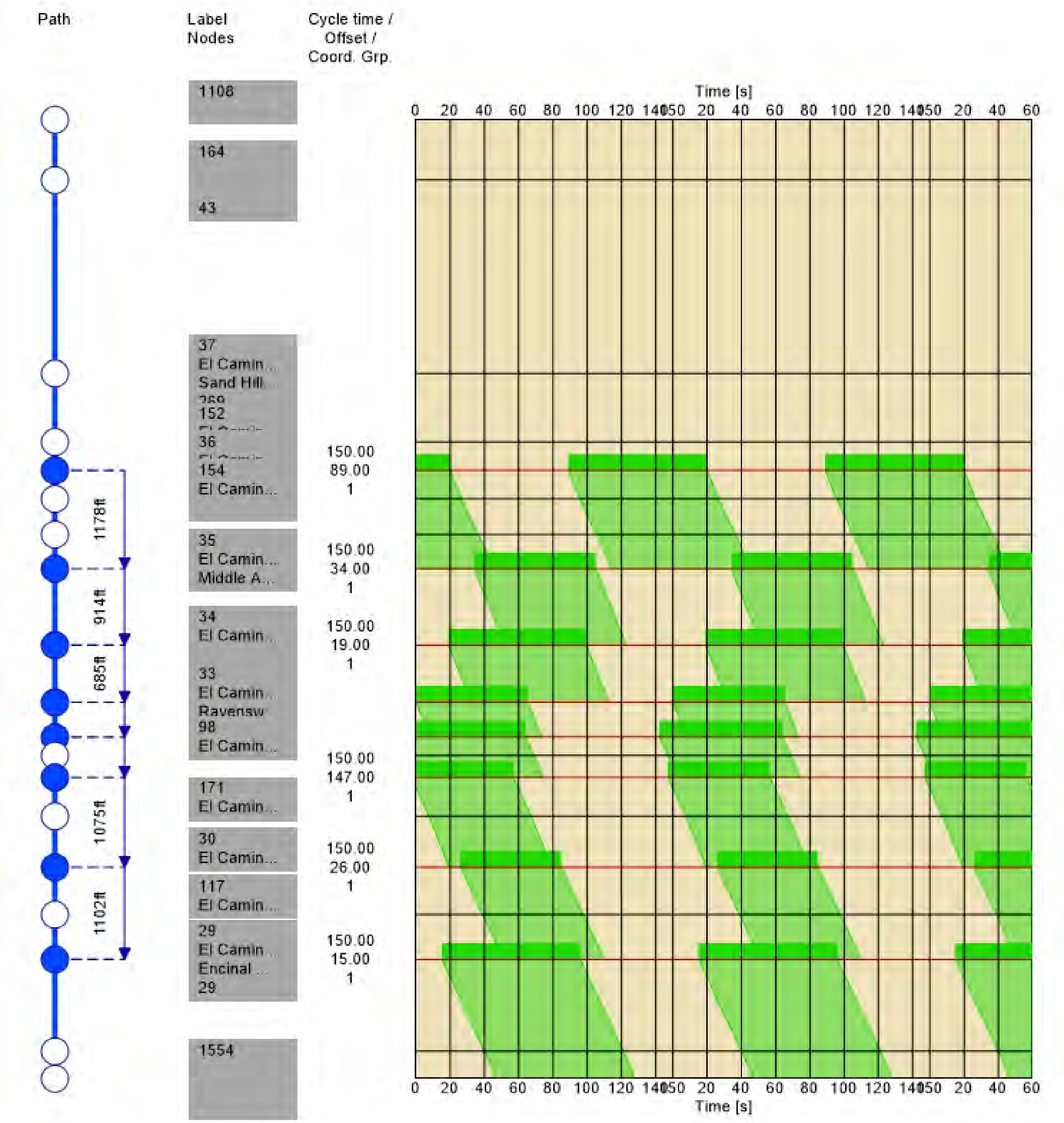
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

Route 1: ECR NB

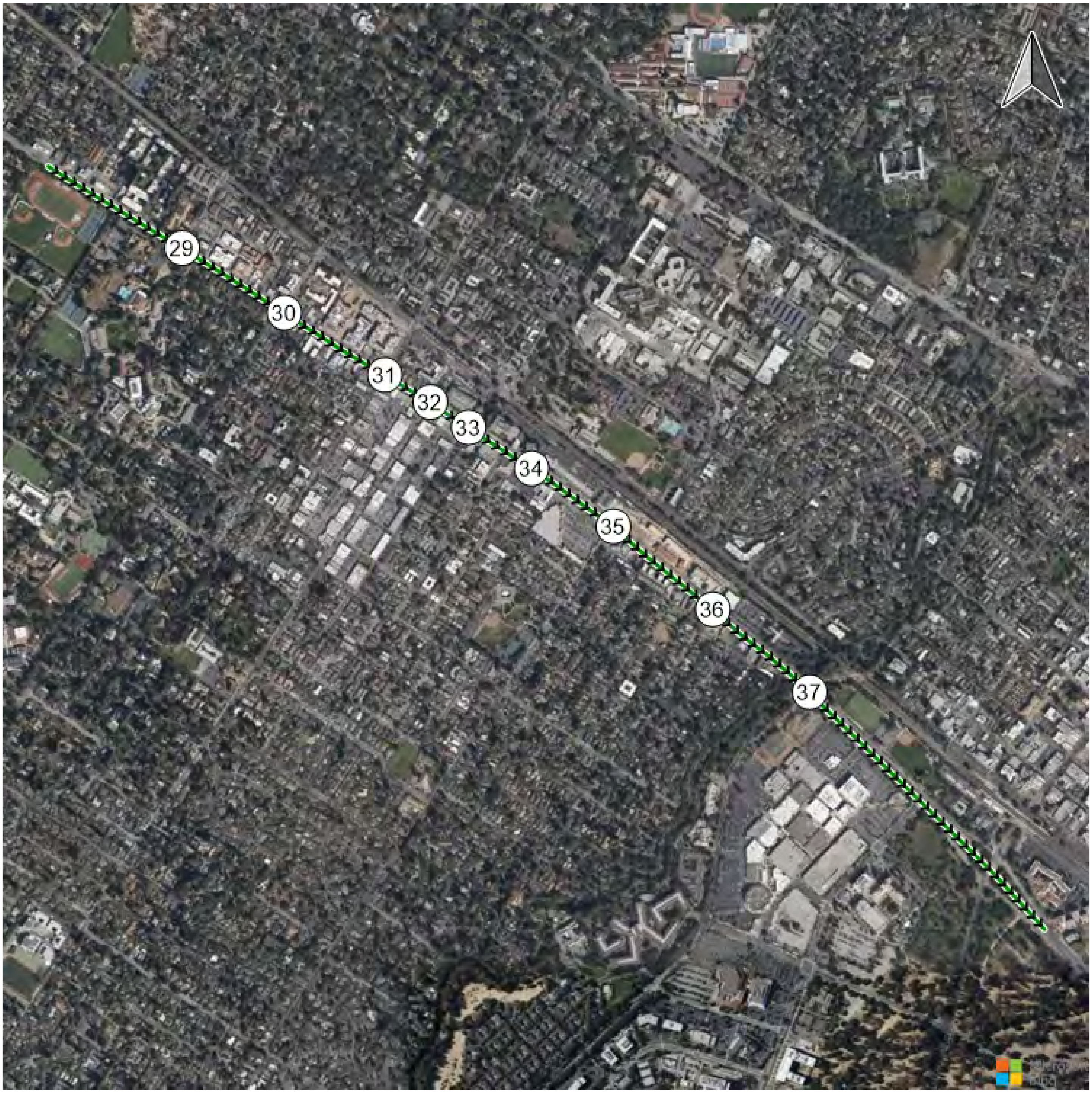


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Flowing Off

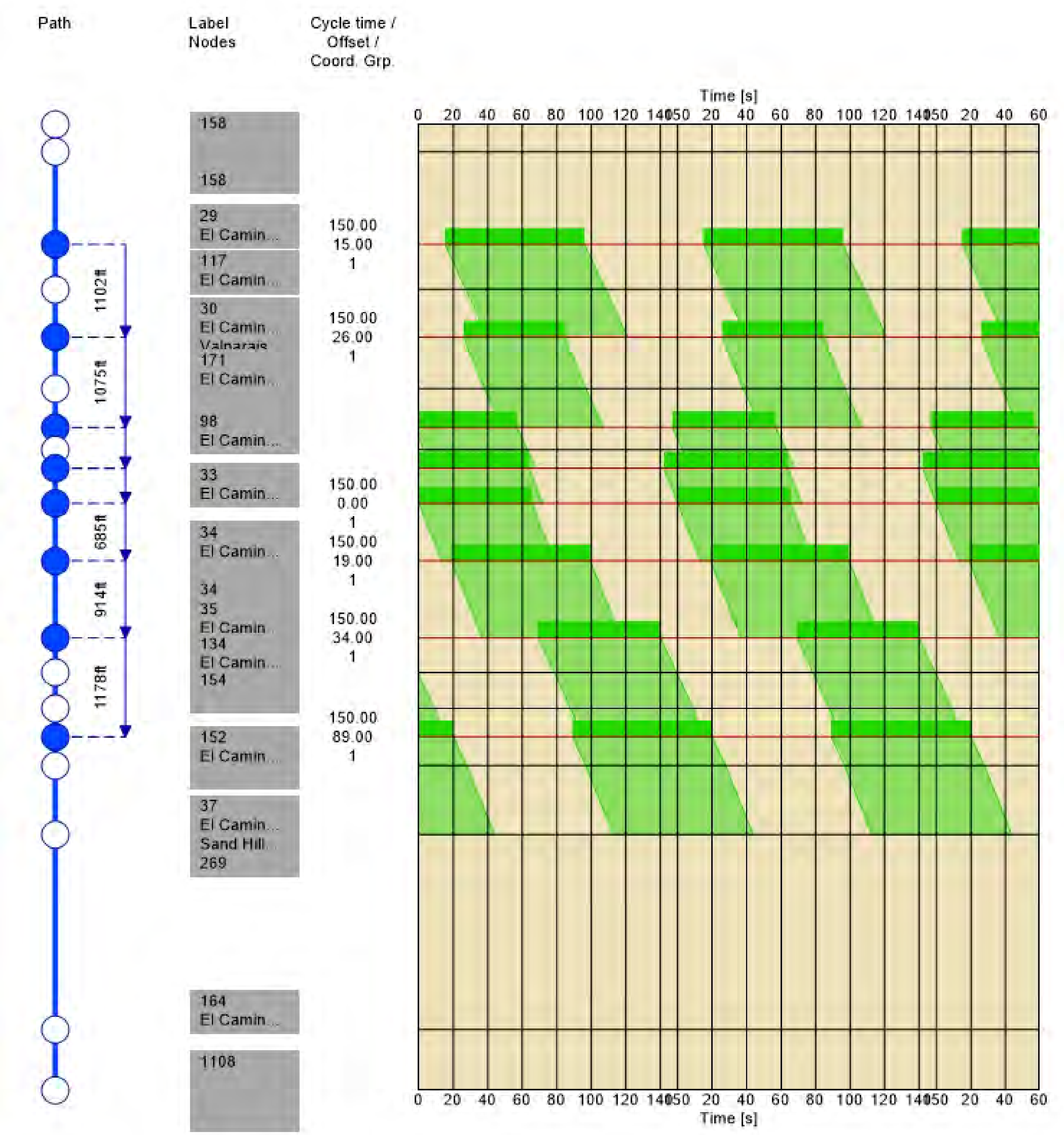
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

# Route 2: ECR SB

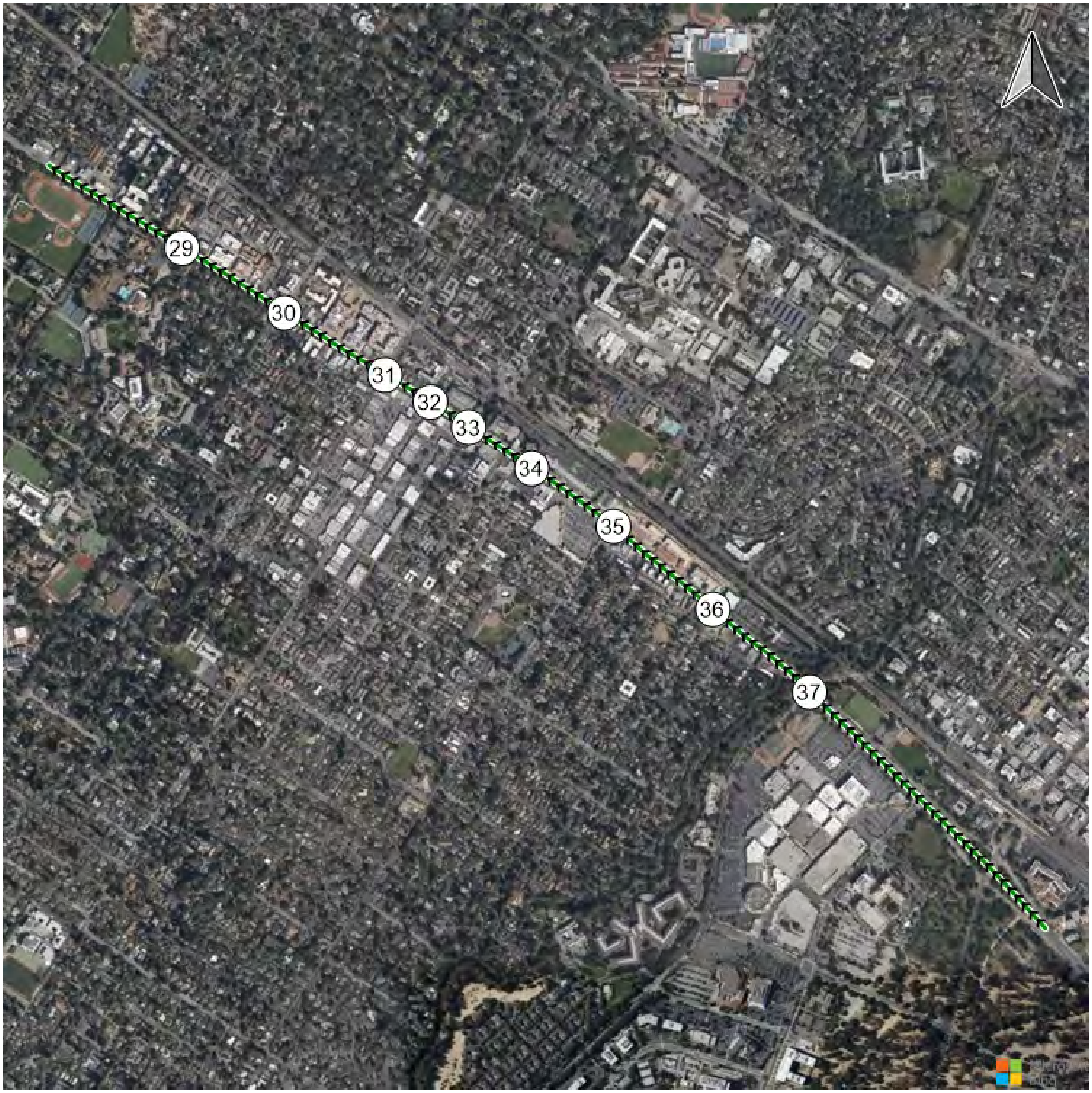


Generated with PTV VISTRO

Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

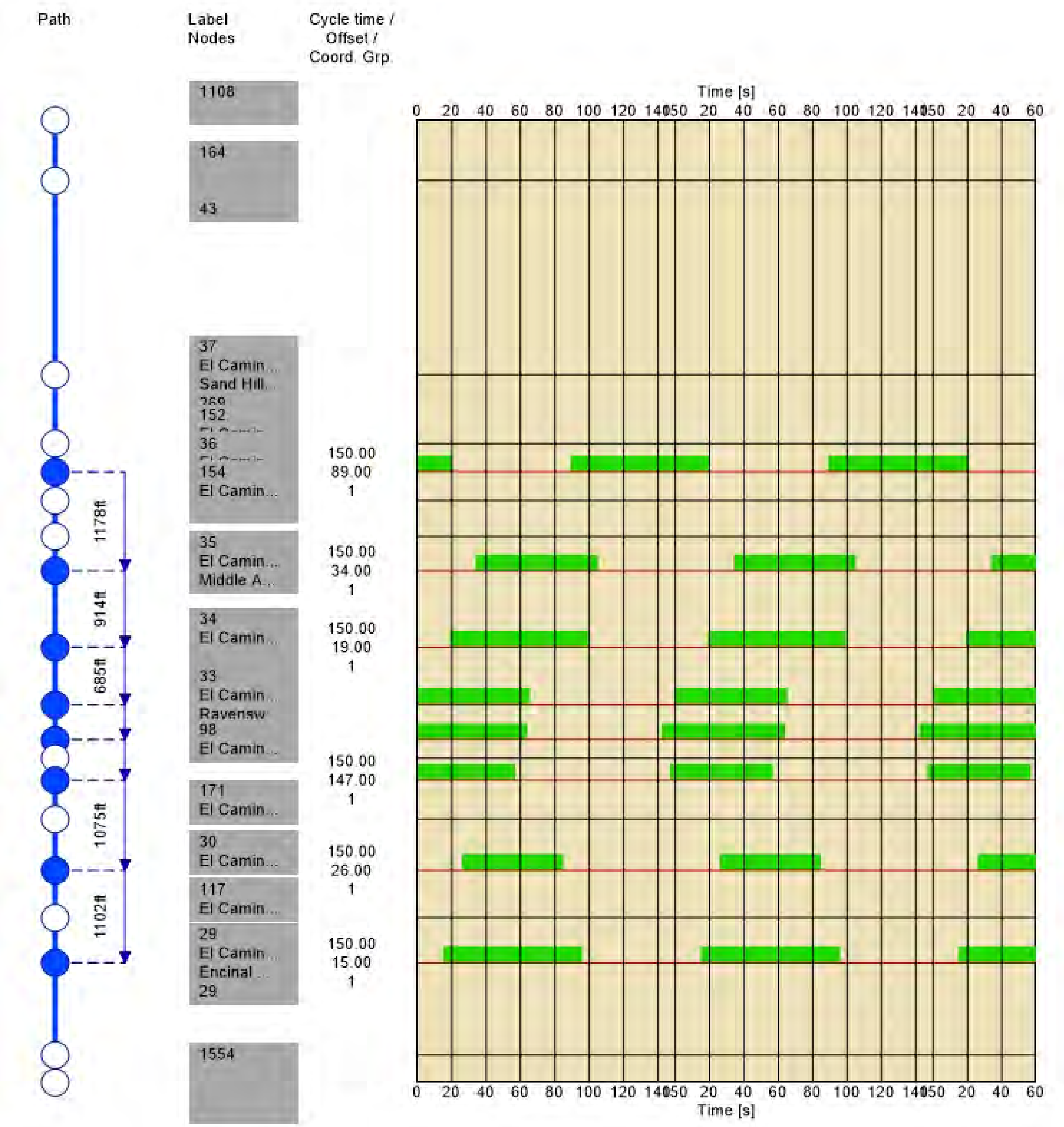
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-6)

## Route 1: ECR NB

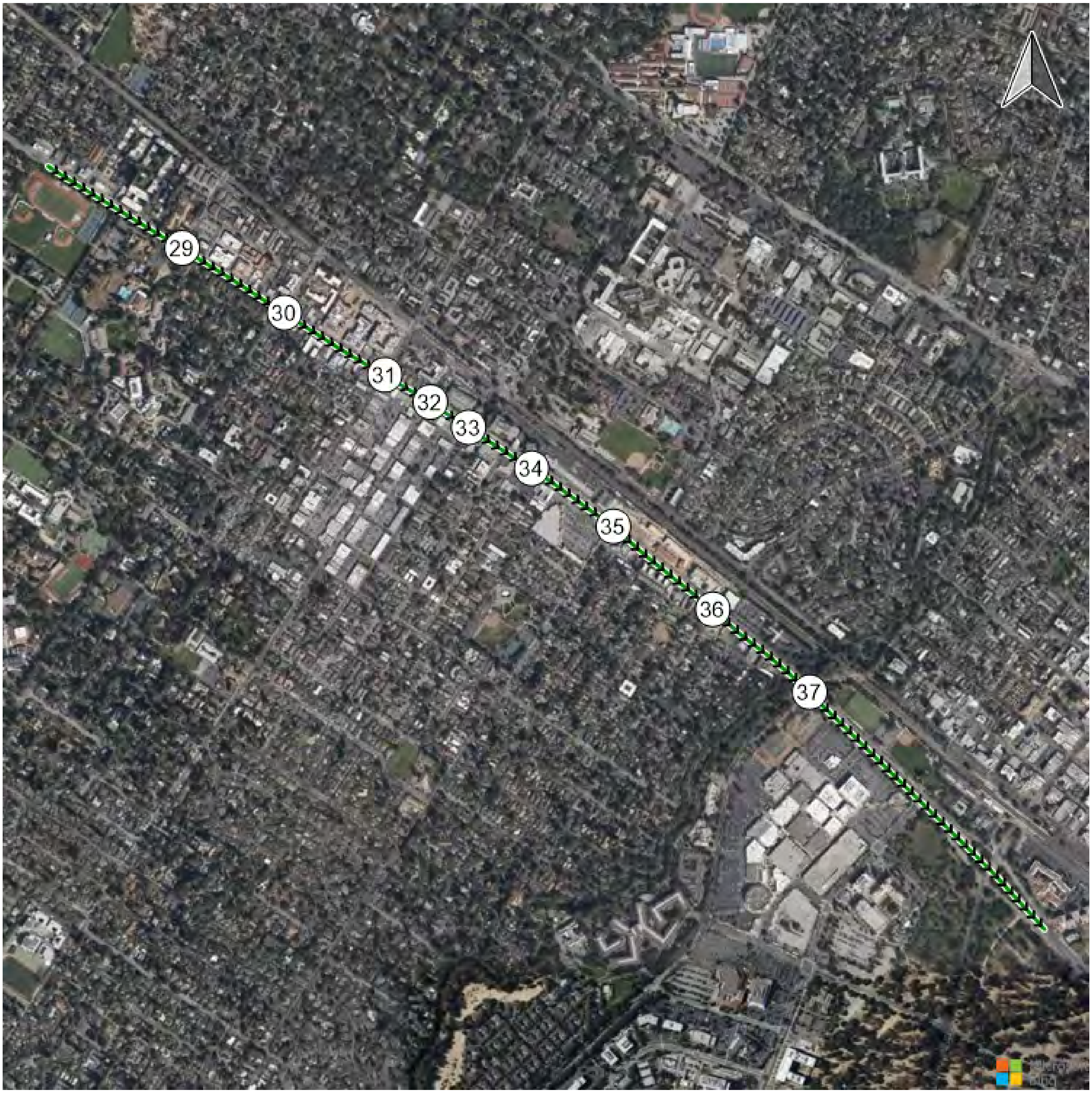


Generated with PTV VISTRO

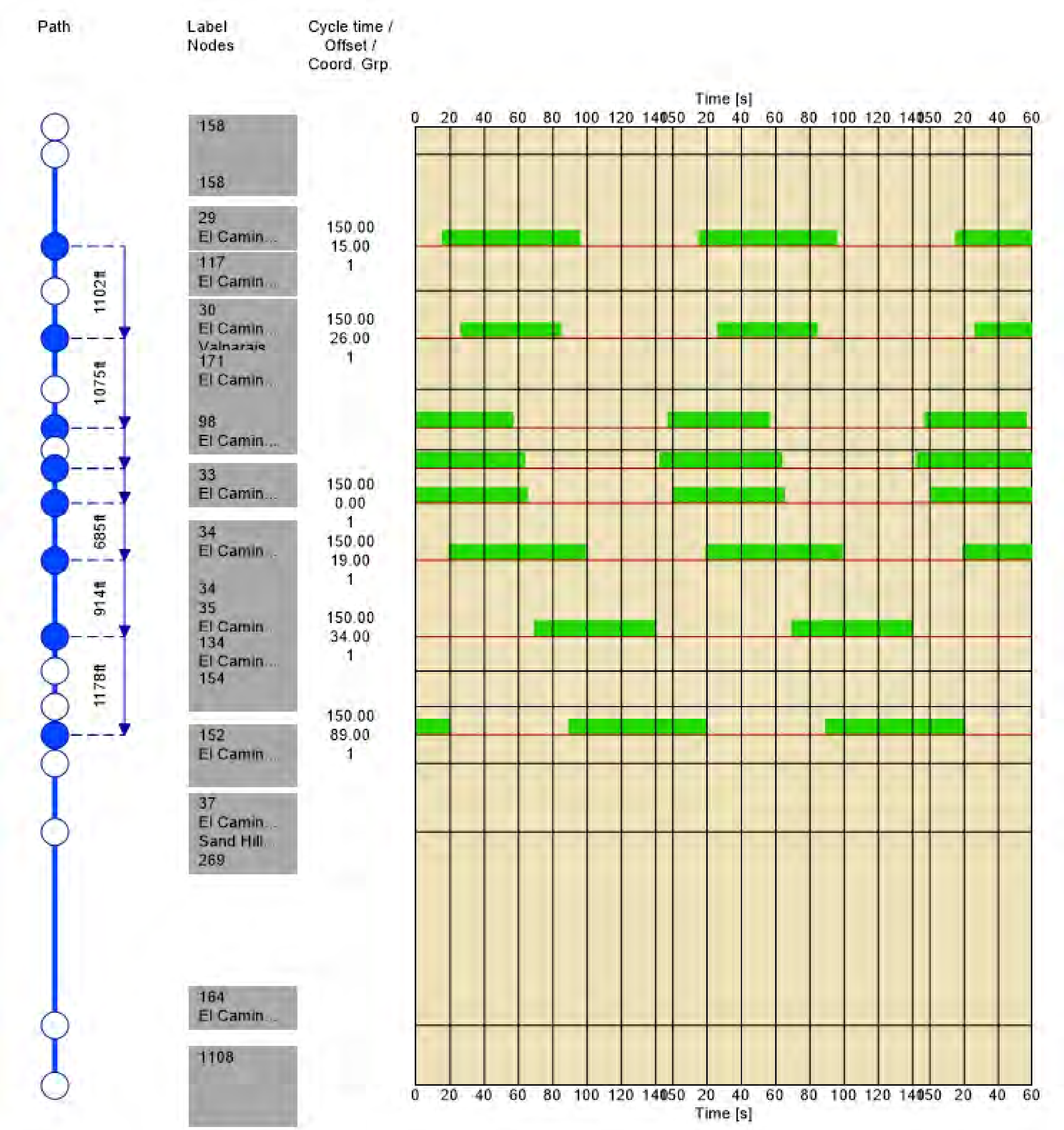
Version 2021 (SP 0-6)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB



Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro

Report File: \...\Cumulative + P AM_Imp.pdf

Scenario 24 Imp-Cumulative AM (2040 vols)+Project

10/14/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.707 | 56.7 | E |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.605 | 235.0 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.340 | 164.6 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Left | 0.929 | 20.9 | C |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.065 | 104.4 | F |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | WB Right | 0.485 | 17.7 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | WB Right | 0.786 | 24.9 | C |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | EB Left | 0.722 | 21.9 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro

Report File: \...\Cumulative + P PM_Imp.pdf

Scenario 24 Imp-Cumulative PM (2040 vols)+Project

10/14/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.736 | 48.3 | D |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.485 | 203.1 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | SB Right | 1.345 | 177.6 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.232 | 98.1 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.214 | 204.9 | F |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | EB Thru | 0.669 | 21.3 | C |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | WB Right | 0.784 | 33.7 | C |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | SB Left | 0.586 | 18.6 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 48.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.736 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 61 | 126 | 87 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 80 | 181 | 15 | 3 | 272 | 95 | 127 | 9 | 16 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 318 | 726 | 58 | 14 | 1089 | 381 | 510 | 37 | 66 | 135 | 94 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | R | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 86 | 86 | 4 | 70 | 70 | 26 | 26 | 26 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.50 | 0.50 | 0.19 | 0.19 | 0.19 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.31 | 0.25 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 3555 | 1521 | 1774 | 1821 | 1572 | 1751 | 1788 |
| c, Capacity [veh/h] | 253 | 1141 | 1108 | 45 | 1777 | 760 | 332 | 341 | 294 | 198 | 202 |
| d1, Uniform Delay [s] | 59.96 | 13.11 | 13.12 | 66.87 | 25.23 | 23.13 | 54.49 | 54.49 | 48.18 | 59.62 | 59.59 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 144.34 | 0.84 | 0.87 | 1.45 | 1.59 | 2.35 | 3.61 | 3.52 | 0.28 | 3.06 | 2.94 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.26 | 0.35 | 0.35 | 0.31 | 0.61 | 0.50 | 0.81 | 0.81 | 0.22 | 0.68 | 0.68 |
| d, Delay for Lane Group [s/veh] | 204.30 | 13.95 | 13.99 | 68.31 | 26.82 | 25.49 | 58.10 | 58.00 | 48.46 | 62.68 | 62.53 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 19.03 | 6.24 | 6.10 | 0.51 | 13.23 | 8.73 | 9.54 | 9.78 | 2.01 | 4.82 | 4.89 |
| 50th-Percentile Queue Length [ft/ln] | 475.84 | 156.05 | 152.48 | 12.71 | 330.76 | 218.37 | 238.57 | 244.59 | 50.35 | 120.54 | 122.13 |
| 95th-Percentile Queue Length [veh/ln] | 28.92 | 10.34 | 10.15 | 0.92 | 19.20 | 13.58 | 14.61 | 14.91 | 3.63 | 8.42 | 8.51 |
| 95th-Percentile Queue Length [ft/ln] | 723.01 | 258.49 | 253.73 | 22.88 | 479.89 | 339.55 | 365.23 | 372.83 | 90.63 | 210.57 | 212.75 |

**Movement, Approach, & Intersection Results**

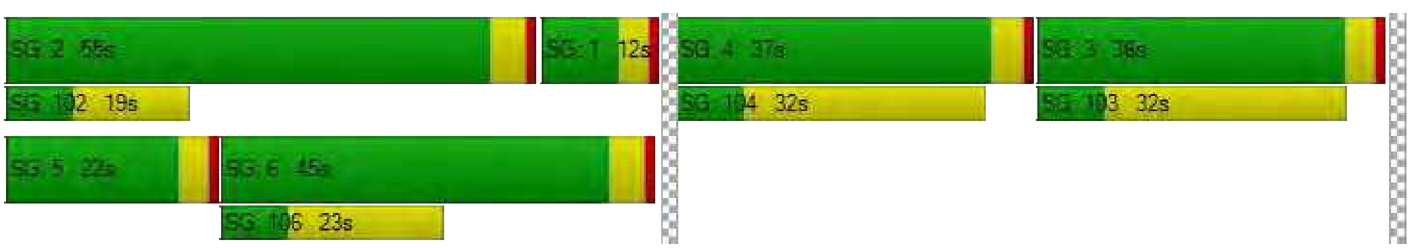
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 204.30 | 13.97 | 13.99 | 68.31 | 26.82 | 25.49 | 58.05 | 58.00 | 48.46 | 62.68 | 62.53 | 62.53 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 68.89 | | | 26.87 | | | 57.02 | | | 62.60 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 48.33 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.736 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.40 | 59.40 | 59.40 | 59.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.960 | 3.139 | 2.721 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 720 | 577 | 457 | 469 |
| d_b, Bicycle Delay [s] | 28.66 | 35.44 | 41.69 | 41.03 |
| I_b,int, Bicycle LOS Score for Intersection | 2.469 | 2.784 | 2.858 | 2.008 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 203.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.485 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 269 | 933 | 1447 | 52 | 163 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 269 | 933 | 1447 | 52 | 163 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 251 | 389 | 14 | 44 | 31 |
| Total Analysis Volume [veh/h] | 289 | 1003 | 1556 | 56 | 175 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 22 | 63 | 41 | 41 | 67 | 67 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | No |
| Maximum Recall | No | No | No | | No | No |
| Pedestrian Recall | No | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 |
| g_i, Effective Green Time [s] | 19 | 99 | 77 | 77 | 24 | 46 |
| g / C, Green / Cycle | 0.15 | 0.76 | 0.59 | 0.59 | 0.18 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.64 | 0.97 | 0.98 | 0.17 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 819 | 1025 | 911 |
| c, Capacity [veh/h] | 186 | 1204 | 494 | 487 | 187 | 320 |
| d1, Uniform Delay [s] | 55.40 | 9.95 | 26.33 | 26.33 | 52.34 | 31.49 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 273.79 | 6.84 | 293.34 | 304.01 | 8.74 | 0.28 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.55 | 0.83 | 1.63 | 1.66 | 0.94 | 0.38 |
| d, Delay for Lane Group [s/veh] | 329.19 | 16.79 | 319.67 | 330.34 | 61.08 | 31.77 |
| Lane Group LOS | F | B | F | F | E | C |
| Critical Lane Group | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 20.13 | 8.32 | 54.03 | 54.70 | 6.07 | 2.93 |
| 50th-Percentile Queue Length [ft/ln] | 503.36 | 208.02 | 1350.81 | 1367.43 | 151.68 | 73.36 |
| 95th-Percentile Queue Length [veh/ln] | 32.32 | 13.05 | 88.14 | 89.56 | 10.11 | 5.28 |
| 95th-Percentile Queue Length [ft/ln] | 808.07 | 326.29 | 2203.38 | 2238.88 | 252.67 | 132.05 |

**Movement, Approach, & Intersection Results**

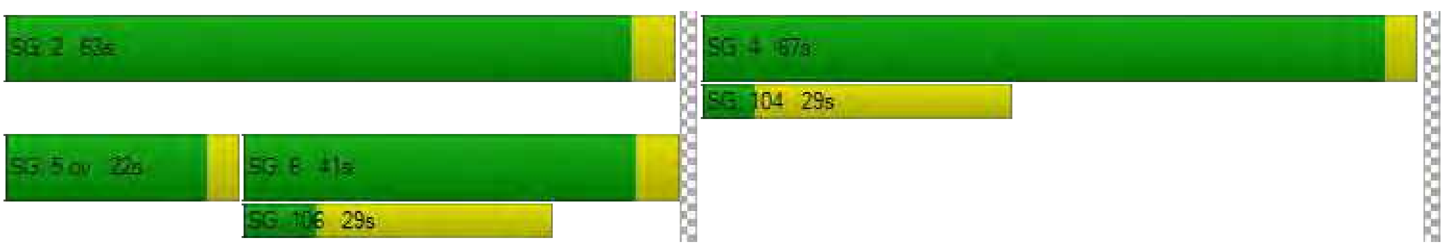
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 329.19 | 16.79 | 324.81 | 330.34 | 61.08 | 31.77 |
| Movement LOS | F | B | F | F | E | C |
| d_A, Approach Delay [s/veh] | 86.67 | | 325.00 | | 48.98 | |
| Approach LOS | F | | F | | D | |
| d_I, Intersection Delay [s/veh] | 203.15 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.485 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.091 | 3.057 | 2.167 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 908 | 570 | 985 |
| d_b, Bicycle Delay [s] | 19.35 | 33.31 | 16.74 |
| I_b,int, Bicycle LOS Score for Intersection | 2.626 | 2.890 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 177.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.345 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 462 | 369 | 285 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 382 | 98 | 21 | 372 | 7 | 7 | 55 | 127 | 101 | 78 | 3 |
| Total Analysis Volume [veh/h] | 295 | 1526 | 390 | 86 | 1488 | 29 | 30 | 221 | 508 | 405 | 313 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 24 | 53 | 53 | 12 | 41 | 41 | 9 | 34 | 34 | 31 | 56 | 56 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 21 | 59 | 59 | 9 | 47 | 47 | 3 | 30 | 30 | 17 | 43 | 43 |
| g / C, Green / Cycle | 0.16 | 0.45 | 0.45 | 0.07 | 0.36 | 0.36 | 0.03 | 0.23 | 0.23 | 0.13 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.52 | 0.54 | 0.09 | 0.54 | 0.54 | 0.02 | 0.23 | 0.33 | 0.12 | 0.24 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1171 | 952 | 1853 | 961 | 1752 | 965 | 1540 | 3409 | 1303 | 1523 |
| c, Capacity [veh/h] | 206 | 1123 | 530 | 66 | 668 | 346 | 45 | 222 | 354 | 452 | 429 | 502 |
| d1, Uniform Delay [s] | 54.50 | 35.57 | 35.57 | 60.50 | 41.57 | 41.57 | 62.80 | 49.99 | 49.43 | 55.49 | 38.48 | 29.46 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.11 | 0.44 | 0.50 | 0.04 | 0.16 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 221.36 | 77.24 | 99.91 | 151.56 | 230.18 | 239.05 | 15.94 | 55.35 | 211.05 | 2.59 | 3.43 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 1.44 | 1.15 | 1.18 | 1.30 | 1.49 | 1.50 | 0.67 | 1.00 | 1.43 | 0.90 | 0.73 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 275.87 | 112.81 | 135.48 | 212.06 | 271.75 | 280.62 | 78.74 | 105.34 | 260.48 | 58.09 | 41.91 | 29.48 |
| Lane Group LOS | F | F | F | F | F | F | E | F | F | E | D | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 19.24 | 28.92 | 30.64 | 4.97 | 32.03 | 34.07 | 1.18 | 10.55 | 32.07 | 6.70 | 9.19 | 0.26 |
| 50th-Percentile Queue Length [ft/ln] | 481.10 | 723.01 | 765.99 | 124.29 | 800.84 | 851.85 | 29.61 | 263.81 | 801.84 | 167.45 | 229.77 | 6.51 |
| 95th-Percentile Queue Length [veh/ln] | 30.58 | 41.59 | 44.58 | 8.95 | 51.01 | 54.02 | 2.13 | 15.88 | 49.11 | 10.94 | 14.16 | 0.47 |
| 95th-Percentile Queue Length [ft/ln] | 764.47 | 1039.73 | 1114.39 | 223.72 | 1275.35 | 1350.49 | 53.29 | 396.99 | 1227.78 | 273.56 | 354.06 | 11.72 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 275.87 | 116.32 | 135.48 | 212.06 | 274.67 | 280.62 | 78.74 | 105.34 | 260.48 | 58.09 | 41.91 | 29.48 |
| Movement LOS | F | F | F | F | F | F | E | F | F | E | D | C |
| d_A, Approach Delay [s/veh] | 140.99 | | | 271.42 | | | 208.12 | | | 50.68 | | |
| Approach LOS | F | | | F | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 177.59 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.345 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 52.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 23.40 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.502 | 2.951 | 2.781 | 2.775 |
| Crosswalk LOS | D | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 738 | 554 | 462 | 800 |
| d_b, Bicycle Delay [s] | 25.86 | 34.07 | 38.54 | 23.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.776 | 2.441 | 3.101 | 2.838 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 98.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.232 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1319 | 809 | 294 | 350 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 40 | 1319 | 809 | 71 | 350 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 340 | 209 | 18 | 90 | 0 |
| Total Analysis Volume [veh/h] | 41 | 1360 | 834 | 73 | 361 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

### Phasing & Timing

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 67 | 67 | 67 | 67 | 67 | 67 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 2 | 40 | 35 | 35 | 17 | 17 |
| g / C, Green / Cycle | 0.03 | 0.61 | 0.52 | 0.52 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.81 | 0.50 | 0.05 | 0.22 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1576 | 1651 | 756 |
| c, Capacity [veh/h] | 58 | 1016 | 877 | 821 | 412 | 188 |
| d1, Uniform Delay [s] | 32.03 | 13.18 | 15.20 | 8.03 | 24.10 | 0.00 |
| k, delay calibration | 0.04 | 0.28 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.64 | 155.99 | 8.74 | 0.07 | 2.39 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.70 | 1.34 | 0.95 | 0.09 | 0.88 | 0.00 |
| d, Delay for Lane Group [s/veh] | 37.67 | 169.17 | 23.93 | 8.10 | 26.50 | 0.00 |
| Lane Group LOS | D | F | C | A | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.72 | 27.72 | 5.83 | 0.46 | 2.68 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 18.06 | 692.97 | 145.66 | 11.39 | 67.10 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.30 | 44.15 | 9.79 | 0.82 | 4.83 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 32.51 | 1103.80 | 244.63 | 20.51 | 120.78 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 37.67 | 169.17 | 23.93 | 8.10 | 26.50 | 0.00 |
| Movement LOS | D | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 165.32 | | 22.66 | | 26.50 | |
| Approach LOS | F | | C | | C | |
| d_I, Intersection Delay [s/veh] | 98.06 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.232 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 23.25 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.363 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1080 | 1080 | 1080 |
| d_b, Bicycle Delay [s] | 7.10 | 7.08 | 7.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.715 | 2.492 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 204.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.214 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 21 | 21 | 10 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 292 | 1 | 8 | 150 | 5 | 40 | 9 | 6 | 6 | 3 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1169 | 4 | 32 | 601 | 20 | 159 | 37 | 23 | 23 | 11 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Overlap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | 1,8 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | No |
| Maximum Recall | No | No | | No | No | | | No | | | No | No |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.50 | 2.50 | 0.00 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0.00 |
| g_i, Effective Green Time [s] | 109 | 100 | 100 | 109 | 103 | 12 | 12 | 12 | 8 | 17 |
| g / C, Green / Cycle | 0.77 | 0.70 | 0.70 | 0.77 | 0.72 | 0.09 | 0.09 | 0.09 | 0.05 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.99 | 0.99 | 0.06 | 1.06 | 0.05 | 0.05 | 0.05 | 0.02 | 0.03 |
| s, saturation flow rate [veh/h] | 515 | 590 | 589 | 575 | 584 | 1748 | 1842 | 445 | 1838 | 1501 |
| c, Capacity [veh/h] | 103 | 412 | 412 | 176 | 422 | 150 | 158 | 38 | 102 | 181 |
| d1, Uniform Delay [s] | 42.17 | 21.54 | 21.54 | 40.16 | 19.82 | 63.28 | 63.26 | 62.81 | 65.04 | 57.20 |
| k, delay calibration | 0.23 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.87 | 204.10 | 204.33 | 0.49 | 224.66 | 4.48 | 4.20 | 14.34 | 1.90 | 0.86 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 1.42 | 1.42 | 0.18 | 1.47 | 0.64 | 0.64 | 0.60 | 0.33 | 0.29 |
| d, Delay for Lane Group [s/veh] | 43.05 | 225.64 | 225.87 | 40.65 | 244.47 | 67.75 | 67.45 | 77.15 | 66.93 | 58.06 |
| Lane Group LOS | D | F | F | D | F | E | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.09 | 36.03 | 36.01 | 0.24 | 38.97 | 3.66 | 3.82 | 0.98 | 1.26 | 1.78 |
| 50th-Percentile Queue Length [ft/ln] | 2.30 | 900.86 | 900.18 | 6.02 | 974.14 | 91.50 | 95.60 | 24.52 | 31.52 | 44.48 |
| 95th-Percentile Queue Length [veh/ln] | 0.17 | 58.24 | 58.21 | 0.43 | 63.65 | 6.59 | 6.88 | 1.77 | 2.27 | 3.20 |
| 95th-Percentile Queue Length [ft/ln] | 4.14 | 1455.93 | 1455.14 | 10.83 | 1591.23 | 164.70 | 172.08 | 44.13 | 56.73 | 80.06 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 43.05 | 225.75 | 225.87 | 40.65 | 244.47 | 244.47 | 67.63 | 67.45 | 77.15 | 66.93 | 66.93 | 58.06 |
| Movement LOS | D | F | F | D | F | F | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 224.21 | | | 234.48 | | | 68.60 | | | 61.57 | | |
| Approach LOS | F | | | F | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 204.89 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.214 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 60.84 | 60.84 | 60.84 | 60.84 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.529 | 2.750 | 2.212 | 2.038 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 280 | 280 | 420 | 420 |
| d_b, Bicycle Delay [s] | 52.90 | 53.06 | 44.59 | 44.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.637 | 1.951 | 1.702 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.669 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 109 | 5 | 21 | 216 | 10 | 6 | 35 | 7 | 2 | 4 | 16 |
| Total Analysis Volume [veh/h] | 24 | 434 | 19 | 82 | 863 | 39 | 24 | 140 | 26 | 8 | 17 | 64 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 2 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 1 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 59 | 0 | 0 | 59 | 0 | 0 | 31 | 0 | 0 | 31 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 55 | 55 | 27 | 27 |
| g / C, Green / Cycle | 0.61 | 0.61 | 0.30 | 0.30 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.56 | 0.11 | 0.05 |
| s, saturation flow rate [veh/h] | 1741 | 1752 | 1773 | 1620 |
| c, Capacity [veh/h] | 1106 | 1114 | 577 | 530 |
| d1, Uniform Delay [s] | 9.16 | 15.09 | 24.61 | 23.31 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.23 | 10.25 | 1.52 | 0.69 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.43 | 0.88 | 0.33 | 0.17 |
| d, Delay for Lane Group [s/veh] | 10.39 | 25.34 | 26.14 | 23.99 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.77 | 18.20 | 3.39 | 1.48 |
| 50th-Percentile Queue Length [ft/ln] | 119.18 | 455.09 | 84.80 | 36.89 |
| 95th-Percentile Queue Length [veh/ln] | 8.35 | 25.20 | 6.11 | 2.66 |
| 95th-Percentile Queue Length [ft/ln] | 208.69 | 630.02 | 152.64 | 66.41 |

**Movement, Approach, & Intersection Results**

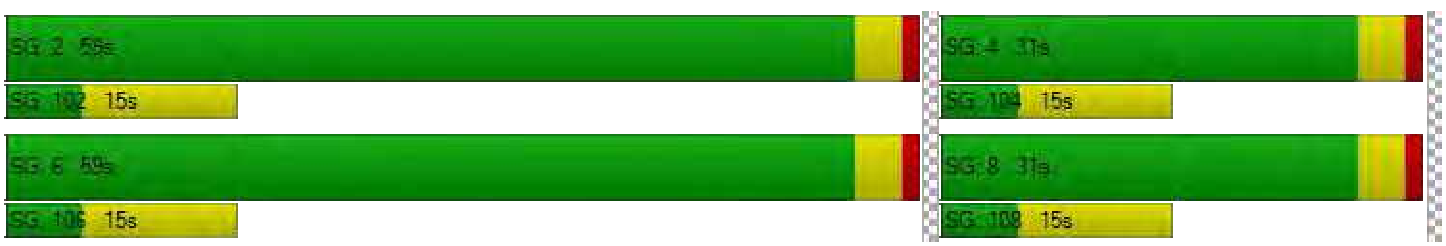
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.39 | 10.39 | 10.39 | 25.34 | 25.34 | 25.34 | 26.14 | 26.14 | 26.14 | 23.99 | 23.99 | 23.99 |
| Movement LOS | B | B | B | C | C | C | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 10.39 | | | 25.34 | | | 26.14 | | | 23.99 | | |
| Approach LOS | B | | | C | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 21.26 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.669 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.398 | 2.485 | 1.860 | 1.994 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1222 | 1222 | 600 | 600 |
| d_b, Bicycle Delay [s] | 6.81 | 6.81 | 22.05 | 22.05 |
| I_b,int, Bicycle LOS Score for Intersection | 2.347 | 3.183 | 1.873 | 1.706 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.784 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 397 | 386 | 167 | 285 | 101 | 336 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 397 | 386 | 167 | 285 | 101 | 336 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 114 | 111 | 48 | 82 | 29 | 97 |
| Total Analysis Volume [veh/h] | 456 | 444 | 192 | 328 | 116 | 386 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 64 | 0 | 0 | 64 | 26 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 60 | 60 | 60 | 22 | 22 |
| g / C, Green / Cycle | 0.67 | 0.67 | 0.67 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.54 | 0.32 | 0.18 | 0.07 | 0.25 |
| s, saturation flow rate [veh/h] | 1682 | 605 | 1828 | 1741 | 1554 |
| c, Capacity [veh/h] | 1121 | 238 | 1219 | 426 | 380 |
| d1, Uniform Delay [s] | 10.76 | 35.37 | 6.09 | 27.52 | 34.00 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.12 | 24.77 | 0.54 | 1.58 | 50.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.80 | 0.81 | 0.27 | 0.27 | 1.02 |
| d, Delay for Lane Group [s/veh] | 16.87 | 60.15 | 6.64 | 29.10 | 84.37 |
| Lane Group LOS | B | E | A | C | F |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 12.46 | 5.88 | 2.36 | 2.18 | 13.36 |
| 50th-Percentile Queue Length [ft/ln] | 311.41 | 147.04 | 59.05 | 54.39 | 333.98 |
| 95th-Percentile Queue Length [veh/ln] | 18.24 | 9.86 | 4.25 | 3.92 | 19.54 |
| 95th-Percentile Queue Length [ft/ln] | 456.11 | 246.47 | 106.29 | 97.90 | 488.39 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.87 | 16.87 | 60.15 | 6.64 | 29.10 | 84.37 |
| Movement LOS | B | B | E | A | C | F |
| d_A, Approach Delay [s/veh] | 16.87 | | 26.39 | | 71.60 | |
| Approach LOS | B | | C | | E | |
| d_I, Intersection Delay [s/veh] | 33.74 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.784 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 36.45 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.384 | 0.000 |
| Crosswalk LOS | F | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1333 | 1333 | 489 |
| d_b, Bicycle Delay [s] | 5.00 | 5.00 | 25.69 |
| I_b,int, Bicycle LOS Score for Intersection | 3.045 | 2.418 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.586 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 118 | 76 | 232 | 669 | 299 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 118 | 76 | 232 | 669 | 299 | 22 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 23 | 70 | 202 | 90 | 7 |
| Total Analysis Volume [veh/h] | 142 | 92 | 280 | 806 | 360 | 27 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 33 | 0 | 0 | 57 | 57 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 29 | 53 | 53 | 53 |
| g / C, Green / Cycle | 0.32 | 0.59 | 0.59 | 0.59 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.29 | 0.44 | 0.22 |
| s, saturation flow rate [veh/h] | 1651 | 968 | 1816 | 1794 |
| c, Capacity [veh/h] | 532 | 519 | 1069 | 1056 |
| d1, Uniform Delay [s] | 24.09 | 18.91 | 13.68 | 9.70 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.63 | 3.99 | 4.93 | 0.98 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.54 | 0.75 | 0.37 |
| d, Delay for Lane Group [s/veh] | 26.71 | 22.90 | 18.61 | 10.68 |
| Lane Group LOS | C | C | B | B |
| Critical Lane Group | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.22 | 4.82 | 12.18 | 3.94 |
| 50th-Percentile Queue Length [ft/ln] | 105.54 | 120.53 | 304.50 | 98.41 |
| 95th-Percentile Queue Length [veh/ln] | 7.59 | 8.42 | 17.90 | 7.09 |
| 95th-Percentile Queue Length [ft/ln] | 189.79 | 210.56 | 447.59 | 177.14 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 26.71 | 26.71 | 22.90 | 18.61 | 10.68 | 10.68 |
| Movement LOS | C | C | C | B | B | B |
| d_A, Approach Delay [s/veh] | 26.71 | | 19.71 | | 10.68 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 18.62 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.586 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.378 | 2.442 | 2.367 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 644 | 1178 | 1178 |
| d_b, Bicycle Delay [s] | 20.67 | 7.61 | 7.61 |
| I_b,int, Bicycle LOS Score for Intersection | 1.946 | 3.352 | 2.198 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro

Report File: \...\Cumulative + P PM_Imp.pdf

Scenario 24 Imp-Cumulative PM (2040 vols)+Project

10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 | 3401 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 269 | 933 | 1447 | 52 | 163 | 114 | 2978 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 | 5045 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 40 | 1319 | 809 | 294 | 350 | 40 | 2852 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 | 1946 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 | 1601 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 397 | 386 | 167 | 285 | 101 | 336 | 1672 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 118 | 76 | 232 | 669 | 299 | 22 | 1416 |

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative + P PM_Imp.pdf

Scenario 24 Imp-Cumulative PM (2040 vols)+Project
10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 296 | 675 | 54 | 13 | 1013 | 354 | 474 | 34 | 235 | 126 | 87 | 40 | 3401 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **296** | **675** | **54** | **13** | **1013** | **354** | **474** | **34** | **235** | **126** | **87** | **40** | **3401** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 269 | 933 | 1447 | 52 | 163 | 114 | 2978 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **269** | **933** | **1447** | **52** | **163** | **114** | **2978** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 201 | 637 | 369 | 285 | 56 | 5045 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1389** | **355** | **78** | **1354** | **26** | **27** | **201** | **637** | **369** | **285** | **56** | **5045** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 40 | 1319 | 809 | 294 | 350 | 40 | 2852 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1319** | **809** | **294** | **350** | **40** | **2852** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1052 | 4 | 29 | 541 | 18 | 143 | 33 | 39 | 21 | 10 | 47 | 1946 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1052** | **4** | **29** | **541** | **18** | **143** | **33** | **39** | **21** | **10** | **47** | **1946** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 402 | 18 | 76 | 797 | 36 | 21 | 124 | 23 | 7 | 16 | 59 | 1601 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **402** | **18** | **76** | **797** | **36** | **21** | **124** | **23** | **7** | **16** | **59** | **1601** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 397 | 386 | 167 | 285 | 101 | 336 | 1672 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **397** | **386** | **167** | **285** | **101** | **336** | **1672** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 118 | 76 | 232 | 669 | 299 | 22 | 1416 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **118** | **76** | **232** | **669** | **299** | **22** | **1416** |

Generated with PTV VISTRO

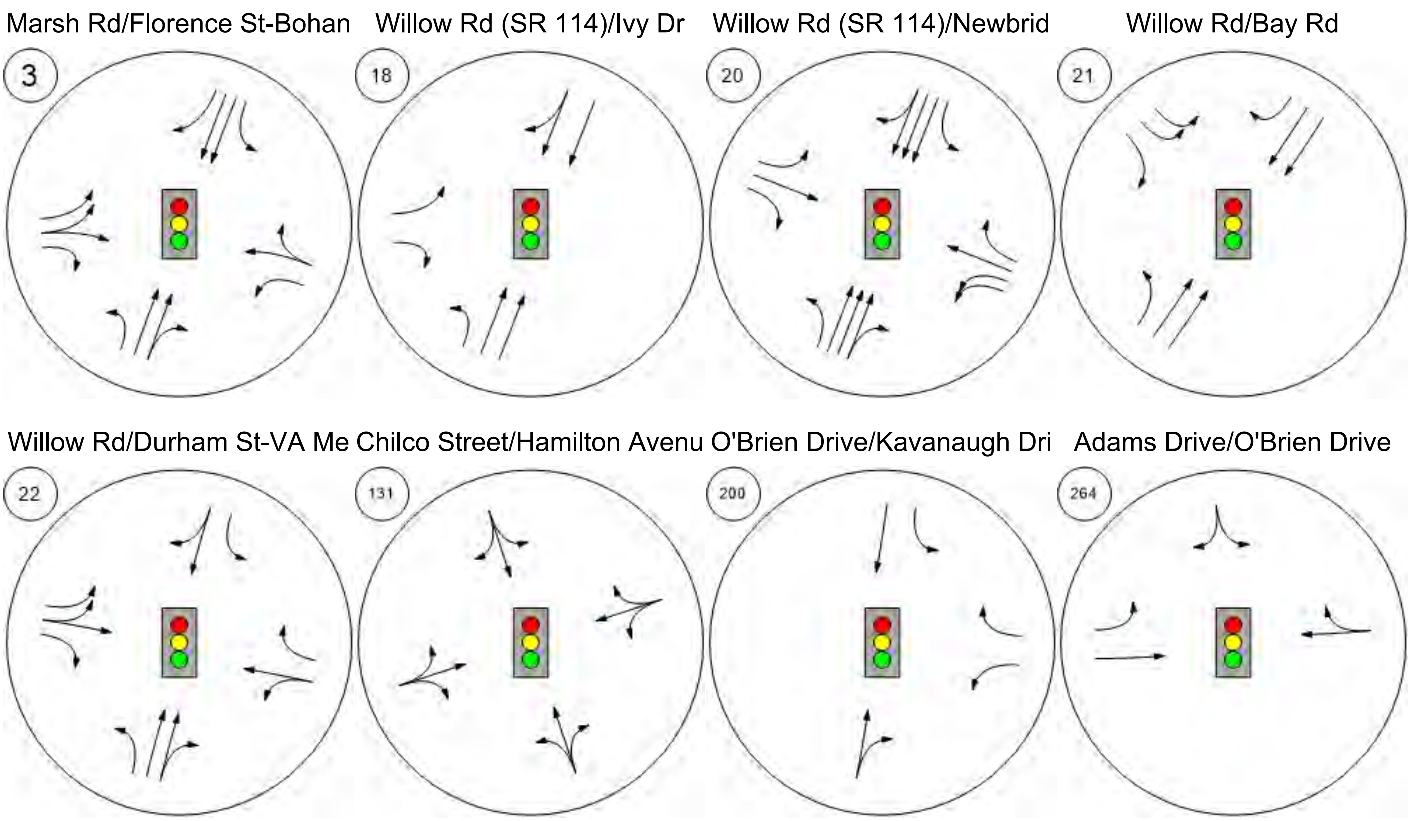
Version 2021 (SP 0-4)

Study Intersections

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

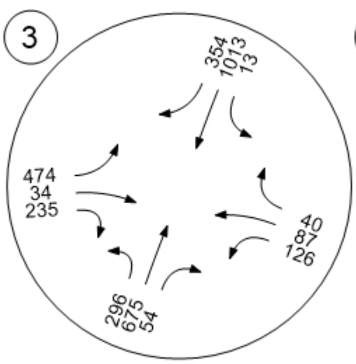



Generated with PTV VISTRO

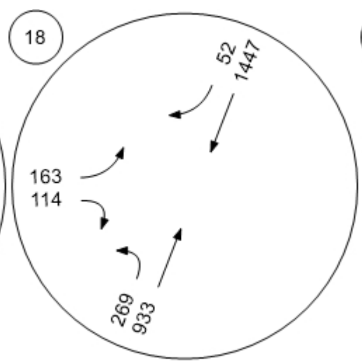
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

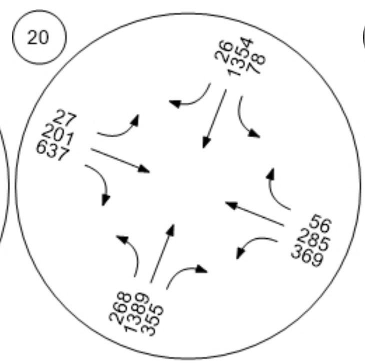

Marsh Rd/Florence St-Bohan



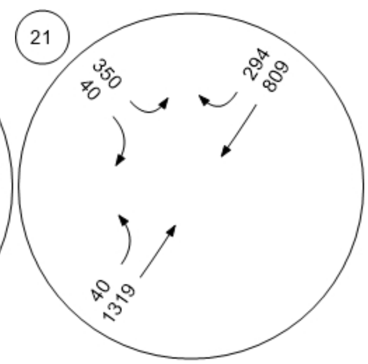

Willow Rd (SR 114)/Ivy Dr



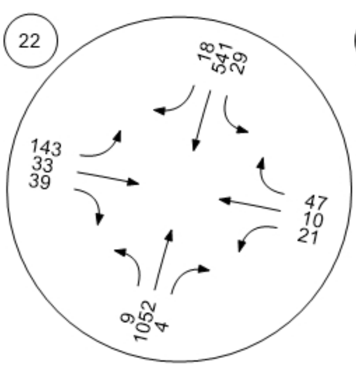

Willow Rd (SR 114)/Newbrid



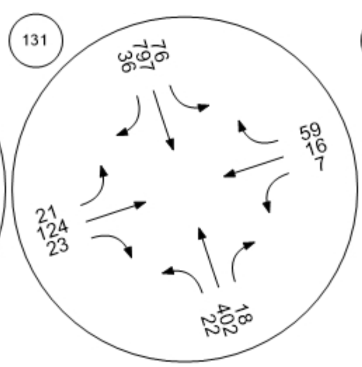

Willow Rd/Bay Rd



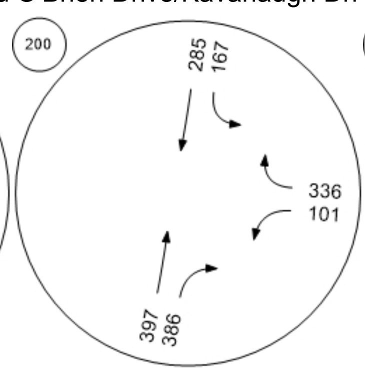

Willow Rd/Durham St-VA Me



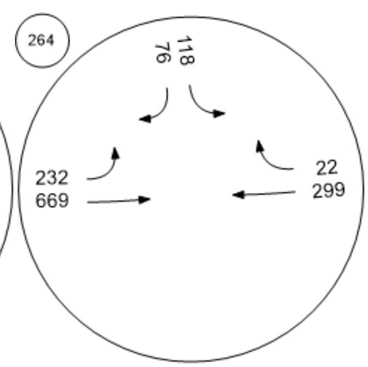

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

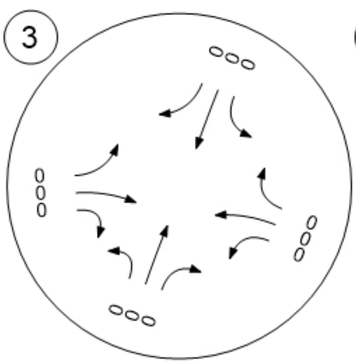


Generated with PTV VISTRO

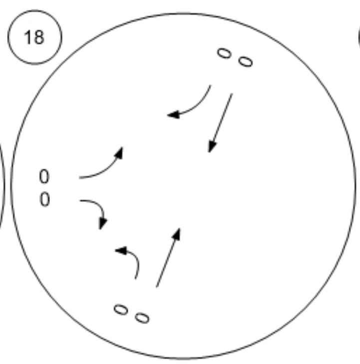
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

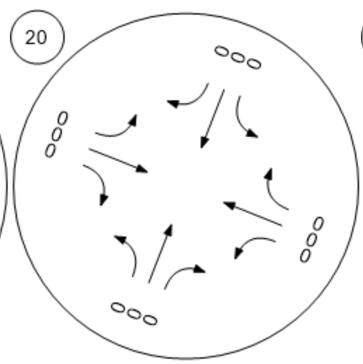

Marsh Rd/Florence St-Bohan



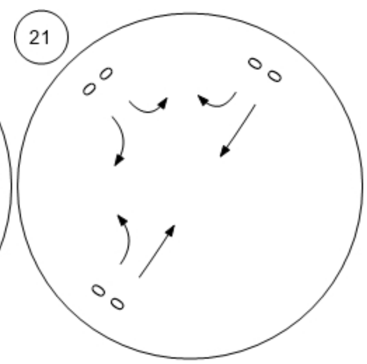

Willow Rd (SR 114)/Ivy Dr



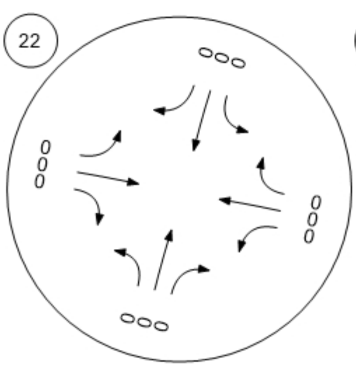

Willow Rd (SR 114)/Newbrid



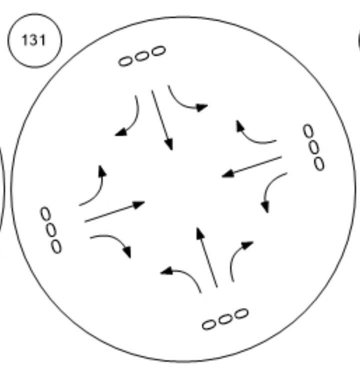

Willow Rd/Bay Rd



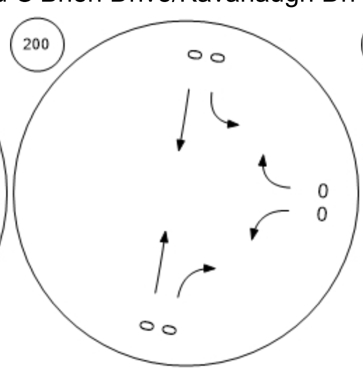

Willow Rd/Durham St-VA Me



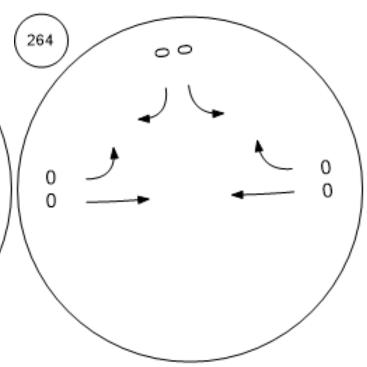

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

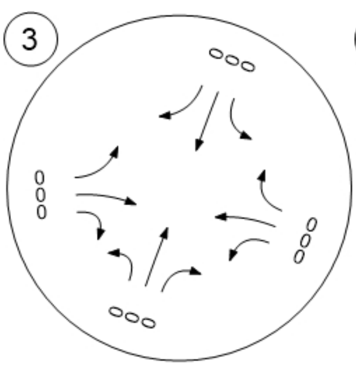


Generated with PTV VISTRO

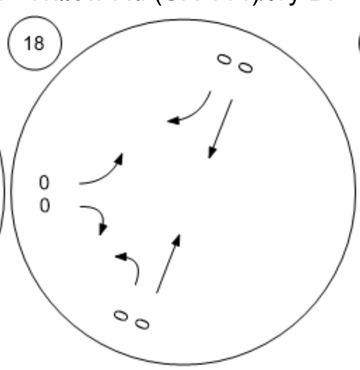
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

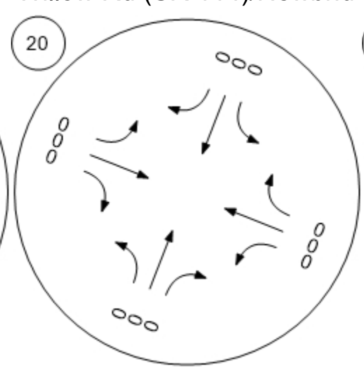

Marsh Rd/Florence St-Bohan



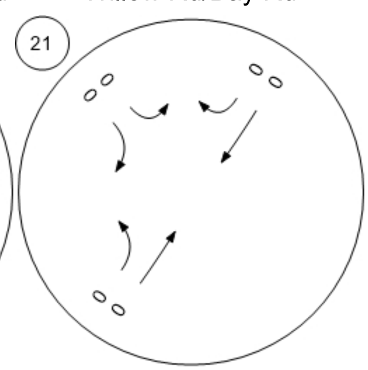

Willow Rd (SR 114)/Ivy Dr



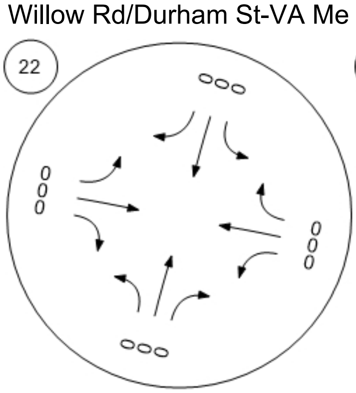

Willow Rd (SR 114)/Newbrid



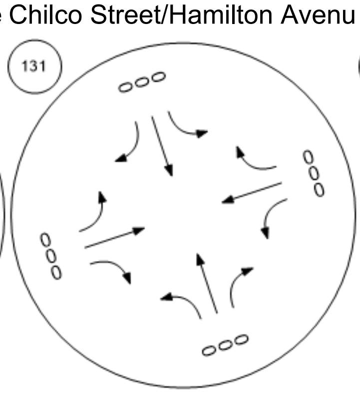

Willow Rd/Bay Rd



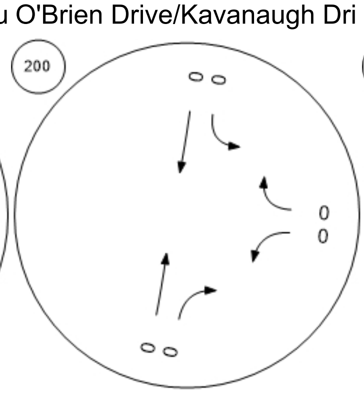

Willow Rd/Durham St-VA Me



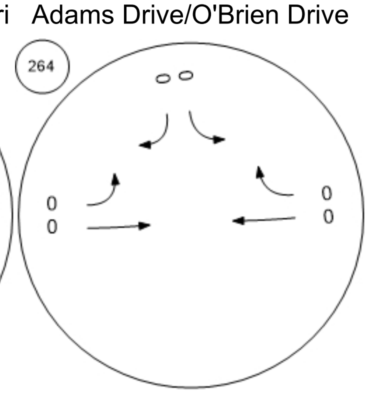

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

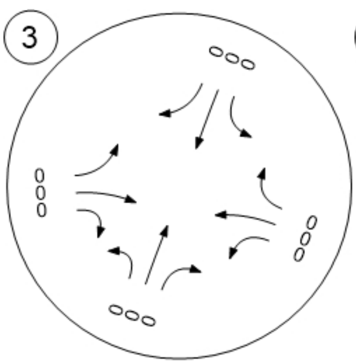


Generated with PTV VISTRO

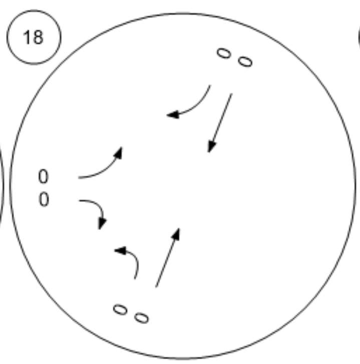
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

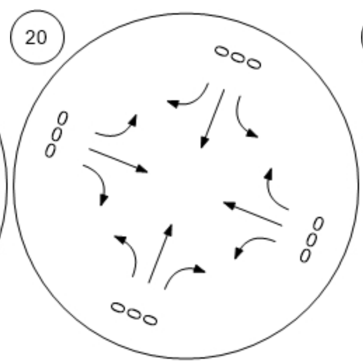

Marsh Rd/Florence St-Bohan



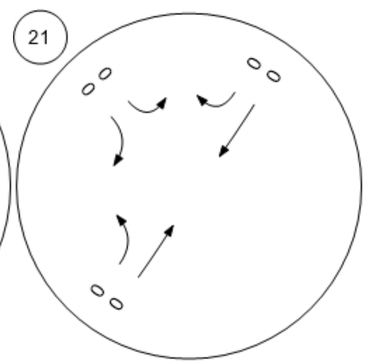

Willow Rd (SR 114)/Ivy Dr



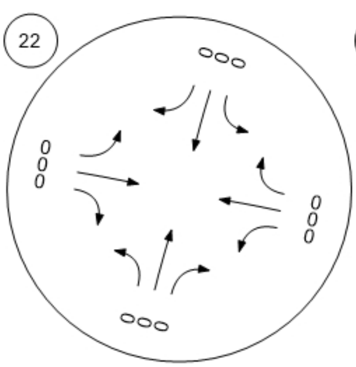

Willow Rd (SR 114)/Newbrid



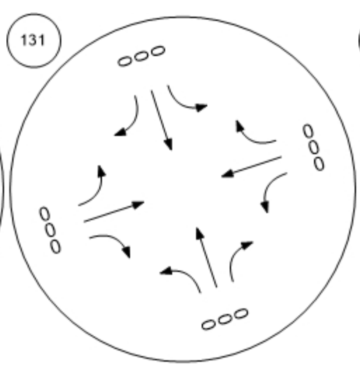

Willow Rd/Bay Rd



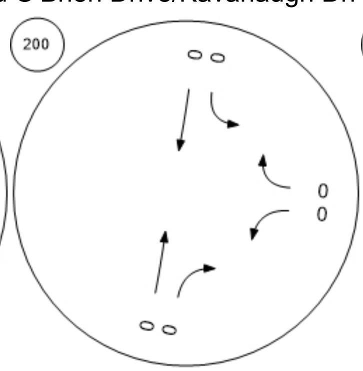

Willow Rd/Durham St-VA Me



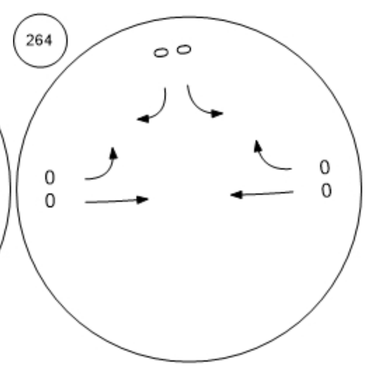

Chilco Street/Hamilton Avenu



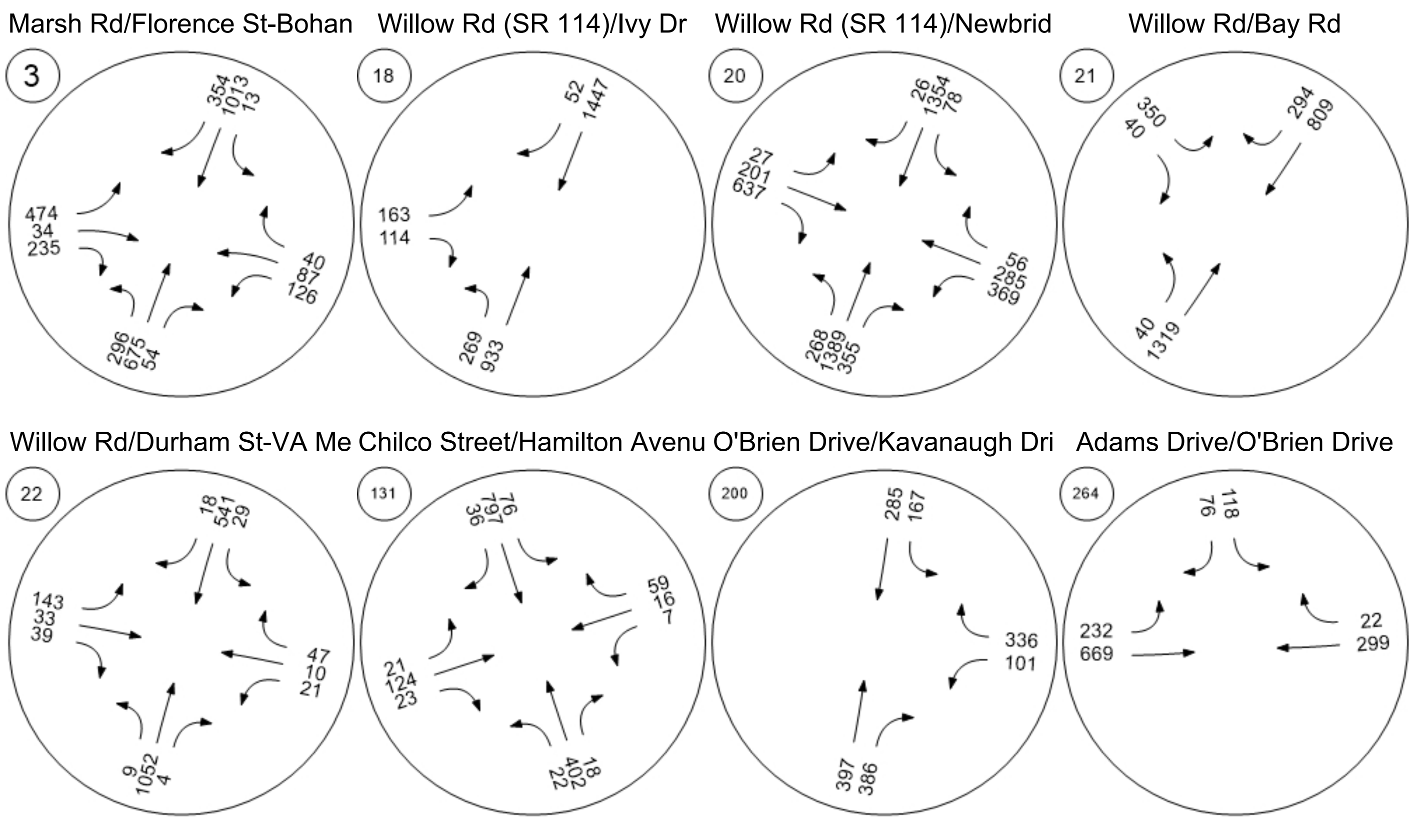

O'Brien Drive/Kavanaugh Dri



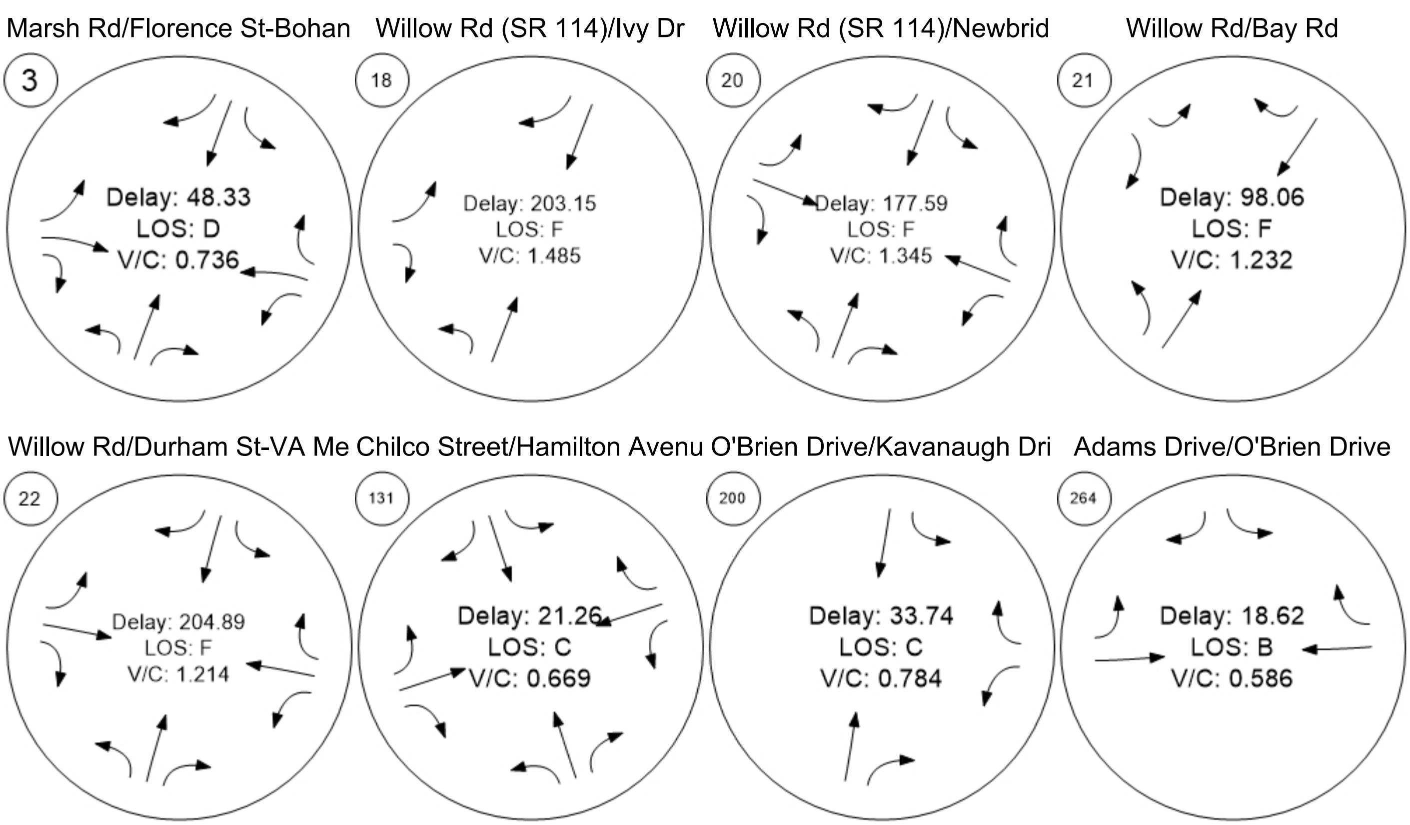

Adams Drive/O'Brien Drive



Traffic Volume - Future Total Volume

## Traffic Conditions

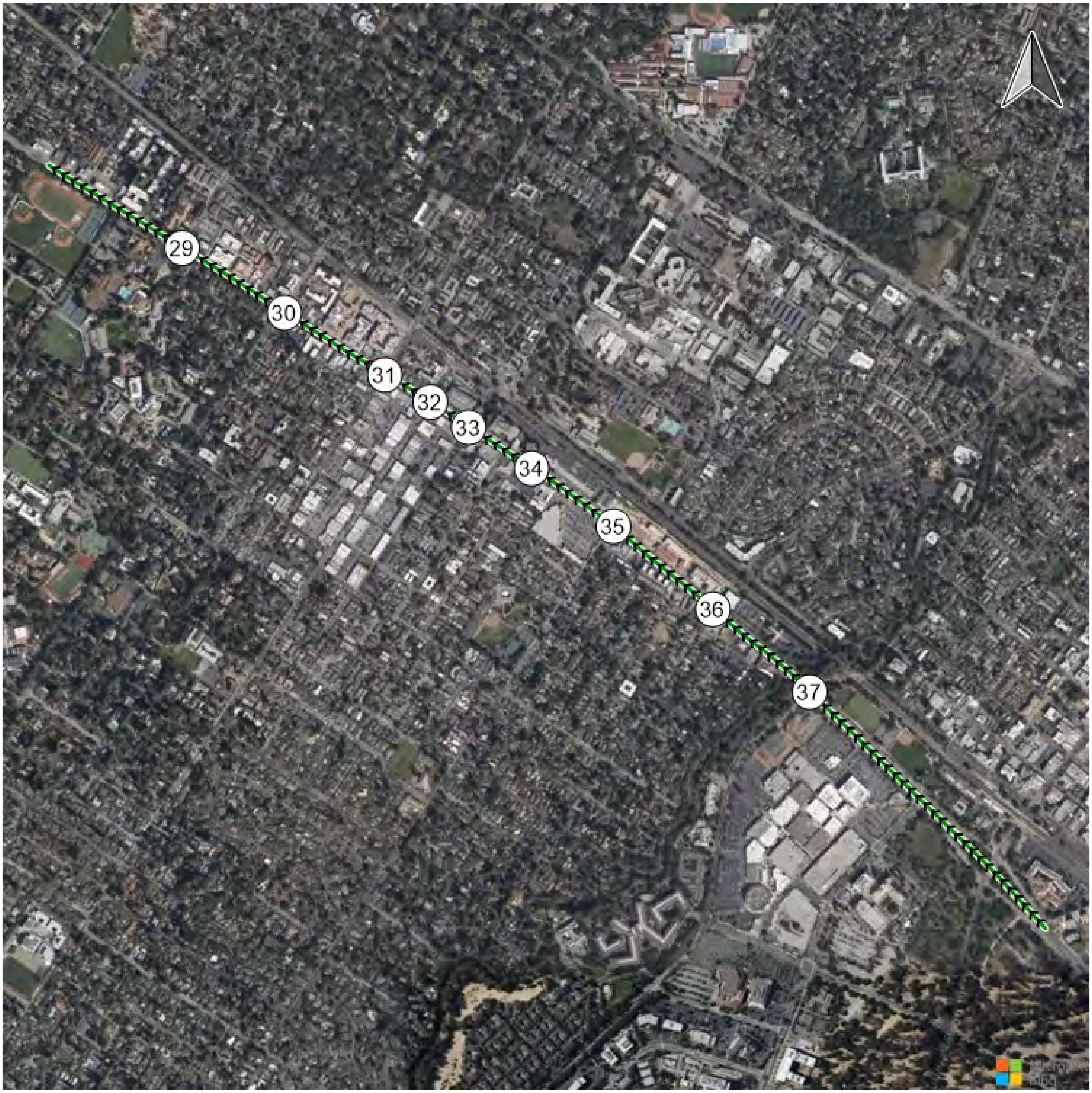



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

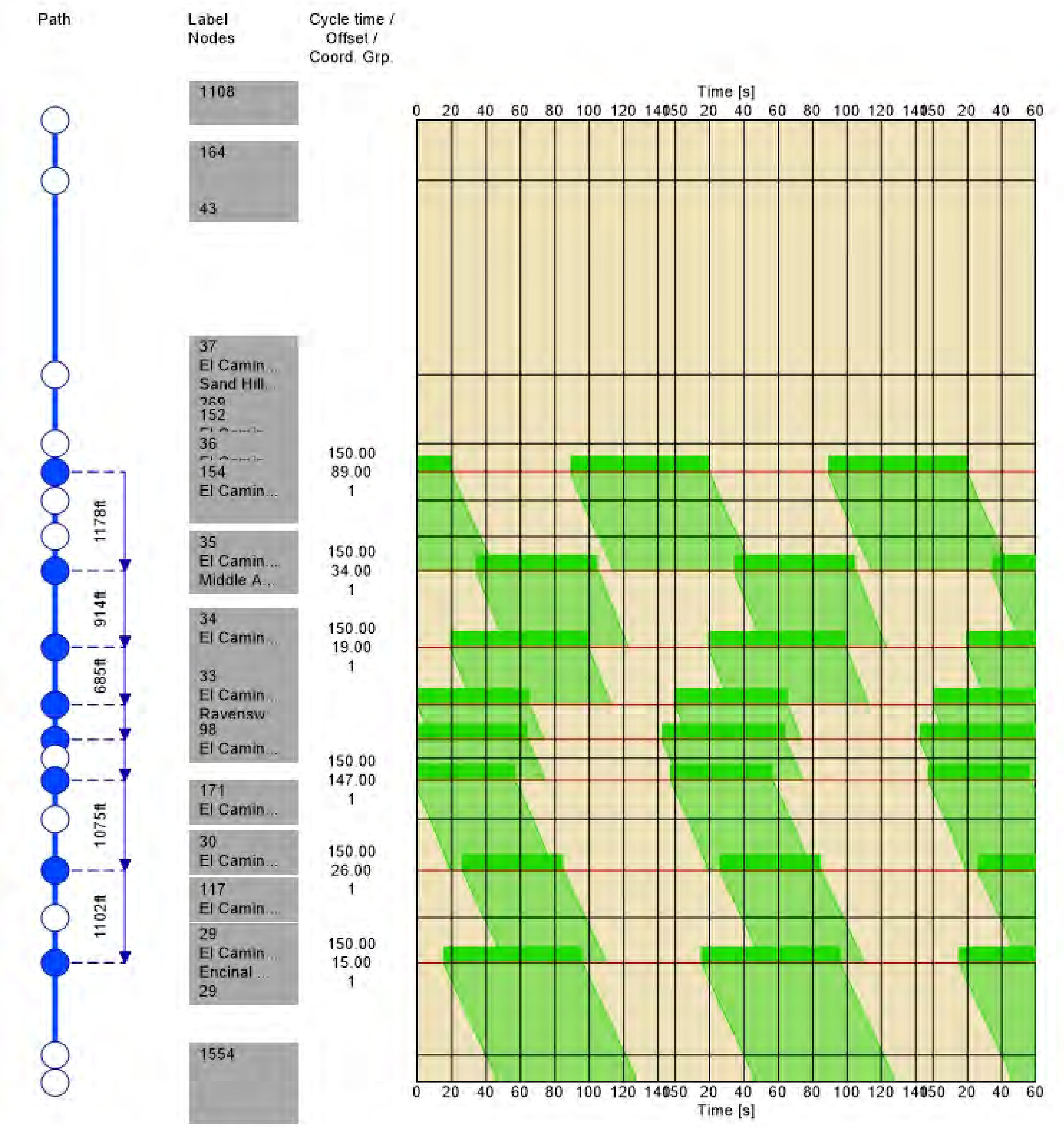
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 1: ECR NB

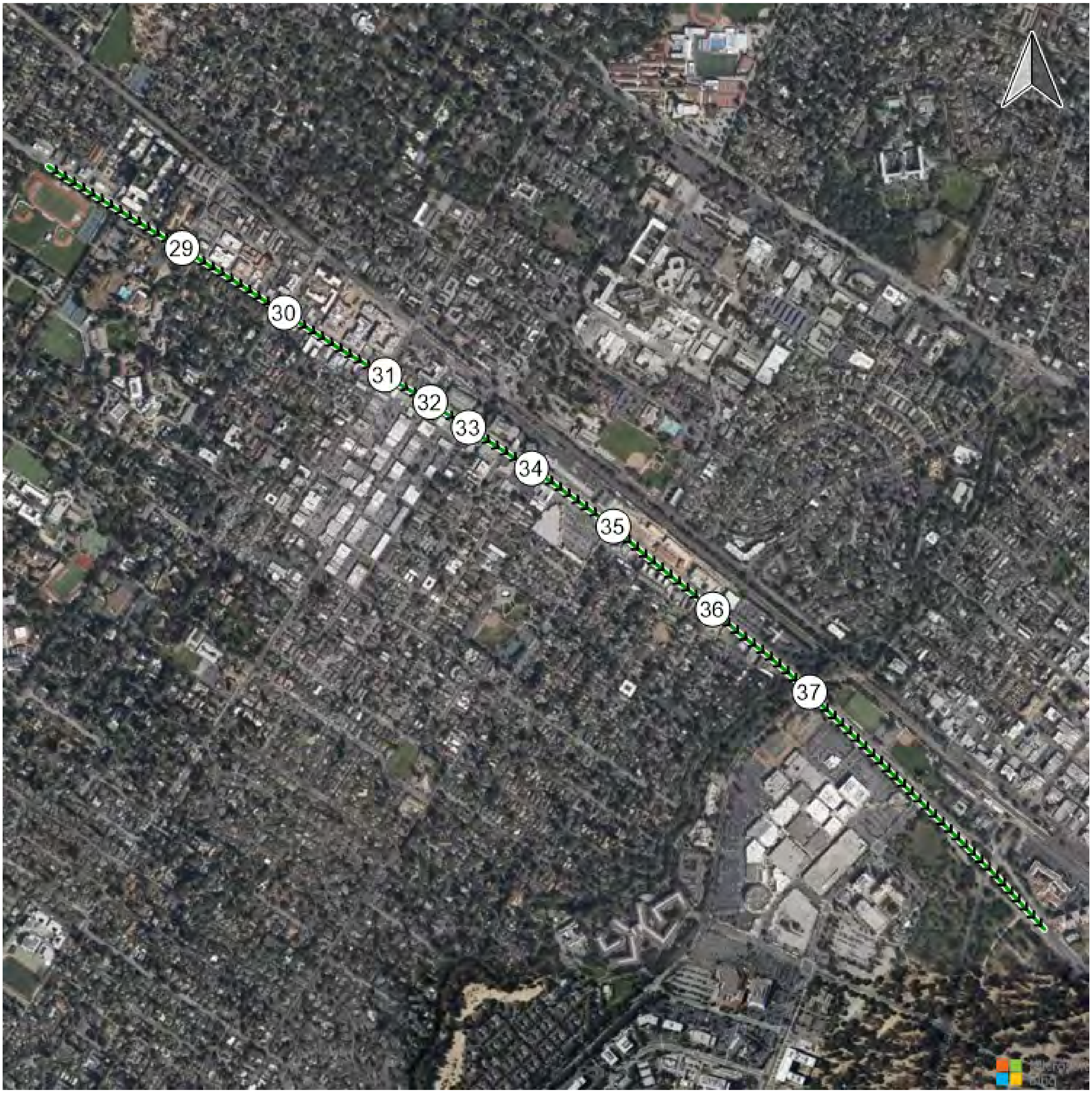


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

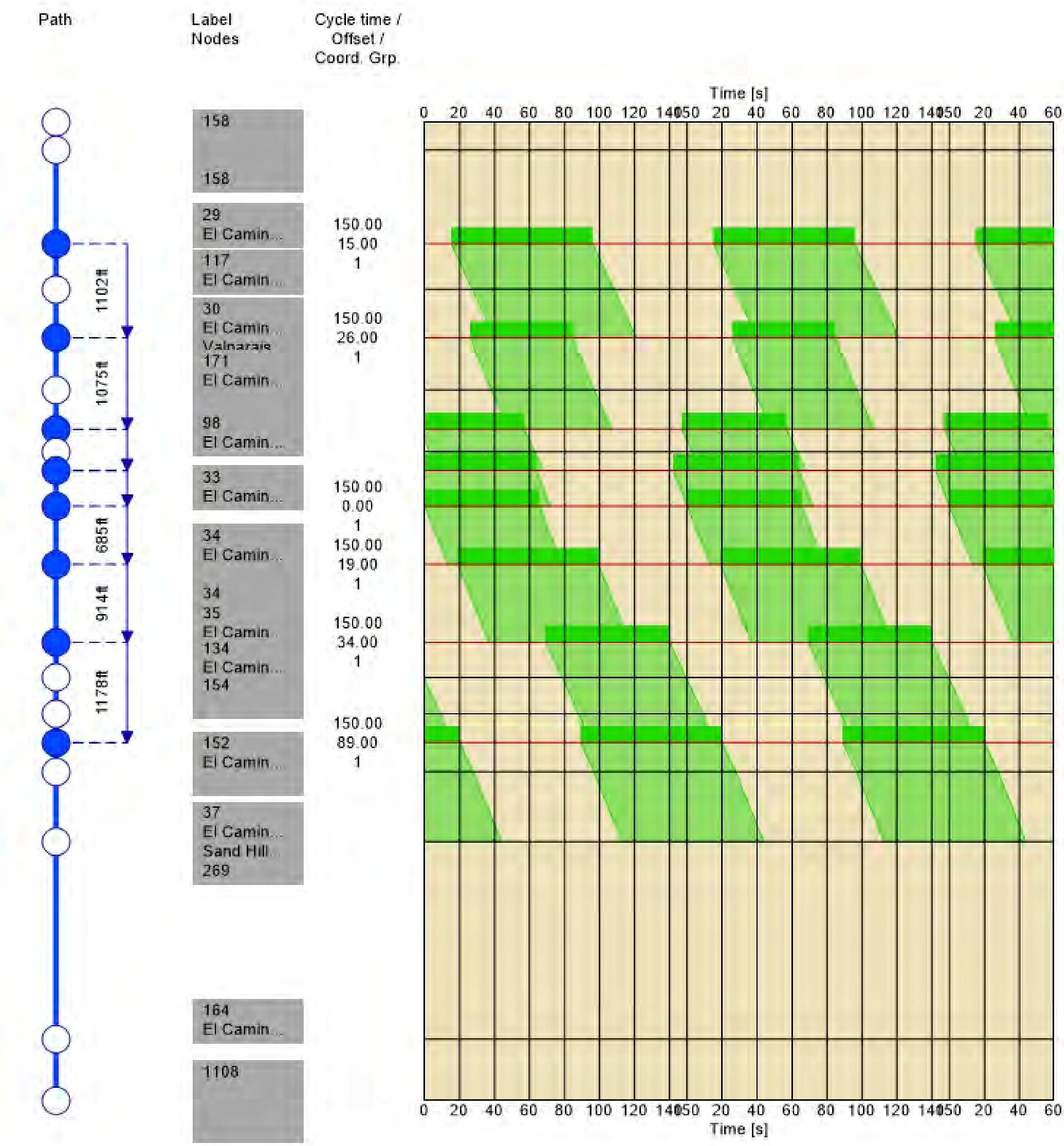
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 2: ECR SB

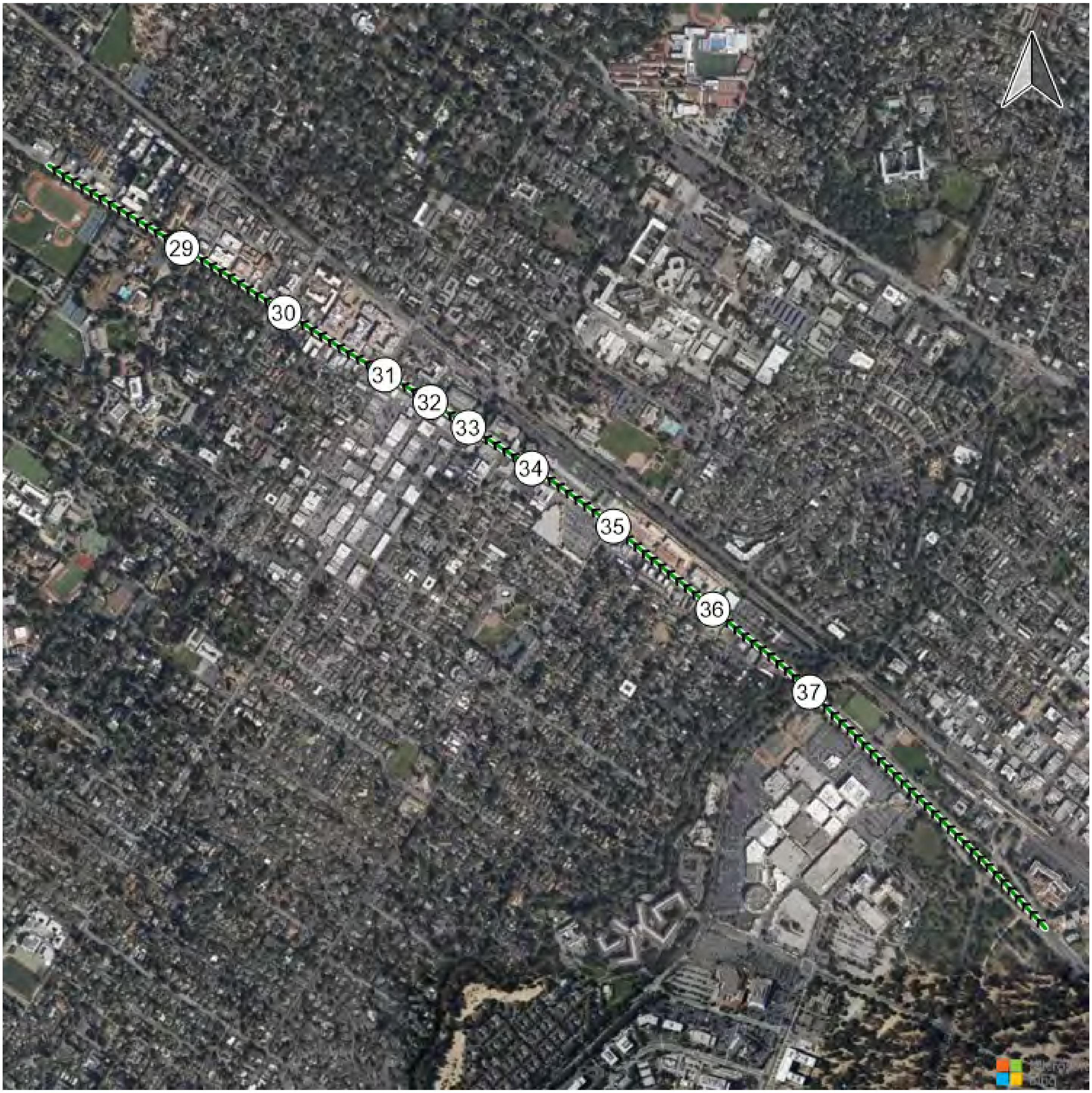


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

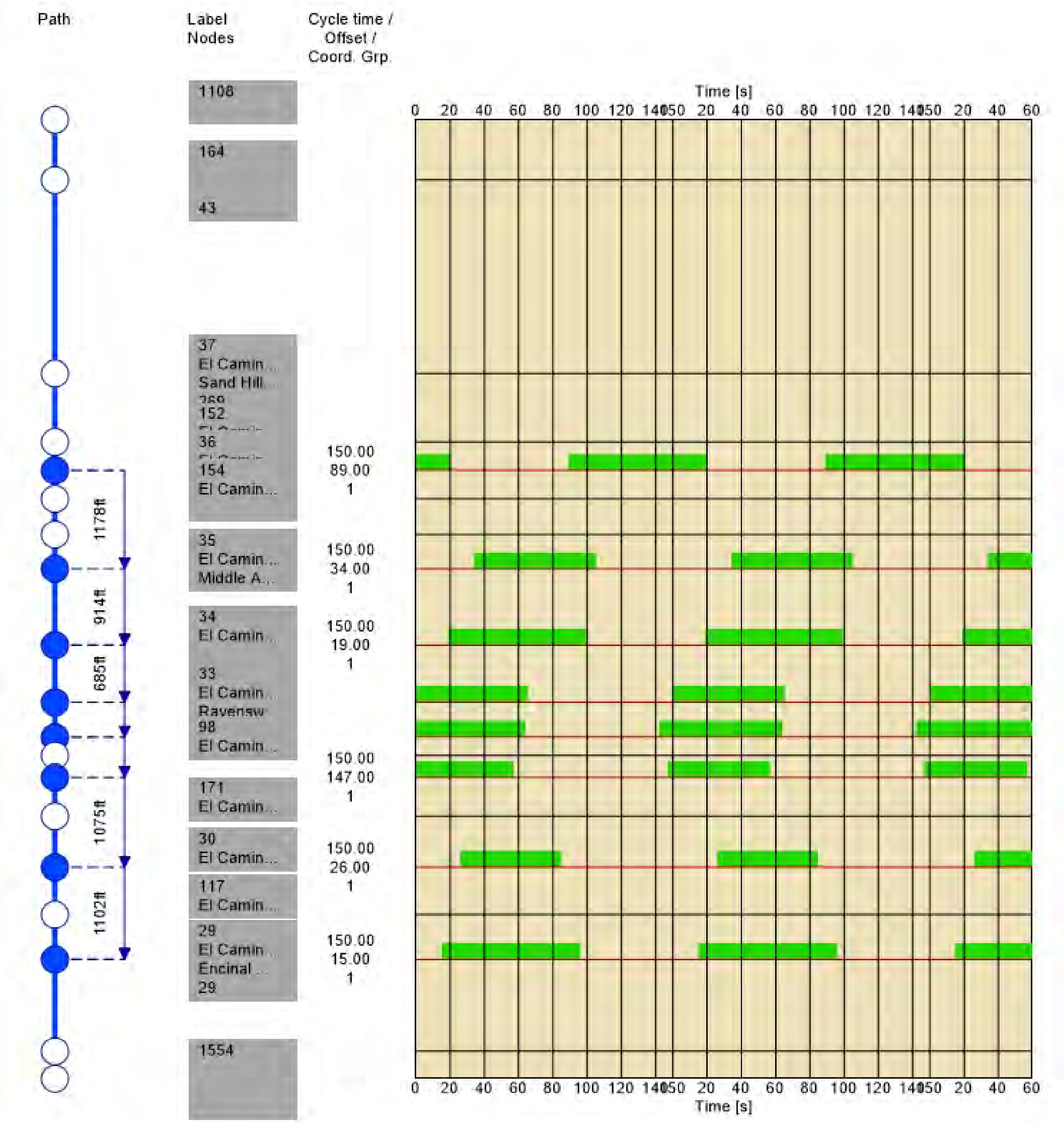
Route 1: ECR NB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 1: ECR NB

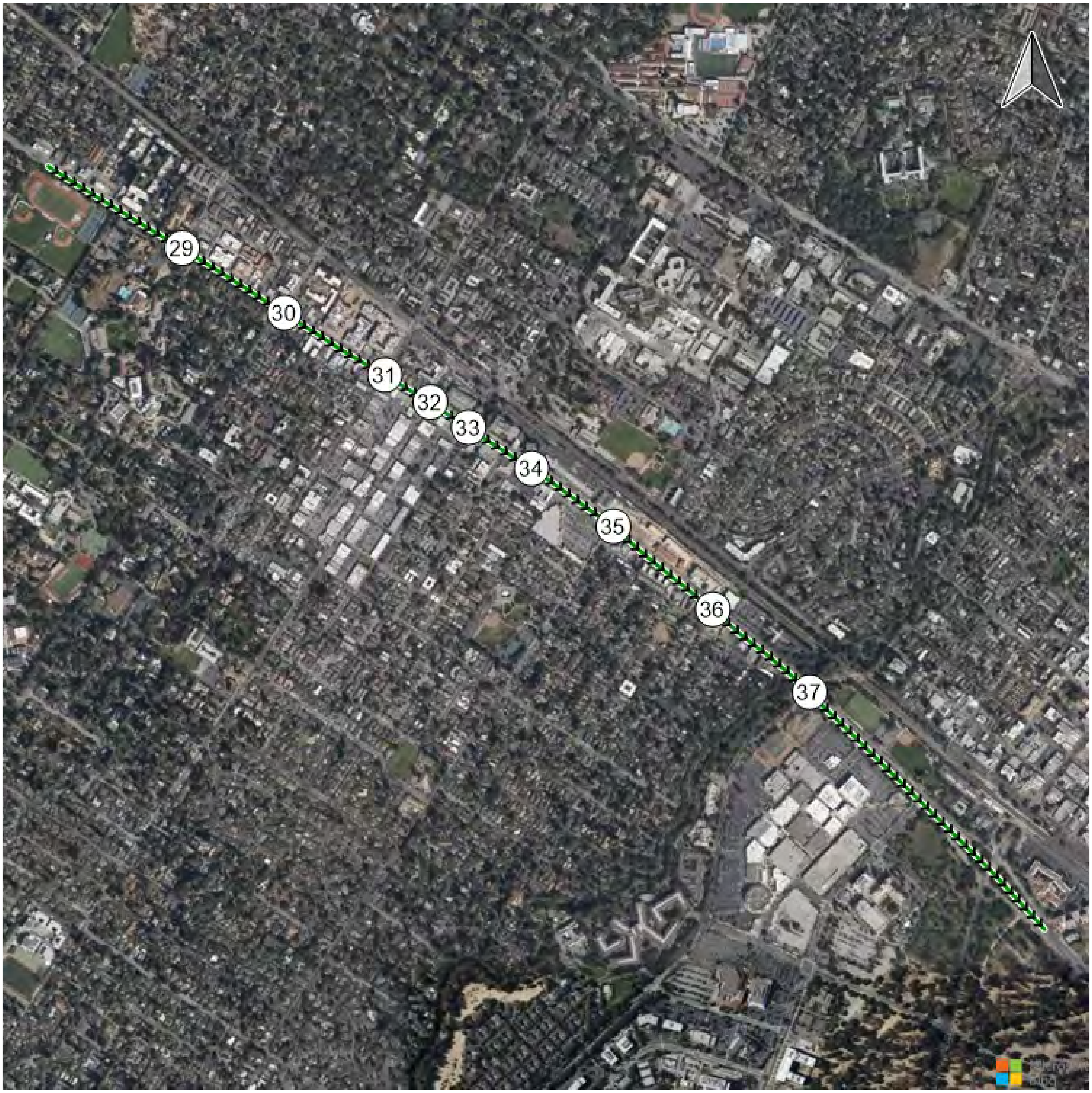


Generated with PTV VISTRO

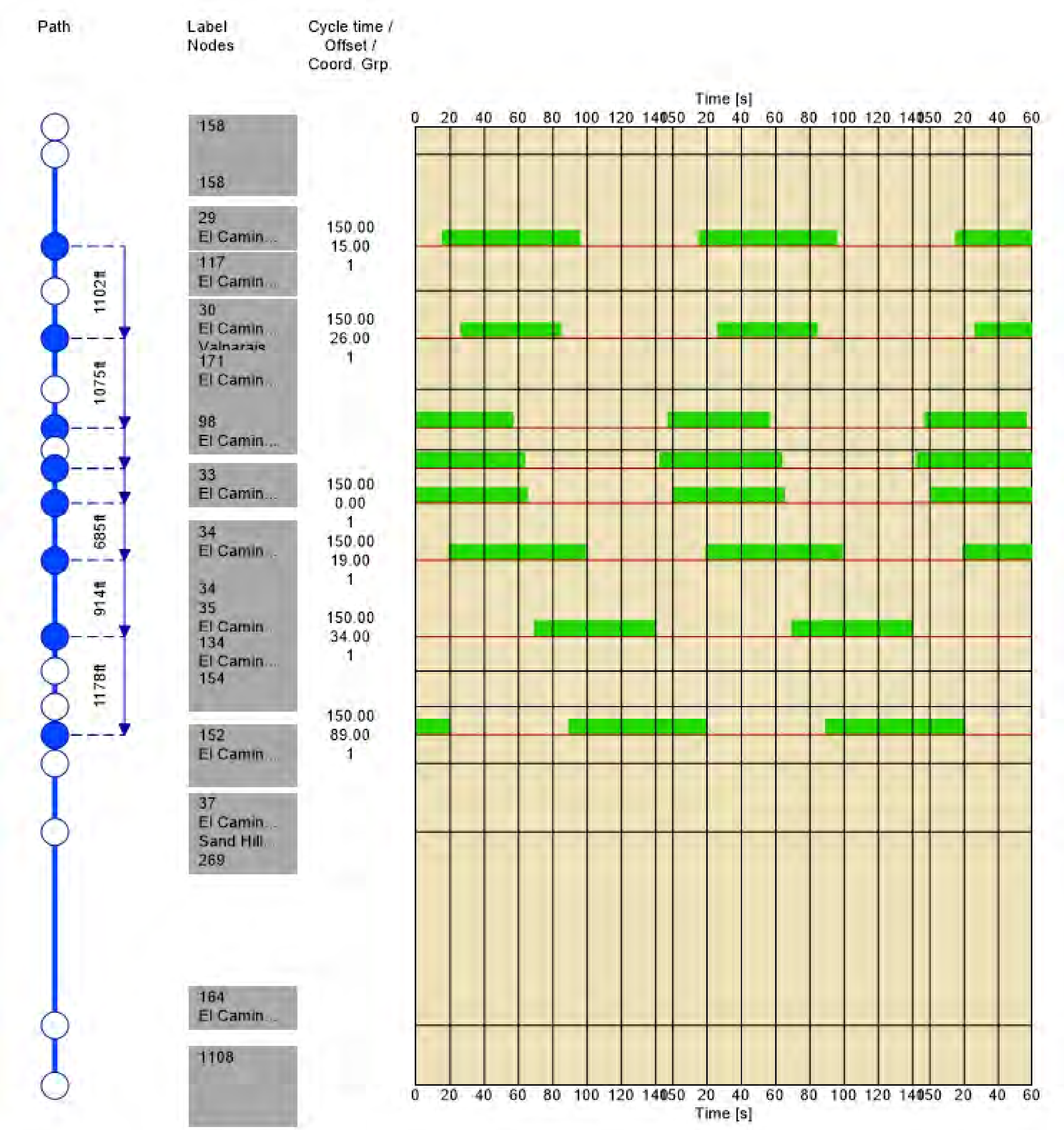
Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



## Route 2: ECR SB



**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 56.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.707 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 215 | 38 | 22 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 59 | 251 | 32 | 7 | 261 | 106 | 162 | 20 | 55 | 10 | 6 | 6 |
| Total Analysis Volume [veh/h] | 235 | 1004 | 130 | 30 | 1045 | 426 | 648 | 79 | 222 | 39 | 23 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | R | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 95 | 95 | 5 | 88 | 88 | 39 | 39 | 39 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.55 | 0.55 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.31 | 0.31 | 0.02 | 0.30 | 0.27 | 0.21 | 0.21 | 0.15 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1792 | 1704 | 3472 | 1576 | 1717 | 1706 | 1527 | 1439 | 1214 |
| c, Capacity [veh/h] | 142 | 1120 | 1070 | 58 | 1910 | 867 | 419 | 416 | 372 | 107 | 91 |
| d1, Uniform Delay [s] | 73.44 | 18.72 | 18.83 | 75.88 | 23.13 | 22.15 | 58.10 | 57.96 | 53.30 | 70.35 | 71.32 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.18 | 0.18 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 322.04 | 1.69 | 1.81 | 2.58 | 1.13 | 1.99 | 9.32 | 8.64 | 1.14 | 1.52 | 3.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.65 | 0.51 | 0.52 | 0.51 | 0.55 | 0.49 | 0.88 | 0.87 | 0.60 | 0.36 | 0.54 |
| d, Delay for Lane Group [s/veh] | 395.48 | 20.41 | 20.64 | 78.45 | 24.26 | 24.14 | 67.43 | 66.60 | 54.44 | 71.87 | 75.00 |
| Lane Group LOS | F | C | C | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 18.58 | 12.85 | 12.52 | 1.26 | 12.93 | 10.34 | 15.48 | 15.14 | 8.12 | 1.59 | 2.06 |
| 50th-Percentile Queue Length [ft/ln] | 464.41 | 321.34 | 313.08 | 31.42 | 323.17 | 258.47 | 387.11 | 378.45 | 203.06 | 39.66 | 51.39 |
| 95th-Percentile Queue Length [veh/ln] | 29.63 | 18.73 | 18.33 | 2.26 | 18.82 | 15.61 | 21.94 | 21.52 | 12.80 | 2.86 | 3.70 |
| 95th-Percentile Queue Length [ft/ln] | 740.87 | 468.34 | 458.18 | 56.56 | 470.58 | 390.30 | 548.45 | 537.97 | 319.90 | 71.40 | 92.51 |

**Movement, Approach, & Intersection Results**

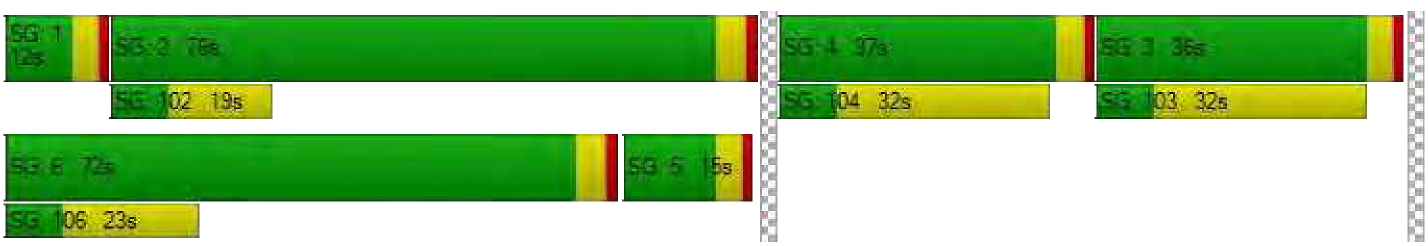
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 395.48 | 20.51 | 20.64 | 78.45 | 24.26 | 24.14 | 67.07 | 66.60 | 54.44 | 71.87 | 75.00 | 75.00 |
| Movement LOS | F | C | C | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 84.89 | | | 25.31 | | | 64.08 | | | 73.62 | | |
| Approach LOS | F | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 56.69 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.707 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.990 | 3.138 | 2.616 | 2.056 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.689 | 2.798 | 3.150 | 1.705 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 235.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.605 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 266 | 1221 | 1418 | 28 | 172 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 266 | 1221 | 1418 | 28 | 172 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 332 | 385 | 8 | 47 | 26 |
| Total Analysis Volume [veh/h] | 289 | 1327 | 1541 | 30 | 187 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | No |
| Maximum Recall | No | No | No | | No | No |
| Pedestrian Recall | No | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 106 | 90 | 90 | 16 | 32 |
| g / C, Green / Cycle | 0.10 | 0.82 | 0.70 | 0.70 | 0.13 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.86 | 1.01 | 1.01 | 0.11 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 775 | 1732 | 792 |
| c, Capacity [veh/h] | 80 | 1267 | 544 | 539 | 219 | 198 |
| d1, Uniform Delay [s] | 58.39 | 11.71 | 19.72 | 19.72 | 55.52 | 41.90 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.17 | 0.29 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1210.33 | 38.72 | 210.54 | 215.54 | 13.25 | 5.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.62 | 1.05 | 1.45 | 1.46 | 0.85 | 0.52 |
| d, Delay for Lane Group [s/veh] | 1268.72 | 50.43 | 230.27 | 235.27 | 68.77 | 47.43 |
| Lane Group LOS | F | F | F | F | E | D |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 29.41 | 17.99 | 45.44 | 45.84 | 6.81 | 3.16 |
| 50th-Percentile Queue Length [ft/ln] | 735.22 | 449.83 | 1136.06 | 1145.98 | 170.16 | 79.02 |
| 95th-Percentile Queue Length [veh/ln] | 47.55 | 25.98 | 72.56 | 73.39 | 11.08 | 5.69 |
| 95th-Percentile Queue Length [ft/ln] | 1188.82 | 649.59 | 1813.88 | 1834.81 | 277.12 | 142.24 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1268.72 | 50.43 | 232.72 | 235.27 | 68.77 | 47.43 |
| Movement LOS | F | F | F | F | E | D |
| d_A, Approach Delay [s/veh] | 268.30 | | 232.77 | | 61.19 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 234.97 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.605 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.166 | 3.153 | 2.156 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.893 | 2.856 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 164.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.340 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 377 | 262 | 121 | 271 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 498 | 113 | 11 | 364 | 2 | 5 | 25 | 100 | 70 | 32 | 72 |
| Total Analysis Volume [veh/h] | 152 | 1994 | 450 | 43 | 1457 | 7 | 18 | 99 | 401 | 279 | 129 | 288 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 10 | 59 | 59 | 7 | 56 | 56 | 9 | 33 | 33 | 31 | 55 | 55 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 7 | 57 | 57 | 4 | 54 | 54 | 2 | 29 | 29 | 25 | 51 | 51 |
| g / C, Green / Cycle | 0.05 | 0.44 | 0.44 | 0.03 | 0.41 | 0.41 | 0.02 | 0.22 | 0.22 | 0.19 | 0.39 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.47 | 0.50 | 0.02 | 0.64 | 0.64 | 0.01 | 0.06 | 0.30 | 0.18 | 0.16 | 0.41 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1628 | 1781 | 1491 | 781 | 1420 | 1577 | 1316 | 1536 | 800 | 696 |
| c, Capacity [veh/h] | 96 | 1511 | 712 | 55 | 618 | 323 | 26 | 350 | 292 | 299 | 312 | 272 |
| d1, Uniform Delay [s] | 61.50 | 36.57 | 36.57 | 62.57 | 38.07 | 38.07 | 63.44 | 41.97 | 50.04 | 51.56 | 28.81 | 38.71 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.11 | 0.04 | 0.50 | 0.04 | 0.11 | 0.47 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 267.66 | 45.81 | 84.49 | 8.78 | 257.84 | 264.95 | 27.62 | 0.16 | 187.89 | 5.77 | 0.87 | 70.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.59 | 1.07 | 1.15 | 0.78 | 1.56 | 1.56 | 0.69 | 0.28 | 1.37 | 0.93 | 0.41 | 1.06 |
| d, Delay for Lane Group [s/veh] | 329.16 | 82.37 | 121.06 | 71.35 | 295.91 | 303.02 | 91.06 | 42.13 | 237.93 | 57.32 | 29.68 | 108.81 |
| Lane Group LOS | F | F | F | E | F | F | F | D | F | E | C | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 10.25 | 32.44 | 38.22 | 1.56 | 31.88 | 34.03 | 0.79 | 2.68 | 24.61 | 4.71 | 3.02 | 13.60 |
| 50th-Percentile Queue Length [ft/ln] | 256.37 | 811.06 | 955.50 | 38.97 | 796.95 | 850.69 | 19.85 | 66.91 | 615.26 | 117.67 | 75.40 | 340.09 |
| 95th-Percentile Queue Length [veh/ln] | 17.33 | 44.07 | 53.55 | 2.81 | 51.93 | 55.13 | 1.43 | 4.82 | 38.07 | 8.26 | 5.43 | 20.42 |
| 95th-Percentile Queue Length [ft/ln] | 433.21 | 1101.86 | 1338.65 | 70.14 | 1298.36 | 1378.17 | 35.73 | 120.44 | 951.65 | 206.62 | 135.71 | 510.54 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 329.16 | 89.57 | 121.06 | 71.35 | 298.33 | 303.02 | 91.06 | 42.13 | 237.93 | 57.32 | 29.68 | 108.81 |
| Movement LOS | F | F | F | E | F | F | F | D | F | E | C | F |
| d_A, Approach Delay [s/veh] | | 109.06 | | | 291.87 | | | 195.40 | | | 73.50 | |
| Approach LOS | | F | | | F | | | F | | | E | |
| d_I, Intersection Delay [s/veh] | | | | | | 164.63 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.340 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 51.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 24.00 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.500 | 3.024 | 2.418 | 2.625 |
| Crosswalk LOS | D | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 831 | 785 | 446 | 785 |
| d_b, Bicycle Delay [s] | 22.24 | 24.02 | 39.33 | 24.17 |
| I_b,int, Bicycle LOS Score for Intersection | 2.987 | 2.388 | 2.487 | 2.764 |
| Bicycle LOS | C | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.929 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1387 | 1216 | 627 | 469 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1387 | 1216 | 328 | 469 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 347 | 304 | 82 | 117 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1387 | 1216 | 328 | 469 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 74 | 74 | 74 | 74 | 74 | 74 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 4 | 43 | 35 | 35 | 21 | 21 |
| g / C, Green / Cycle | 0.06 | 0.58 | 0.48 | 0.48 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.53 | 0.44 | 0.27 | 0.26 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1230 | 1801 | 841 |
| c, Capacity [veh/h] | 75 | 1518 | 1318 | 585 | 520 | 243 |
| d1, Uniform Delay [s] | 34.61 | 13.88 | 18.11 | 13.75 | 25.32 | 0.00 |
| k, delay calibration | 0.04 | 0.15 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.48 | 3.55 | 4.43 | 1.20 | 2.43 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.91 | 0.92 | 0.56 | 0.90 | 0.00 |
| d, Delay for Lane Group [s/veh] | 45.09 | 17.43 | 22.54 | 14.95 | 27.75 | 0.00 |
| Lane Group LOS | D | B | C | B | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.34 | 9.20 | 9.08 | 3.58 | 3.89 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 33.61 | 229.93 | 227.07 | 89.55 | 97.25 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.42 | 14.17 | 14.03 | 6.45 | 7.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 60.49 | 354.27 | 350.64 | 161.20 | 175.05 | 0.00 |

**Movement, Approach, & Intersection Results**

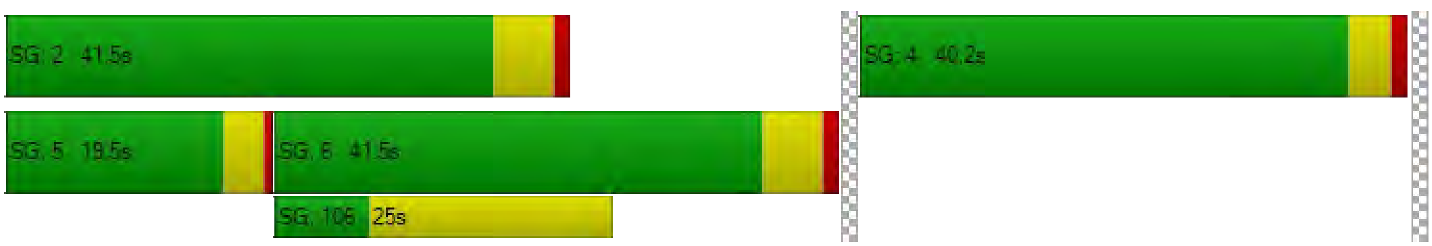
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 45.09 | 17.43 | 22.54 | 14.95 | 27.75 | 0.00 |
| Movement LOS | D | B | C | B | C | A |
| d_A, Approach Delay [s/veh] | 18.67 | | 20.93 | | 27.75 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 20.90 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.929 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 26.74 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.531 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 975 | 975 | 975 |
| d_b, Bicycle Delay [s] | 9.70 | 9.71 | 9.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.758 | 3.080 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 104.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.065 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 26 | 59 | 12 | 363 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 237 | 2 | 9 | 242 | 28 | 18 | 4 | 7 | 15 | 3 | 95 |
| Total Analysis Volume [veh/h] | 23 | 947 | 7 | 38 | 967 | 113 | 71 | 16 | 27 | 61 | 13 | 378 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Overlap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | 1,8 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | No |
| Maximum Recall | No | No | | No | No | | | No | | | No | No |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.50 | 2.50 | 0.00 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0.00 |
| g_i, Effective Green Time [s] | 107 | 74 | 74 | 107 | 100 | 14 | 14 | 14 | 30 | 63 |
| g / C, Green / Cycle | 0.65 | 0.45 | 0.45 | 0.65 | 0.61 | 0.08 | 0.08 | 0.08 | 0.18 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.29 | 0.29 | 0.05 | 0.76 | 0.04 | 0.04 | 0.02 | 0.08 | 0.45 |
| s, saturation flow rate [veh/h] | 551 | 1445 | 1894 | 700 | 1414 | 952 | 1397 | 1337 | 960 | 842 |
| c, Capacity [veh/h] | 92 | 652 | 855 | 380 | 860 | 80 | 117 | 112 | 175 | 322 |
| d1, Uniform Delay [s] | 41.56 | 34.67 | 34.67 | 14.65 | 32.24 | 71.73 | 71.71 | 70.23 | 59.56 | 50.40 |
| k, delay calibration | 0.23 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.99 | 2.17 | 1.67 | 0.11 | 124.65 | 3.86 | 2.60 | 1.10 | 1.61 | 105.83 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.25 | 0.63 | 0.63 | 0.10 | 1.26 | 0.45 | 0.44 | 0.24 | 0.42 | 1.17 |
| d, Delay for Lane Group [s/veh] | 44.55 | 36.84 | 36.34 | 14.76 | 156.89 | 75.59 | 74.31 | 71.34 | 61.17 | 156.23 |
| Lane Group LOS | D | D | D | B | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.39 | 13.32 | 17.36 | 0.54 | 63.16 | 1.55 | 2.22 | 1.13 | 2.86 | 22.70 |
| 50th-Percentile Queue Length [ft/ln] | 9.70 | 333.08 | 434.05 | 13.39 | 1579.00 | 38.83 | 55.46 | 28.22 | 71.44 | 567.62 |
| 95th-Percentile Queue Length [veh/ln] | 0.70 | 19.31 | 24.20 | 0.96 | 90.70 | 2.80 | 3.99 | 2.03 | 5.14 | 33.79 |
| 95th-Percentile Queue Length [ft/ln] | 17.47 | 482.74 | 604.89 | 24.10 | 2267.59 | 69.90 | 99.82 | 50.80 | 128.60 | 844.81 |

**Movement, Approach, & Intersection Results**

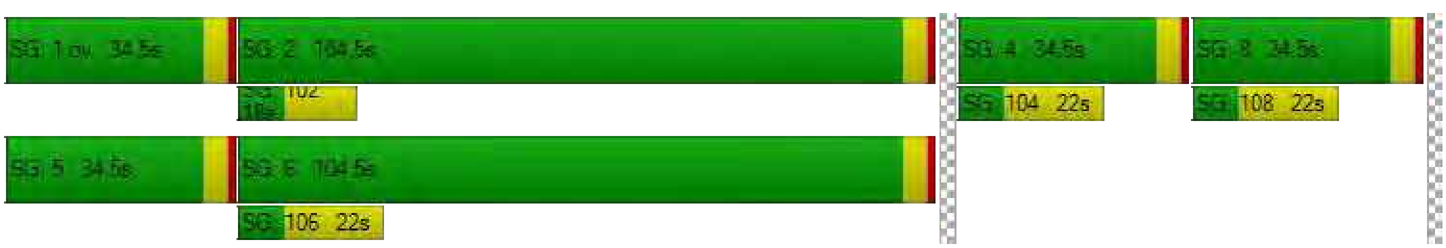
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.55 | 36.56 | 36.34 | 14.76 | 156.89 | 156.89 | 74.98 | 74.31 | 71.34 | 61.17 | 61.17 | 156.23 |
| Movement LOS | D | D | D | B | F | F | E | E | E | E | E | F |
| d_A, Approach Delay [s/veh] | | 36.74 | | | 152.06 | | | 74.00 | | | 140.67 | |
| Approach LOS | | D | | | F | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | 104.44 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.065 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 71.55 | 71.55 | 71.55 | 71.55 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.574 | 2.822 | 2.210 | 2.133 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 243 | 243 | 365 | 365 |
| d_b, Bicycle Delay [s] | 63.46 | 63.43 | 55.08 | 54.97 |
| I_b,int, Bicycle LOS Score for Intersection | 2.366 | 3.404 | 1.758 | 2.305 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.485 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 123 | 3 | 25 | 69 | 14 | 12 | 13 | 7 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 493 | 10 | 101 | 276 | 56 | 47 | 52 | 28 | 24 | 56 | 144 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 4 | | | 5 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 5 | | | 4 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 50 | 0 | 0 | 50 | 0 | 0 | 40 | 0 | 0 | 40 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 46 | 46 | 36 | 36 |
| g / C, Green / Cycle | 0.51 | 0.51 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.30 | 0.08 | 0.14 |
| s, saturation flow rate [veh/h] | 1848 | 1447 | 1506 | 1636 |
| c, Capacity [veh/h] | 986 | 789 | 657 | 699 |
| d1, Uniform Delay [s] | 14.89 | 14.81 | 17.44 | 18.70 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.00 | 2.74 | 0.65 | 1.21 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.55 | 0.19 | 0.32 |
| d, Delay for Lane Group [s/veh] | 16.88 | 17.55 | 18.10 | 19.91 |
| Lane Group LOS | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 7.23 | 6.27 | 1.78 | 3.37 |
| 50th-Percentile Queue Length [ft/ln] | 180.70 | 156.71 | 44.38 | 84.20 |
| 95th-Percentile Queue Length [veh/ln] | 11.64 | 10.37 | 3.20 | 6.06 |
| 95th-Percentile Queue Length [ft/ln] | 290.93 | 259.36 | 79.88 | 151.55 |

**Movement, Approach, & Intersection Results**

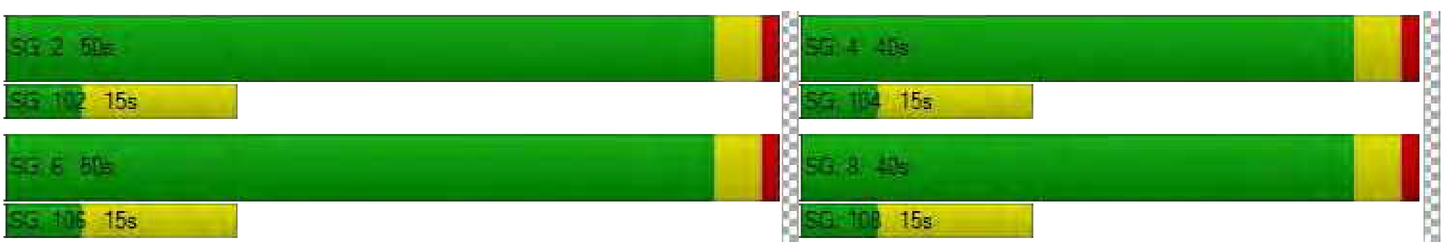
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.88 | 16.88 | 16.88 | 17.55 | 17.55 | 17.55 | 18.10 | 18.10 | 18.10 | 19.91 | 19.91 | 19.91 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 16.88 | | | 17.55 | | | 18.10 | | | 19.91 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 17.74 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.485 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.162 | 2.328 | 1.860 | 2.049 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1022 | 1022 | 800 | 800 |
| d_b, Bicycle Delay [s] | 10.76 | 10.76 | 16.20 | 16.20 |
| I_b,int, Bicycle LOS Score for Intersection | 2.413 | 2.274 | 1.769 | 1.929 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.786 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | No | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 663 | 270 | 74 | 388 | 210 | 257 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 663 | 270 | 74 | 388 | 210 | 257 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 188 | 77 | 21 | 110 | 60 | 73 |
| Total Analysis Volume [veh/h] | 753 | 307 | 84 | 441 | 239 | 292 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 65 | 0 | 0 | 65 | 25 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 61 | 61 | 61 | 21 | 21 |
| g / C, Green / Cycle | 0.68 | 0.68 | 0.68 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.60 | 0.16 | 0.24 | 0.14 | 0.19 |
| s, saturation flow rate [veh/h] | 1765 | 528 | 1855 | 1767 | 1577 |
| c, Capacity [veh/h] | 1196 | 170 | 1257 | 412 | 368 |
| d1, Uniform Delay [s] | 11.70 | 36.78 | 6.13 | 30.59 | 32.46 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.83 | 9.87 | 0.77 | 5.84 | 16.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 0.49 | 0.35 | 0.58 | 0.79 |
| d, Delay for Lane Group [s/veh] | 21.53 | 46.66 | 6.90 | 36.43 | 48.51 |
| Lane Group LOS | C | D | A | D | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 16.99 | 2.25 | 3.26 | 5.17 | 7.48 |
| 50th-Percentile Queue Length [ft/ln] | 424.82 | 56.23 | 81.53 | 129.24 | 186.88 |
| 95th-Percentile Queue Length [veh/ln] | 23.75 | 4.05 | 5.87 | 8.90 | 11.96 |
| 95th-Percentile Queue Length [ft/ln] | 593.83 | 101.21 | 146.76 | 222.46 | 298.98 |

**Movement, Approach, & Intersection Results**

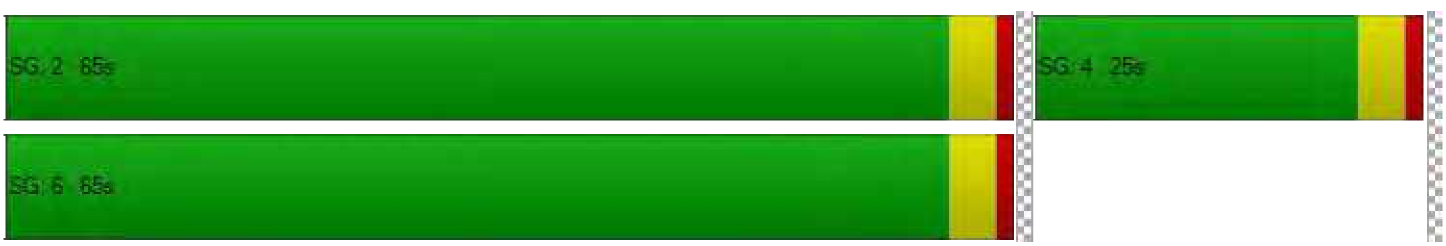
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.53 | 21.53 | 46.66 | 6.90 | 36.43 | 48.51 |
| Movement LOS | C | C | D | A | D | D |
| d_A, Approach Delay [s/veh] | 21.53 | | 13.26 | | 43.07 | |
| Approach LOS | C | | B | | D | |
| d_I, Intersection Delay [s/veh] | 24.89 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.786 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1356 | 1356 | 467 |
| d_b, Bicycle Delay [s] | 4.67 | 4.67 | 26.45 |
| I_b,int, Bicycle LOS Score for Intersection | 3.309 | 2.426 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.722 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 72 | 155 | 353 | 762 | 112 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 72 | 155 | 353 | 762 | 112 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 23 | 50 | 115 | 247 | 36 |
| Total Analysis Volume [veh/h] | 43 | 94 | 201 | 458 | 990 | 145 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 19 | 0 | 0 | 71 | 71 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 15 | 67 | 67 | 67 |
| g / C, Green / Cycle | 0.17 | 0.74 | 0.74 | 0.74 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.42 | 0.25 | 0.64 |
| s, saturation flow rate [veh/h] | 1604 | 483 | 1823 | 1783 |
| c, Capacity [veh/h] | 267 | 213 | 1357 | 1328 |
| d1, Uniform Delay [s] | 34.17 | 36.83 | 3.92 | 8.08 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.86 | 48.74 | 0.67 | 7.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.94 | 0.34 | 0.85 |
| d, Delay for Lane Group [s/veh] | 41.03 | 85.57 | 4.60 | 15.28 |
| Lane Group LOS | D | F | A | B |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.20 | 7.33 | 2.40 | 13.60 |
| 50th-Percentile Queue Length [ft/ln] | 79.96 | 183.16 | 59.94 | 339.93 |
| 95th-Percentile Queue Length [veh/ln] | 5.76 | 11.77 | 4.32 | 19.64 |
| 95th-Percentile Queue Length [ft/ln] | 143.92 | 294.14 | 107.89 | 491.12 |

**Movement, Approach, & Intersection Results**

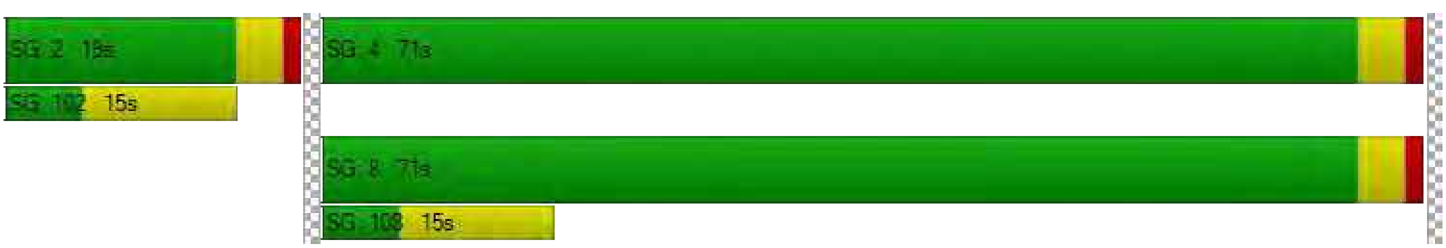
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 41.03 | 41.03 | 85.57 | 4.60 | 15.28 | 15.28 |
| Movement LOS | D | D | F | A | B | B |
| d_A, Approach Delay [s/veh] | 41.03 | | 29.29 | | 15.28 | |
| Approach LOS | D | | C | | B | |
| d_I, Intersection Delay [s/veh] | 21.89 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.722 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.238 | 2.508 | 2.514 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 333 | 1489 | 1489 |
| d_b, Bicycle Delay [s] | 31.25 | 2.94 | 2.94 |
| I_b,int, Bicycle LOS Score for Intersection | 1.786 | 2.647 | 3.432 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative + P AM_Imp.pdf

Scenario 24 Imp-Cumulative AM (2040 vols)+Project

10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 | 3805 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 266 | 1221 | 1418 | 28 | 172 | 95 | 3200 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 | 5076 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1387 | 1216 | 627 | 469 | 60 | 3824 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 | 2559 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 | 1146 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 663 | 270 | 74 | 388 | 210 | 257 | 1862 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 33 | 72 | 155 | 353 | 762 | 112 | 1487 |

Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative + P AM_Imp.pdf

Scenario 24 Imp-Cumulative AM (2040 vols)+Project
10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 228 | 974 | 126 | 29 | 1014 | 413 | 629 | 77 | 230 | 38 | 22 | 25 | 3805 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **228** | **974** | **126** | **29** | **1014** | **413** | **629** | **77** | **230** | **38** | **22** | **25** | **3805** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 266 | 1221 | 1418 | 28 | 172 | 95 | 3200 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **266** | **1221** | **1418** | **28** | **172** | **95** | **3200** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1874 | 423 | 40 | 1370 | 7 | 17 | 93 | 421 | 262 | 121 | 305 | 5076 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1874** | **423** | **40** | **1370** | **7** | **17** | **93** | **421** | **262** | **121** | **305** | **5076** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1387 | 1216 | 627 | 469 | 60 | 3824 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1387** | **1216** | **627** | **469** | **60** | **3824** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 909 | 7 | 36 | 928 | 108 | 68 | 15 | 32 | 59 | 12 | 363 | 2559 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **909** | **7** | **36** | **928** | **108** | **68** | **15** | **32** | **59** | **12** | **363** | **2559** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 472 | 10 | 81 | 221 | 45 | 37 | 41 | 22 | 22 | 51 | 131 | 1146 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **472** | **10** | **81** | **221** | **45** | **37** | **41** | **22** | **22** | **51** | **131** | **1146** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 663 | 270 | 74 | 388 | 210 | 257 | 1862 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **663** | **270** | **74** | **388** | **210** | **257** | **1862** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 33 | 72 | 155 | 353 | 762 | 112 | 1487 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **33** | **72** | **155** | **353** | **762** | **112** | **1487** |

Generated with PTV VISTRO

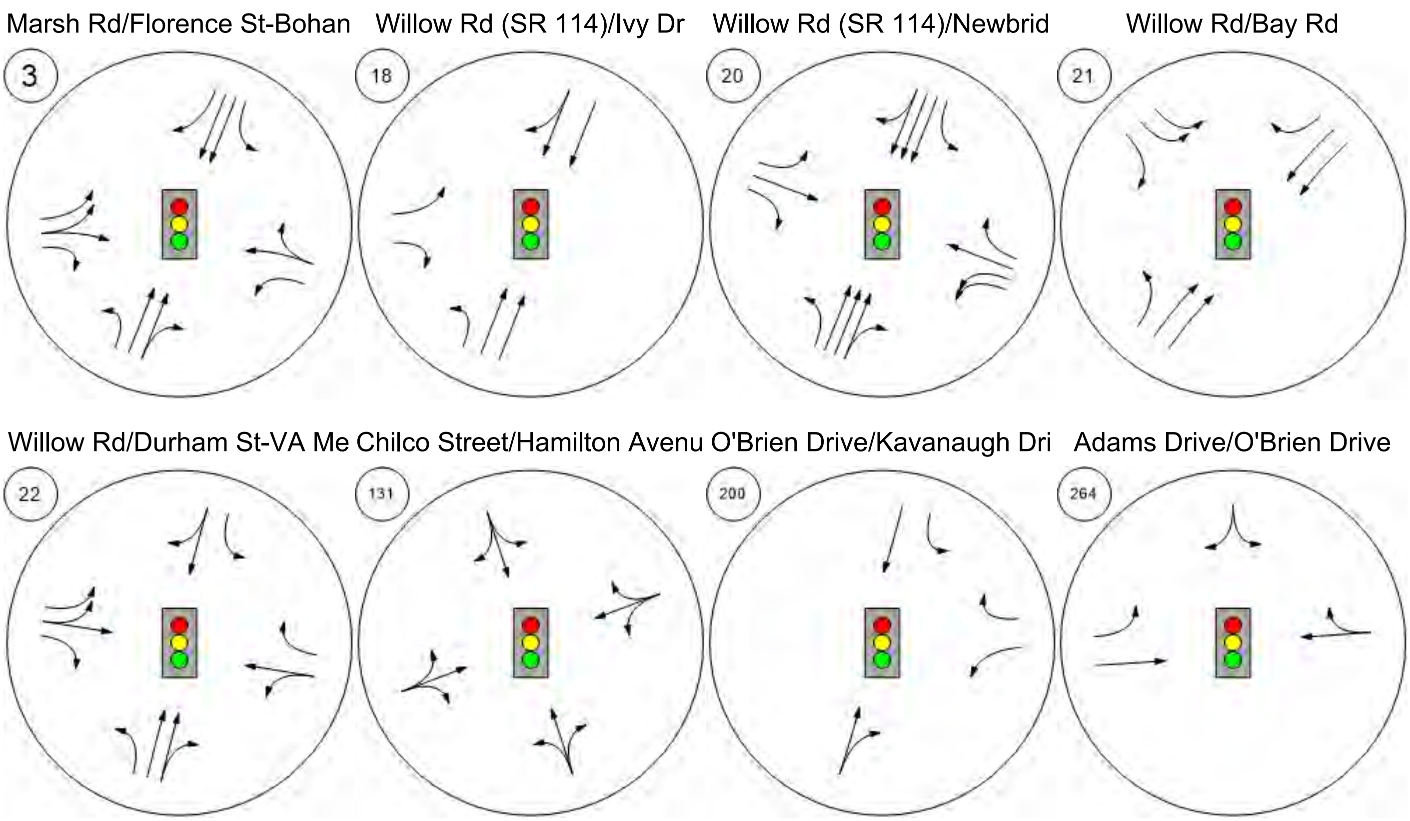
Version 2021 (SP 0-4)

Study Intersections

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

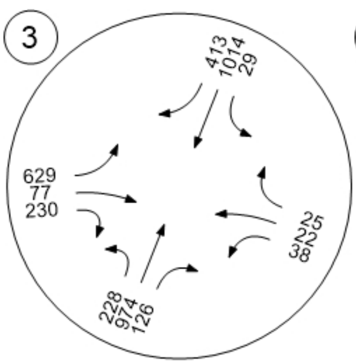



Generated with PTV VISTRO

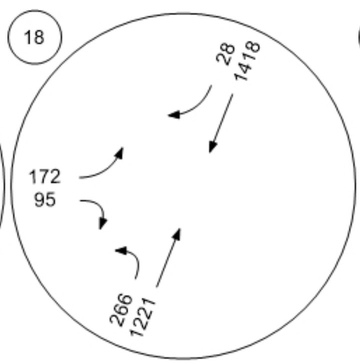
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

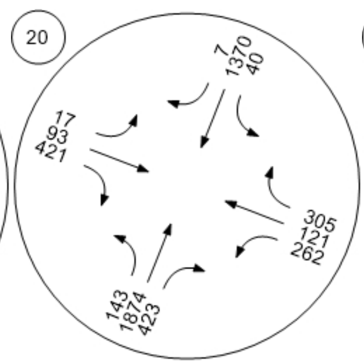

Marsh Rd/Florence St-Bohan



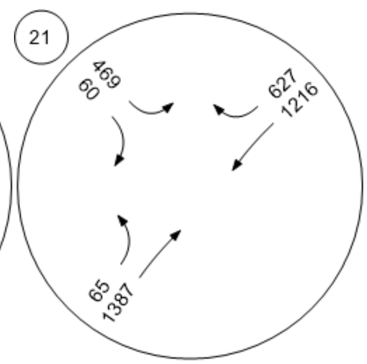

Willow Rd (SR 114)/Ivy Dr



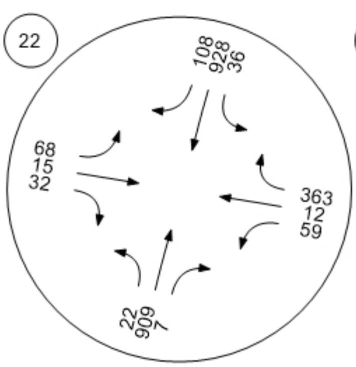

Willow Rd (SR 114)/Newbrid



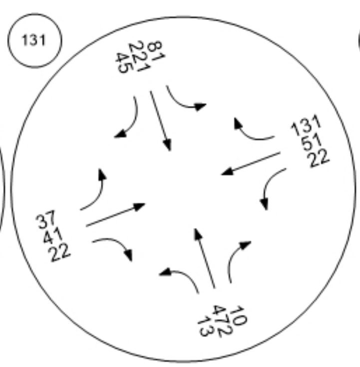

Willow Rd/Bay Rd



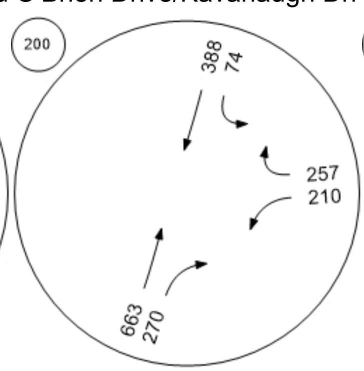

Willow Rd/Durham St-VA Me



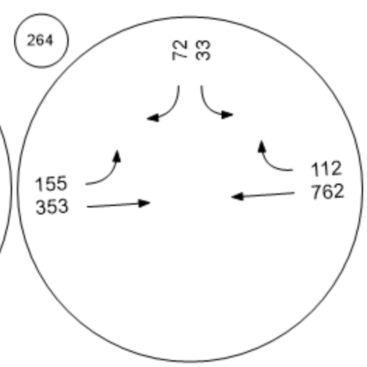

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri



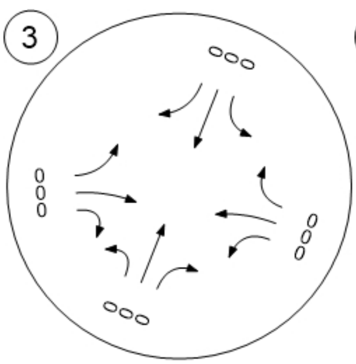

Adams Drive/O'Brien Drive



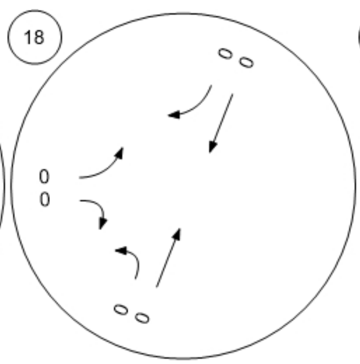
Generated with PTV VISTRO
Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

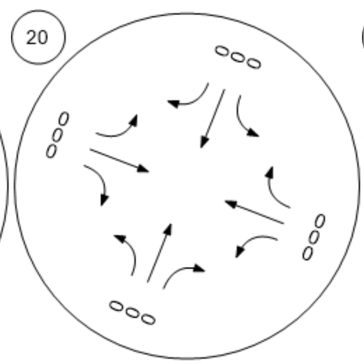

Marsh Rd/Florence St-Bohan



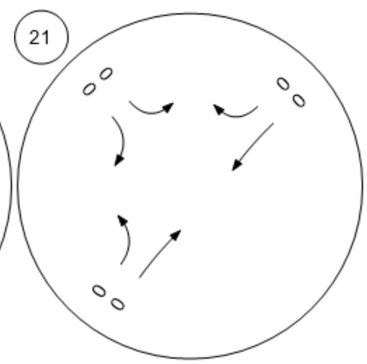

Willow Rd (SR 114)/Ivy Dr



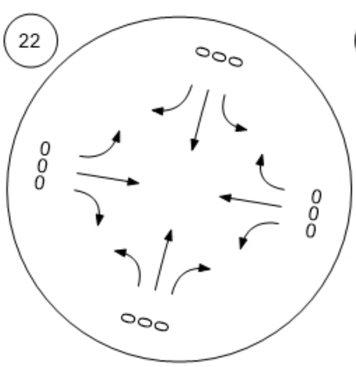

Willow Rd (SR 114)/Newbrid



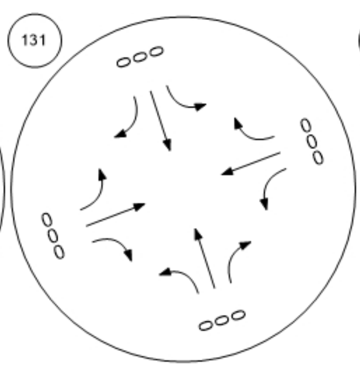

Willow Rd/Bay Rd



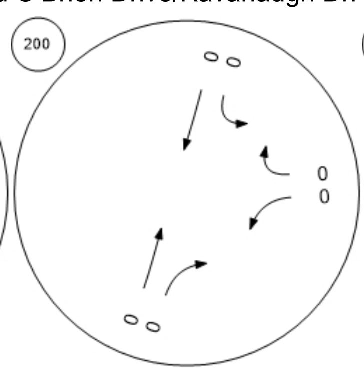

Willow Rd/Durham St-VA Me



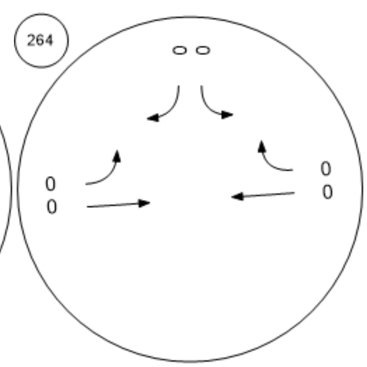

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

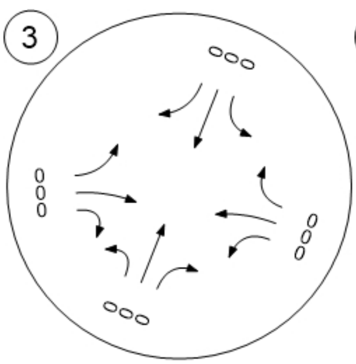


Generated with PTV VISTRO

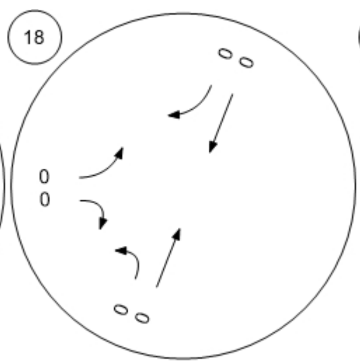
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

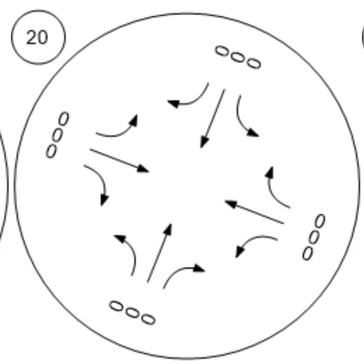

Marsh Rd/Florence St-Bohan



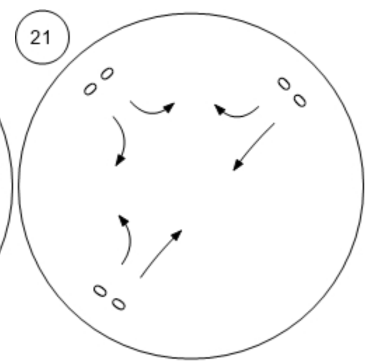

Willow Rd (SR 114)/Ivy Dr



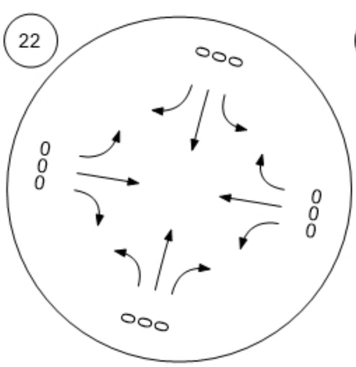

Willow Rd (SR 114)/Newbrid



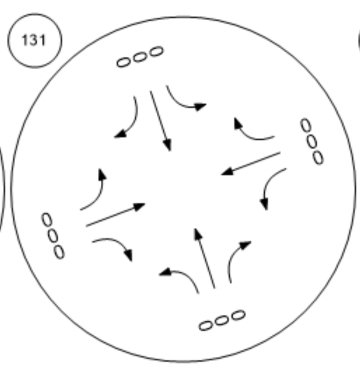

Willow Rd/Bay Rd



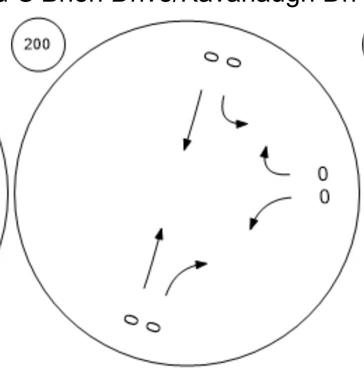

Willow Rd/Durham St-VA Me



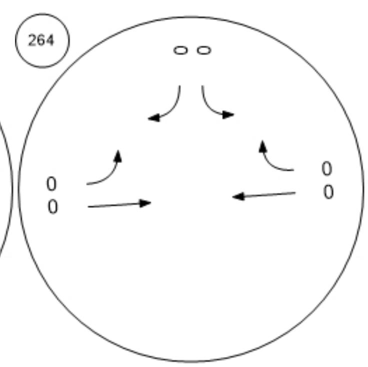

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

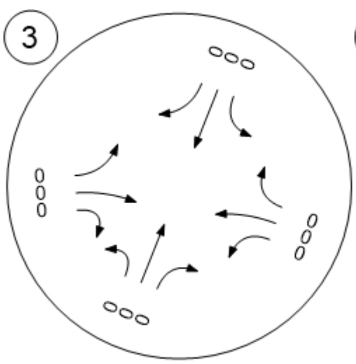


Generated with PTV VISTRO

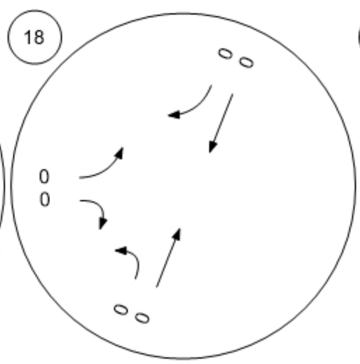
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

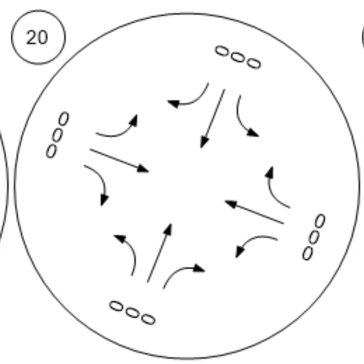

Marsh Rd/Florence St-Bohan



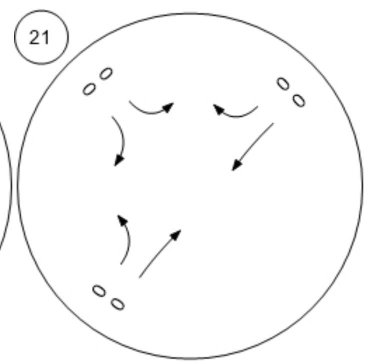

Willow Rd (SR 114)/Ivy Dr



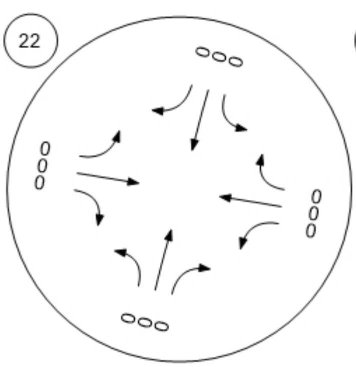

Willow Rd (SR 114)/Newbrid



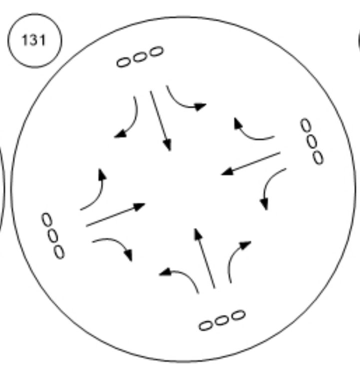

Willow Rd/Bay Rd



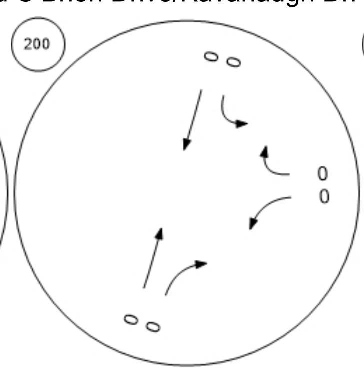

Willow Rd/Durham St-VA Me



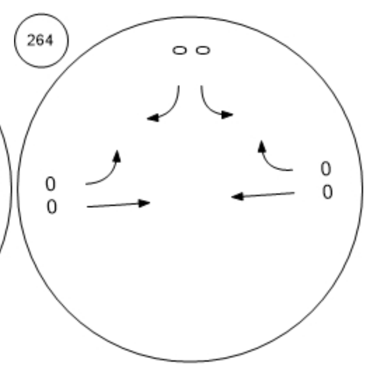

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

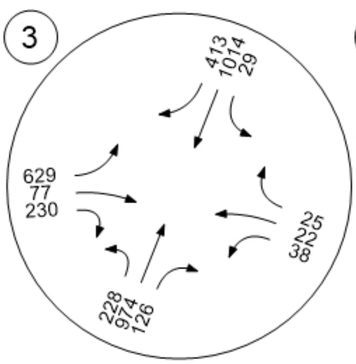


Generated with PTV VISTRO

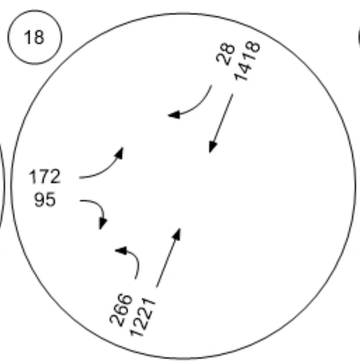
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

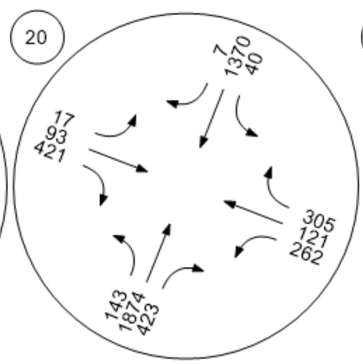

Marsh Rd/Florence St-Bohan



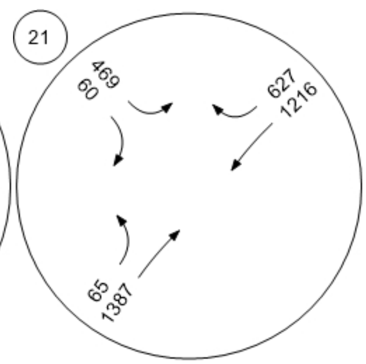

Willow Rd (SR 114)/Ivy Dr



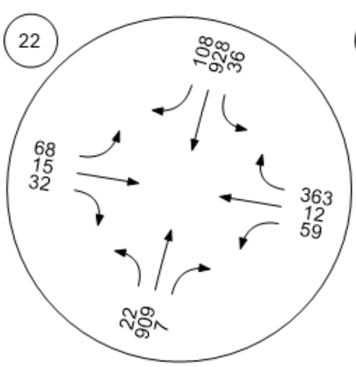

Willow Rd (SR 114)/Newbrid



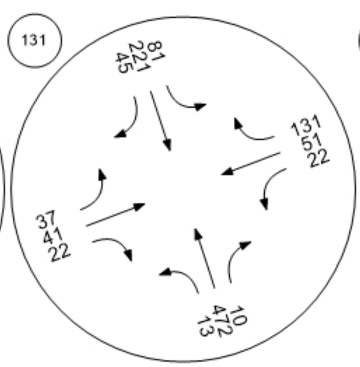

Willow Rd/Bay Rd



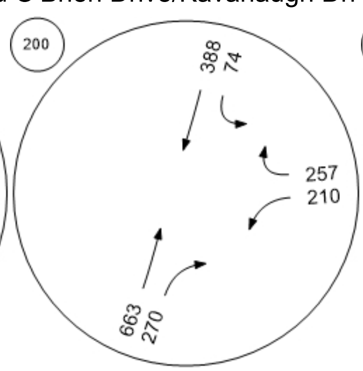

Willow Rd/Durham St-VA Me



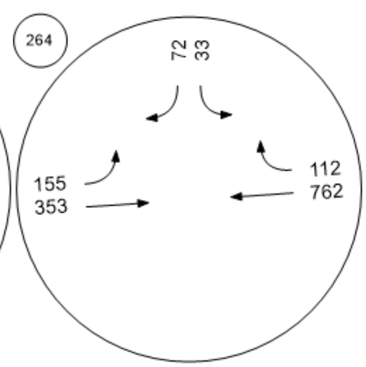

Chilco Street/Hamilton Avenu



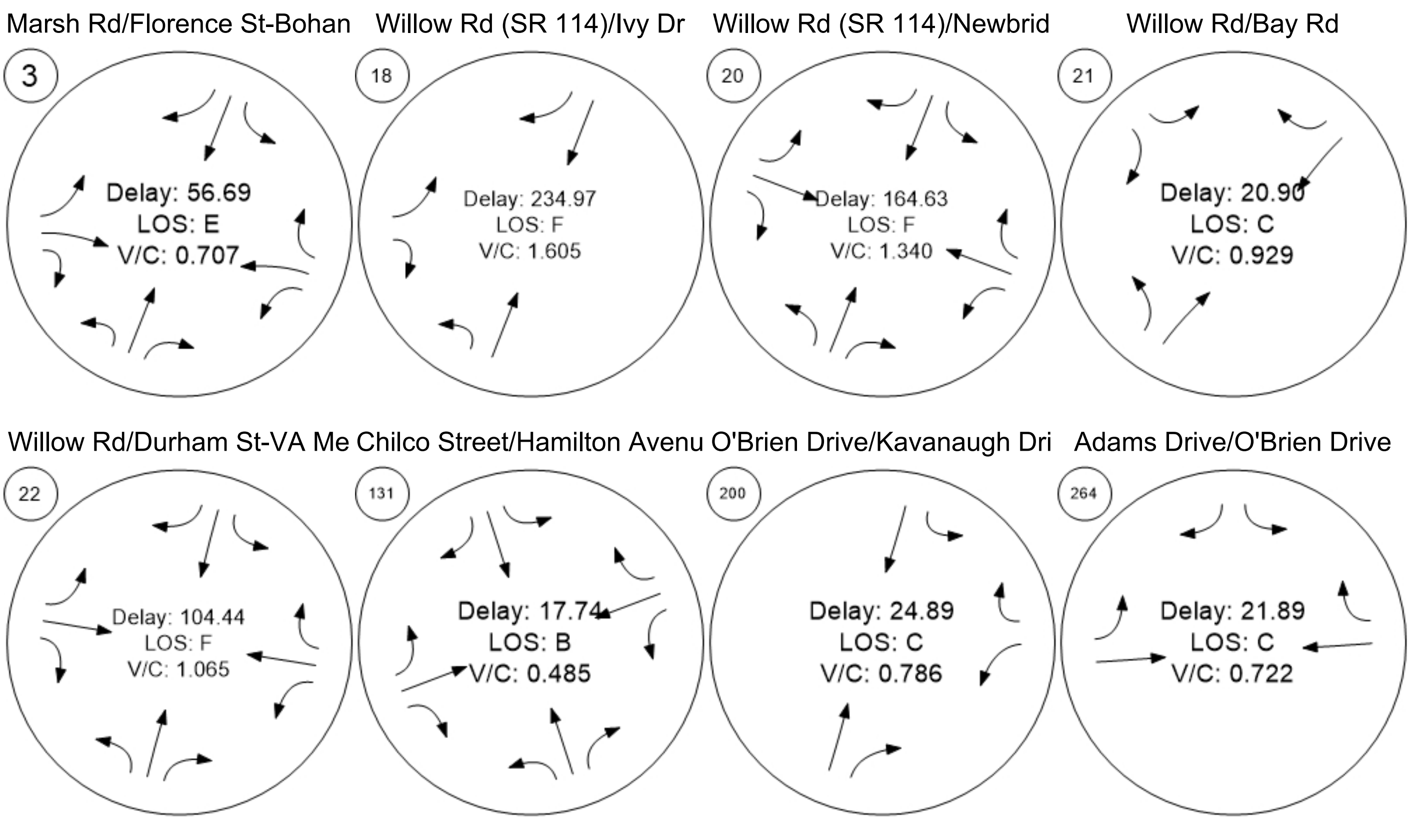

O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive



Traffic Conditions

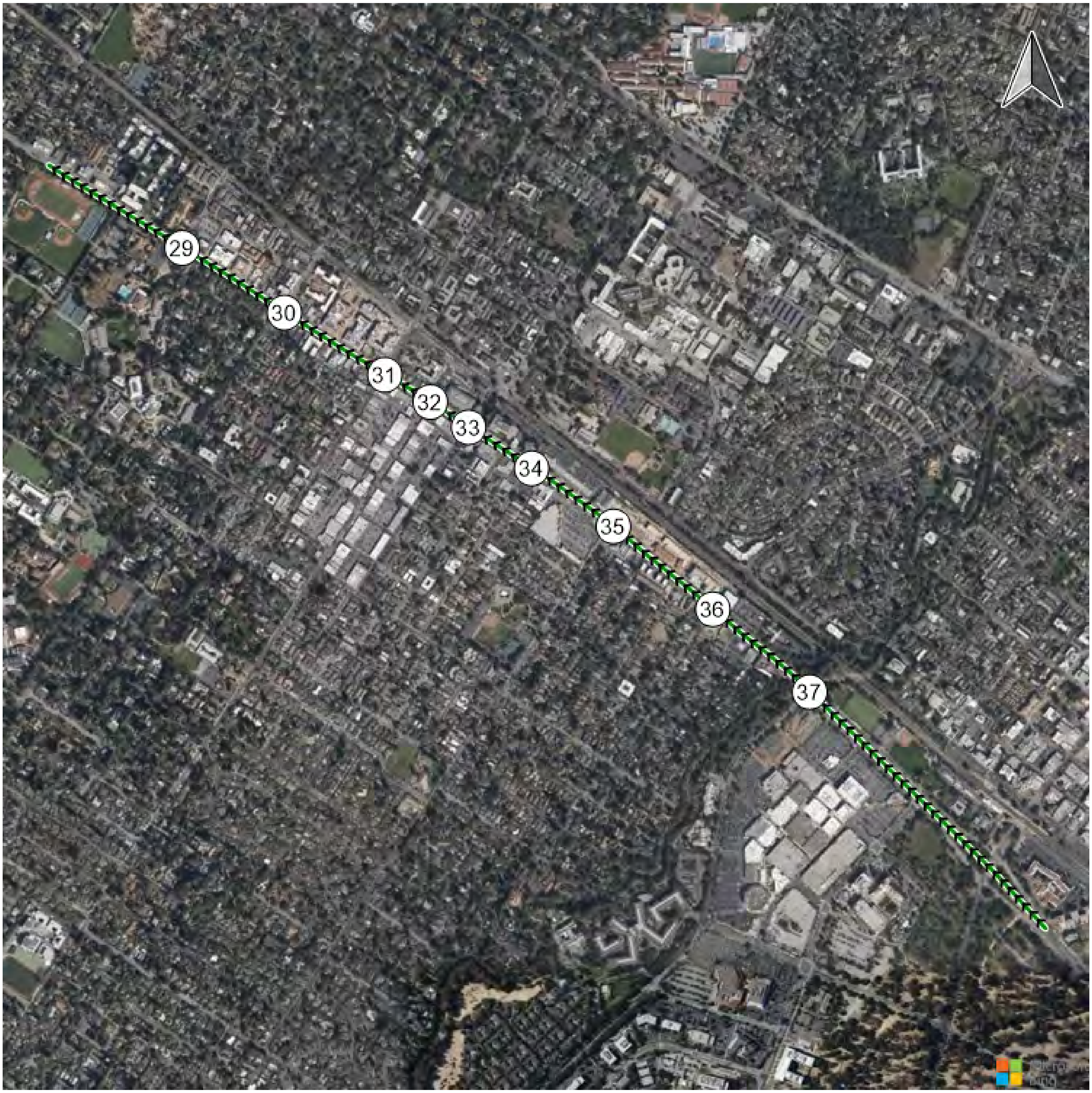



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



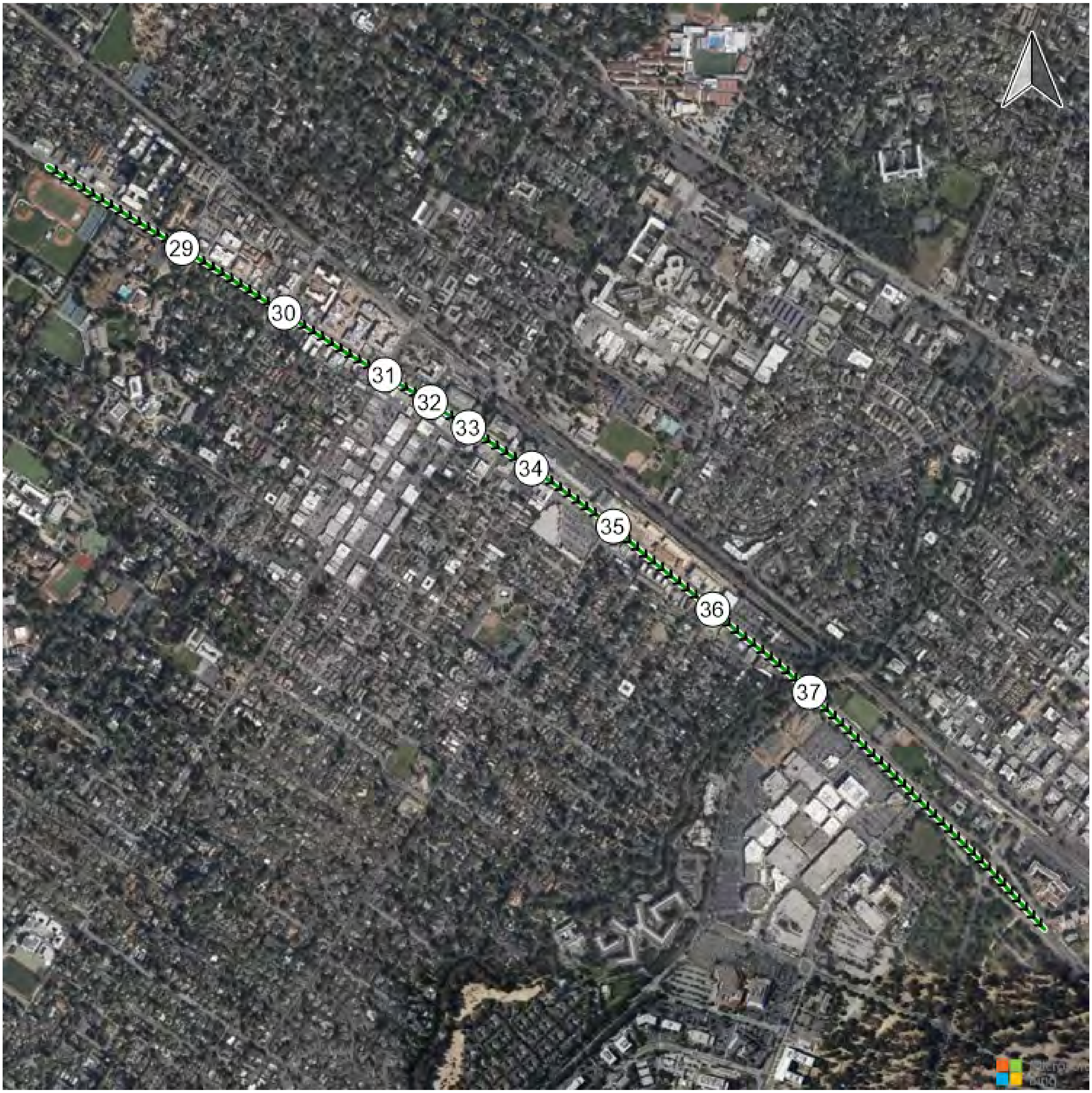
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



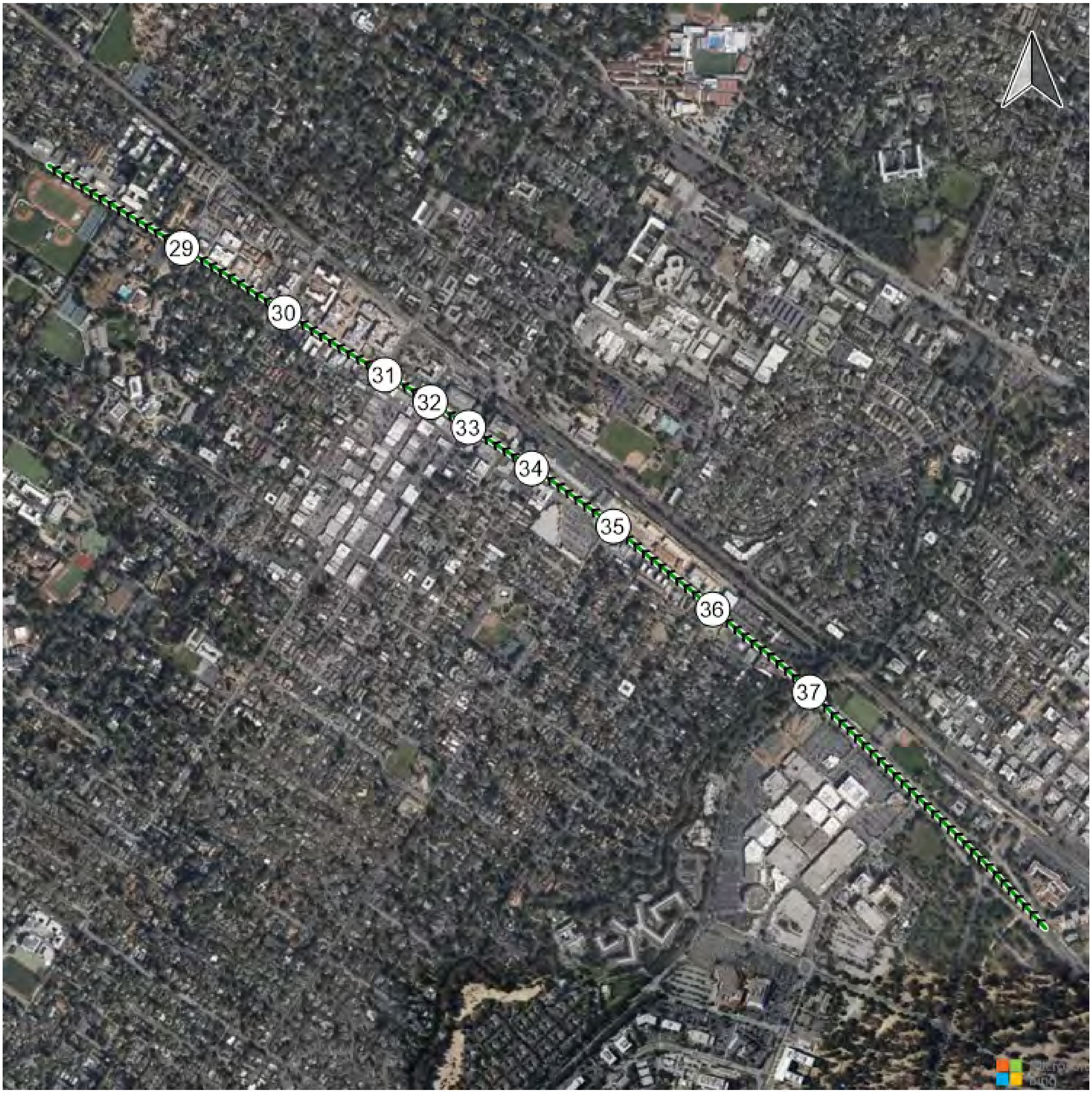
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



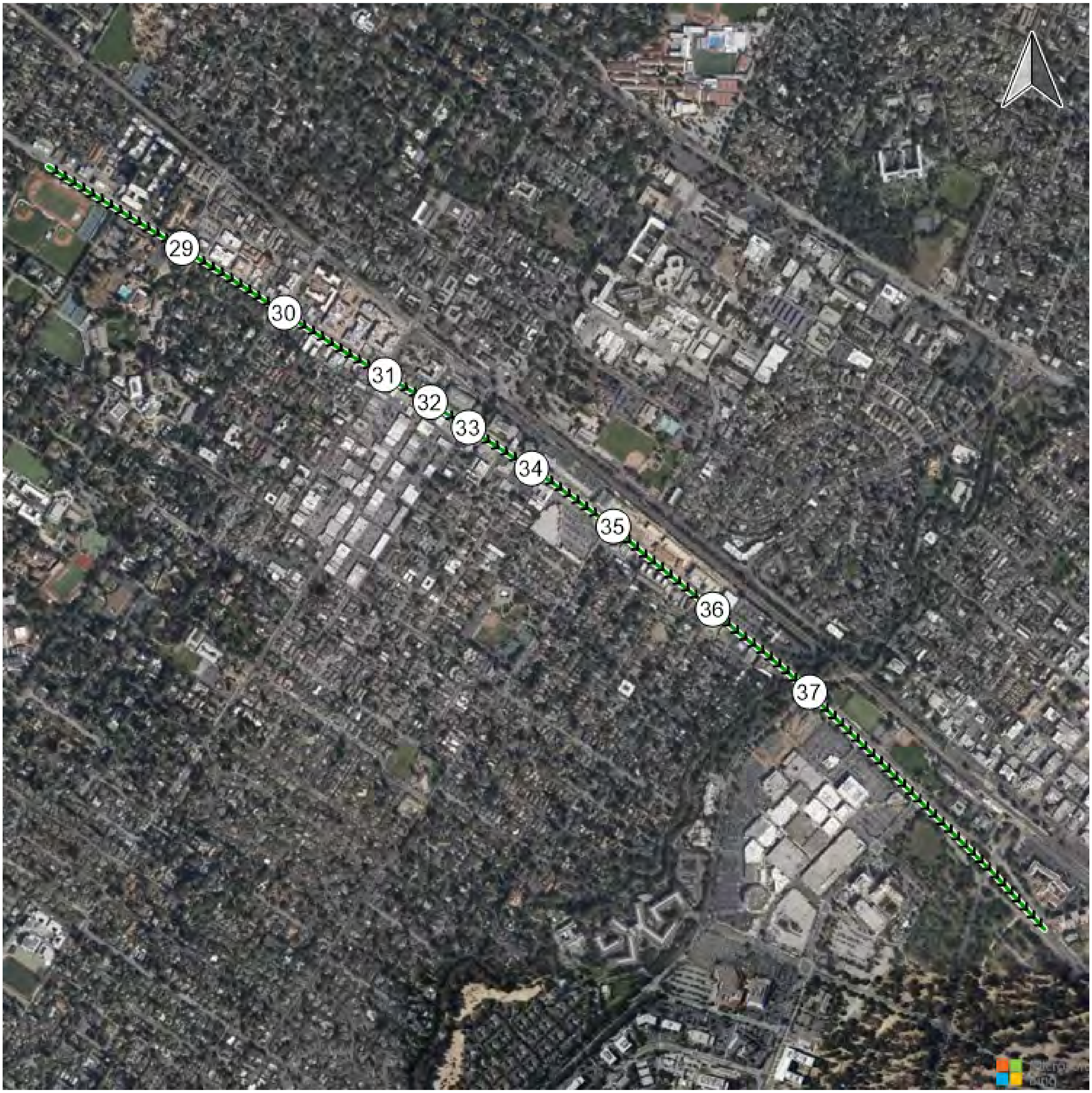
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro
Report File: \...\Cumulative AM_DUMB.pdf

Scenario 21 Cumulative w/Dumbarton AM (2040 vols)
12/9/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.913 | 22.8 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | SEB Left | 0.842 | 31.2 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.833 | 57.8 | E |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 1.122 | 54.5 | D |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.757 | 49.7 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.407 | 13.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.801 | 14.7 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.303 | 253.5 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Thru | 1.735 | 424.8 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.421 | 199.1 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.246 | 102.7 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | WB Right | 1.481 | 198.6 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.137 | 74.2 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | WB Right | 1.135 | 127.7 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.933 | 33.9 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.696 | 23.7 | C |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.619 | 64.4 | E |
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 1.095 | 60.7 | E |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.865 | 23.6 | C |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.876 | 68.5 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.708 | 94.7 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.608 | 144.2 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.023 | 43.2 | D |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.713 | 13.0 | B |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.734 | 5.7 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.466 | 134.8 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.945 | 10.1 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Left | 0.707 | 95.1 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | SB Thru | 1.507 | 294.4 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.410 | 47.2 | E |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.052 | 18.9 | C |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | | 0.000 | 0.0 | A |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Left | | 2.7 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.913 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1021 | 1472 | 217 | 1341 | 539 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1021 | 1472 | 217 | 1341 | 539 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 260 | 376 | 54 | 342 | 138 |
| Total Analysis Volume [veh/h] | 0 | 1042 | 1502 | 217 | 1368 | 550 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.43 | 0.41 | 0.35 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2121 | 1772 | 1394 | 650 |
| d1, Uniform Delay [s] | 11.91 | 17.15 | 23.13 | 21.15 |
| k, delay calibration | 0.50 | 0.50 | 0.05 | 0.38 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.82 | 5.26 | 4.17 | 10.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.49 | 0.85 | 0.98 | 0.85 |
| d, Delay for Lane Group [s/veh] | 12.73 | 22.41 | 27.30 | 31.38 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.39 | 11.64 | 12.49 | 10.44 |
| 50th-Percentile Queue Length [ft/ln] | 134.74 | 291.06 | 312.30 | 260.92 |
| 95th-Percentile Queue Length [veh/ln] | 9.20 | 17.24 | 18.29 | 15.73 |
| 95th-Percentile Queue Length [ft/ln] | 229.92 | 430.96 | 457.21 | 393.37 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.73 | 22.41 | 0.00 | 27.30 | 31.38 |
| Movement LOS | | B | C | | C | C |
| d_A, Approach Delay [s/veh] | 12.73 | | 22.41 | | 28.47 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 22.76 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.913 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.007 | 0.000 | 2.588 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.419 | 2.799 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.842 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 42 | 1288 | 7 | 448 | 1248 | 338 | 13 | 4 | 68 | 348 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 1288 | 7 | 448 | 1248 | 338 | 13 | 4 | 9 | 348 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 358 | 2 | 124 | 347 | 94 | 4 | 1 | 3 | 97 | 5 | 0 |
| Total Analysis Volume [veh/h] | 47 | 1431 | 8 | 498 | 1387 | 376 | 14 | 4 | 10 | 387 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| l1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| l2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 96 | 96 | 112 | 102 | 102 | 7 | 7 | 35 | 35 |
| g / C, Green / Cycle | 0.05 | 0.60 | 0.60 | 0.70 | 0.64 | 0.64 | 0.04 | 0.04 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.27 | 0.27 | 0.48 | 0.48 | 0.52 | 0.01 | 0.00 | 0.22 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1039 | 1840 | 1711 | 1829 | 2555 | 1785 | 1900 |
| c, Capacity [veh/h] | 82 | 2122 | 1111 | 708 | 1177 | 1095 | 82 | 115 | 390 | 415 |
| d1, Uniform Delay [s] | 74.70 | 17.39 | 17.39 | 15.58 | 19.91 | 21.39 | 73.64 | 73.20 | 62.32 | 49.35 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.50 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.69 | 0.68 | 1.29 | 5.78 | 4.39 | 6.33 | 0.98 | 0.24 | 43.45 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.58 | 0.45 | 0.45 | 0.70 | 0.75 | 0.81 | 0.22 | 0.09 | 0.99 | 0.05 |
| d, Delay for Lane Group [s/veh] | 79.39 | 18.07 | 18.69 | 21.37 | 24.29 | 27.72 | 74.62 | 73.44 | 105.76 | 49.39 |
| Lane Group LOS | E | B | B | C | C | C | E | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.00 | 9.62 | 10.27 | 3.81 | 23.25 | 25.36 | 0.75 | 0.20 | 20.55 | 0.68 |
| 50th-Percentile Queue Length [ft/ln] | 50.05 | 240.59 | 256.77 | 95.18 | 581.13 | 633.98 | 18.64 | 5.09 | 513.76 | 17.12 |
| 95th-Percentile Queue Length [veh/ln] | 3.60 | 14.71 | 15.53 | 6.85 | 31.15 | 33.62 | 1.34 | 0.37 | 27.98 | 1.23 |
| 95th-Percentile Queue Length [ft/ln] | 90.09 | 367.78 | 388.17 | 171.32 | 778.80 | 840.45 | 33.55 | 9.16 | 699.62 | 30.82 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

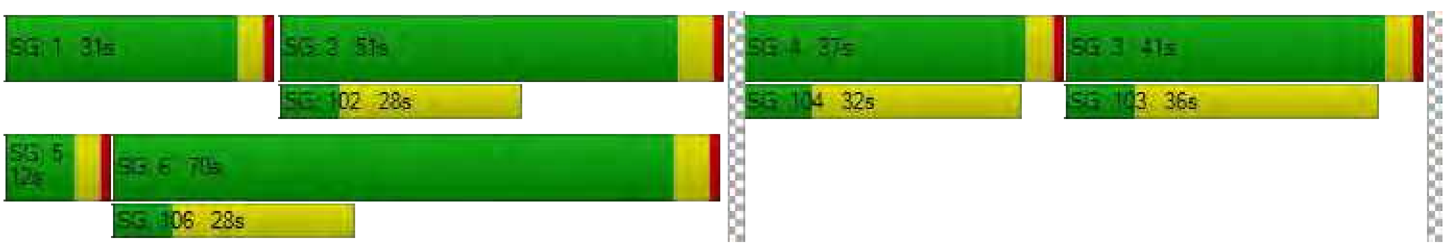
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.39 | 18.28 | 18.69 | 21.37 | 25.54 | 27.72 | 74.62 | 74.62 | 73.44 | 105.76 | 49.39 | 49.39 |
| Movement LOS | E | B | B | C | C | C | E | E | E | F | D | D |
| d_A, Approach Delay [s/veh] | 20.22 | | | 24.99 | | | 74.20 | | | 102.86 | | |
| Approach LOS | C | | | C | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 31.22 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.842 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.43 | 68.43 | 69.35 | 69.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.090 | 3.295 | 2.945 | 2.194 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.61 | 28.18 | 47.41 | 50.54 |
| I_b,int, Bicycle LOS Score for Intersection | 2.377 | 3.425 | 1.703 | 2.233 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 57.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.833 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 220 | 960 | 124 | 29 | 1031 | 413 | 609 | 76 | 229 | 38 | 21 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 220 | 960 | 124 | 29 | 1031 | 413 | 609 | 76 | 214 | 38 | 21 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 247 | 32 | 7 | 266 | 106 | 157 | 20 | 55 | 10 | 5 | 6 |
| Total Analysis Volume [veh/h] | 227 | 990 | 128 | 30 | 1063 | 426 | 628 | 78 | 221 | 39 | 22 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 97 | 97 | 5 | 89 | 89 | 38 | 38 | 38 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.56 | 0.56 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.30 | 0.31 | 0.02 | 0.42 | 0.44 | 0.21 | 0.21 | 0.14 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1792 | 1704 | 1823 | 1650 | 1717 | 1706 | 1526 | 1439 | 1212 |
| c, Capacity [veh/h] | 142 | 1133 | 1082 | 58 | 1016 | 919 | 408 | 405 | 363 | 106 | 90 |
| d1, Uniform Delay [s] | 73.44 | 17.98 | 18.07 | 75.88 | 27.14 | 27.77 | 58.60 | 58.47 | 54.14 | 70.46 | 71.37 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.16 | 0.16 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 298.03 | 1.59 | 1.70 | 2.58 | 5.30 | 6.58 | 8.57 | 7.98 | 1.23 | 1.56 | 3.65 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.59 | 0.50 | 0.51 | 0.51 | 0.76 | 0.78 | 0.87 | 0.86 | 0.61 | 0.37 | 0.54 |
| d, Delay for Lane Group [s/veh] | 371.47 | 19.56 | 19.77 | 78.45 | 32.43 | 34.35 | 67.17 | 66.45 | 55.37 | 72.02 | 75.03 |
| Lane Group LOS | F | B | B | E | C | C | E | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 17.63 | 12.33 | 12.00 | 1.26 | 23.61 | 22.80 | 14.96 | 14.65 | 8.16 | 1.59 | 2.01 |
| 50th-Percentile Queue Length [ft/ln] | 440.67 | 308.31 | 300.00 | 31.42 | 590.23 | 569.99 | 374.07 | 366.35 | 203.95 | 39.71 | 50.35 |
| 95th-Percentile Queue Length [veh/ln] | 28.13 | 18.09 | 17.68 | 2.26 | 31.58 | 30.63 | 21.31 | 20.93 | 12.84 | 2.86 | 3.63 |
| 95th-Percentile Queue Length [ft/ln] | 703.25 | 452.29 | 442.03 | 56.56 | 789.44 | 765.76 | 532.66 | 523.30 | 321.06 | 71.48 | 90.63 |

**Movement, Approach, & Intersection Results**

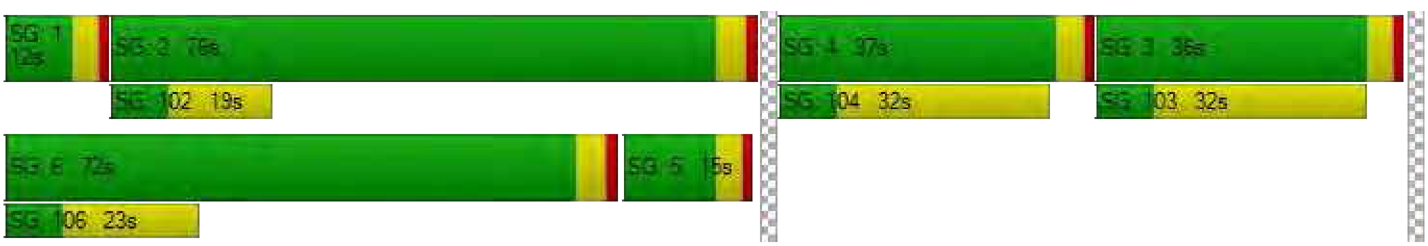
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 371.47 | 19.65 | 19.77 | 78.45 | 32.96 | 34.35 | 66.86 | 66.45 | 55.37 | 72.02 | 75.03 | 75.03 |
| Movement LOS | F | B | B | E | C | C | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 79.04 | | | 34.25 | | | 64.09 | | | 73.68 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 57.80 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.833 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.989 | 3.080 | 2.508 | 2.055 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.669 | 2.813 | 3.114 | 1.703 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 54.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.122 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 836 | 82 | 425 | 755 | 47 | 292 | 68 | 2 | 43 | 46 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 836 | 82 | 425 | 755 | 47 | 292 | 68 | 2 | 43 | 46 | 339 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 213 | 21 | 108 | 193 | 12 | 74 | 17 | 1 | 11 | 12 | 86 |
| Total Analysis Volume [veh/h] | 0 | 853 | 84 | 434 | 770 | 48 | 298 | 69 | 2 | 44 | 47 | 346 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 5 | | | 0 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 5 | | | 0 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 1 | | | 1 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 12 | | | 9 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 30 | 30 |
| g / C, Green / Cycle | 0.33 | 0.33 | 0.20 | 0.57 | 0.57 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.25 | 0.23 | 0.23 | 0.55 | 0.26 |
| s, saturation flow rate [veh/h] | 1882 | 1656 | 1708 | 1807 | 1763 | 675 | 1702 |
| c, Capacity [veh/h] | 669 | 549 | 343 | 1030 | 1005 | 333 | 684 |
| d1, Uniform Delay [s] | 24.38 | 24.39 | 32.07 | 9.62 | 9.64 | 30.99 | 21.70 |
| k, delay calibration | 0.50 | 0.50 | 0.23 | 0.50 | 0.50 | 0.50 | 0.33 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.38 | 11.55 | 129.85 | 1.16 | 1.21 | 82.16 | 3.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.74 | 0.80 | 1.26 | 0.40 | 0.40 | 1.11 | 0.64 |
| d, Delay for Lane Group [s/veh] | 31.76 | 35.93 | 161.92 | 10.79 | 10.84 | 113.14 | 24.72 |
| Lane Group LOS | C | D | F | B | B | F | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.35 | 8.79 | 18.68 | 3.80 | 3.74 | 14.11 | 7.19 |
| 50th-Percentile Queue Length [ft/ln] | 233.73 | 219.65 | 467.07 | 94.97 | 93.56 | 352.74 | 179.77 |
| 95th-Percentile Queue Length [veh/ln] | 14.36 | 13.65 | 28.83 | 6.84 | 6.74 | 21.62 | 11.59 |
| 95th-Percentile Queue Length [ft/ln] | 359.10 | 341.18 | 720.64 | 170.94 | 168.42 | 540.60 | 289.71 |

**Movement, Approach, & Intersection Results**

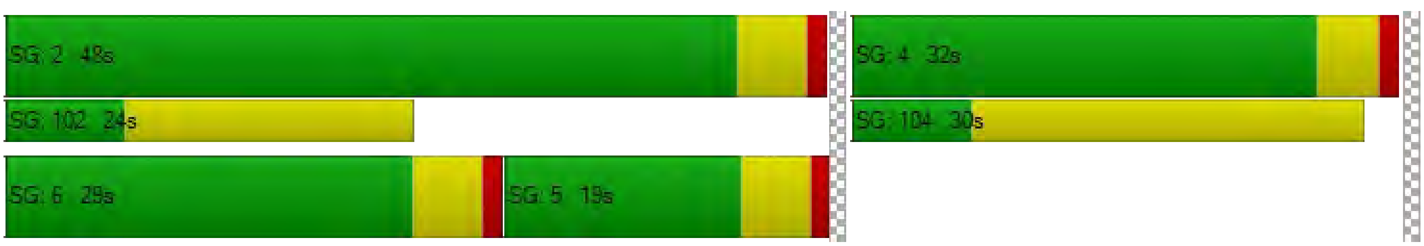
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.76 | 33.50 | 35.93 | 161.92 | 10.81 | 10.84 | 113.14 | 113.14 | 113.14 | 24.72 | 24.72 | 24.72 |
| Movement LOS | C | C | D | F | B | B | F | F | F | C | C | C |
| d_A, Approach Delay [s/veh] | 33.71 | | | 63.20 | | | 113.14 | | | 24.72 | | |
| Approach LOS | C | | | E | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 54.51 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 1.122 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.82 | 29.82 | 29.82 | 19.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.686 | 3.343 | 1.897 | 2.191 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.73 | 8.70 | 17.50 | 17.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.333 | 2.593 | 2.168 | 2.281 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.757 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 569 | 520 | 508 | 501 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 520 | 508 | 501 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 138 | 135 | 133 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 553 | 540 | 533 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.31 | 0.29 | 0.36 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1779 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1005 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.30 | 17.79 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 84.97 | 0.61 | 3.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.14 | 0.35 | 0.64 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 25.56 | 2.07 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 639.03 | 51.64 | 308.77 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 36.59 | 3.72 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 914.81 | 92.96 | 452.86 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

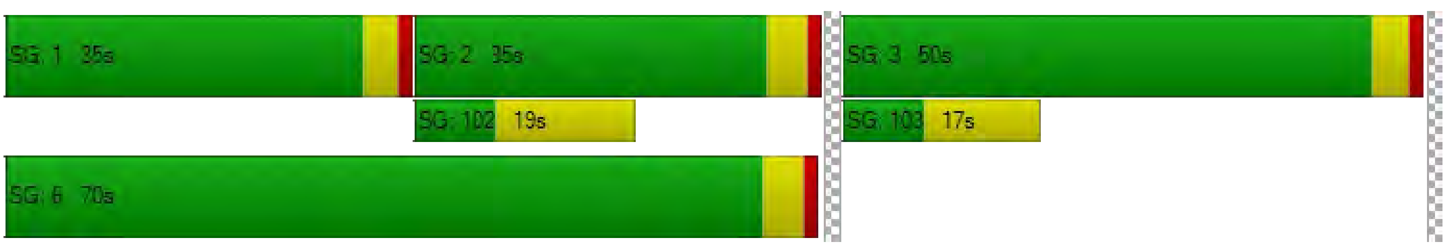
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 | 20.92 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 66.45 | | 20.92 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 49.70 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.757 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.948 | 2.892 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.363 | 2.622 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.407 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 683 | 206 | 288 | 747 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 122 | 21 | 683 | 110 | 288 | 747 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 32 | 6 | 182 | 29 | 77 | 199 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 130 | 22 | 727 | 117 | 306 | 795 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 80 | 80 | 91 | 85 | 85 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.19 | 0.78 | 0.67 | 0.67 | 0.76 | 0.71 | 0.71 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.09 | 0.03 | 0.21 | 0.08 | 0.36 | 0.24 | 0.24 |
| s, saturation flow rate [veh/h] | 1397 | 1736 | 1310 | 1477 | 706 | 3526 | 1474 | 846 | 1840 | 1779 |
| c, Capacity [veh/h] | 124 | 325 | 300 | 277 | 579 | 2343 | 979 | 666 | 1301 | 1258 |
| d1, Uniform Delay [s] | 54.82 | 40.13 | 46.92 | 43.22 | 4.12 | 8.51 | 7.28 | 5.14 | 6.73 | 6.75 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 0.08 | 1.54 | 1.18 | 0.03 | 0.35 | 0.25 | 2.28 | 0.69 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.07 | 0.56 | 0.47 | 0.04 | 0.31 | 0.12 | 0.46 | 0.33 | 0.34 |
| d, Delay for Lane Group [s/veh] | 54.97 | 40.22 | 48.46 | 44.40 | 4.14 | 8.86 | 7.53 | 7.42 | 7.42 | 7.48 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.56 | 4.82 | 3.52 | 0.11 | 3.80 | 1.08 | 2.26 | 4.01 | 3.93 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 13.93 | 120.50 | 88.10 | 2.87 | 94.99 | 27.09 | 56.54 | 100.19 | 98.34 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 1.00 | 8.42 | 6.34 | 0.21 | 6.84 | 1.95 | 4.07 | 7.21 | 7.08 |
| 95th-Percentile Queue Length [ft/ln] | 8.20 | 25.07 | 210.52 | 158.59 | 5.16 | 170.98 | 48.76 | 101.77 | 180.33 | 177.01 |

**Movement, Approach, & Intersection Results**

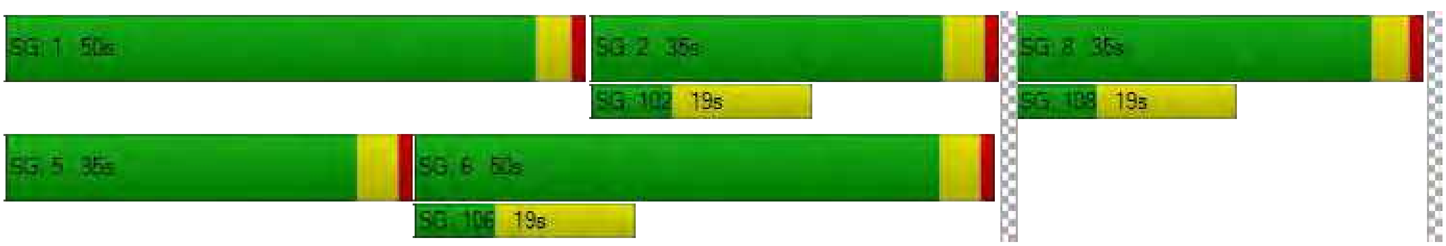
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.97 | 40.22 | 40.22 | 48.46 | 48.46 | 44.40 | 4.14 | 8.86 | 7.53 | 7.42 | 7.45 | 7.48 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 43.38 | | | 46.68 | | | 8.56 | | | 7.44 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.23 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.407 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.008 | 2.898 | 3.159 | 2.833 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.416 | 2.353 | 2.517 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.801 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 829 | 101 | 1288 | 2933 | 333 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 829 | 101 | 1288 | 2933 | 333 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 214 | 26 | 332 | 756 | 86 | 107 |
| Total Analysis Volume [veh/h] | 855 | 104 | 1328 | 3024 | 343 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 78 | 78 | 78 | 78 | 78 | 78 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 21 | 21 | 33 | 58 | 10 | 48 |
| g / C, Green / Cycle | 0.27 | 0.27 | 0.43 | 0.74 | 0.13 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.07 | 0.38 | 0.60 | 0.10 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1547 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1324 | 414 | 1475 | 3729 | 464 | 2545 |
| d1, Uniform Delay [s] | 25.30 | 22.42 | 20.87 | 6.64 | 32.43 | 6.58 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.64 | 0.38 | 0.87 | 0.54 | 0.87 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.65 | 0.25 | 0.90 | 0.81 | 0.74 | 0.17 |
| d, Delay for Lane Group [s/veh] | 25.94 | 22.80 | 21.73 | 7.18 | 33.30 | 6.59 |
| Lane Group LOS | C | C | C | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.15 | 1.36 | 9.23 | 4.30 | 3.03 | 0.85 |
| 50th-Percentile Queue Length [ft/ln] | 103.84 | 34.03 | 230.75 | 107.43 | 75.73 | 21.22 |
| 95th-Percentile Queue Length [veh/ln] | 7.48 | 2.45 | 14.21 | 7.70 | 5.45 | 1.53 |
| 95th-Percentile Queue Length [ft/ln] | 186.91 | 61.26 | 355.31 | 192.43 | 136.31 | 38.20 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

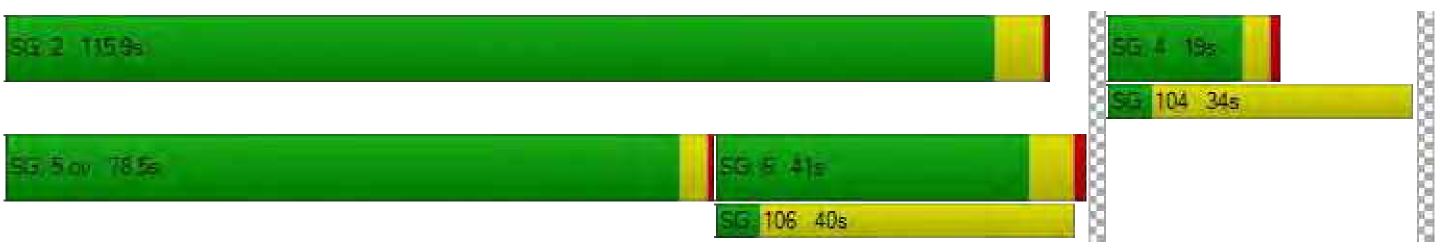
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 25.94 | 22.80 | 21.73 | 7.18 | 33.30 | 6.59 |
| Movement LOS | C | C | C | A | C | A |
| d_A, Approach Delay [s/veh] | 25.60 | | 11.62 | | 18.46 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 14.69 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.801 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 30.45 | 0.00 | 30.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.693 | 0.000 | 2.946 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 899 | 360 | 385 |
| d_b, Bicycle Delay [s] | 11.80 | 26.21 | 25.38 |
| I_b,int, Bicycle LOS Score for Intersection | 2.087 | 3.953 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 253.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.303 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 249 | 596 | 277 | 35 | 75 | 72 | 386 | 465 | 191 | 1101 | 2572 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 249 | 596 | 277 | 35 | 75 | 56 | 386 | 465 | 85 | 1101 | 2572 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 152 | 71 | 9 | 19 | 14 | 98 | 119 | 22 | 281 | 656 | 18 |
| Total Analysis Volume [veh/h] | 254 | 608 | 283 | 36 | 77 | 57 | 394 | 474 | 87 | 1123 | 2624 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 3 | | | 2 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 0 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 0 | | | 4 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.34 | 0.28 | 0.07 | 0.05 | 0.03 | 0.05 | 0.26 | 0.10 | 0.06 | 0.41 | 0.52 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 57.49 | 55.96 | 57.37 | 50.10 | 24.79 | 23.83 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.16 | 0.11 | 0.15 | 0.17 | 0.11 | 0.11 | 0.46 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 467.79 | 302.80 | 0.05 | 28.36 | 1.27 | 17.49 | 127.00 | 0.06 | 0.11 | 495.14 | 144.31 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.98 | 1.65 | 0.18 | 0.75 | 0.39 | 0.74 | 1.26 | 0.24 | 0.15 | 2.09 | 1.32 | 0.11 |
| d, Delay for Lane Group [s/veh] | 519.94 | 355.34 | 24.50 | 85.86 | 57.23 | 74.85 | 177.10 | 24.85 | 23.94 | 545.73 | 182.40 | 24.16 |
| Lane Group LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 20.65 | 21.26 | 1.81 | 1.52 | 1.23 | 2.18 | 10.40 | 3.16 | 1.69 | 45.46 | 46.68 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 516.15 | 531.54 | 45.13 | 38.08 | 30.70 | 54.61 | 260.10 | 79.03 | 42.14 | 1136.58 | 1166.96 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 34.82 | 34.60 | 3.25 | 2.74 | 2.21 | 3.93 | 17.40 | 5.69 | 3.03 | 72.48 | 68.84 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 870.62 | 865.09 | 81.24 | 68.54 | 55.27 | 98.31 | 435.04 | 142.26 | 75.86 | 1811.92 | 1720.97 | 63.56 |

**Movement, Approach, & Intersection Results**

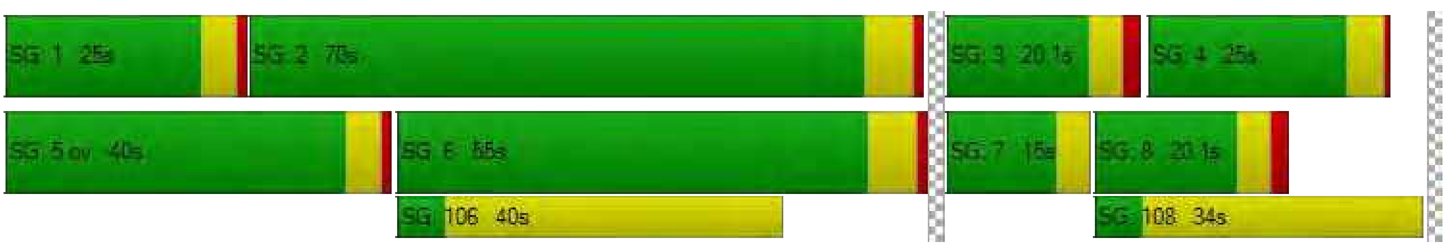
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 519.94 | 355.34 | 24.50 | 85.86 | 57.23 | 74.85 | 177.10 | 24.85 | 23.94 | 545.73 | 182.40 | 24.16 |
| Movement LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | | 310.08 | | | 69.20 | | | 87.58 | | | 286.18 | |
| Approach LOS | | F | | | E | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 253.48 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.303 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.136 | 0.000 | 3.346 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.63 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.504 | 1.713 | 2.143 | 3.661 |
| Bicycle LOS | B | A | B | D |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 424.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.735 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 99 | 820 | 359 | 190 | 1255 | 45 | 47 | 56 | 48 | 56 | 422 | 349 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 99 | 820 | 359 | 190 | 1255 | 45 | 47 | 56 | 48 | 56 | 422 | 349 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 220 | 97 | 51 | 337 | 12 | 13 | 15 | 13 | 15 | 113 | 94 |
| Total Analysis Volume [veh/h] | 106 | 882 | 386 | 204 | 1349 | 48 | 51 | 60 | 52 | 60 | 454 | 375 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 78 | 78 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.60 | 0.60 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.82 | 0.85 | 0.42 | 0.75 | 0.76 | 0.44 | 0.97 |
| s, saturation flow rate [veh/h] | 432 | 808 | 714 | 491 | 934 | 917 | 371 | 914 |
| c, Capacity [veh/h] | 133 | 454 | 401 | 178 | 562 | 552 | 130 | 247 |
| d1, Uniform Delay [s] | 33.71 | 28.50 | 28.50 | 47.18 | 25.84 | 25.84 | 51.50 | 48.23 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 37.55 | 219.03 | 242.10 | 113.07 | 125.20 | 131.27 | 162.70 | 1180.84 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.80 | 1.46 | 1.51 | 1.15 | 1.25 | 1.26 | 1.25 | 3.60 |
| d, Delay for Lane Group [s/veh] | 71.26 | 247.52 | 270.60 | 160.24 | 151.04 | 157.11 | 214.20 | 1229.07 |
| Lane Group LOS | E | F | F | F | F | F | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.34 | 40.52 | 38.41 | 7.41 | 35.82 | 36.10 | 10.22 | 89.02 |
| 50th-Percentile Queue Length [ft/ln] | 58.45 | 1012.90 | 960.18 | 185.21 | 895.38 | 902.44 | 255.42 | 2225.56 |
| 95th-Percentile Queue Length [veh/ln] | 4.21 | 64.57 | 62.29 | 13.01 | 53.59 | 54.32 | 17.21 | 142.54 |
| 95th-Percentile Queue Length [ft/ln] | 105.20 | 1614.24 | 1557.15 | 325.26 | 1339.79 | 1358.12 | 430.19 | 3563.59 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 71.26 | 253.27 | 270.60 | 160.24 | 153.96 | 157.11 | 214.20 | 214.20 | 214.20 | 1229.07 | 1229.07 | 1229.07 |
| Movement LOS | E | F | F | F | F | F | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 244.10 | | | 154.85 | | | 214.20 | | | 1229.07 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 424.85 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.735 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.46 | 54.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.488 | 3.017 | 2.139 | 2.542 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1123 | 1077 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.59 | 14.11 | 36.42 | 36.38 |
| I_b,int, Bicycle LOS Score for Intersection | 2.693 | 2.880 | 1.829 | 3.026 |
| Bicycle LOS | B | C | A | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 199.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.421 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 235 | 1304 | 1205 | 31 | 86 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 235 | 1304 | 1205 | 31 | 86 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 354 | 327 | 8 | 23 | 26 |
| Total Analysis Volume [veh/h] | 255 | 1417 | 1310 | 34 | 93 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 103 | 87 | 87 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.32 | 0.92 | 0.86 | 0.87 | 0.05 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 773 | 1745 | 779 |
| c, Capacity [veh/h] | 80 | 1230 | 525 | 520 | 262 | 117 |
| d1, Uniform Delay [s] | 58.39 | 13.26 | 21.27 | 21.27 | 49.50 | 53.78 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.04 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1020.00 | 78.17 | 140.17 | 145.86 | 0.30 | 38.87 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.20 | 1.15 | 1.28 | 1.29 | 0.35 | 0.88 |
| d, Delay for Lane Group [s/veh] | 1078.39 | 91.43 | 161.44 | 167.14 | 49.80 | 92.65 |
| Lane Group LOS | F | F | F | F | D | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 25.19 | 25.52 | 34.04 | 34.51 | 2.75 | 4.55 |
| 50th-Percentile Queue Length [ft/ln] | 629.76 | 638.11 | 850.97 | 862.80 | 68.74 | 113.66 |
| 95th-Percentile Queue Length [veh/ln] | 41.29 | 38.01 | 52.26 | 53.23 | 4.95 | 8.04 |
| 95th-Percentile Queue Length [ft/ln] | 1032.21 | 950.13 | 1306.51 | 1330.65 | 123.73 | 201.09 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1078.39 | 91.43 | 164.21 | 167.14 | 49.80 | 92.65 |
| Movement LOS | F | F | F | F | D | F |
| d_A, Approach Delay [s/veh] | 241.95 | | 164.29 | | 72.32 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 199.10 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.421 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.121 | 3.078 | 2.115 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.939 | 2.668 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 102.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.246 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1395 | 828 | 42 | 1173 | 237 | 230 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1395 | 828 | 42 | 1173 | 237 | 230 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 371 | 220 | 11 | 312 | 63 | 61 |
| Total Analysis Volume [veh/h] | 1484 | 881 | 45 | 1248 | 252 | 245 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 93 | 93 | 4 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.71 | 0.71 | 0.03 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.96 | 0.60 | 0.03 | 0.84 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 1549 | 1477 | 1704 | 1494 | 1312 | 1519 |
| c, Capacity [veh/h] | 1104 | 1052 | 57 | 1149 | 230 | 266 |
| d1, Uniform Delay [s] | 18.68 | 12.47 | 62.31 | 14.99 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.45 | 0.45 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 161.07 | 7.95 | 8.53 | 53.02 | 56.77 | 52.80 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.34 | 0.84 | 0.79 | 1.09 | 1.00 | 1.00 |
| d, Delay for Lane Group [s/veh] | 179.74 | 20.41 | 70.85 | 68.01 | 110.33 | 106.37 |
| Lane Group LOS | F | C | E | F | F | F |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 38.21 | 16.72 | 1.59 | 20.90 | 11.13 | 12.59 |
| 50th-Percentile Queue Length [ft/ln] | 955.16 | 418.01 | 39.85 | 522.46 | 278.37 | 314.76 |
| 95th-Percentile Queue Length [veh/ln] | 59.83 | 23.43 | 2.87 | 30.44 | 16.61 | 18.42 |
| 95th-Percentile Queue Length [ft/ln] | 1495.82 | 585.67 | 71.73 | 760.90 | 415.37 | 460.47 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 179.74 | 20.41 | 70.85 | 68.01 | 110.27 | 106.37 |
| Movement LOS | F | C | E | F | F | F |
| d_A, Approach Delay [s/veh] | 120.39 | | 68.11 | | 108.20 | |
| Approach LOS | F | | E | | F | |
| d_I, Intersection Delay [s/veh] | 102.66 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.246 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.420 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.18 | 3.45 | 44.20 |
| I_b,int, Bicycle LOS Score for Intersection | 3.511 | 2.626 | 2.380 |
| Bicycle LOS | D | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 198.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.481 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 160 | 1806 | 351 | 40 | 1335 | 7 | 79 | 135 | 445 | 298 | 167 | 221 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 160 | 1806 | 351 | 40 | 1335 | 7 | 79 | 135 | 401 | 298 | 167 | 187 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 43 | 480 | 93 | 11 | 355 | 2 | 21 | 36 | 107 | 79 | 44 | 50 |
| Total Analysis Volume [veh/h] | 170 | 1921 | 373 | 43 | 1420 | 7 | 84 | 144 | 427 | 317 | 178 | 199 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 4 | 46 | 46 | 36 | 36 | 36 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.03 | 0.36 | 0.36 | 0.27 | 0.27 | 0.27 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.44 | 0.47 | 0.02 | 0.63 | 0.63 | 0.06 | 0.09 | 0.32 | 0.21 | 0.22 | 0.30 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1647 | 1781 | 1491 | 781 | 1420 | 1577 | 1322 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 178 | 1480 | 706 | 55 | 536 | 281 | 386 | 428 | 359 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 58.21 | 37.15 | 37.15 | 62.54 | 41.63 | 41.63 | 36.66 | 37.96 | 46.79 | 55.02 | 55.02 | 54.28 |
| k, delay calibration | 0.10 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.50 | 0.14 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 20.82 | 31.85 | 60.12 | 8.43 | 344.05 | 351.13 | 0.10 | 0.17 | 109.84 | 162.65 | 241.75 | 455.76 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.95 | 1.03 | 1.09 | 0.78 | 1.75 | 1.75 | 0.22 | 0.34 | 1.19 | 1.34 | 1.45 | 1.94 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 79.02 | 69.00 | 97.27 | 70.97 | 385.69 | 392.76 | 36.77 | 38.13 | 156.63 | 217.66 | 296.76 | 510.04 |
| Lane Group LOS | E | F | F | E | F | F | D | D | F | F | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.51 | 29.04 | 33.22 | 1.55 | 34.20 | 36.37 | 2.10 | 3.72 | 22.32 | 9.19 | 12.26 | 16.31 |
| 50th-Percentile Queue Length [ft/ln] | 162.76 | 726.01 | 830.56 | 38.85 | 854.94 | 909.14 | 52.41 | 93.03 | 558.00 | 229.68 | 306.59 | 407.77 |
| 95th-Percentile Queue Length [veh/ln] | 10.70 | 38.78 | 45.39 | 2.80 | 56.55 | 59.84 | 3.77 | 6.70 | 33.17 | 15.82 | 20.65 | 27.96 |
| 95th-Percentile Queue Length [ft/ln] | 267.38 | 969.51 | 1134.85 | 69.93 | 1413.87 | 1495.95 | 94.33 | 167.46 | 829.31 | 395.52 | 516.35 | 699.09 |

**Movement, Approach, & Intersection Results**

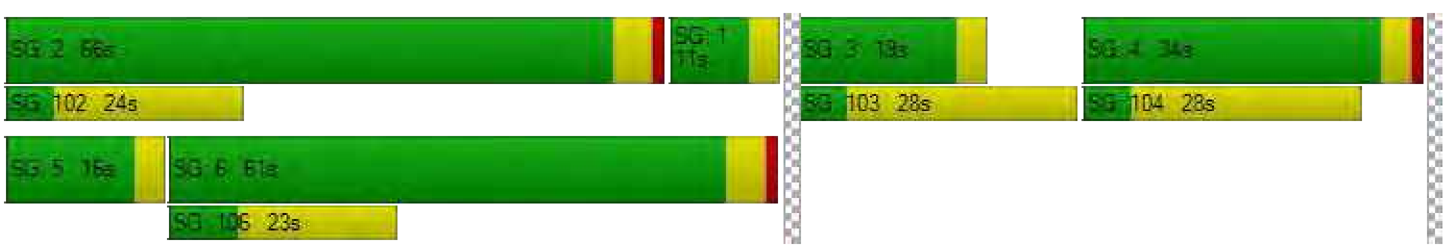
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.02 | 74.80 | 97.27 | 70.97 | 388.09 | 392.76 | 36.77 | 38.13 | 156.63 | 217.66 | 296.76 | 510.04 |
| Movement LOS | E | E | F | E | F | F | D | D | F | F | F | F |
| d_A, Approach Delay [s/veh] | | 78.50 | | | 378.84 | | | 115.21 | | | 321.79 | |
| Approach LOS | | E | | | F | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | 198.58 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.481 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.481 | 3.043 | 2.468 | 2.618 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.915 | 2.368 | 2.713 | 2.761 |
| Bicycle LOS | C | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 74.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.137 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1402 | 1215 | 655 | 429 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1402 | 1215 | 356 | 429 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 351 | 304 | 89 | 107 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1402 | 1215 | 356 | 429 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.54 | 0.44 | 0.29 | 0.46 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 22.85 | 27.29 | 22.94 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.23 | 0.16 | 0.27 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 44.07 | 51.61 | 5.08 | 99.41 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 1.08 | 1.10 | 0.73 | 1.16 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 66.92 | 78.90 | 28.02 | 126.71 | 0.00 |
| Lane Group LOS | D | F | F | C | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 20.53 | 18.87 | 6.66 | 17.67 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 513.21 | 471.85 | 166.55 | 441.87 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 29.62 | 27.76 | 10.90 | 27.03 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 740.57 | 694.06 | 272.38 | 675.75 | 0.00 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 66.92 | 78.90 | 28.02 | 126.71 | 0.00 |
| Movement LOS | D | F | F | C | F | A |
| d_A, Approach Delay [s/veh] | 66.18 | | 67.37 | | 126.71 | |
| Approach LOS | E | | E | | F | |
| d_I, Intersection Delay [s/veh] | 74.21 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.137 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.448 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.770 | 3.102 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 127.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.135 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 911 | 7 | 36 | 931 | 108 | 67 | 13 | 32 | 59 | 12 | 359 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 911 | 7 | 36 | 931 | 108 | 67 | 13 | 26 | 59 | 12 | 359 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 237 | 2 | 9 | 242 | 28 | 17 | 3 | 7 | 15 | 3 | 93 |
| Total Analysis Volume [veh/h] | 23 | 949 | 7 | 38 | 970 | 113 | 70 | 14 | 27 | 61 | 13 | 374 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 14 | 14 | 14 | 30 | 30 |
| g / C, Green / Cycle | 0.02 | 0.58 | 0.58 | 0.04 | 0.60 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.29 | 0.29 | 0.04 | 0.70 | 0.04 | 0.04 | 0.02 | 0.06 | 0.32 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1395 | 1334 | 952 | 1202 |
| c, Capacity [veh/h] | 23 | 844 | 1106 | 42 | 927 | 79 | 115 | 110 | 172 | 217 |
| d1, Uniform Delay [s] | 80.81 | 20.09 | 20.10 | 78.92 | 32.88 | 72.36 | 72.34 | 70.94 | 59.40 | 67.88 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 82.45 | 0.94 | 0.72 | 44.70 | 87.33 | 3.76 | 2.54 | 1.14 | 1.23 | 368.74 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.98 | 0.49 | 0.49 | 0.91 | 1.17 | 0.44 | 0.43 | 0.25 | 0.35 | 1.78 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 163.26 | 21.04 | 20.82 | 123.61 | 120.21 | 76.12 | 74.88 | 72.08 | 60.63 | 436.61 |
| Lane Group LOS | F | C | C | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.53 | 9.76 | 12.73 | 2.16 | 58.89 | 1.51 | 2.16 | 1.14 | 2.34 | 31.57 |
| 50th-Percentile Queue Length [ft/ln] | 38.26 | 243.93 | 318.36 | 53.88 | 1472.16 | 37.78 | 53.94 | 28.50 | 58.53 | 789.35 |
| 95th-Percentile Queue Length [veh/ln] | 2.76 | 14.88 | 18.59 | 3.88 | 81.09 | 2.72 | 3.88 | 2.05 | 4.21 | 50.37 |
| 95th-Percentile Queue Length [ft/ln] | 68.88 | 372.00 | 464.67 | 96.98 | 2027.21 | 68.01 | 97.09 | 51.29 | 105.35 | 1259.37 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 163.26 | 20.91 | 20.82 | 123.61 | 120.21 | 120.21 | 75.51 | 74.88 | 72.08 | 60.63 | 436.61 | 436.61 |
| Movement LOS | F | C | C | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 24.26 | | | 120.32 | | | 74.58 | | | 385.42 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 127.71 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.135 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 72.18 | 72.18 | 72.18 | 72.18 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.575 | 2.822 | 2.190 | 2.106 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 242 | 242 | 362 | 362 |
| d_b, Bicycle Delay [s] | 64.09 | 64.05 | 55.70 | 55.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 3.409 | 1.753 | 2.299 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.933 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 37 | 783 | 7 | 4 | 878 | 186 | 275 | 6 | 64 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 37 | 783 | 7 | 4 | 878 | 186 | 275 | 6 | 64 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 206 | 2 | 1 | 231 | 49 | 72 | 2 | 17 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 39 | 824 | 7 | 4 | 924 | 196 | 289 | 6 | 67 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 105 | 105 | 105 | 105 | 37 | 37 |
| g / C, Green / Cycle | 0.70 | 0.70 | 0.70 | 0.70 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.46 | 0.01 | 0.63 | 0.26 | 0.01 |
| s, saturation flow rate [veh/h] | 493 | 1826 | 671 | 1778 | 1393 | 1743 |
| c, Capacity [veh/h] | 137 | 1278 | 342 | 1244 | 385 | 454 |
| d1, Uniform Delay [s] | 54.55 | 12.39 | 23.78 | 18.25 | 57.25 | 42.92 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.11 | 2.58 | 0.06 | 10.57 | 32.93 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.28 | 0.65 | 0.01 | 0.90 | 0.94 | 0.02 |
| d, Delay for Lane Group [s/veh] | 59.66 | 14.96 | 23.84 | 28.81 | 90.18 | 42.94 |
| Lane Group LOS | E | B | C | C | F | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.53 | 15.94 | 0.09 | 32.80 | 17.48 | 0.26 |
| 50th-Percentile Queue Length [ft/ln] | 38.17 | 398.50 | 2.21 | 819.98 | 436.90 | 6.56 |
| 95th-Percentile Queue Length [veh/ln] | 2.75 | 22.49 | 0.16 | 42.19 | 24.33 | 0.47 |
| 95th-Percentile Queue Length [ft/ln] | 68.71 | 562.19 | 3.98 | 1054.79 | 608.29 | 11.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 59.66 | 14.96 | 14.96 | 23.84 | 28.81 | 28.81 | 90.18 | 90.18 | 90.18 | 42.94 | 42.94 | 42.94 |
| Movement LOS | E | B | B | C | C | C | F | F | F | D | D | D |
| d_A, Approach Delay [s/veh] | 16.97 | | | 28.80 | | | 90.18 | | | 42.94 | | |
| Approach LOS | B | | | C | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 33.89 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.933 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.470 | 3.105 | 2.087 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.77 | 42.89 | 42.63 |
| I_b,int, Bicycle LOS Score for Intersection | 2.995 | 3.414 | 2.157 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.696 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 686 | 151 | 52 | 905 | 0 | 21 | 98 | 11 | 150 | 95 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 686 | 151 | 52 | 905 | 0 | 21 | 98 | 11 | 150 | 95 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 186 | 41 | 14 | 246 | 0 | 6 | 27 | 3 | 41 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 746 | 164 | 57 | 984 | 0 | 23 | 107 | 12 | 163 | 103 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 112 | 112 | 112 | 112 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.75 | 0.75 | 0.75 | 0.75 | 0.20 | 0.20 | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.52 | 0.10 | 0.53 | 0.02 | 0.06 | 0.13 | 0.12 |
| s, saturation flow rate [veh/h] | 581 | 1756 | 586 | 1846 | 1169 | 1851 | 1246 | 1715 |
| c, Capacity [veh/h] | 305 | 1311 | 318 | 1377 | 138 | 369 | 210 | 341 |
| d1, Uniform Delay [s] | 23.59 | 10.01 | 24.23 | 10.34 | 65.03 | 51.33 | 65.22 | 54.52 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.20 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 3.05 | 1.24 | 3.19 | 0.56 | 0.50 | 10.54 | 2.36 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.69 | 0.18 | 0.71 | 0.17 | 0.32 | 0.78 | 0.60 |
| d, Delay for Lane Group [s/veh] | 23.75 | 13.07 | 25.47 | 13.53 | 65.59 | 51.84 | 75.76 | 56.88 |
| Lane Group LOS | C | B | C | B | E | D | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 16.06 | 1.36 | 17.90 | 0.86 | 3.95 | 6.91 | 7.33 |
| 50th-Percentile Queue Length [ft/ln] | 4.50 | 401.39 | 34.04 | 447.46 | 21.50 | 98.84 | 172.71 | 183.20 |
| 95th-Percentile Queue Length [veh/ln] | 0.32 | 22.63 | 2.45 | 24.84 | 1.55 | 7.12 | 11.22 | 11.77 |
| 95th-Percentile Queue Length [ft/ln] | 8.10 | 565.68 | 61.28 | 620.92 | 38.71 | 177.91 | 280.47 | 294.19 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.75 | 13.07 | 13.07 | 25.47 | 13.53 | 13.53 | 65.59 | 51.84 | 51.84 | 75.76 | 56.88 | 56.88 |
| Movement LOS | C | B | B | C | B | B | E | D | D | E | E | E |
| d_A, Approach Delay [s/veh] | 13.16 | | | 14.18 | | | 54.06 | | | 65.26 | | |
| Approach LOS | B | | | B | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 23.69 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.696 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.35 | 64.35 | 64.35 | 64.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.759 | 2.576 | 2.044 | 2.234 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.84 | 4.84 | 48.29 | 48.29 |
| I_b,int, Bicycle LOS Score for Intersection | 3.074 | 3.277 | 1.794 | 2.165 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 64.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.619 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 295 | 153 | 374 | 135 | 445 | 130 | 456 | 170 | 343 | 331 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 295 | 34 | 374 | 135 | 0 | 130 | 456 | 170 | 343 | 331 | 20 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 77 | 9 | 97 | 35 | 0 | 34 | 119 | 44 | 89 | 86 | 5 |
| Total Analysis Volume [veh/h] | 28 | 307 | 35 | 390 | 141 | 0 | 135 | 475 | 177 | 357 | 345 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 27 | 27 | 27 | 57 | 57 | 57 | 22 | 22 | 22 | 22 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.38 | 0.38 | 0.38 | 0.15 | 0.15 | 0.15 | 0.15 | 0.16 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.17 | 0.02 | 0.15 | 0.15 | 0.00 | 0.08 | 0.12 | 0.13 | 0.12 | 0.14 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1447 | 1772 | 1816 | 1567 | 1774 | 1892 | 1892 | 1491 | 1734 | 1803 | 1634 |
| c, Capacity [veh/h] | 330 | 332 | 264 | 676 | 693 | 597 | 265 | 282 | 282 | 222 | 286 | 297 | 269 |
| d1, Uniform Delay [s] | 50.94 | 60.29 | 51.30 | 33.67 | 33.67 | 0.00 | 58.75 | 61.83 | 62.30 | 61.30 | 60.79 | 60.77 | 60.87 |
| k, delay calibration | 0.11 | 0.35 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.19 | 0.22 | 0.18 | 0.14 | 0.14 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 26.31 | 0.23 | 1.68 | 1.64 | 0.00 | 1.52 | 10.01 | 14.49 | 10.30 | 8.81 | 8.39 | 9.96 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.08 | 0.92 | 0.13 | 0.39 | 0.39 | 0.00 | 0.51 | 0.82 | 0.86 | 0.80 | 0.85 | 0.85 | 0.85 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 51.05 | 86.60 | 51.52 | 35.35 | 35.31 | 0.00 | 60.27 | 71.83 | 76.79 | 71.60 | 69.60 | 69.16 | 70.83 |
| Lane Group LOS | D | F | D | D | D | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.90 | 13.94 | 1.13 | 7.44 | 7.61 | 0.00 | 4.87 | 9.36 | 10.25 | 7.14 | 9.67 | 10.00 | 9.28 |
| 50th-Percentile Queue Length [ft/ln] | 22.42 | 348.41 | 28.32 | 185.89 | 190.26 | 0.00 | 121.7 | 233.9 | 256.2 | 178.6 | 241.71 | 250.06 | 232.11 |
| 95th-Percentile Queue Length [veh/ln] | 1.61 | 20.06 | 2.04 | 11.91 | 12.13 | 0.00 | 8.49 | 14.37 | 15.50 | 11.53 | 14.77 | 15.19 | 14.28 |
| 95th-Percentile Queue Length [ft/ln] | 40.35 | 501.47 | 50.97 | 297.69 | 303.37 | 0.00 | 212.1 | 359.3 | 387.4 | 288.1 | 369.19 | 379.73 | 357.04 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 51.05 | 86.60 | 51.52 | 35.34 | 35.31 | 0.00 | 60.27 | 74.38 | 71.60 | 69.45 | 70.17 | 70.83 |
| Movement LOS | D | F | D | D | D | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 80.59 | | | 35.33 | | | 71.33 | | | 69.84 | | |
| Approach LOS | F | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 64.38 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.619 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.46 | 63.46 | 63.46 | 63.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.516 | 4.294 | 4.334 | 2.758 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 457 |
| d_b, Bicycle Delay [s] | 49.75 | 39.81 | 50.32 | 45.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.366 | 4.086 | 3.034 | 2.156 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 60.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.095 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1802 | 0 | 0 | 906 | 771 | 1250 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1802 | 0 | 0 | 906 | 771 | 1250 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 464 | 0 | 0 | 234 | 199 | 322 |
| Total Analysis Volume [veh/h] | 1858 | 0 | 0 | 934 | 795 | 1289 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.53 | 0.27 | 0.23 | 0.47 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 14.14 | 9.05 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.24 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.67 | 0.72 | 0.23 | 152.84 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.90 | 0.45 | 0.66 | 1.33 |
| d, Delay for Lane Group [s/veh] | 20.81 | 9.77 | 22.10 | 178.79 |
| Lane Group LOS | C | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 14.13 | 4.13 | 6.00 | 29.15 |
| 50th-Percentile Queue Length [ft/ln] | 353.15 | 103.34 | 149.89 | 728.66 |
| 95th-Percentile Queue Length [veh/ln] | 20.29 | 7.44 | 10.01 | 44.76 |
| 95th-Percentile Queue Length [ft/ln] | 507.25 | 186.00 | 250.29 | 1118.93 |

**Movement, Approach, & Intersection Results**

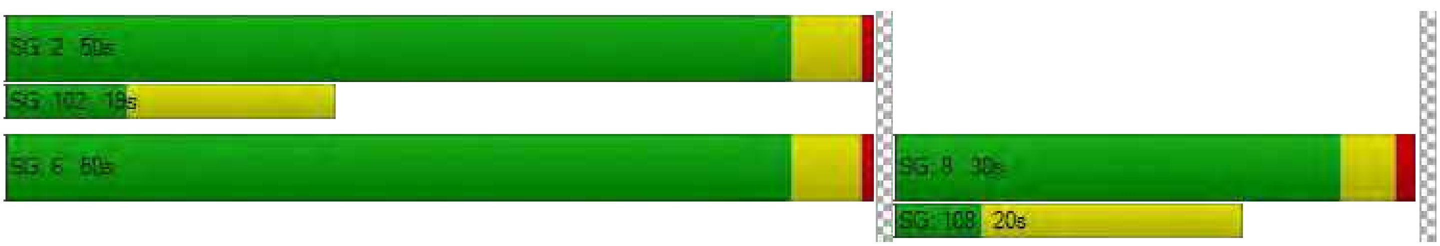
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.81 | 0.00 | 0.00 | 9.77 | 22.10 | 178.79 |
| Movement LOS | C | | | A | C | F |
| d_A, Approach Delay [s/veh] | 20.81 | | 9.77 | | 119.02 | |
| Approach LOS | C | | A | | F | |
| d_I, Intersection Delay [s/veh] | 60.67 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.095 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.121 | 2.632 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.092 | 2.330 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 23.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.865 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 493 | 10 | 52 | 171 | 31 | 37 | 41 | 22 | 22 | 55 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 493 | 10 | 52 | 171 | 31 | 37 | 41 | 22 | 22 | 55 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 129 | 3 | 16 | 53 | 10 | 12 | 13 | 7 | 6 | 15 | 36 |
| Total Analysis Volume [veh/h] | 14 | 515 | 10 | 65 | 214 | 39 | 47 | 52 | 28 | 24 | 60 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 623 | 586 | 511 | 559 |
| Degree of Utilization, x | 0.87 | 0.54 | 0.25 | 0.41 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 9.90 | 3.24 | 0.97 | 1.97 |
| 95th-Percentile Queue Length [ft] | 247.60 | 81.09 | 24.33 | 49.30 |
| Approach Delay [s/veh] | 34.74 | 16.18 | 12.36 | 13.80 |
| Approach LOS | D | C | B | B |
| Intersection Delay [s/veh] | 23.59 | | | |
| Intersection LOS | C | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 68.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.876 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1345 | 10 | 30 | 7 | 8 | 464 | 296 | 2095 | 757 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1345 | 10 | 30 | 7 | 8 | 464 | 296 | 2095 | 757 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 350 | 3 | 8 | 2 | 2 | 121 | 77 | 546 | 197 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1401 | 10 | 31 | 7 | 8 | 483 | 308 | 2182 | 789 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.11 | 0.54 | 0.18 | 0.18 | 0.23 | 0.23 | 0.23 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.34 | 0.01 | 0.01 | 0.16 | 0.16 | 0.21 | 0.43 | 0.46 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1624 | 1480 | 1444 | 5075 | 1806 |
| c, Capacity [veh/h] | 208 | 2144 | 339 | 293 | 367 | 334 | 326 | 2121 | 755 |
| d1, Uniform Delay [s] | 70.36 | 27.70 | 54.28 | 54.32 | 56.94 | 56.94 | 60.33 | 46.57 | 46.57 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.15 | 0.15 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 49.59 | 1.57 | 0.03 | 0.04 | 3.29 | 3.60 | 26.84 | 27.36 | 60.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.95 | 0.65 | 0.07 | 0.08 | 0.70 | 0.70 | 0.94 | 1.03 | 1.09 |
|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 119.95 | 29.27 | 54.31 | 54.36 | 60.23 | 60.54 | 87.17 | 73.94 | 107.29 |
| Lane Group LOS | F | C | D | D | E | E | F | F | F |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 10.93 | 13.30 | 0.86 | 0.78 | 9.95 | 9.10 | 14.65 | 33.27 | 42.50 |
| 50th-Percentile Queue Length [ft/ln] | 273.30 | 332.44 | 21.43 | 19.47 | 248.83 | 227.50 | 366.26 | 831.64 | 1062.47 |
| 95th-Percentile Queue Length [veh/ln] | 16.35 | 19.28 | 1.54 | 1.40 | 15.13 | 14.05 | 20.93 | 43.67 | 56.81 |
| 95th-Percentile Queue Length [ft/ln] | 408.86 | 481.95 | 38.58 | 35.04 | 378.18 | 351.18 | 523.19 | 1091.78 | 1420.26 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 119.95 | 119.95 | 29.27 | 54.31 | 54.34 | 54.36 | 60.23 | 60.38 | 87.17 | 73.94 | 107.29 | 107.29 |
| Movement LOS | F | F | C | D | D | D | E | E | F | F | F | F |
| d_A, Approach Delay [s/veh] | 40.45 | | | 54.33 | | | 70.71 | | | 83.08 | | |
| Approach LOS | D | | | D | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 68.51 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.876 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.589 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 4.196 | 1.599 | 2.219 | 6.520 |
| Bicycle LOS | D | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 94.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.708 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1357 | 623 | 0 | 1313 | 905 | 0 | 0 | 0 | 1062 | 0 | 394 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1357 | 623 | 0 | 1313 | 905 | 0 | 0 | 0 | 1062 | 0 | 394 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 350 | 156 | 0 | 338 | 233 | 0 | 0 | 0 | 266 | 0 | 109 |
| Total Analysis Volume [veh/h] | 0 | 1399 | 623 | 0 | 1354 | 933 | 0 | 0 | 0 | 1062 | 0 | 438 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 44 | 44 | 44 | | 28 | 28 |
| g / C, Green / Cycle | 0.55 | 0.55 | 0.55 | | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.27 | 1.06 | | 0.30 | 0.15 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 2757 | 2757 | 479 | | 1244 | 1012 |
| d1, Uniform Delay [s] | 11.39 | 11.25 | 17.69 | | 23.86 | 19.66 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.67 | 0.63 | 434.64 | | 1.77 | 0.29 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.49 | 1.95 | | 0.85 | 0.43 |
| d, Delay for Lane Group [s/veh] | 12.06 | 11.88 | 452.33 | | 25.63 | 19.95 |
| Lane Group LOS | B | B | F | | C | B |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.82 | 4.61 | 65.21 | | 9.01 | 3.00 |
| 50th-Percentile Queue Length [ft/ln] | 120.56 | 115.18 | 1630.28 | | 225.21 | 74.97 |
| 95th-Percentile Queue Length [veh/ln] | 8.42 | 8.13 | 109.11 | | 13.93 | 5.40 |
| 95th-Percentile Queue Length [ft/ln] | 210.59 | 203.18 | 2727.83 | | 348.27 | 134.94 |

**Movement, Approach, & Intersection Results**

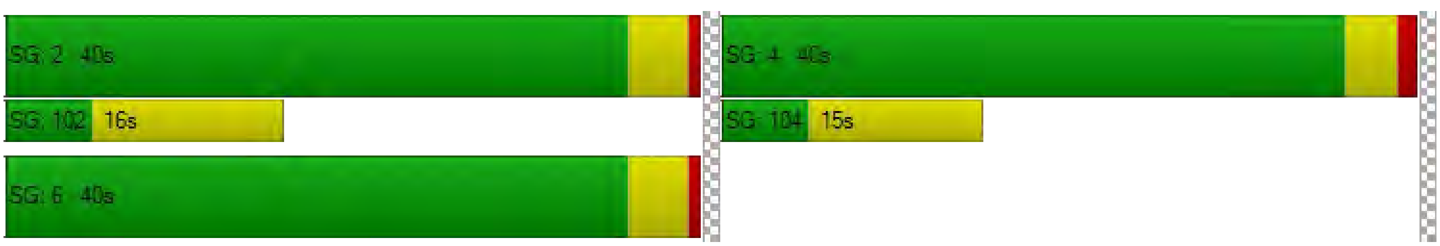
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.06 | 0.00 | 0.00 | 11.88 | 452.33 | 0.00 | 0.00 | 0.00 | 25.63 | 0.00 | 19.95 |
| Movement LOS | | B | | | B | F | | | | C | | B |
| d_A, Approach Delay [s/veh] | 12.06 | | | 191.57 | | | 0.00 | | | 23.97 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 94.67 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.708 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.034 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.329 | 2.817 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 144.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.608 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1674 | 748 | 0 | 1914 | 424 | 0 | 0 | 0 | 386 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1674 | 748 | 0 | 1914 | 424 | 0 | 0 | 0 | 386 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 431 | 193 | 0 | 493 | 106 | 0 | 0 | 0 | 97 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1726 | 771 | 0 | 1973 | 424 | 0 | 0 | 0 | 386 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.34 | 0.50 | 0.73 | | 0.11 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 18.45 | 21.54 | 21.97 | | 13.54 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.56 | 66.88 | 281.45 | | 0.08 | 113.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.77 | 1.11 | 1.62 | | 0.24 | 1.24 |
| d, Delay for Lane Group [s/veh] | 21.00 | 88.42 | 303.41 | | 13.62 | 135.29 |
| Lane Group LOS | C | F | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.72 | 24.54 | 38.69 | | 2.04 | 17.06 |
| 50th-Percentile Queue Length [ft/ln] | 217.99 | 613.40 | 967.24 | | 50.95 | 426.41 |
| 95th-Percentile Queue Length [veh/ln] | 13.56 | 35.09 | 63.12 | | 3.67 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 339.05 | 877.28 | 1578.12 | | 91.71 | 680.82 |

**Movement, Approach, & Intersection Results**

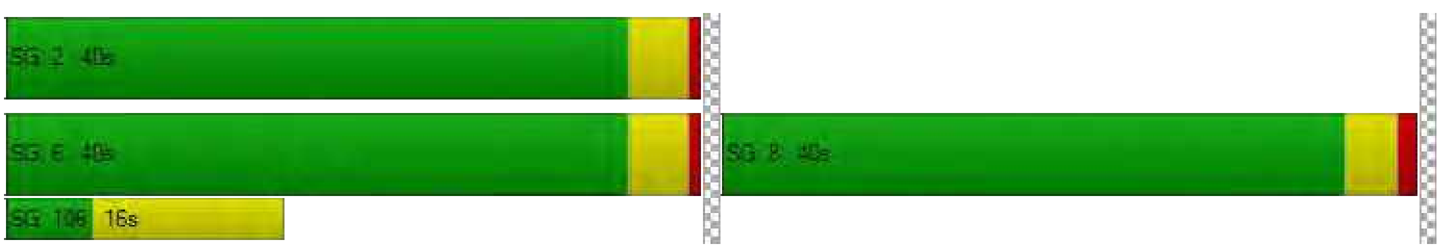
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 21.00 | 88.42 | 0.00 | 303.41 | 0.00 | 0.00 | 0.00 | 0.00 | 13.62 | 0.00 | 135.29 |
| Movement LOS | | C | F | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 41.82 | | | 303.41 | | | 0.00 | | | 98.10 | | |
| Approach LOS | D | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 144.25 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.608 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.933 | 2.645 | 4.132 | 1.560 |
| Bicycle LOS | C | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
## Intersection 195: Bayfront Expy/Chilco St

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 43.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.023 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 308 | 292 | 1210 | 744 | 625 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 308 | 292 | 1210 | 744 | 625 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 81 | 77 | 318 | 196 | 164 | 517 |
| Total Analysis Volume [veh/h] | 324 | 307 | 1274 | 783 | 658 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 109 | 109 | 109 | 109 | 109 | 109 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 79 | 79 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.46 | 0.46 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.23 | 0.26 | 0.51 | 0.76 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 865 | 5020 |
| c, Capacity [veh/h] | 627 | 242 | 2278 | 710 | 646 | 3643 |
| d1, Uniform Delay [s] | 40.14 | 44.50 | 21.48 | 29.50 | 28.60 | 6.97 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.24 | 148.76 | 0.08 | 65.59 | 40.00 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 1.27 | 0.56 | 1.10 | 1.02 | 0.57 |
| d, Delay for Lane Group [s/veh] | 40.38 | 193.26 | 21.56 | 95.09 | 68.60 | 7.02 |
| Lane Group LOS | D | F | C | F | F | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.93 | 16.49 | 7.21 | 29.45 | 12.09 | 5.57 |
| 50th-Percentile Queue Length [ft/ln] | 98.23 | 412.23 | 180.28 | 736.27 | 302.29 | 139.13 |
| 95th-Percentile Queue Length [veh/ln] | 7.07 | 25.79 | 11.62 | 41.22 | 18.05 | 9.43 |
| 95th-Percentile Queue Length [ft/ln] | 176.82 | 644.63 | 290.38 | 1030.45 | 451.36 | 235.85 |

**Movement, Approach, & Intersection Results**

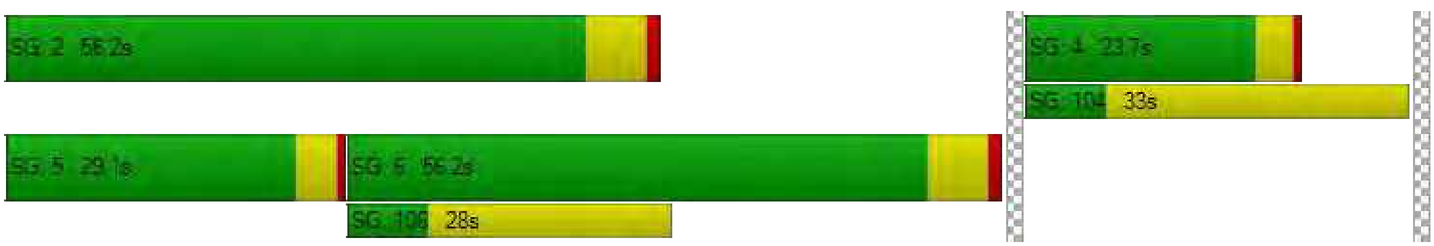
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 40.38 | 193.26 | 21.56 | 95.09 | 68.60 | 7.02 |
| Movement LOS | D | F | C | F | F | A |
| d_A, Approach Delay [s/veh] | 114.76 | | 49.55 | | 21.90 | |
| Approach LOS | F | | D | | C | |
| d_I, Intersection Delay [s/veh] | 43.23 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 1.023 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.06 | 44.06 | 44.06 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.245 | 3.638 | 3.502 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 367 | 917 | 917 |
| d_b, Bicycle Delay [s] | 36.33 | 15.97 | 15.97 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.691 | 3.058 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.713 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 437 | 93 | 1762 | 469 | 160 | 2354 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 437 | 93 | 1762 | 469 | 160 | 2354 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 113 | 24 | 454 | 121 | 41 | 607 |
| Total Analysis Volume [veh/h] | 451 | 96 | 1816 | 484 | 165 | 2427 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 73 | 73 | 73 | 73 | 73 | 73 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 12 | 12 | 38 | 38 | 8 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.52 | 0.52 | 0.11 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.06 | 0.37 | 0.32 | 0.09 | 0.48 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1493 | 1810 | 5024 |
| c, Capacity [veh/h] | 532 | 253 | 2551 | 768 | 207 | 3440 |
| d1, Uniform Delay [s] | 29.55 | 27.07 | 13.61 | 12.64 | 31.60 | 7.04 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.47 | 0.35 | 0.14 | 0.32 | 2.68 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.38 | 0.71 | 0.63 | 0.80 | 0.71 |
| d, Delay for Lane Group [s/veh] | 31.02 | 27.41 | 13.75 | 12.96 | 34.28 | 7.14 |
| Lane Group LOS | C | C | B | B | C | A |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.85 | 1.48 | 6.01 | 4.51 | 2.77 | 4.45 |
| 50th-Percentile Queue Length [ft/ln] | 96.34 | 37.12 | 150.32 | 112.70 | 69.32 | 111.17 |
| 95th-Percentile Queue Length [veh/ln] | 6.94 | 2.67 | 10.03 | 7.99 | 4.99 | 7.91 |
| 95th-Percentile Queue Length [ft/ln] | 173.41 | 66.82 | 250.85 | 199.75 | 124.77 | 197.63 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

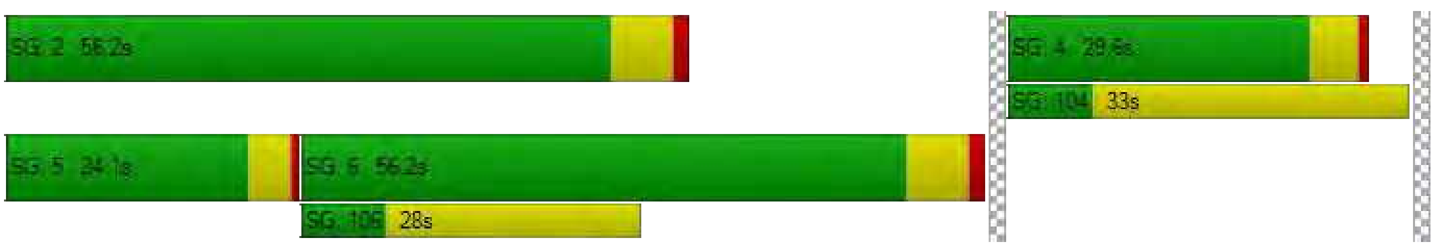
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.02 | 27.41 | 13.75 | 12.96 | 34.28 | 7.14 |
| Movement LOS | C | C | B | B | C | A |
| d_A, Approach Delay [s/veh] | 30.38 | | 13.59 | | 8.87 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 13.03 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.713 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 26.35 | 26.35 | 26.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.363 | 3.661 | 3.523 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 685 | 1369 | 1369 |
| d_b, Bicycle Delay [s] | 15.80 | 3.64 | 3.64 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.825 | 2.985 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.734 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 66 | 51 | 1101 | 396 | 247 | 2478 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 66 | 51 | 1101 | 396 | 247 | 2478 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 13 | 287 | 103 | 64 | 645 |
| Total Analysis Volume [veh/h] | 69 | 53 | 1147 | 413 | 257 | 2581 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 64 | 64 | 64 | 64 | 64 | 64 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 40 | 40 | 49 | 49 |
| g / C, Green / Cycle | 0.08 | 0.08 | 0.62 | 0.62 | 0.77 | 0.77 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.06 | 0.27 | 0.31 | 0.22 | 0.57 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1162 | 4496 |
| c, Capacity [veh/h] | 92 | 83 | 2640 | 824 | 975 | 3447 |
| d1, Uniform Delay [s] | 28.70 | 28.79 | 6.21 | 6.59 | 2.90 | 4.09 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.22 | 4.23 | 0.04 | 0.18 | 0.05 | 0.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.68 | 0.72 | 0.43 | 0.50 | 0.26 | 0.75 |
| d, Delay for Lane Group [s/veh] | 31.93 | 33.03 | 6.25 | 6.76 | 2.95 | 4.21 |
| Lane Group LOS | C | C | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.97 | 0.95 | 1.63 | 1.90 | 0.09 | 1.18 |
| 50th-Percentile Queue Length [ft/ln] | 24.28 | 23.70 | 40.76 | 47.41 | 2.15 | 29.38 |
| 95th-Percentile Queue Length [veh/ln] | 1.75 | 1.71 | 2.93 | 3.41 | 0.15 | 2.12 |
| 95th-Percentile Queue Length [ft/ln] | 43.70 | 42.67 | 73.37 | 85.34 | 3.87 | 52.88 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

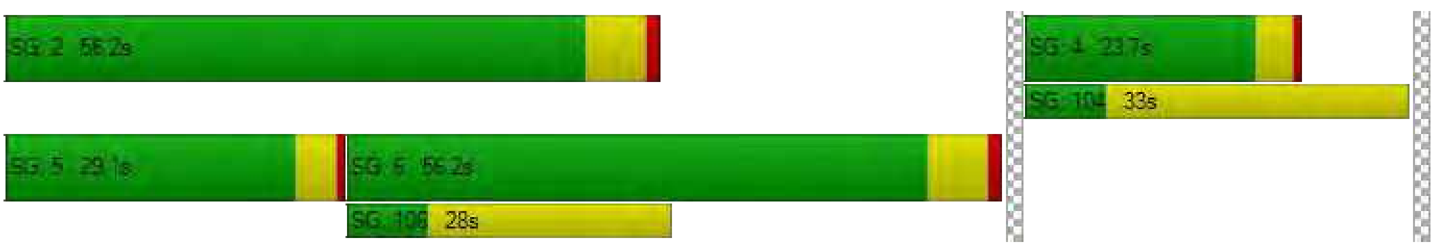
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.05 | 33.03 | 6.25 | 6.76 | 2.95 | 4.21 |
| Movement LOS | C | C | A | A | A | A |
| d_A, Approach Delay [s/veh] | 32.46 | | 6.39 | | 4.10 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.65 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.734 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.87 | 21.87 | 21.87 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.545 | 3.455 | 3.445 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 626 | 1566 | 1566 |
| d_b, Bicycle Delay [s] | 15.06 | 1.50 | 1.50 |
| I_b,int, Bicycle LOS Score for Intersection | 1.761 | 2.418 | 3.121 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 134.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.466 |

### Intersection Setup

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

### Volumes

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 395 | 365 | 10 | 388 | 327 | 21 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 395 | 365 | 10 | 388 | 327 | 21 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 112 | 104 | 3 | 110 | 93 | 6 |
| Total Analysis Volume [veh/h] | 449 | 415 | 11 | 441 | 372 | 24 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 864 | 552 | 516 |
| Degree of Utilization, x | 1.47 | 0.82 | 0.77 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 42.06 | 8.19 | 6.79 |
| 95th-Percentile Queue Length [ft] | 1051.42 | 204.75 | 169.81 |
| Approach Delay [s/veh] | 236.73 | 32.50 | 29.30 |
| Approach LOS | F | D | D |
| Intersection Delay [s/veh] | 134.83 | | |
| Intersection LOS | F | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.945 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 48 | 955 | 234 | 86 | 2766 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 48 | 955 | 234 | 86 | 2766 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 13 | 254 | 62 | 23 | 736 |
| Total Analysis Volume [veh/h] | 0 | 51 | 1016 | 249 | 91 | 2943 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| | | | | | | |
|---|---|---|---|---|---|---|
| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 52 | 52 | 52 | 52 | 52 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 31 | 31 | 39 | 39 |
| g / C, Green / Cycle | 0.06 | 0.59 | 0.59 | 0.75 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.24 | 0.19 | 0.14 | 0.66 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 654 | 4426 |
| c, Capacity [veh/h] | 28 | 2481 | 774 | 622 | 3300 |
| d1, Uniform Delay [s] | 24.41 | 5.86 | 5.49 | 2.33 | 5.05 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 372.10 | 0.04 | 0.09 | 0.04 | 0.36 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.80 | 0.41 | 0.32 | 0.15 | 0.89 |
| d, Delay for Lane Group [s/veh] | 396.52 | 5.90 | 5.58 | 2.37 | 5.40 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.27 | 1.09 | 0.76 | 0.02 | 0.45 |
| 50th-Percentile Queue Length [ft/ln] | 81.70 | 27.13 | 18.99 | 0.45 | 11.23 |
| 95th-Percentile Queue Length [veh/ln] | 5.88 | 1.95 | 1.37 | 0.03 | 0.81 |
| 95th-Percentile Queue Length [ft/ln] | 147.05 | 48.83 | 34.19 | 0.81 | 20.22 |

**Movement, Approach, & Intersection Results**

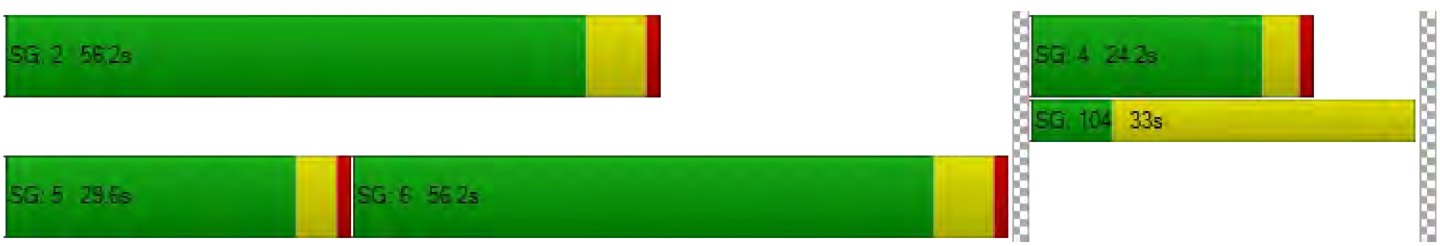
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 396.52 | 5.90 | 5.58 | 2.37 | 5.40 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 396.52 | | 5.84 | | 5.31 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 10.05 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.945 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 16.21 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.442 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 768 | 1920 | 1920 |
| d_b, Bicycle Delay [s] | 9.89 | 0.04 | 0.04 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.255 | 3.228 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 95.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.707 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 255 | 380 | 196 | 766 | 263 | 423 | 90 | 10 | 111 | 42 | 24 | 84 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 255 | 380 | 196 | 766 | 263 | 423 | 90 | 10 | 111 | 42 | 24 | 84 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 65 | 97 | 50 | 195 | 67 | 108 | 23 | 3 | 28 | 11 | 6 | 21 |
| Total Analysis Volume [veh/h] | 260 | 388 | 200 | 782 | 268 | 432 | 92 | 10 | 113 | 43 | 24 | 86 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 11 | 46 | 0 | 11 | 46 | 0 | 0 | 36 | 0 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 14 | 53 | 0 | 37 | 76 | 0 | 0 | 19 | 0 | 0 | 21 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 10 | 49 | 33 | 72 | 15 | 15 | 17 | 17 |
| g / C, Green / Cycle | 0.08 | 0.38 | 0.25 | 0.55 | 0.12 | 0.12 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.35 | 0.23 | 0.42 | 0.06 | 0.08 | 0.04 | 0.05 |
| s, saturation flow rate [veh/h] | 1767 | 1664 | 3431 | 1673 | 1775 | 1433 | 1760 | 1577 |
| c, Capacity [veh/h] | 136 | 627 | 871 | 926 | 205 | 165 | 230 | 206 |
| d1, Uniform Delay [s] | 60.00 | 39.03 | 46.87 | 22.25 | 53.97 | 54.79 | 51.41 | 51.54 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 437.05 | 23.52 | 13.95 | 5.71 | 8.41 | 20.53 | 4.02 | 4.82 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.91 | 0.94 | 0.90 | 0.76 | 0.50 | 0.68 | 0.34 | 0.36 |
| d, Delay for Lane Group [s/veh] | 497.05 | 62.55 | 60.82 | 27.96 | 62.37 | 75.32 | 55.43 | 56.36 |
| Lane Group LOS | F | E | E | C | E | E | E | E |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 20.98 | 21.94 | 13.87 | 17.39 | 3.62 | 4.48 | 2.61 | 2.49 |
| 50th-Percentile Queue Length [ft/ln] | 524.52 | 548.40 | 346.80 | 434.76 | 90.58 | 112.01 | 65.25 | 62.36 |
| 95th-Percentile Queue Length [veh/ln] | 33.59 | 29.62 | 19.98 | 24.23 | 6.52 | 7.95 | 4.70 | 4.49 |
| 95th-Percentile Queue Length [ft/ln] | 839.86 | 740.42 | 499.50 | 605.74 | 163.04 | 198.79 | 117.44 | 112.24 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 497.05 | 62.55 | 62.55 | 60.82 | 27.96 | 27.96 | 62.37 | 62.37 | 75.32 | 55.43 | 55.43 | 56.25 |
| Movement LOS | F | E | E | E | C | C | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 195.77 | | | 45.30 | | | 69.18 | | | 55.88 | | |
| Approach LOS | F | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 95.09 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 0.707 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 56.31 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.373 | 2.718 | 2.262 | 2.429 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 754 | 1108 | 231 | 262 |
| d_b, Bicycle Delay [s] | 25.23 | 12.94 | 50.87 | 49.11 |
| I_b,int, Bicycle LOS Score for Intersection | 2.959 | 4.005 | 1.914 | 1.812 |
| Bicycle LOS | C | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 294.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.507 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 159 | 333 | 115 | 189 | 301 | 292 | 39 | 34 | 190 | 0 | 252 | 24 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 159 | 333 | 115 | 189 | 301 | 292 | 39 | 34 | 190 | 0 | 252 | 24 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 44 | 93 | 32 | 53 | 84 | 81 | 11 | 9 | 53 | 0 | 70 | 7 |
| Total Analysis Volume [veh/h] | 177 | 370 | 128 | 210 | 334 | 324 | 43 | 38 | 211 | 0 | 280 | 27 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.80 | 0.15 | 0.42 | 0.28 | 0.11 | 0.12 |
| s, saturation flow rate [veh/h] | 841 | 1357 | 1561 | 1031 | 1371 | 1290 |
| c, Capacity [veh/h] | 292 | 399 | 459 | 302 | 439 | 380 |
| d1, Uniform Delay [s] | 42.19 | 30.01 | 35.94 | 35.49 | 28.39 | 28.70 |
| k, delay calibration | 0.50 | 0.11 | 0.50 | 0.42 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 599.83 | 1.07 | 206.83 | 39.70 | 0.49 | 0.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 2.31 | 0.53 | 1.43 | 0.97 | 0.36 | 0.40 |
| d, Delay for Lane Group [s/veh] | 642.01 | 31.08 | 242.78 | 75.19 | 28.88 | 29.36 |
| Lane Group LOS | F | C | F | E | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 56.14 | 4.37 | 37.52 | 10.31 | 3.06 | 2.98 |
| 50th-Percentile Queue Length [ft/ln] | 1403.43 | 109.19 | 938.06 | 257.69 | 76.53 | 74.43 |
| 95th-Percentile Queue Length [veh/ln] | 91.91 | 7.80 | 57.37 | 15.57 | 5.51 | 5.36 |
| 95th-Percentile Queue Length [ft/ln] | 2297.73 | 194.88 | 1434.25 | 389.33 | 137.76 | 133.98 |

**Movement, Approach, & Intersection Results**

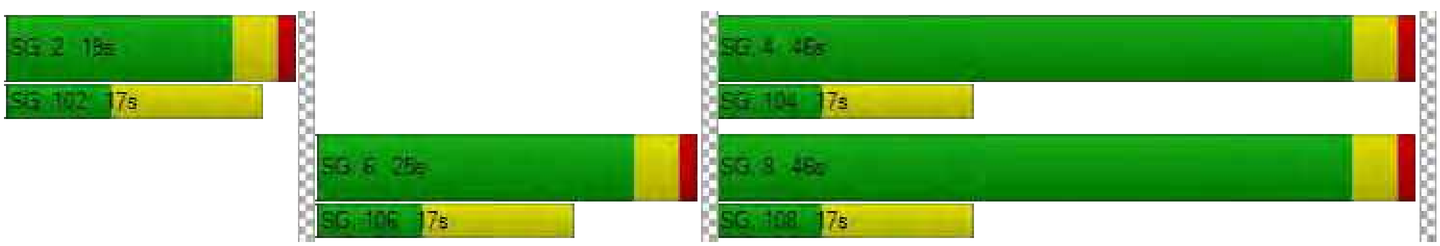
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 642.01 | 642.01 | 642.01 | 31.08 | 242.78 | 242.78 | 75.19 | 75.19 | 75.19 | 28.88 | 29.09 | 29.36 |
| Movement LOS | F | F | F | C | F | F | E | E | E | C | C | C |
| d_A, Approach Delay [s/veh] | 642.01 | | | 191.56 | | | 75.19 | | | 29.12 | | |
| Approach LOS | F | | | F | | | E | | | C | | |
| d_I, Intersection Delay [s/veh] | 294.37 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.507 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 40.56 | 40.56 | 40.56 | 40.56 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.393 | 2.282 | 2.377 | 2.285 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 824 | 412 | 294 | 824 |
| d_b, Bicycle Delay [s] | 17.62 | 32.13 | 37.07 | 17.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.673 | 2.992 | 2.041 | 1.813 |
| Bicycle LOS | B | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 47.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.410 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 48 | 91 | 163 | 204 | 327 | 125 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 48 | 91 | 163 | 204 | 327 | 125 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 30 | 53 | 66 | 106 | 41 |
| Total Analysis Volume [veh/h] | 62 | 118 | 212 | 265 | 425 | 162 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.41 | 0.21 | 0.22 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 47.20 | 29.80 | 9.73 | 0.00 | 0.00 | 0.00 |
| Movement LOS | E | D | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 3.84 | 3.84 | 0.83 | 0.83 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 96.02 | 96.02 | 20.72 | 20.72 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 35.79 | | 4.32 | | 0.00 | |
| Approach LOS | E | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.84 | | | | | |
| Intersection LOS | E | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 18.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.052 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 212 | 42 | 60 | 103 | 13 | 103 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 212 | 42 | 60 | 103 | 13 | 103 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 62 | 12 | 18 | 30 | 4 | 30 |
| Total Analysis Volume [veh/h] | 249 | 49 | 71 | 121 | 15 | 121 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.19 | 0.00 | 0.00 | 0.00 | 0.05 | 0.15 |
| d_M, Delay for Movement [s/veh] | 8.36 | 0.00 | 0.00 | 0.00 | 18.89 | 10.78 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.69 | 0.69 | 0.00 | 0.00 | 0.75 | 0.75 |
| 95th-Percentile Queue Length [ft/ln] | 17.33 | 17.33 | 0.00 | 0.00 | 18.71 | 18.71 |
| d_A, Approach Delay [s/veh] | 6.98 | | 0.00 | | 11.67 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.86 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | | | | | |
| Maximum Recall | | | | | | |
| Pedestrian Recall | | | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Lane Group Calculations**

**Lane Group Results**

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | | | | | |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.00 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.000 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 45.00 | 45.00 | 45.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.141 | 2.463 | 2.141 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 | 0 |
| d_b, Bicycle Delay [s] | 45.00 | 45.00 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 | 1.560 |
| Bicycle LOS | A | A | A |

**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 2.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Exiting Flow Rate [veh/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjusted Demand Flow Rate [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 0 | 0 | 0 | 0 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1380 | 1380 | 1380 | 1380 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1353 | 1353 | 1353 | 1353 |
| X, volume / capacity | 0.00 | 0.00 | 0.00 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | A | A | A |
| 95th-Percentile Queue Length [veh] | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 |
| Approach Delay [s/veh] | 2.66 | 2.66 | 2.66 | 2.66 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 2.66 | | | |
| Intersection LOS | A | | | |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro
Report File: \...\Cumulative AM_DUMB.pdf

Scenario 21 Cumulative w/Dumbarton AM (2040 vols)
12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 1021 | 1472 | 1341 | 539 | 4373 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 42 | 1288 | 7 | 448 | 1248 | 338 | 13 | 4 | 68 | 348 | 19 | 0 | 3823 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 220 | 960 | 124 | 29 | 1031 | 413 | 609 | 76 | 229 | 38 | 21 | 25 | 3775 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 836 | 82 | 425 | 755 | 47 | 292 | 68 | 2 | 43 | 46 | 339 | 2935 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 569 | 520 | 508 | 501 | 104 | 2289 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 683 | 206 | 288 | 747 | 56 | 2528 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 829 | 101 | 1288 | 2933 | 333 | 416 | 5900 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 249 | 596 | 277 | 35 | 75 | 72 | 386 | 465 | 191 | 1101 | 2572 | 72 | 6091 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 99 | 820 | 359 | 190 | 1255 | 45 | 47 | 56 | 48 | 56 | 422 | 349 | 3746 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 235 | 1304 | 1205 | 31 | 86 | 95 | 2956 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1395 | 828 | 42 | 1173 | 237 | 230 | 3905 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 160 | 1806 | 351 | 40 | 1335 | 7 | 79 | 135 | 445 | 298 | 167 | 221 | 5044 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1402 | 1215 | 655 | 429 | 60 | 3826 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 911 | 7 | 36 | 931 | 108 | 67 | 13 | 32 | 59 | 12 | 359 | 2557 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 37 | 783 | 7 | 4 | 878 | 186 | 275 | 6 | 64 | 1 | 2 | 6 | 2249 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 686 | 151 | 52 | 905 | 0 | 21 | 98 | 11 | 150 | 95 | 93 | 2269 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 295 | 153 | 374 | 135 | 445 | 130 | 456 | 170 | 343 | 331 | 20 | 2879 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1802 | 906 | 771 | 1250 | 4729 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 493 | 10 | 52 | 171 | 31 | 37 | 41 | 22 | 22 | 55 | 131 | 1078 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1345 | 10 | 30 | 7 | 8 | 464 | 296 | 2095 | 757 | 34 | 5235 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1357 | 623 | 1313 | 905 | 1062 | 394 | 5654 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1674 | 748 | 1914 | 424 | 386 | 789 | 5935 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 308 | 292 | 1210 | 744 | 625 | 1963 | 5142 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 437 | 93 | 1762 | 469 | 160 | 2354 | 5275 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 66 | 51 | 1101 | 396 | 247 | 2478 | 4339 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 395 | 365 | 10 | 388 | 327 | 21 | 1506 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 48 | 955 | 234 | 86 | 2766 | 4089 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 255 | 380 | 196 | 766 | 263 | 423 | 90 | 10 | 111 | 42 | 24 | 84 | 2644 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 159 | 333 | 115 | 189 | 301 | 292 | 39 | 34 | 190 | 0 | 252 | 24 | 1928 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 48 | 91 | 163 | 204 | 327 | 125 | 958 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 212 | 42 | 60 | 103 | 13 | 103 | 533 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro
Report File: \...\Cumulative AM_DUMB.pdf

Scenario 21 Cumulative w/Dumbarton AM (2040 vols)
12/9/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 1021 | 1472 | 1341 | 539 | 4373 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1021** | **1472** | **1341** | **539** | **4373** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 42 | 1288 | 7 | 448 | 1248 | 338 | 13 | 4 | 68 | 348 | 19 | 0 | 3823 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **42** | **1288** | **7** | **448** | **1248** | **338** | **13** | **4** | **68** | **348** | **19** | **0** | **3823** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 220 | 960 | 124 | 29 | 1031 | 413 | 609 | 76 | 229 | 38 | 21 | 25 | 3775 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **220** | **960** | **124** | **29** | **1031** | **413** | **609** | **76** | **229** | **38** | **21** | **25** | **3775** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 836 | 82 | 425 | 755 | 47 | 292 | 68 | 2 | 43 | 46 | 339 | 2935 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **836** | **82** | **425** | **755** | **47** | **292** | **68** | **2** | **43** | **46** | **339** | **2935** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 569 | 520 | 508 | 501 | 104 | 2289 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **569** | **520** | **508** | **501** | **104** | **2289** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 344 | 21 | 683 | 206 | 288 | 747 | 56 | 2528 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **344** | **21** | **683** | **206** | **288** | **747** | **56** | **2528** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 829 | 101 | 1288 | 2933 | 333 | 416 | 5900 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **829** | **101** | **1288** | **2933** | **333** | **416** | **5900** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 249 | 596 | 277 | 35 | 75 | 72 | 386 | 465 | 191 | 1101 | 2572 | 72 | 6091 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **249** | **596** | **277** | **35** | **75** | **72** | **386** | **465** | **191** | **1101** | **2572** | **72** | **6091** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 99 | 820 | 359 | 190 | 1255 | 45 | 47 | 56 | 48 | 56 | 422 | 349 | 3746 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **99** | **820** | **359** | **190** | **1255** | **45** | **47** | **56** | **48** | **56** | **422** | **349** | **3746** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 235 | 1304 | 1205 | 31 | 86 | 95 | 2956 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **235** | **1304** | **1205** | **31** | **86** | **95** | **2956** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1395 | 828 | 42 | 1173 | 237 | 230 | 3905 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1395** | **828** | **42** | **1173** | **237** | **230** | **3905** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 160 | 1806 | 351 | 40 | 1335 | 7 | 79 | 135 | 445 | 298 | 167 | 221 | 5044 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **160** | **1806** | **351** | **40** | **1335** | **7** | **79** | **135** | **445** | **298** | **167** | **221** | **5044** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1402 | 1215 | 655 | 429 | 60 | 3826 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1402** | **1215** | **655** | **429** | **60** | **3826** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 911 | 7 | 36 | 931 | 108 | 67 | 13 | 32 | 59 | 12 | 359 | 2557 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **911** | **7** | **36** | **931** | **108** | **67** | **13** | **32** | **59** | **12** | **359** | **2557** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 37 | 783 | 7 | 4 | 878 | 186 | 275 | 6 | 64 | 1 | 2 | 6 | 2249 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **37** | **783** | **7** | **4** | **878** | **186** | **275** | **6** | **64** | **1** | **2** | **6** | **2249** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 686 | 151 | 52 | 905 | 0 | 21 | 98 | 11 | 150 | 95 | 93 | 2269 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **686** | **151** | **52** | **905** | **0** | **21** | **98** | **11** | **150** | **95** | **93** | **2269** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 295 | 153 | 374 | 135 | 445 | 130 | 456 | 170 | 343 | 331 | 20 | 2879 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **295** | **153** | **374** | **135** | **445** | **130** | **456** | **170** | **343** | **331** | **20** | **2879** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1802 | 906 | 771 | 1250 | 4729 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1802** | **906** | **771** | **1250** | **4729** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 493 | 10 | 52 | 171 | 31 | 37 | 41 | 22 | 22 | 55 | 131 | 1078 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **493** | **10** | **52** | **171** | **31** | **37** | **41** | **22** | **22** | **55** | **131** | **1078** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1345 | 10 | 30 | 7 | 8 | 464 | 296 | 2095 | 757 | 34 | 5235 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1345** | **10** | **30** | **7** | **8** | **464** | **296** | **2095** | **757** | **34** | **5235** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1357 | 623 | 1313 | 905 | 1062 | 394 | 5654 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1357** | **623** | **1313** | **905** | **1062** | **394** | **5654** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1674 | 748 | 1914 | 424 | 386 | 789 | 5935 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1674** | **748** | **1914** | **424** | **386** | **789** | **5935** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 308 | 292 | 1210 | 744 | 625 | 1963 | 5142 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **308** | **292** | **1210** | **744** | **625** | **1963** | **5142** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 437 | 93 | 1762 | 469 | 160 | 2354 | 5275 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **437** | **93** | **1762** | **469** | **160** | **2354** | **5275** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 66 | 51 | 1101 | 396 | 247 | 2478 | 4339 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **66** | **51** | **1101** | **396** | **247** | **2478** | **4339** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 395 | 365 | 10 | 388 | 327 | 21 | 1506 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **395** | **365** | **10** | **388** | **327** | **21** | **1506** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 48 | 955 | 234 | 86 | 2766 | 4089 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **955** | **234** | **86** | **2766** | **4089** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 255 | 380 | 196 | 766 | 263 | 423 | 90 | 10 | 111 | 42 | 24 | 84 | 2644 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **255** | **380** | **196** | **766** | **263** | **423** | **90** | **10** | **111** | **42** | **24** | **84** | **2644** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 159 | 333 | 115 | 189 | 301 | 292 | 39 | 34 | 190 | 0 | 252 | 24 | 1928 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **159** | **333** | **115** | **189** | **301** | **292** | **39** | **34** | **190** | **0** | **252** | **24** | **1928** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 48 | 91 | 163 | 204 | 327 | 125 | 958 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **91** | **163** | **204** | **327** | **125** | **958** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 212 | 42 | 60 | 103 | 13 | 103 | 533 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **212** | **42** | **60** | **103** | **13** | **103** | **533** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 516 | 254 | 208 | 100 |
| 2 | 501 | 246 | 202 | 97 |
| 3 | 490 | 241 | 198 | 95 |
| 4 | 459 | 226 | 185 | 89 |
| 5 | 408 | 201 | 164 | 79 |
| 6 | 402 | 198 | 162 | 78 |
| 7 | 397 | 196 | 160 | 77 |
| 8 | 361 | 178 | 146 | 70 |
| 9 | 356 | 175 | 144 | 69 |
| 10 | 351 | 173 | 141 | 68 |
| 11 | 304 | 150 | 123 | 59 |
| 12 | 284 | 140 | 114 | 55 |
| 13 | 279 | 137 | 112 | 54 |
| 14 | 206 | 102 | 83 | 40 |
| 15 | 206 | 102 | 83 | 40 |
| 16 | 144 | 71 | 58 | 28 |
| 17 | 83 | 41 | 33 | 16 |
| 18 | 83 | 41 | 33 | 16 |
| 19 | 46 | 23 | 19 | 9 |
| 20 | 26 | 13 | 10 | 5 |
| 21 | 15 | 8 | 6 | 3 |
| 22 | 5 | 3 | 2 | 1 |
| 23 | 5 | 3 | 2 | 1 |
| 24 | 5 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 770 | 1 | 208 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 747 | 1 | 202 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 731 | 1 | 198 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 685 | 1 | 185 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 609 | 1 | 164 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 600 | 1 | 162 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 593 | 1 | 160 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 8 | 1 | 539 | 1 | 146 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 531 | 1 | 144 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 524 | 1 | 141 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 11 | 1 | 454 | 1 | 123 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 424 | 1 | 114 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 416 | 1 | 112 | No | No | Yes | Yes | No | No | No | No | No | No |
| 14 | 1 | 308 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 308 | 1 | 83 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 215 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 124 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 124 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 69 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 39 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 23 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 7 | 11 | 13 | 13 | 1 | 6 | 9 | 12 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.8 | 12.4 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:47 | 0:20 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 208 | 100 |
| High Minor Volume Condition Met | Yes | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1078 | 1078 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 398 | 760 | 348 |
| 2 | 386 | 737 | 338 |
| 3 | 378 | 722 | 331 |
| 4 | 354 | 676 | 310 |
| 5 | 314 | 600 | 275 |
| 6 | 310 | 593 | 271 |
| 7 | 306 | 585 | 268 |
| 8 | 279 | 532 | 244 |
| 9 | 275 | 524 | 240 |
| 10 | 271 | 517 | 237 |
| 11 | 235 | 448 | 205 |
| 12 | 219 | 418 | 191 |
| 13 | 215 | 410 | 188 |
| 14 | 159 | 304 | 139 |
| 15 | 159 | 304 | 139 |
| 16 | 111 | 213 | 97 |
| 17 | 64 | 122 | 56 |
| 18 | 64 | 122 | 56 |
| 19 | 36 | 68 | 31 |
| 20 | 20 | 38 | 17 |
| 21 | 12 | 23 | 10 |
| 22 | 4 | 8 | 3 |
| 23 | 4 | 8 | 3 |
| 24 | 4 | 8 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1158 | 1 | 348 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1123 | 1 | 338 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1100 | 1 | 331 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1030 | 1 | 310 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 914 | 1 | 275 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 903 | 1 | 271 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 891 | 1 | 268 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 811 | 1 | 244 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 799 | 1 | 240 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 788 | 1 | 237 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 683 | 1 | 205 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 637 | 1 | 191 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 625 | 1 | 188 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 463 | 1 | 139 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 463 | 1 | 139 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 324 | 1 | 97 | No | No | No | Yes | No | No | No | No | No | No |
| 17 | 1 | 186 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 186 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 104 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 58 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 35 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 15 | 15 | 16 | 10 | 13 | 13 | 15 | 11 | 4 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | E |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 29.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 2:49 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 348 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1506 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 452 | 367 | 139 |
| 2 | 438 | 356 | 135 |
| 3 | 429 | 349 | 132 |
| 4 | 402 | 327 | 124 |
| 5 | 357 | 290 | 110 |
| 6 | 353 | 286 | 108 |
| 7 | 348 | 283 | 107 |
| 8 | 316 | 257 | 97 |
| 9 | 312 | 253 | 96 |
| 10 | 307 | 250 | 95 |
| 11 | 267 | 217 | 82 |
| 12 | 249 | 202 | 76 |
| 13 | 244 | 198 | 75 |
| 14 | 181 | 147 | 56 |
| 15 | 181 | 147 | 56 |
| 16 | 127 | 103 | 39 |
| 17 | 72 | 59 | 22 |
| 18 | 72 | 59 | 22 |
| 19 | 41 | 33 | 13 |
| 20 | 23 | 18 | 7 |
| 21 | 14 | 11 | 4 |
| 22 | 5 | 4 | 1 |
| 23 | 5 | 4 | 1 |
| 24 | 5 | 4 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 819 | 1 | 139 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 2 | 1 | 794 | 1 | 135 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 3 | 1 | 778 | 1 | 132 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 4 | 1 | 729 | 1 | 124 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 5 | 1 | 647 | 1 | 110 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 639 | 1 | 108 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 631 | 1 | 107 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 573 | 1 | 97 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 565 | 1 | 96 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 557 | 1 | 95 | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 484 | 1 | 82 | No | No | No | No | No | No | No | Yes | No | No |
| 12 | 1 | 451 | 1 | 76 | No | No | No | No | No | No | No | Yes | No | No |
| 13 | 1 | 442 | 1 | 75 | No | No | No | No | No | No | No | Yes | No | No |
| 14 | 1 | 328 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 328 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 230 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 131 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 131 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 74 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 41 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 25 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 9 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 4 | 7 | 10 | 3 | 7 | 10 | 13 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 35.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:22 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 139 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 958 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 254 | 163 | 116 |
| 2 | 246 | 158 | 113 |
| 3 | 241 | 155 | 110 |
| 4 | 226 | 145 | 103 |
| 5 | 201 | 129 | 92 |
| 6 | 198 | 127 | 90 |
| 7 | 196 | 126 | 89 |
| 8 | 178 | 114 | 81 |
| 9 | 175 | 112 | 80 |
| 10 | 173 | 111 | 79 |
| 11 | 150 | 96 | 68 |
| 12 | 140 | 90 | 64 |
| 13 | 137 | 88 | 63 |
| 14 | 102 | 65 | 46 |
| 15 | 102 | 65 | 46 |
| 16 | 71 | 46 | 32 |
| 17 | 41 | 26 | 19 |
| 18 | 41 | 26 | 19 |
| 19 | 23 | 15 | 10 |
| 20 | 13 | 8 | 6 |
| 21 | 8 | 5 | 3 |
| 22 | 3 | 2 | 1 |
| 23 | 3 | 2 | 1 |
| 24 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 417 | 1 | 116 | No | No | Yes | Yes | No | No | No | No | No | No |
| 2 | 1 | 404 | 1 | 113 | No | No | Yes | Yes | No | No | No | No | No | No |
| 3 | 1 | 396 | 1 | 110 | No | No | Yes | Yes | No | No | No | No | No | No |
| 4 | 1 | 371 | 1 | 103 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 1 | 330 | 1 | 92 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 325 | 1 | 90 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 322 | 1 | 89 | No | No | No | Yes | No | No | No | No | No | No |
| 8 | 1 | 292 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 287 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 284 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 246 | 1 | 68 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 230 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 225 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 167 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 167 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 117 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 67 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 67 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 38 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 21 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 13 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 3 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:22 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 116 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 533 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

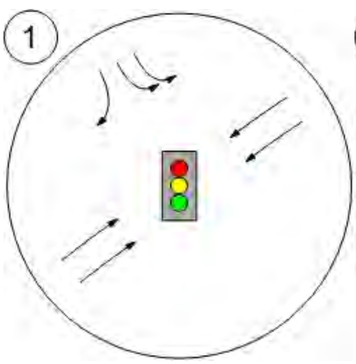
Study Intersections

Generated with PTV VISTRO

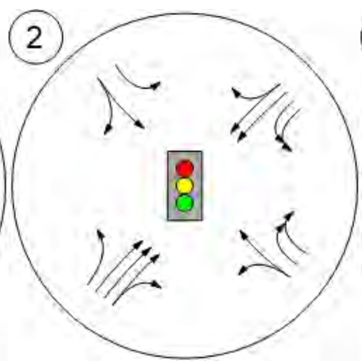
Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control

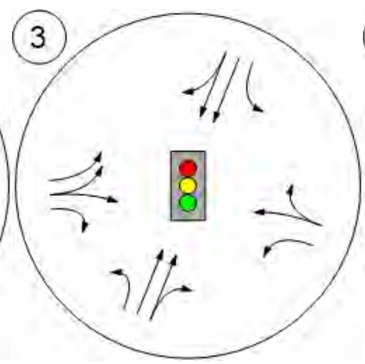

Marsh Rd (SR 84)/US 101 S



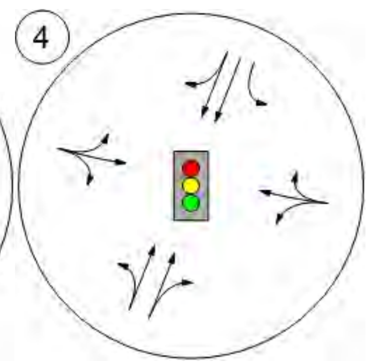

Marsh Rd/Rolison Rd-Scott D



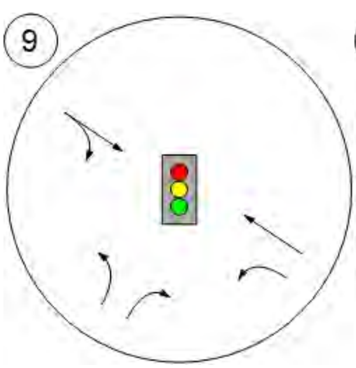

Marsh Rd/Florence St-Bohan



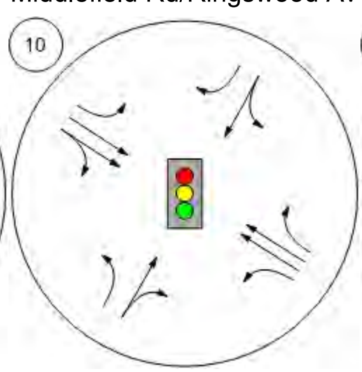

Marsh Rd/Bay Rd



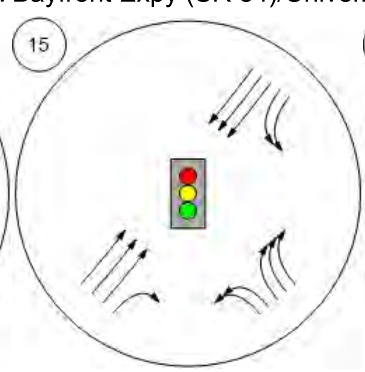

Middlefield Rd/Ravenswood



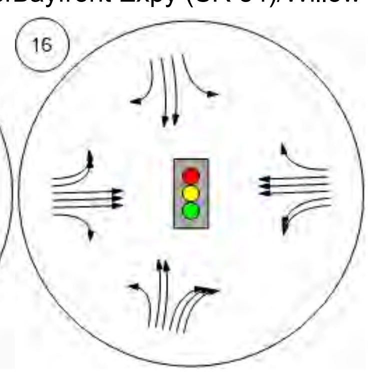

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow



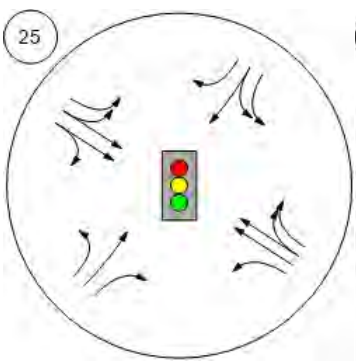
Generated with PTV VISTRO

Version 2021 (SP 0-4)

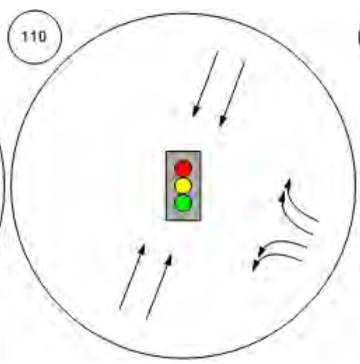
Lane Configuration and Traffic Control


## Lane Configuration and Traffic Control

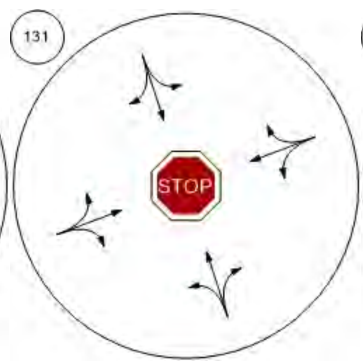

Middlefield Rd-Willow Rd



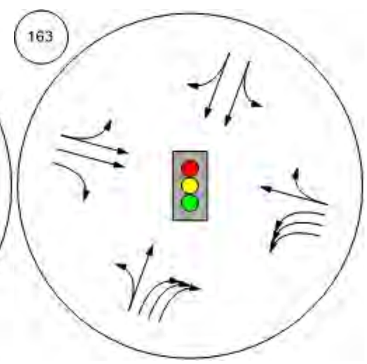

Marsh Road and US 101 NB



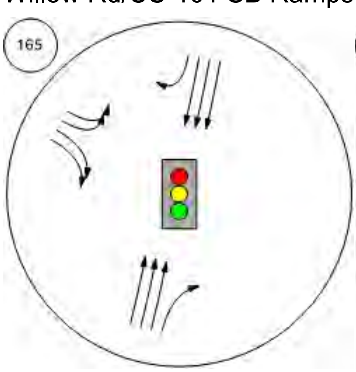

Chilco Street/Hamilton Avenu



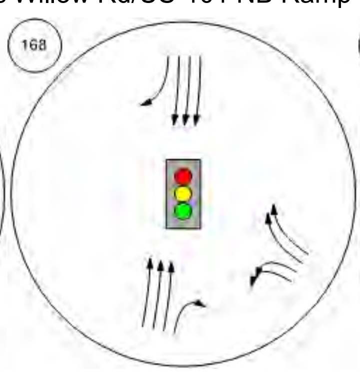

Bayfront Expy/Marsh Rd



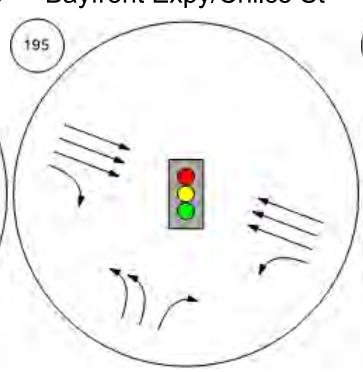

Willow Rd/US-101 SB Ramps



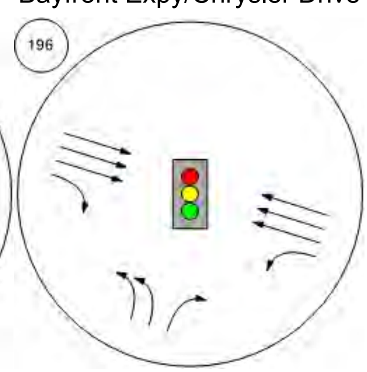

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

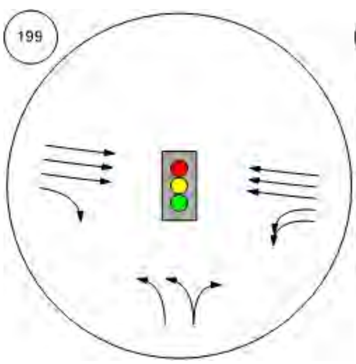


Generated with PTV VISTRO

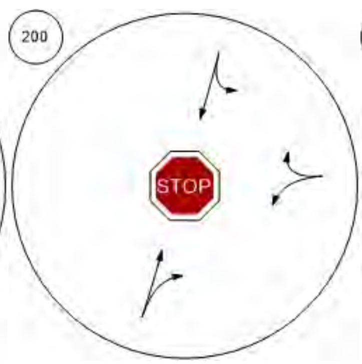
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

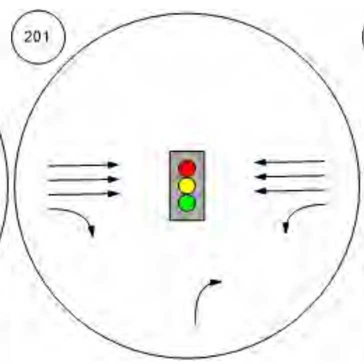

Bayfront Expwy/Bldg 21



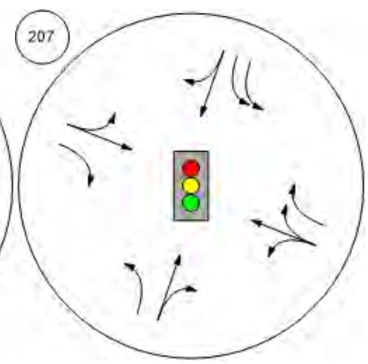

O'Brien Drive/Kavanaugh Dri



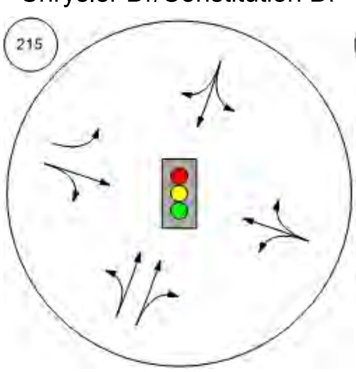

Bayfront Expwy/Bldg 20



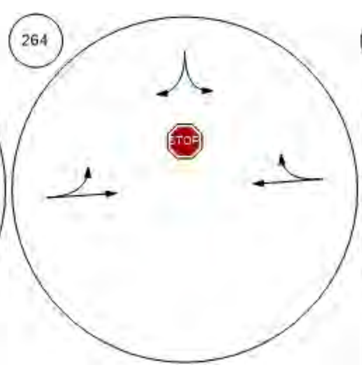

Chilco St/Constitution Dr



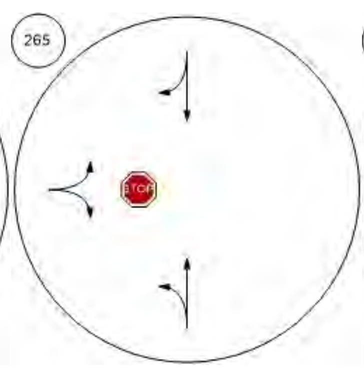

Chrysler Dr/Constitution Dr



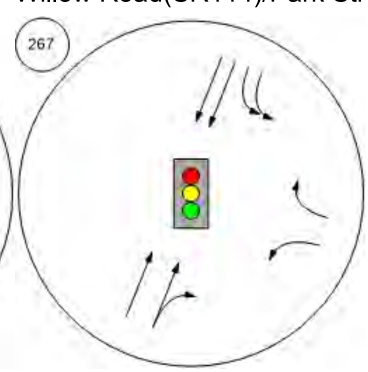

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

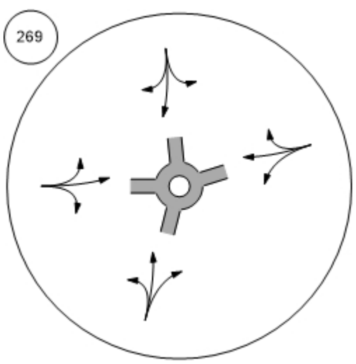



Willow Road(SR114)/Park Str



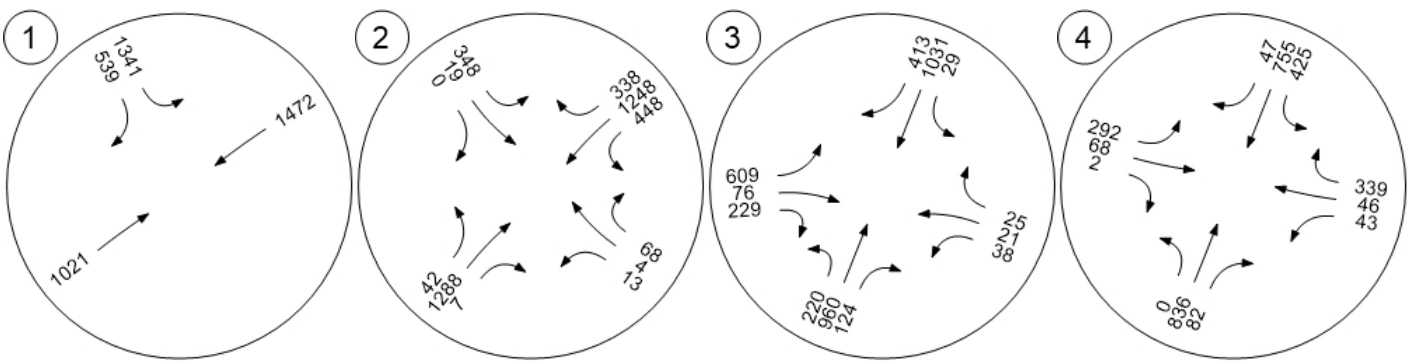
## Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

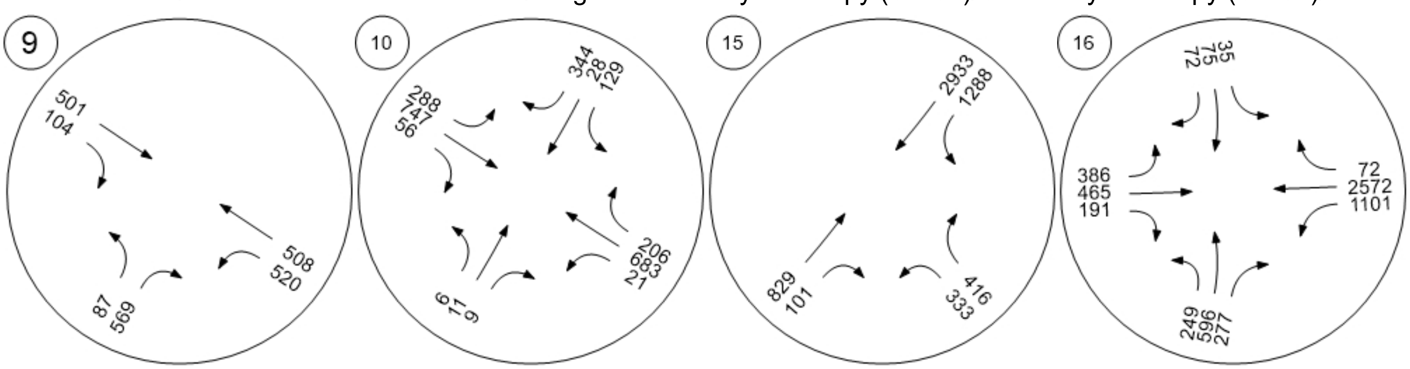


## Traffic Volume - Base Volume


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd

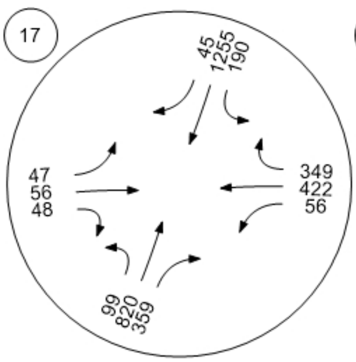



Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

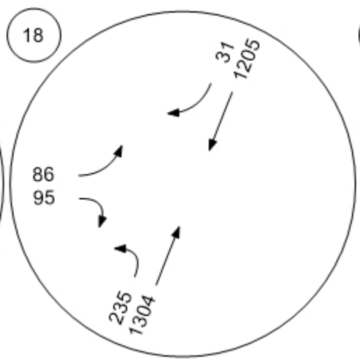


## Traffic Volume - Base Volume

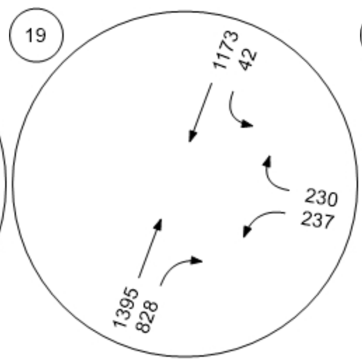

Willow Rd (SR 114)/Hamilton



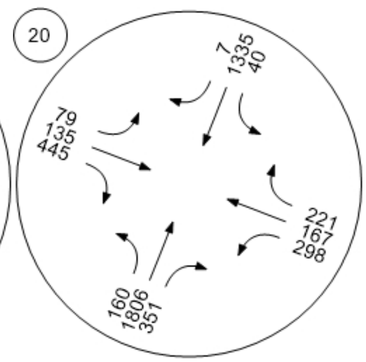

Willow Rd (SR 114)/Ivy Dr



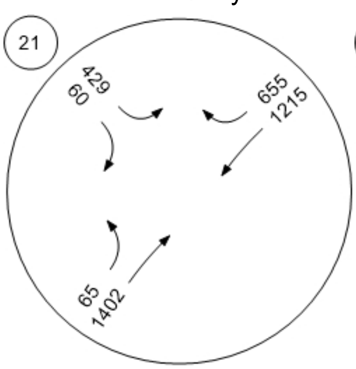

Willow Rd (SR 114)/O'Brien



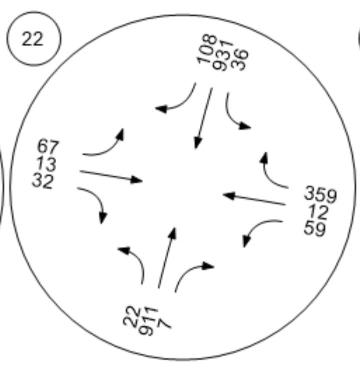

Willow Rd (SR 114)/Newbrid



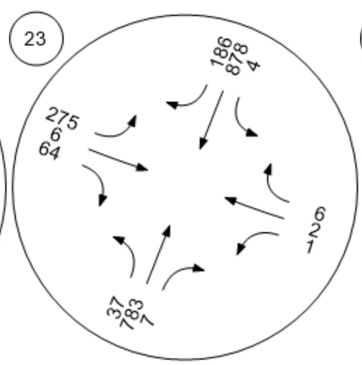

Willow Rd/Bay Rd



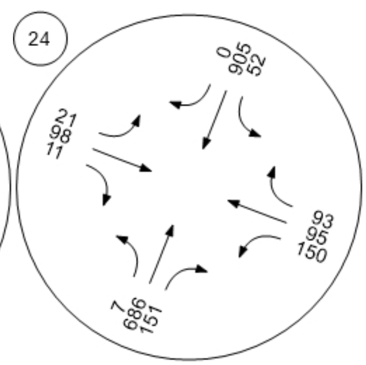

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

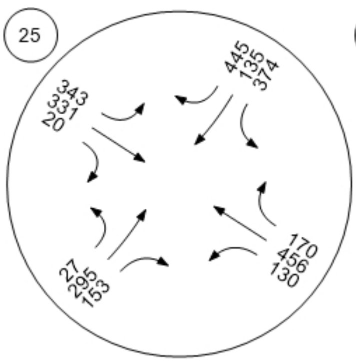


Generated with PTV VISTRO

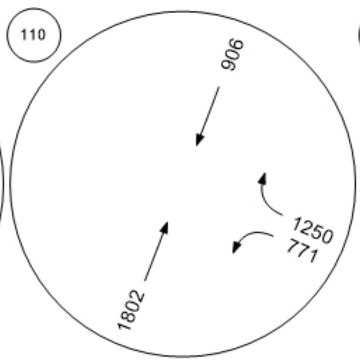
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

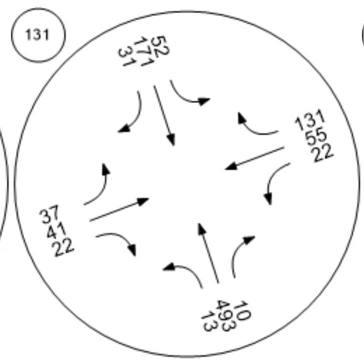

Middlefield Rd-Willow Rd



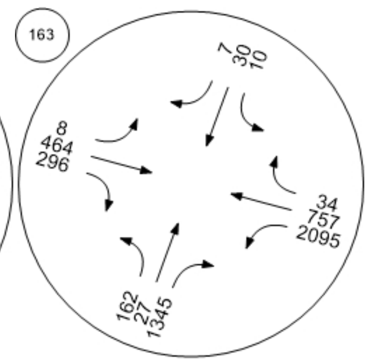

Marsh Road and US 101 NB



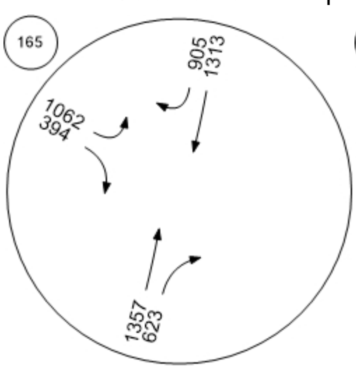

Chilco Street/Hamilton Avenu



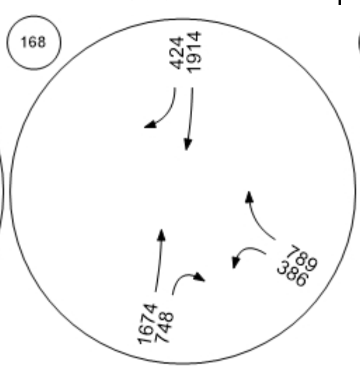

Bayfront Expy/Marsh Rd



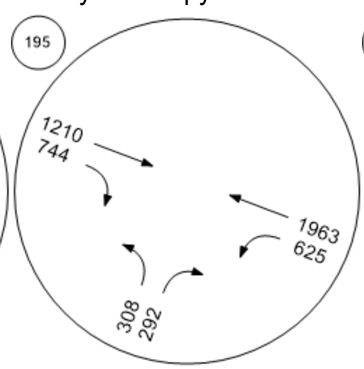

Willow Rd/US-101 SB Ramps



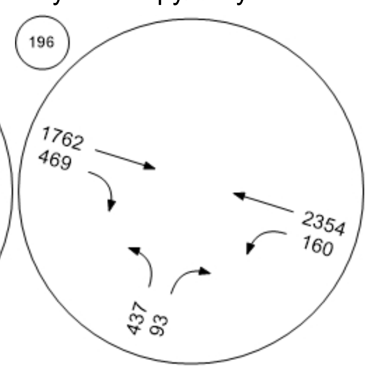

Willow Rd/US-101 NB Ramp



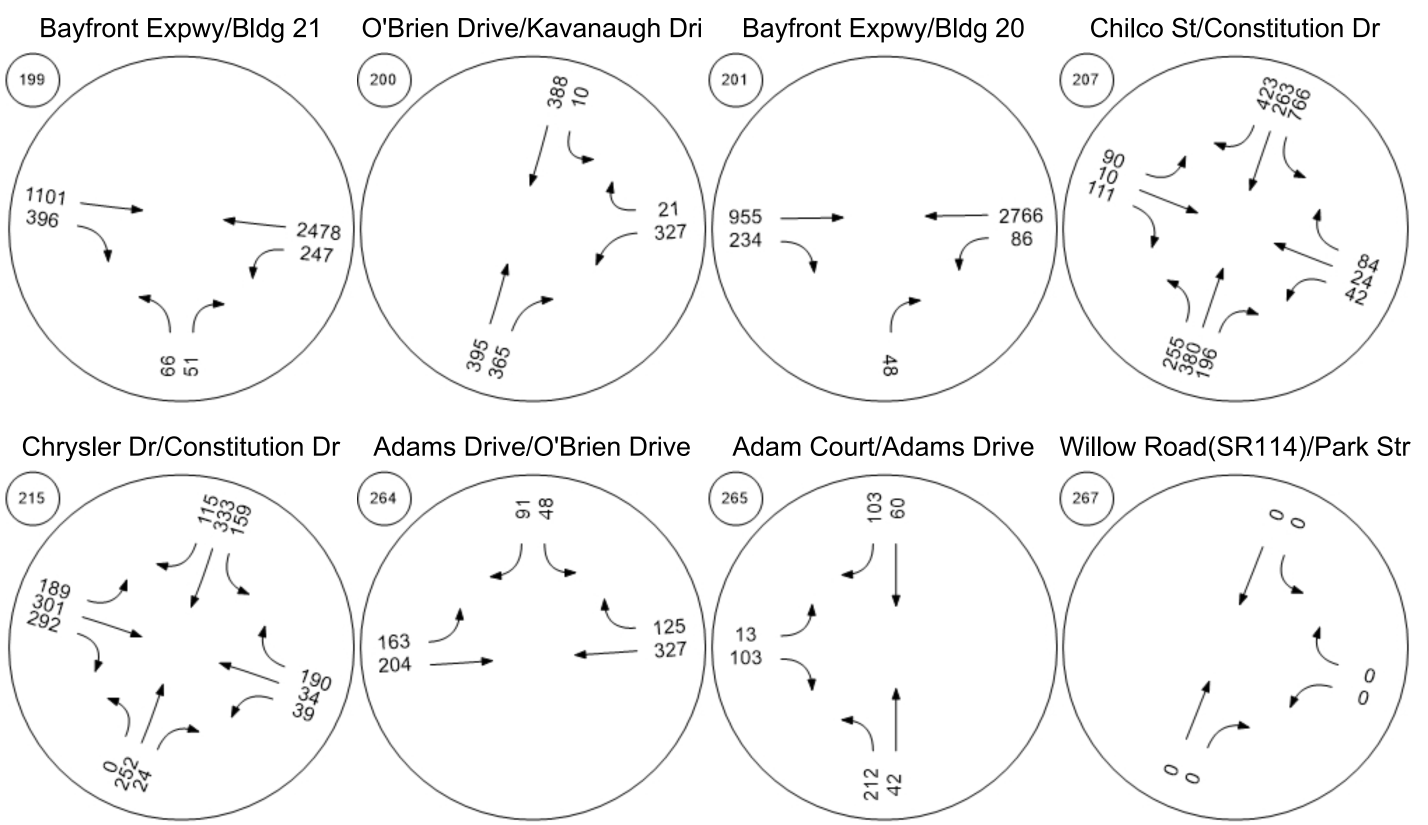

Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



Traffic Volume - Base Volume

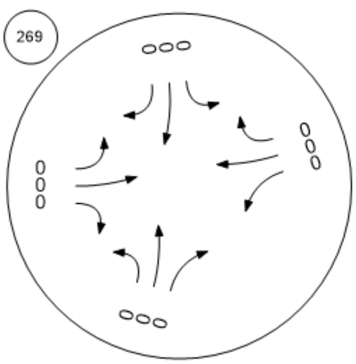



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Base Volume


O'Brien Drive/Loop Road

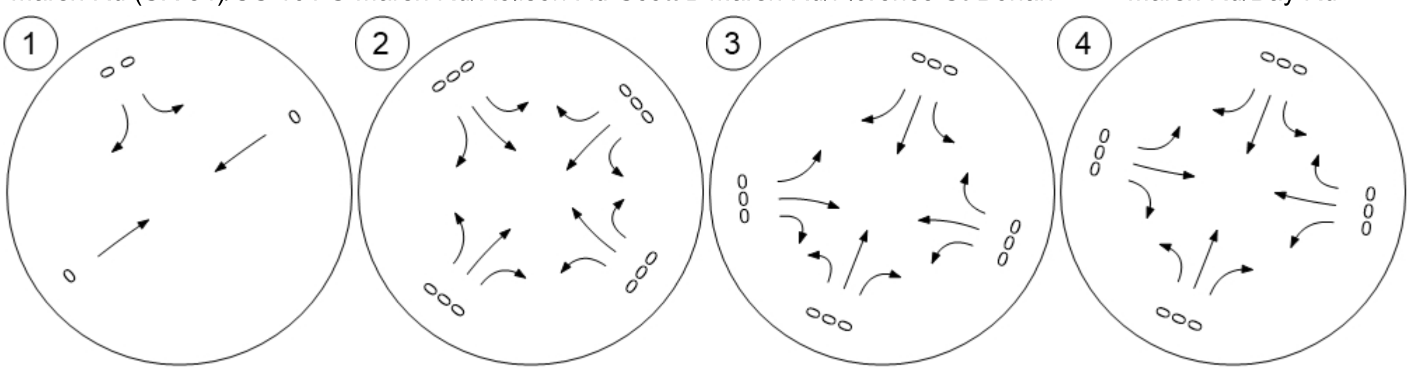


Generated with PTV VISTRO

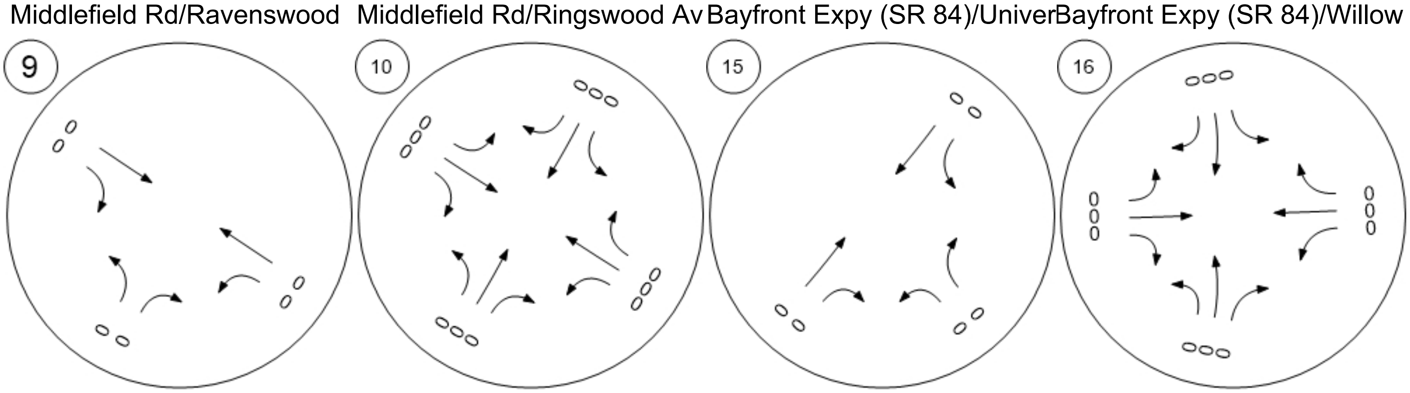
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringswood Av Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

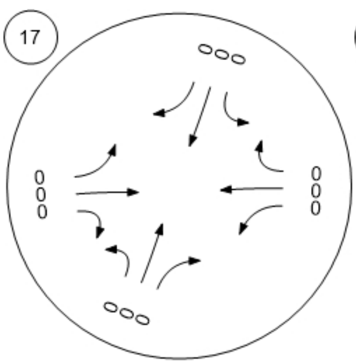


Generated with PTV VISTRO

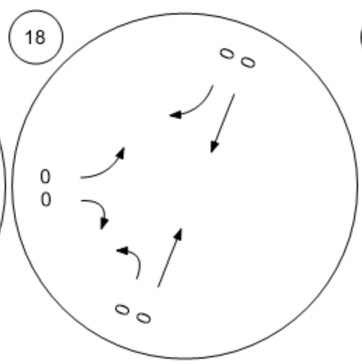
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

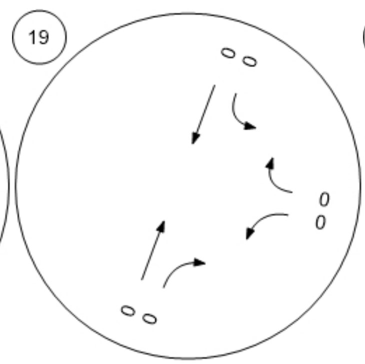

Willow Rd (SR 114)/Hamilton



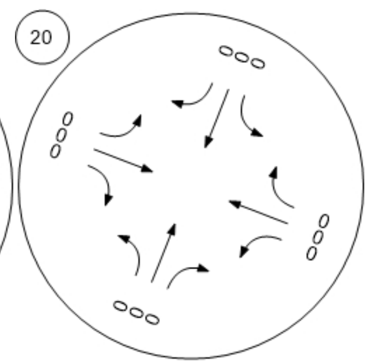

Willow Rd (SR 114)/Ivy Dr



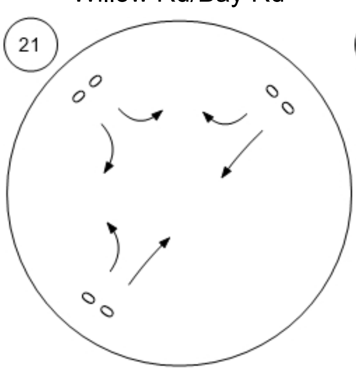

Willow Rd (SR 114)/O'Brien



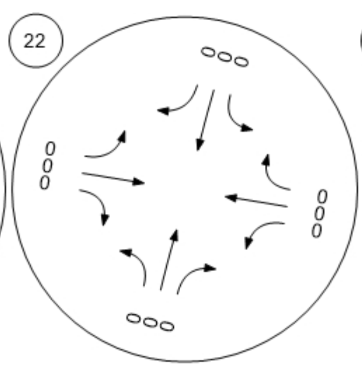

Willow Rd (SR 114)/Newbrid



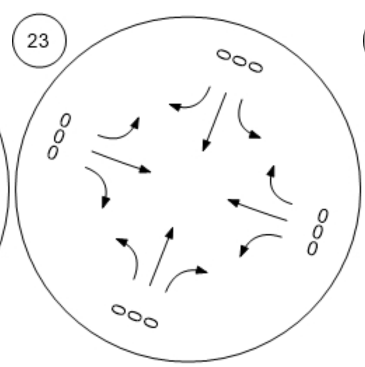

Willow Rd/Bay Rd



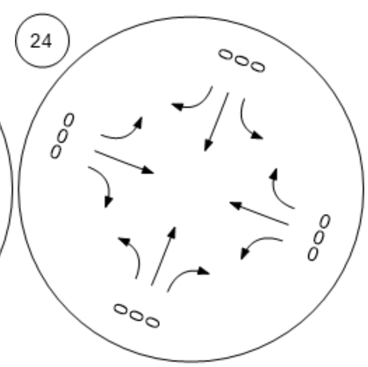

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



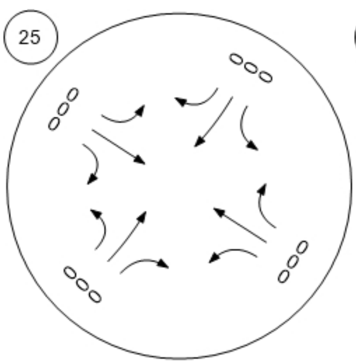
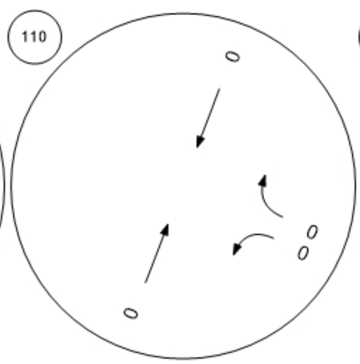
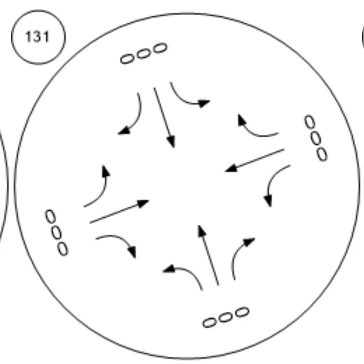
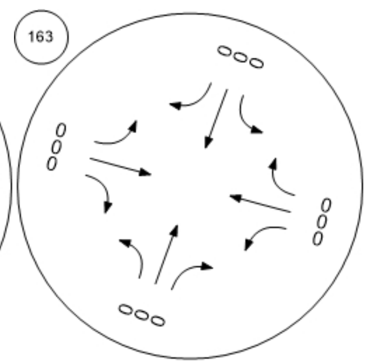

Willow Rd/Gilbert Ave

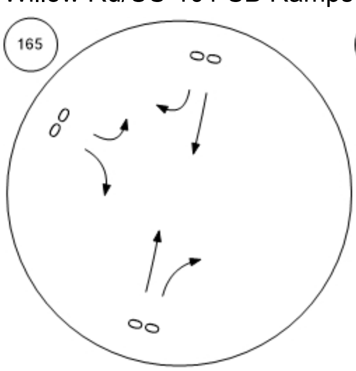
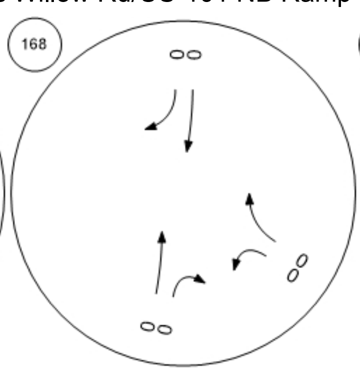
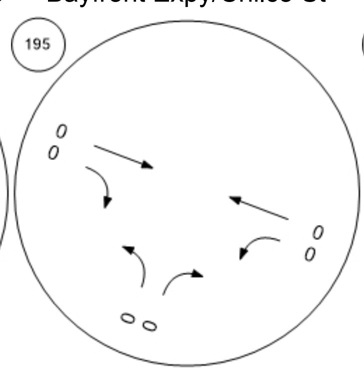
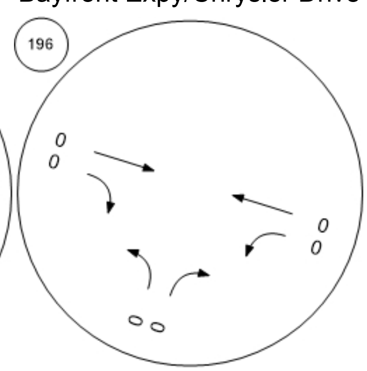


Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume


| Middlefield Rd-Willow Rd | Marsh Road and US 101 NB | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd |
|---|---|---|---|
|   |   |   |   |

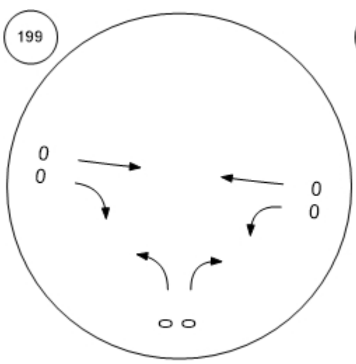
| Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive |
|---|---|---|---|
|   |   |   |   |

Generated with PTV VISTRO

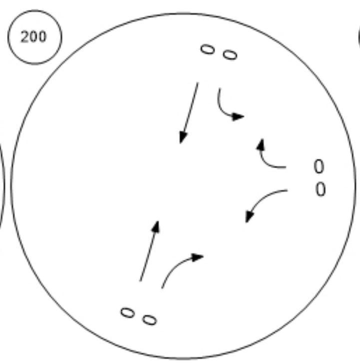
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

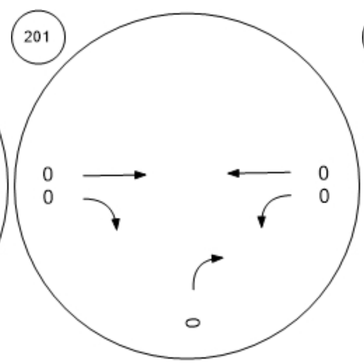

Bayfront Expwy/Bldg 21



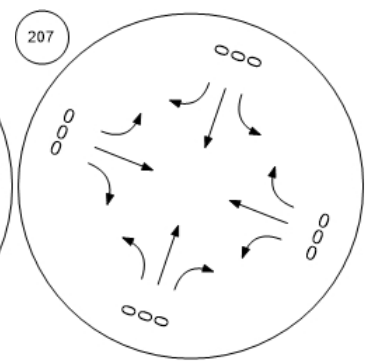

O'Brien Drive/Kavanaugh Dri



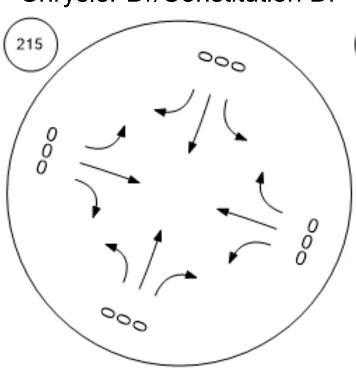

Bayfront Expwy/Bldg 20



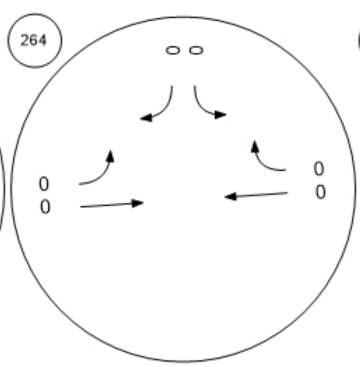

Chilco St/Constitution Dr



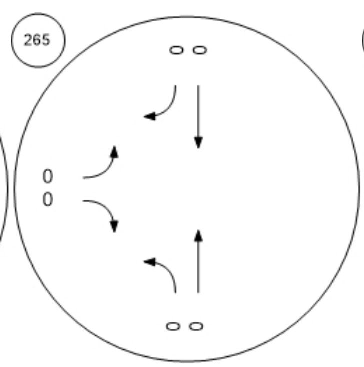

Chrysler Dr/Constitution Dr



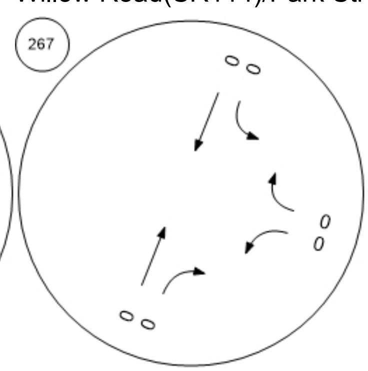

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

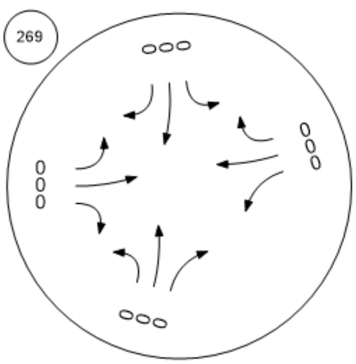


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road

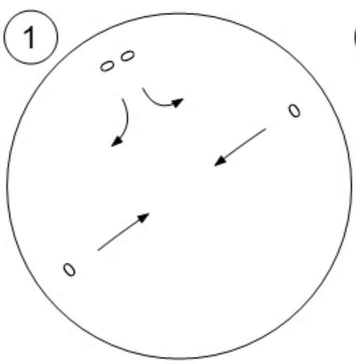


Generated with PTV VISTRO

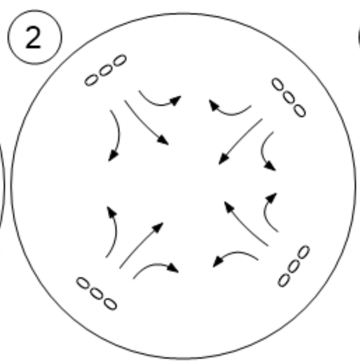
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

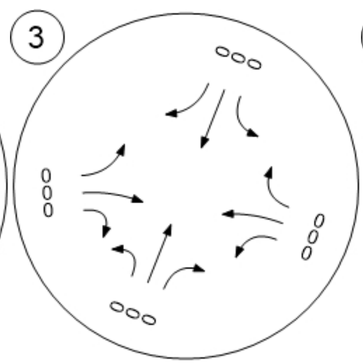

Marsh Rd (SR 84)/US 101 S



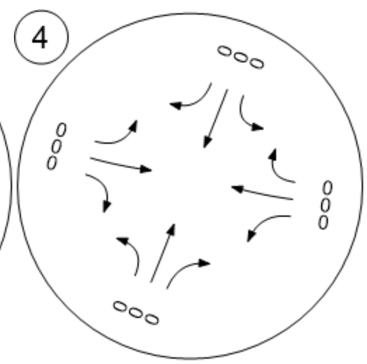

Marsh Rd/Rolison Rd-Scott D



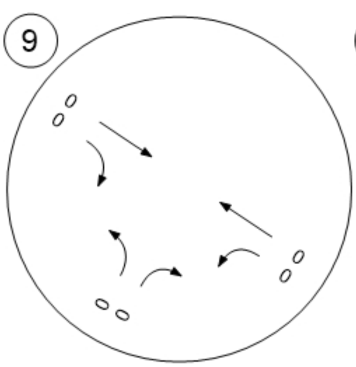

Marsh Rd/Florence St-Bohan



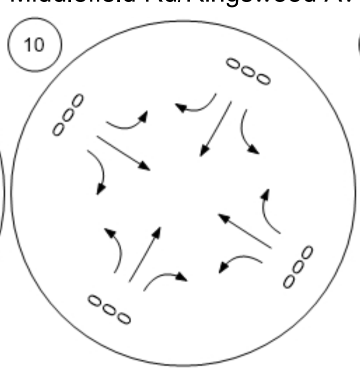

Marsh Rd/Bay Rd



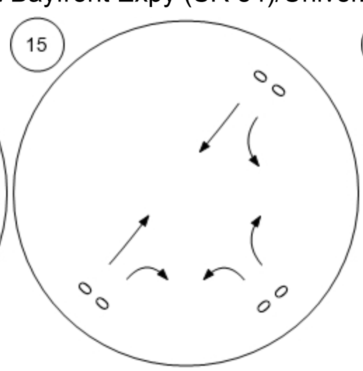

Middlefield Rd/Ravenswood



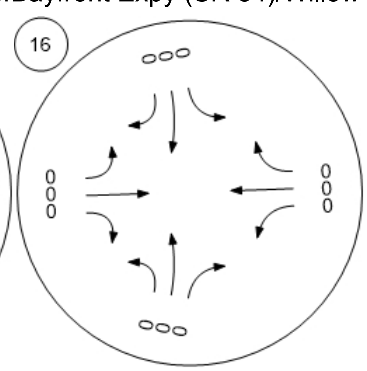

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow



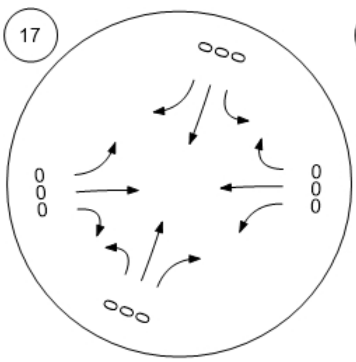
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

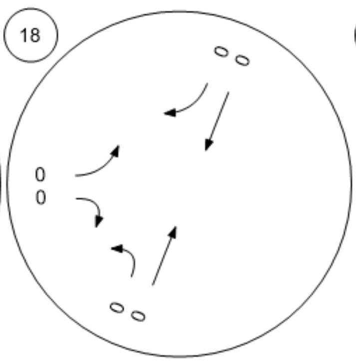

Willow Rd (SR 114)/Hamilton

17



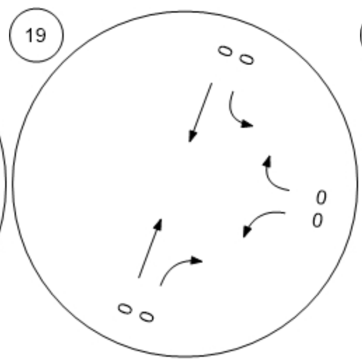

Willow Rd (SR 114)/Ivy Dr

18



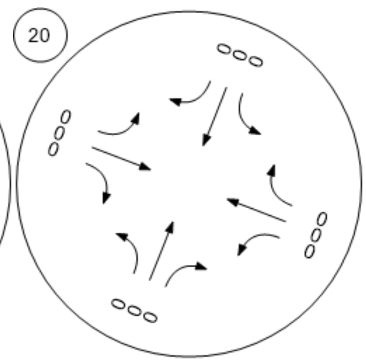

Willow Rd (SR 114)/O'Brien

19



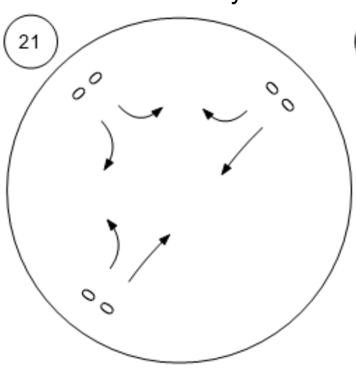

Willow Rd (SR 114)/Newbrid

20



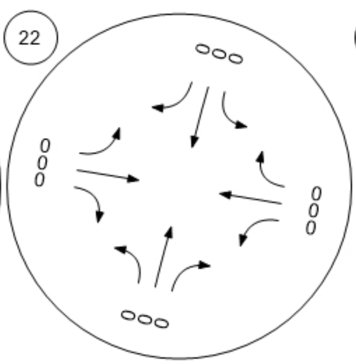

Willow Rd/Bay Rd

21



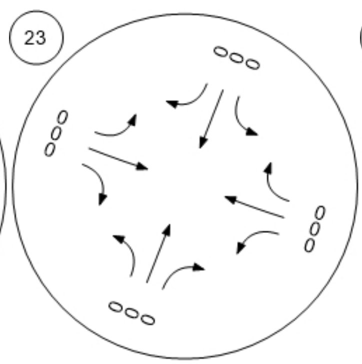

Willow Rd/Durham St-VA Me

22



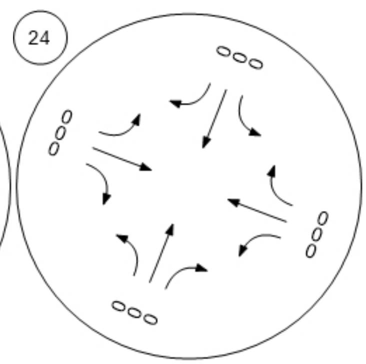

Willow Rd/Coleman Ave

23




Willow Rd/Gilbert Ave

24

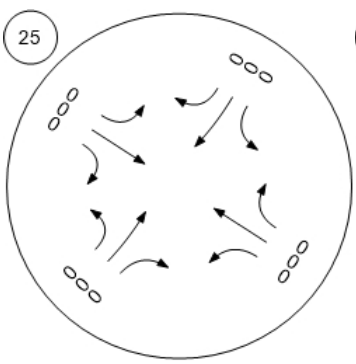


Generated with PTV VISTRO

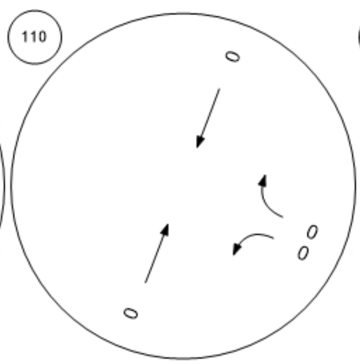
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

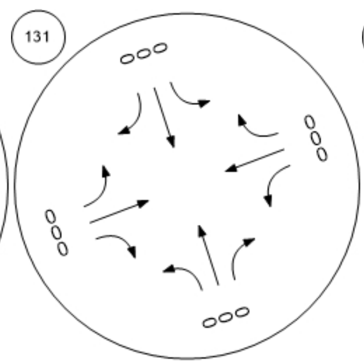

Middlefield Rd-Willow Rd



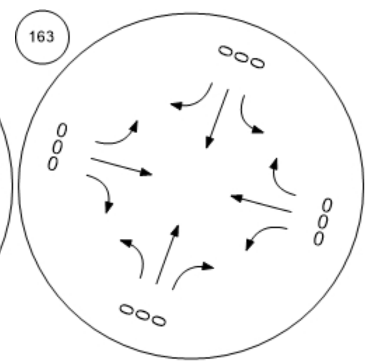

Marsh Road and US 101 NB



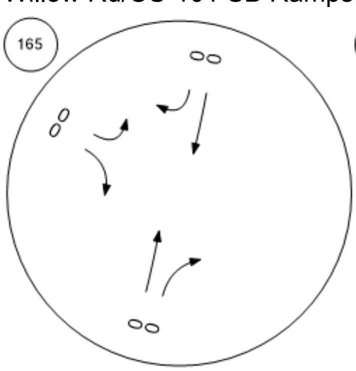

Chilco Street/Hamilton Avenu



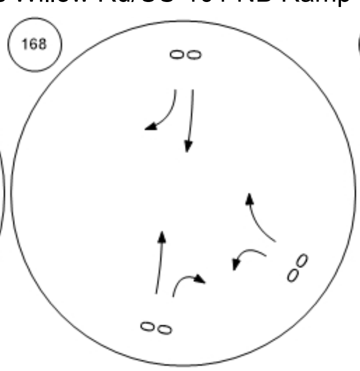

Bayfront Expy/Marsh Rd



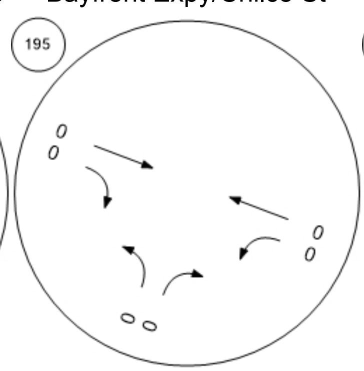

Willow Rd/US-101 SB Ramps



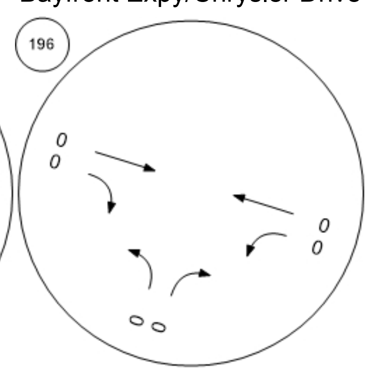

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

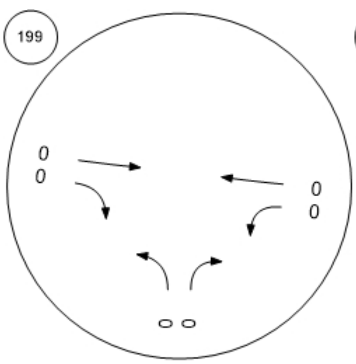


Generated with PTV VISTRO

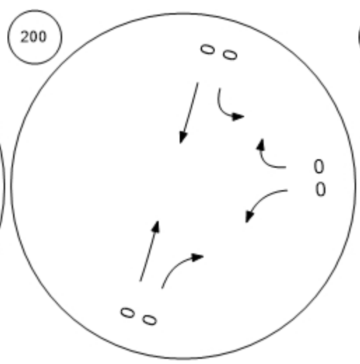
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

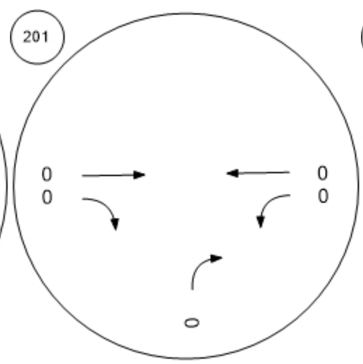

Bayfront Expwy/Bldg 21



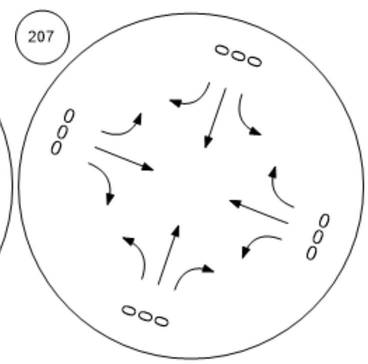

O'Brien Drive/Kavanaugh Dri



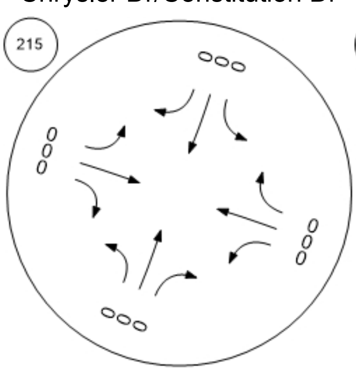

Bayfront Expwy/Bldg 20



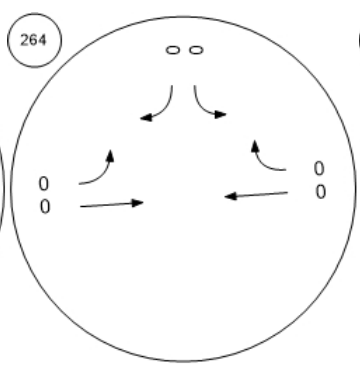

Chilco St/Constitution Dr



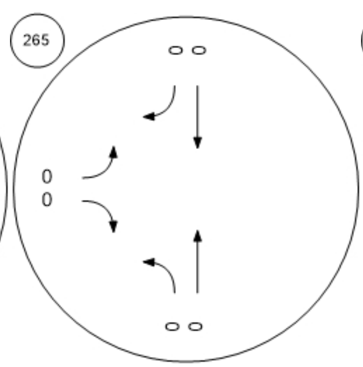

Chrysler Dr/Constitution Dr



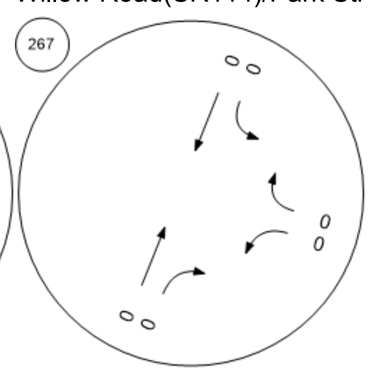

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

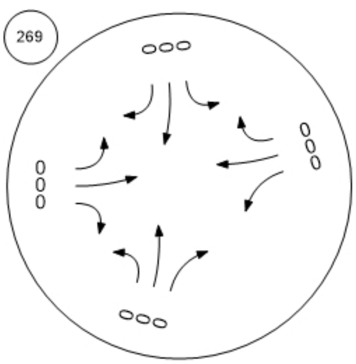


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips


O'Brien Drive/Loop Road

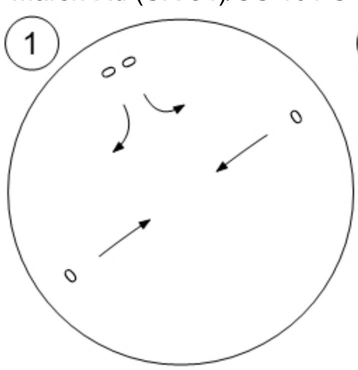


Generated with PTV VISTRO

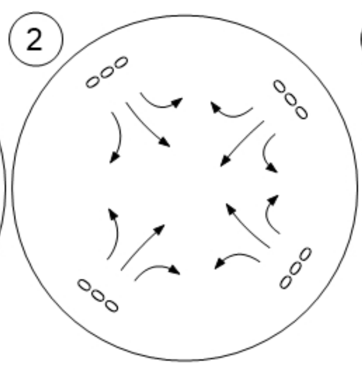
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

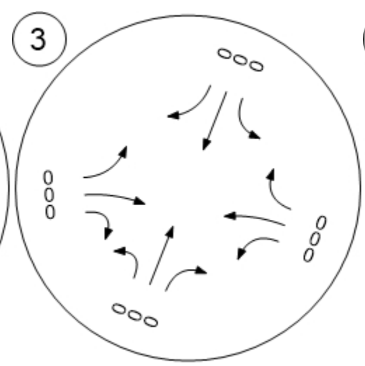

Marsh Rd (SR 84)/US 101 S



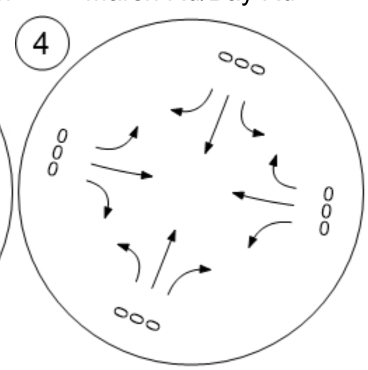

Marsh Rd/Rolison Rd-Scott D



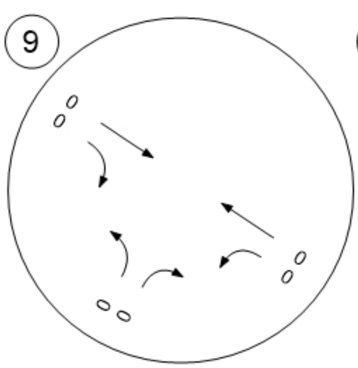

Marsh Rd/Florence St-Bohan



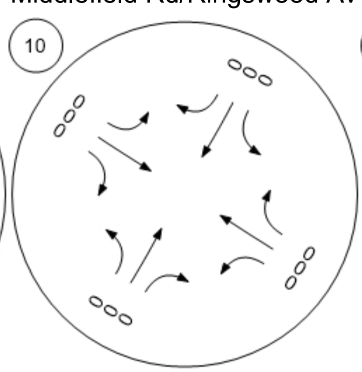

Marsh Rd/Bay Rd



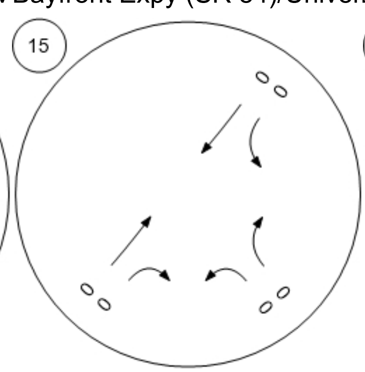

Middlefield Rd/Ravenswood



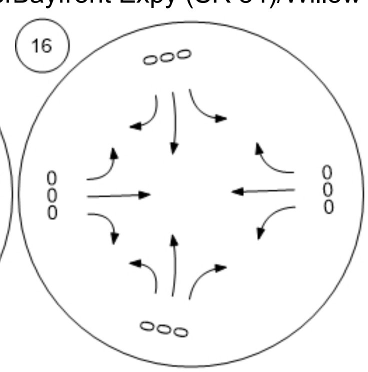

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

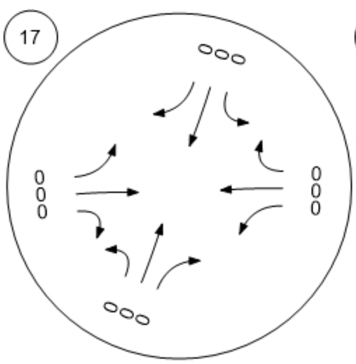


Generated with PTV VISTRO

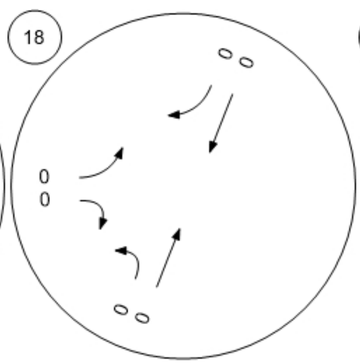
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

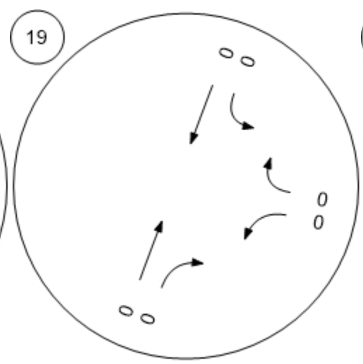

Willow Rd (SR 114)/Hamilton



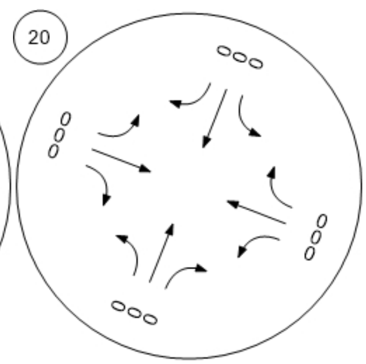

Willow Rd (SR 114)/Ivy Dr



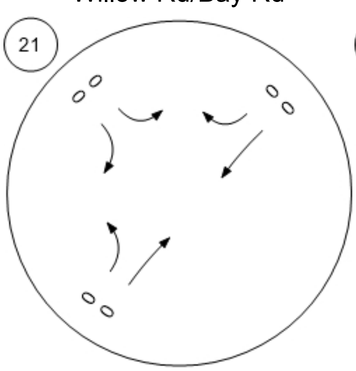

Willow Rd (SR 114)/O'Brien



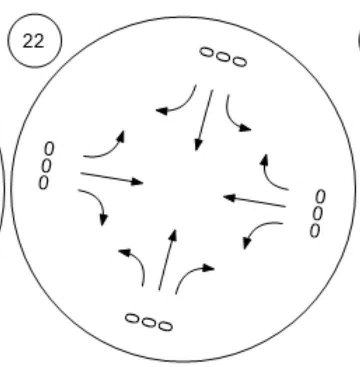

Willow Rd (SR 114)/Newbrid



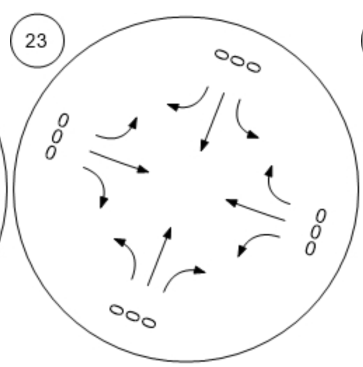

Willow Rd/Bay Rd



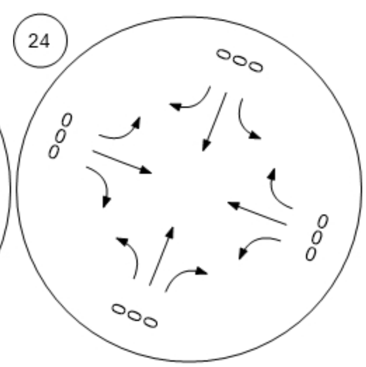

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

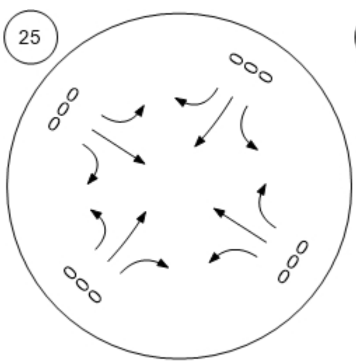


Generated with PTV VISTRO

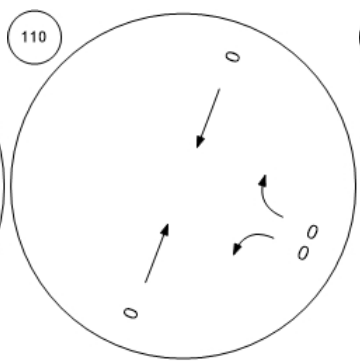
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

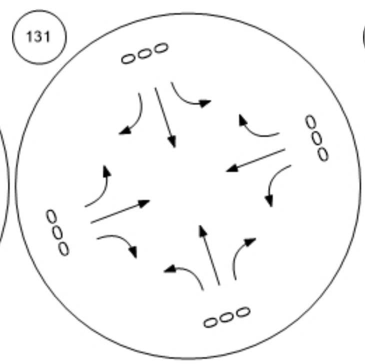

Middlefield Rd-Willow Rd



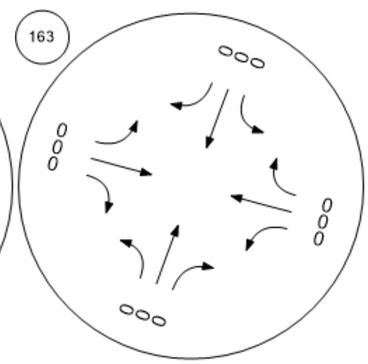

Marsh Road and US 101 NB



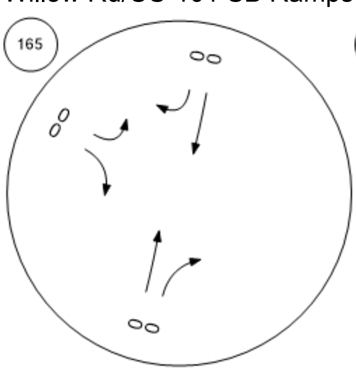

Chilco Street/Hamilton Avenu



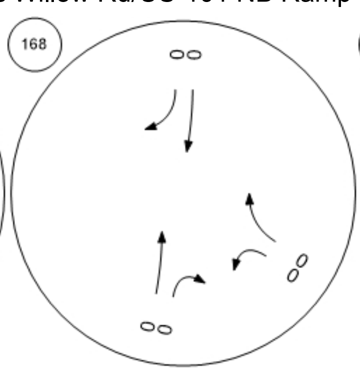

Bayfront Expy/Marsh Rd



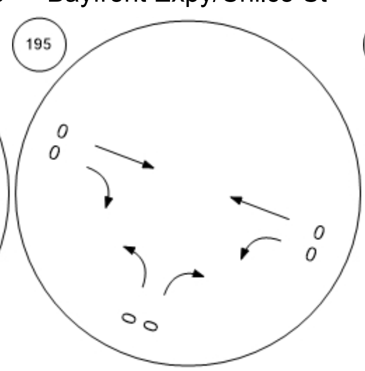

Willow Rd/US-101 SB Ramps



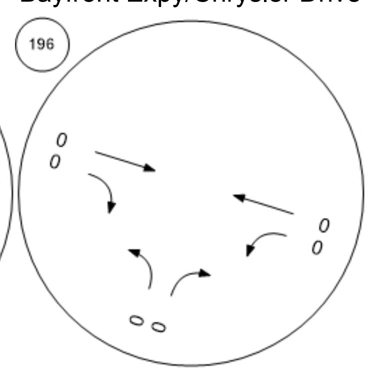

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

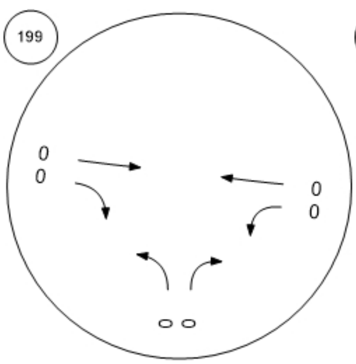


Generated with PTV VISTRO

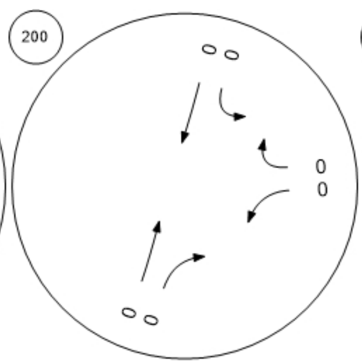
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

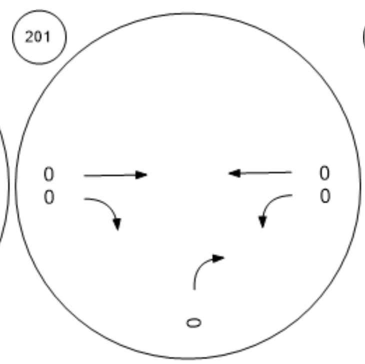

Bayfront Expwy/Bldg 21



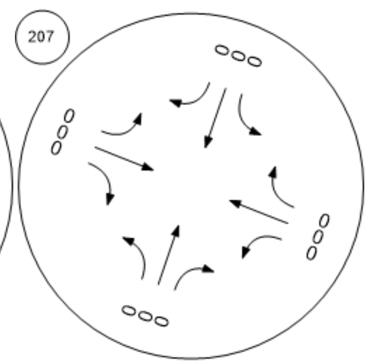

O'Brien Drive/Kavanaugh Dri



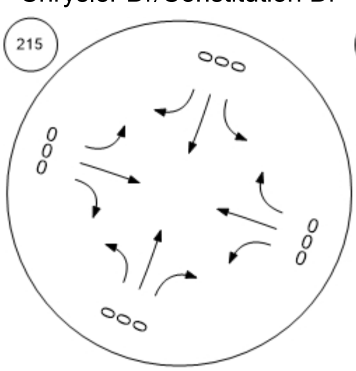

Bayfront Expwy/Bldg 20



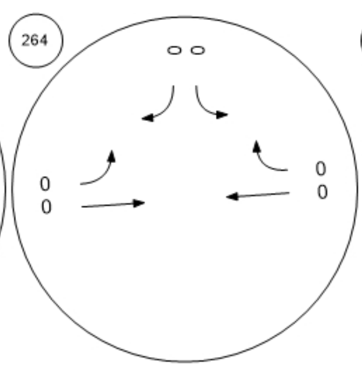

Chilco St/Constitution Dr



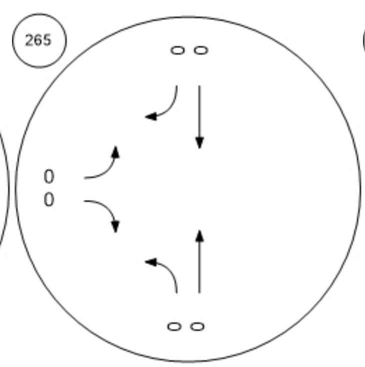

Chrysler Dr/Constitution Dr



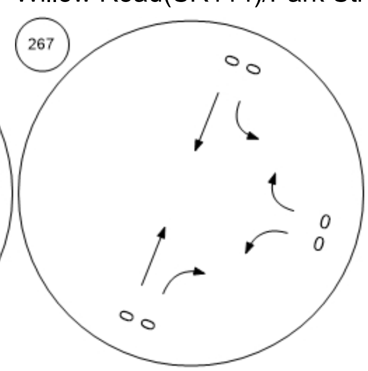

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

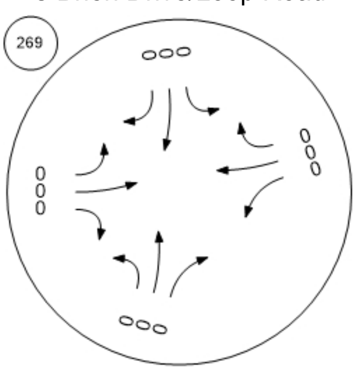


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume


O'Brien Drive/Loop Road

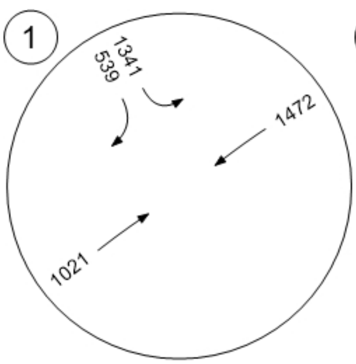


Generated with PTV VISTRO

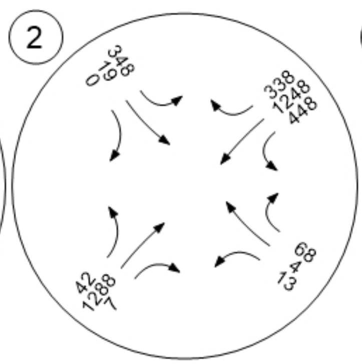
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

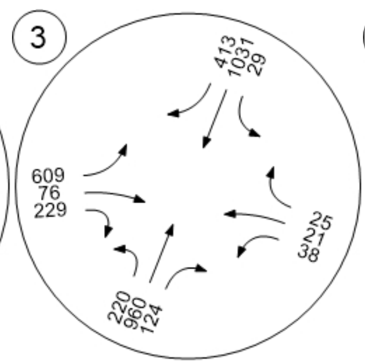

Marsh Rd (SR 84)/US 101 S



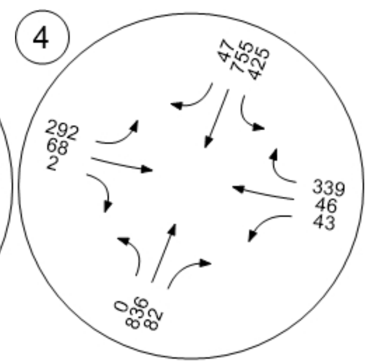

Marsh Rd/Rolison Rd-Scott D



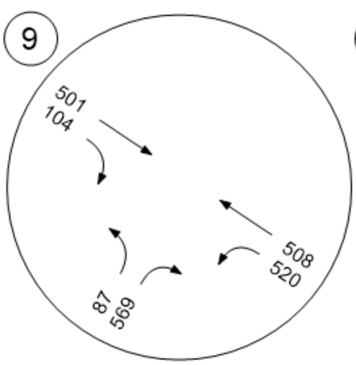

Marsh Rd/Florence St-Bohan



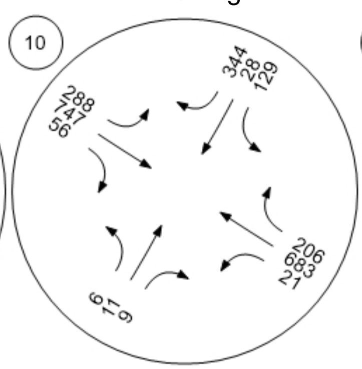

Marsh Rd/Bay Rd



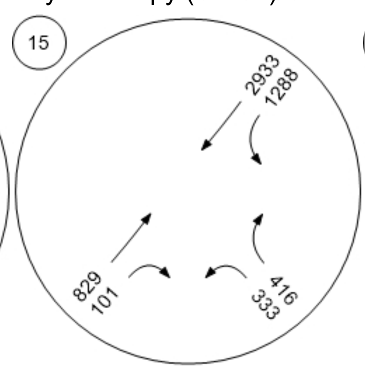

Middlefield Rd/Ravenswood



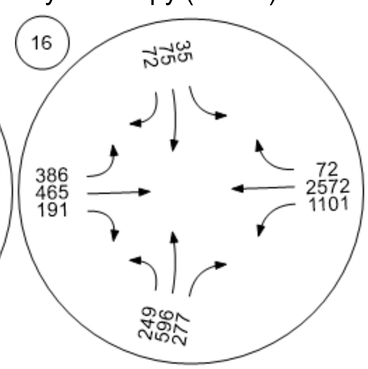

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer



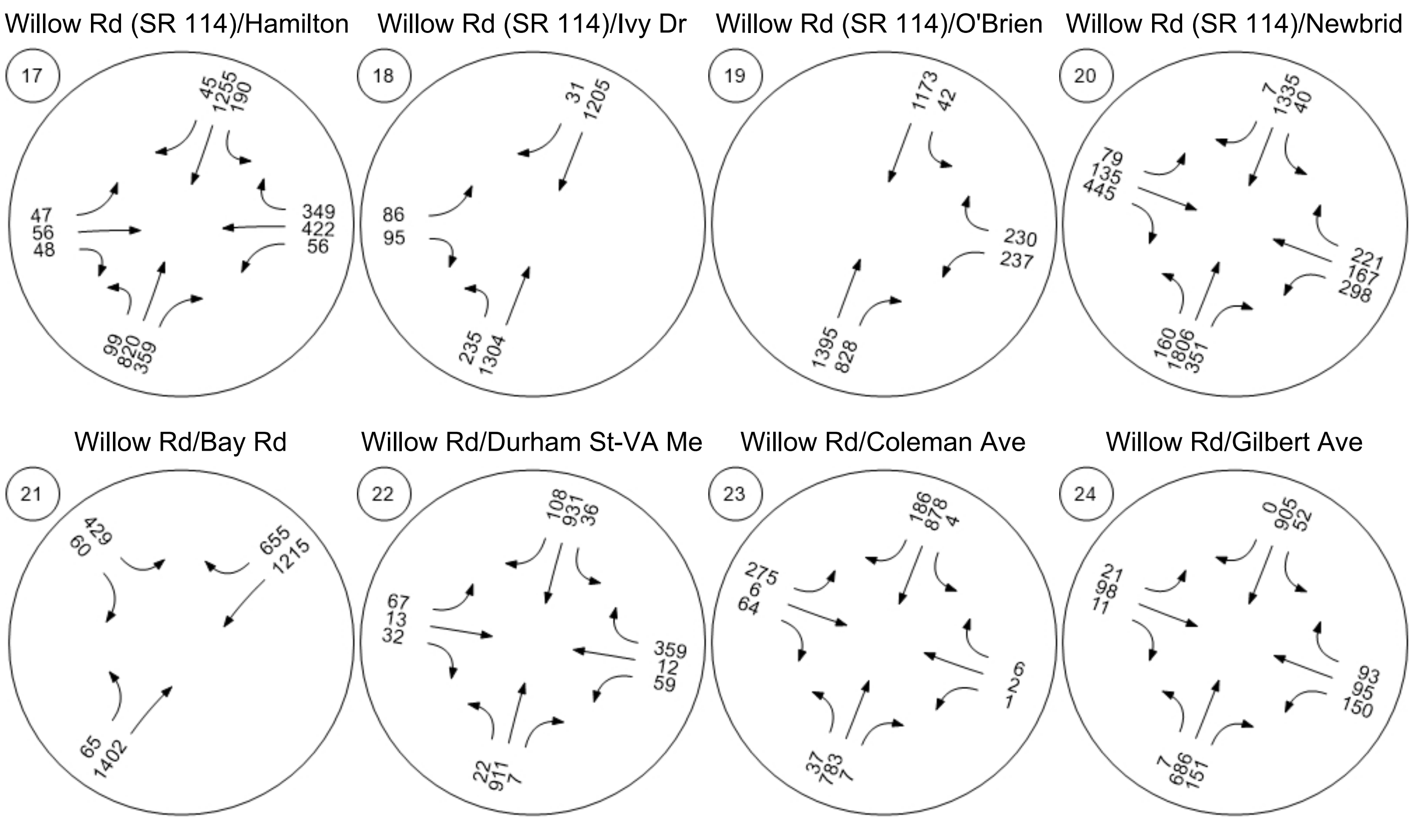

Bayfront Expy (SR 84)/Willow



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

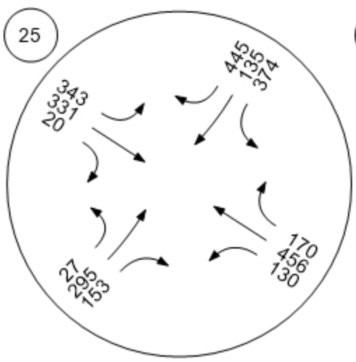



Generated with PTV VISTRO

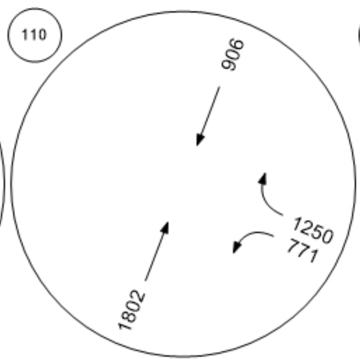
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

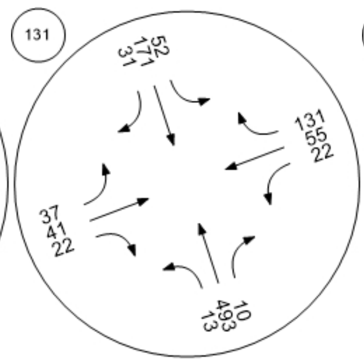

Middlefield Rd-Willow Rd



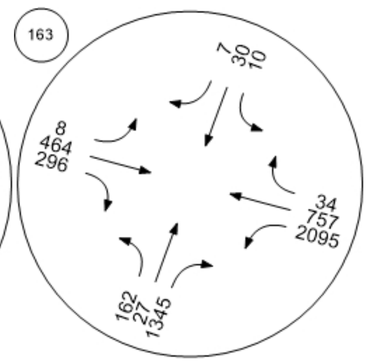

Marsh Road and US 101 NB



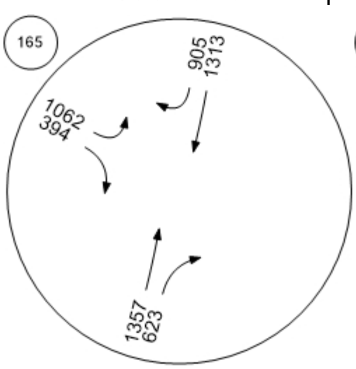

Chilco Street/Hamilton Avenu



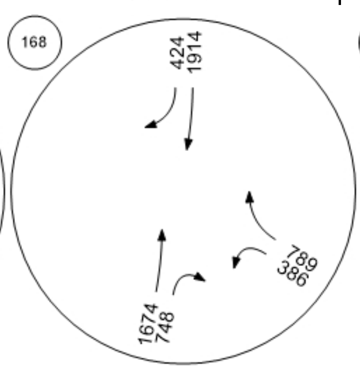

Bayfront Expy/Marsh Rd



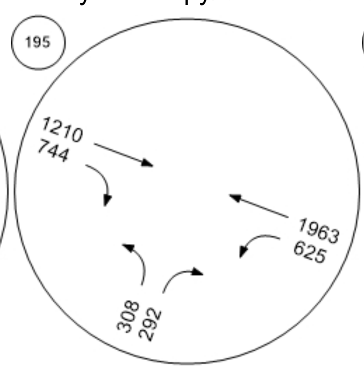

Willow Rd/US-101 SB Ramps



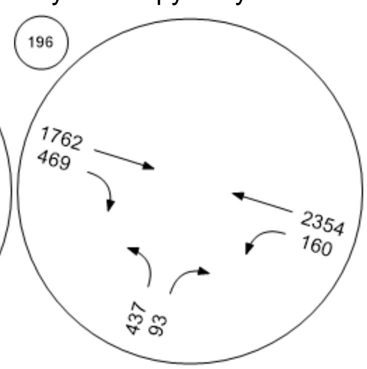

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

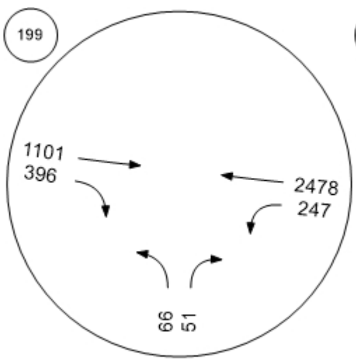



Bayfront Expy/Chrysler Drive

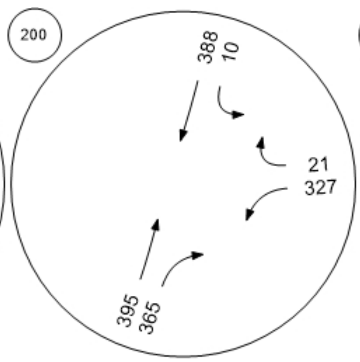


Traffic Volume - Future Total Volume

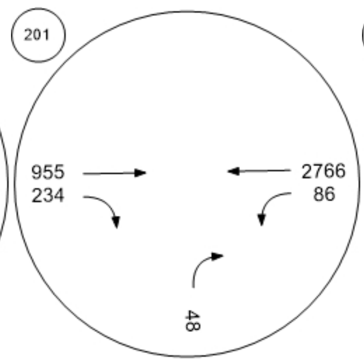

Bayfront Expwy/Bldg 21



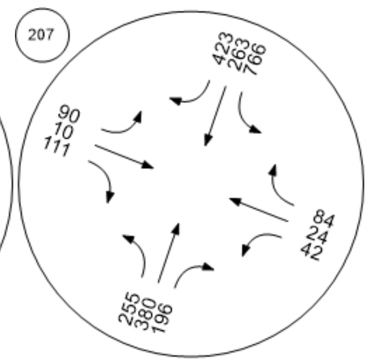

O'Brien Drive/Kavanaugh Dri



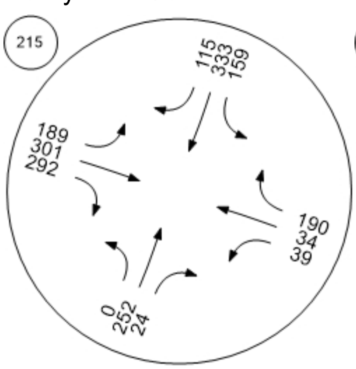

Bayfront Expwy/Bldg 20



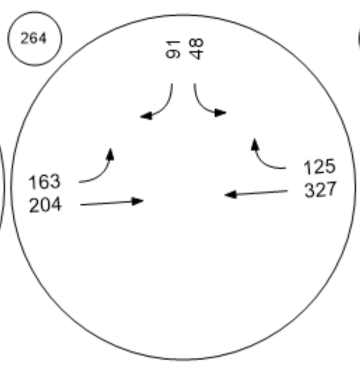

Chilco St/Constitution Dr



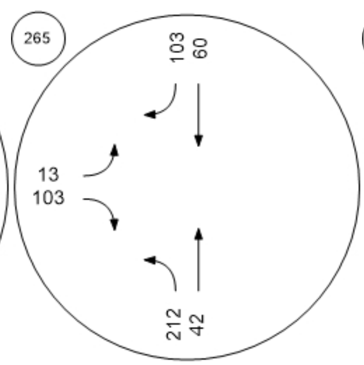

Chrysler Dr/Constitution Dr



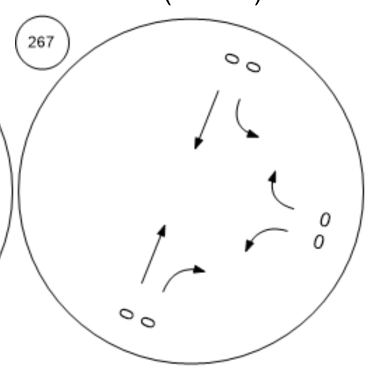

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

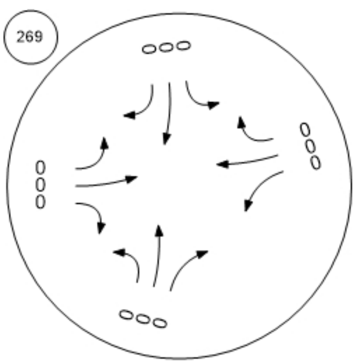


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

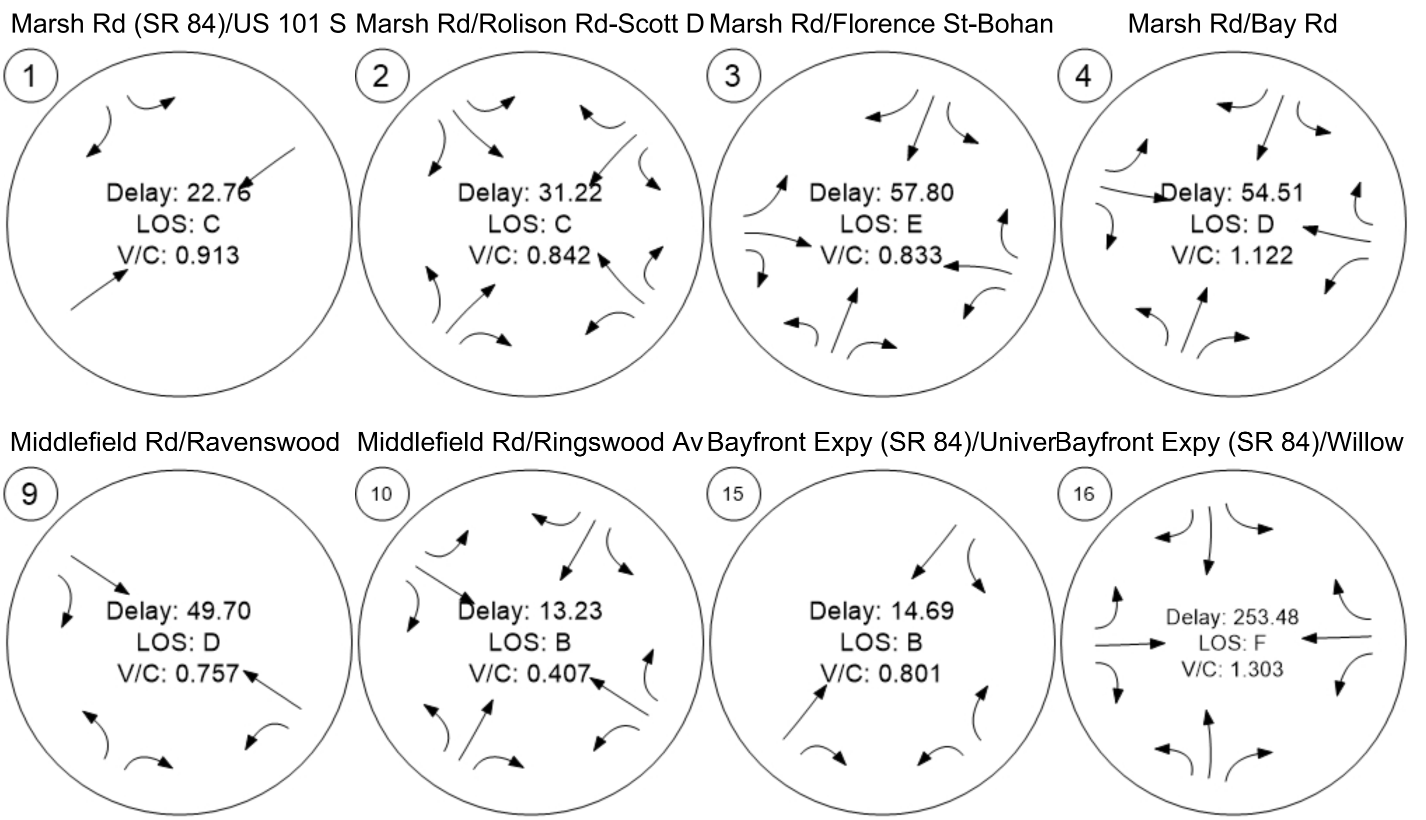

O'Brien Drive/Loop Road



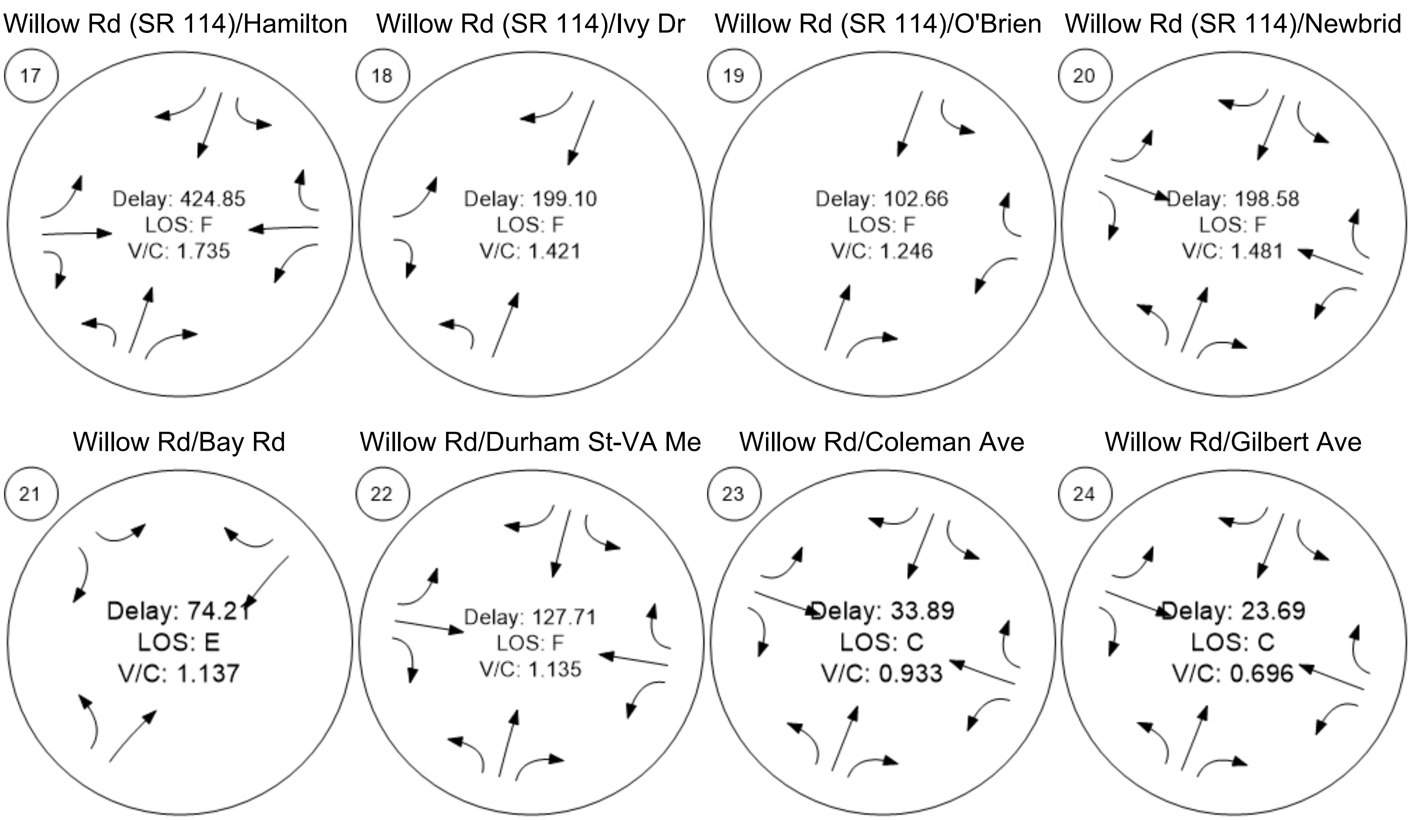
Generated with PTV VISTRO

Version 2021 (SP 0-4)

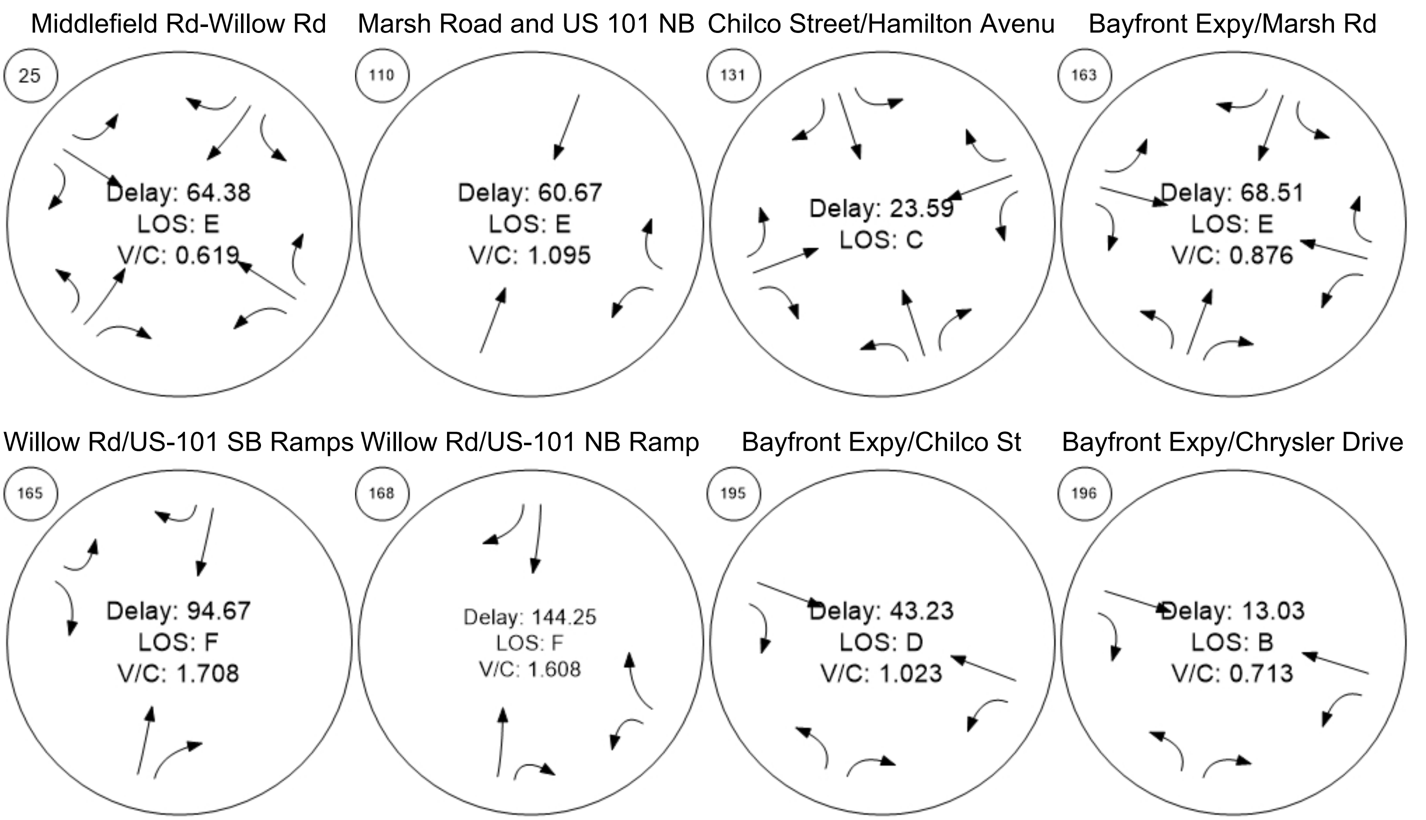
Traffic Conditions

Traffic Conditions

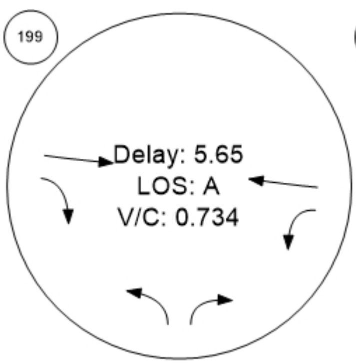



Traffic Conditions

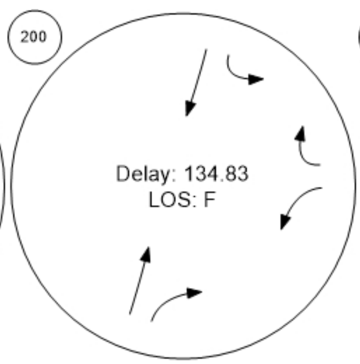



Traffic Conditions

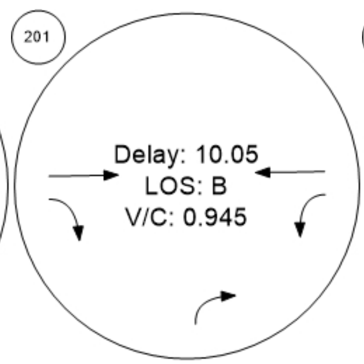

Bayfront Expwy/Bldg 21



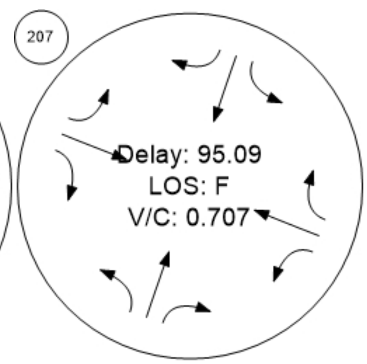

O'Brien Drive/Kavanaugh Dri



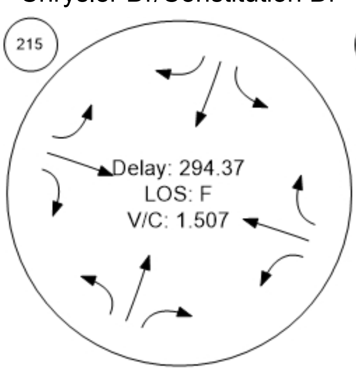

Bayfront Expwy/Bldg 20



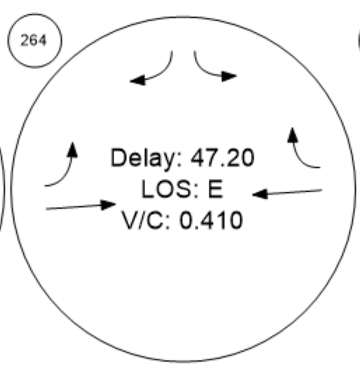

Chilco St/Constitution Dr



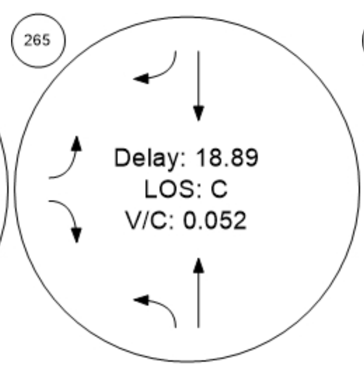

Chrysler Dr/Constitution Dr



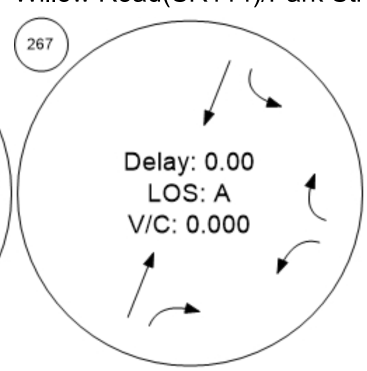

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

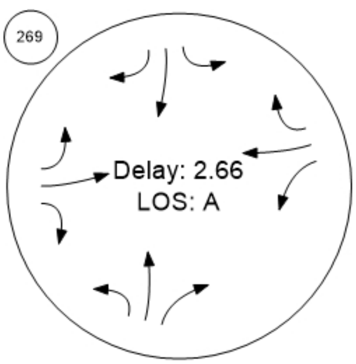


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions


O'Brien Drive/Loop Road

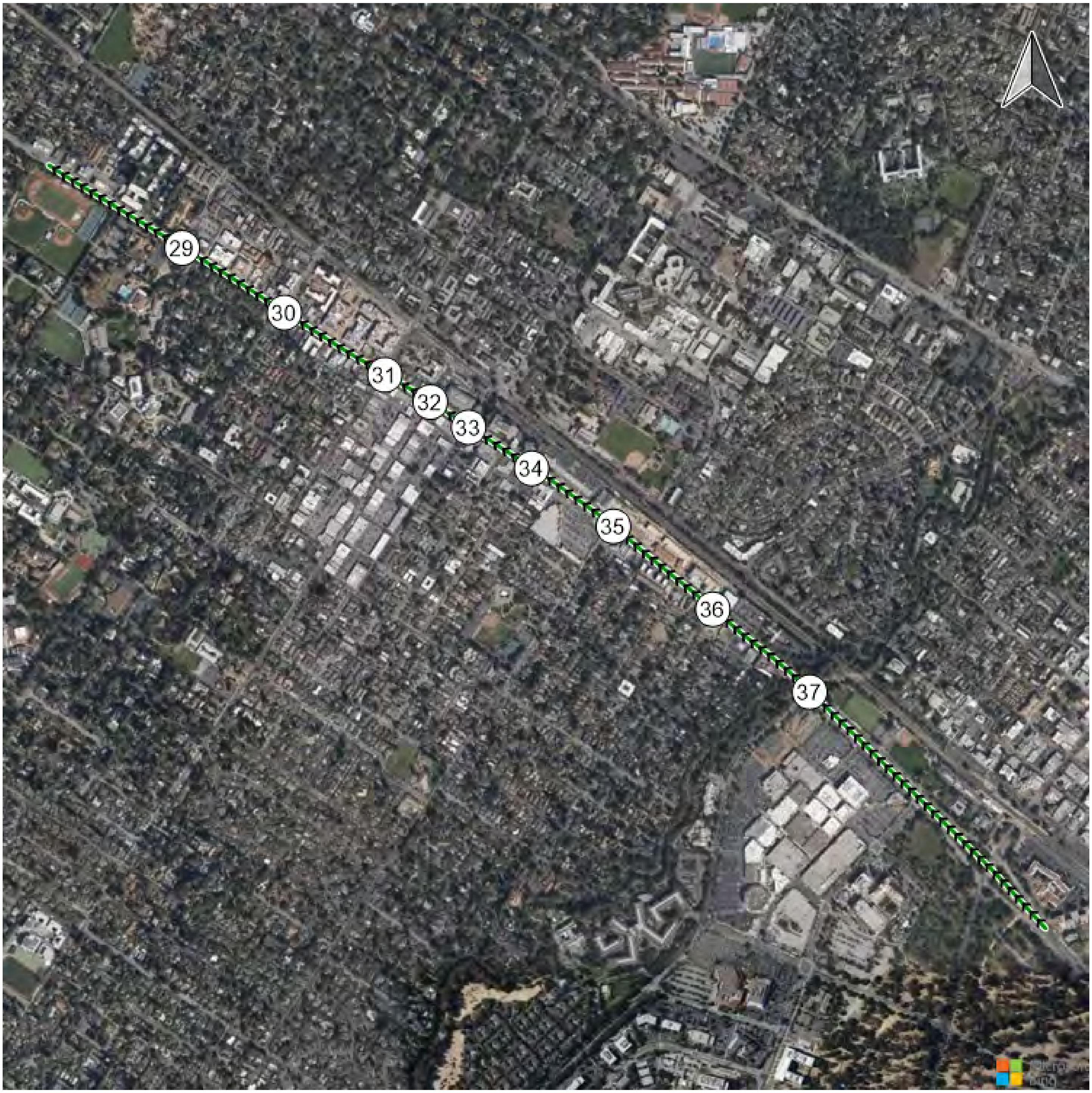


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



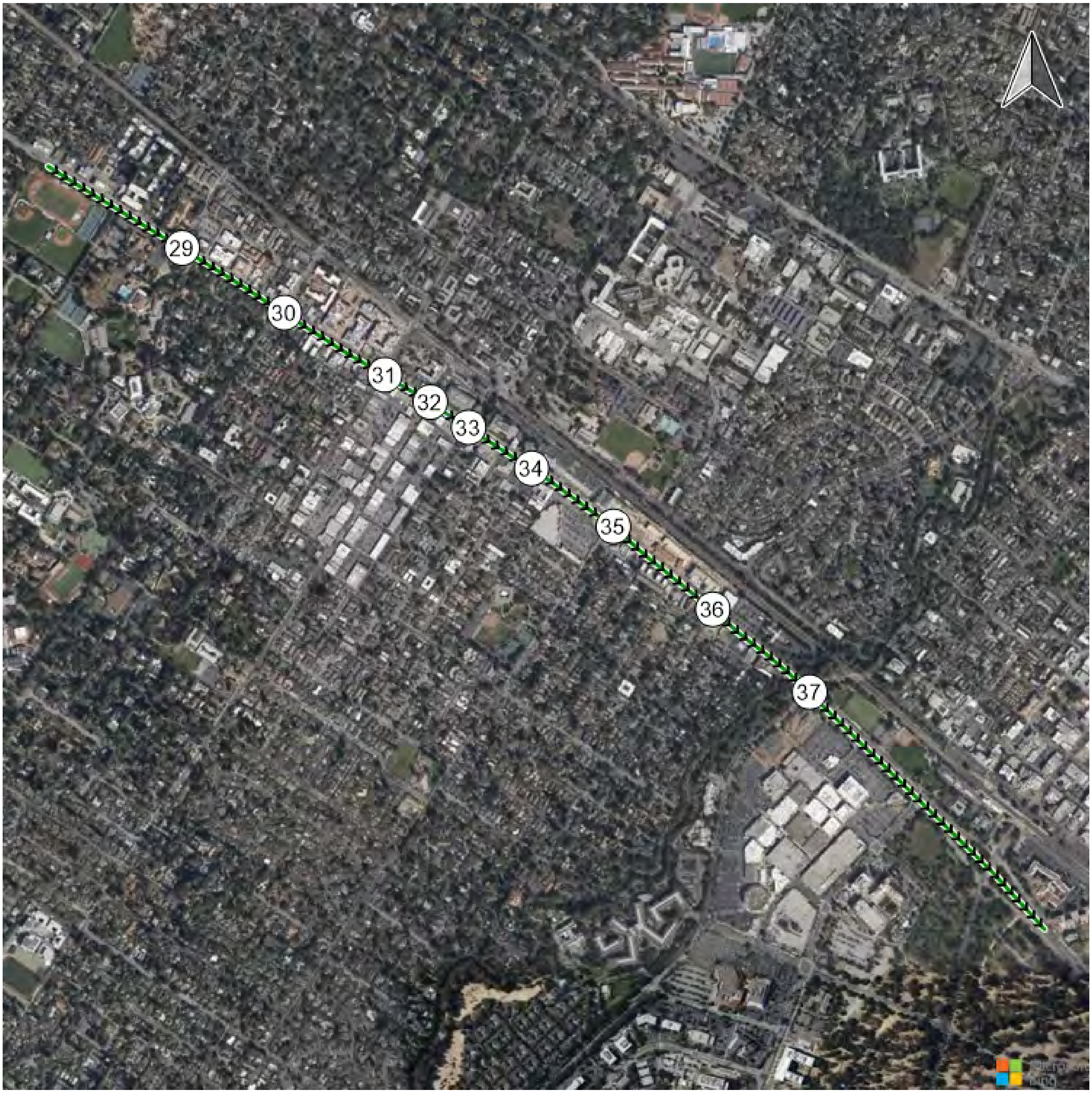
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



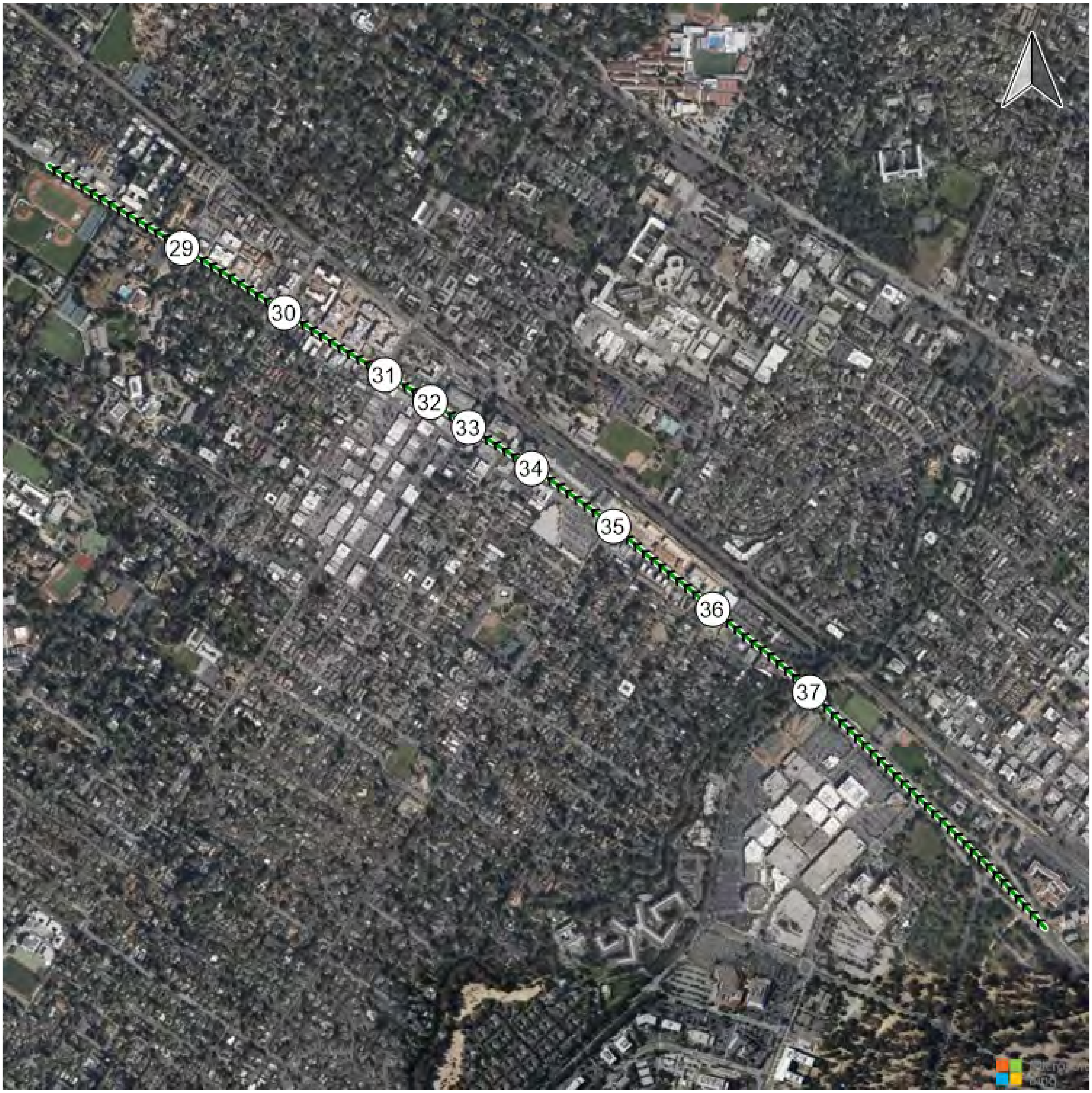
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



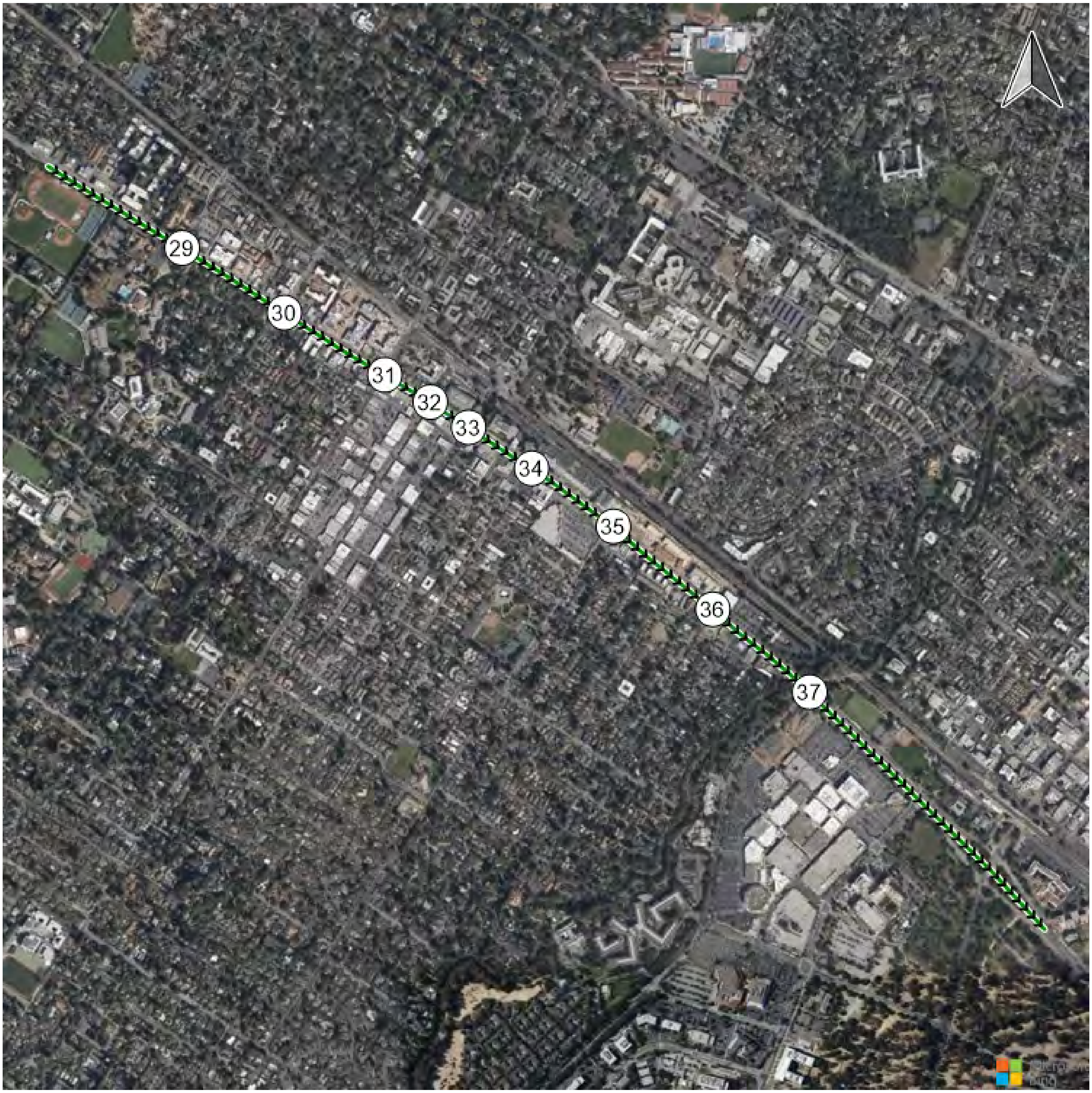
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro | Scenario 21 Cumulative w/dumbarton PM (2040 vols)
Report File: \...\Cumulative PM_DUMB.pdf | 12/9/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.800 | 19.2 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.586 | 17.8 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.840 | 51.5 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.876 | 47.9 | D |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.287 | 20.3 | C |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.532 | 21.0 | C |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NEB Thru | 1.158 | 137.3 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | SB Thru | 1.432 | 280.9 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | WB Right | 2.135 | 535.8 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.231 | 122.0 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 2.367 | 445.4 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.603 | 270.7 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.406 | 227.4 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.276 | 221.9 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.693 | 13.1 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.563 | 14.1 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.713 | 42.5 | D |
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.994 | 22.9 | C |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 1.460 | 145.6 | F |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | WB Left | 1.066 | 63.2 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 2.089 | 163.0 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.264 | 237.6 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.114 | 68.3 | E |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | NB Left | 0.975 | 38.3 | D |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.940 | 36.3 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.504 | 157.8 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.888 | 18.6 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.085 | 251.9 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.375 | 143.1 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 1.521 | 393.2 | F |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.086 | 15.8 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.800 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | ǁ | | ǁ | | ┑┑┎ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 959 | 1145 | 279 | 1338 | 444 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 959 | 1145 | 279 | 1338 | 444 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 245 | 292 | 70 | 341 | 113 |
| Total Analysis Volume [veh/h] | 0 | 979 | 1168 | 279 | 1365 | 453 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.33 | 0.40 | 0.28 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2122 | 1785 | 1411 | 665 |
| d1, Uniform Delay [s] | 11.66 | 14.65 | 22.92 | 19.15 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.23 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.72 | 1.89 | 2.59 | 2.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.46 | 0.65 | 0.97 | 0.68 |
| d, Delay for Lane Group [s/veh] | 12.38 | 16.54 | 25.51 | 21.73 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.95 | 7.34 | 12.06 | 6.88 |
| 50th-Percentile Queue Length [ft/ln] | 123.73 | 183.60 | 301.38 | 172.00 |
| 95th-Percentile Queue Length [veh/ln] | 8.60 | 11.79 | 17.75 | 11.18 |
| 95th-Percentile Queue Length [ft/ln] | 214.94 | 294.70 | 443.73 | 279.55 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.38 | 16.54 | 0.00 | 25.51 | 21.73 |
| Movement LOS | | B | B | | C | C |
| d_A, Approach Delay [s/veh] | 12.38 | | 16.54 | | 24.57 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 19.19 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.800 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.866 | 0.000 | 2.524 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.81 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.367 | 2.523 | 1.560 |
| Bicycle LOS | B | B | A |

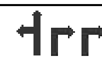
## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.586 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 49 | 1326 | 7 | 75 | 1031 | 249 | 15 | 6 | 412 | 303 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 1326 | 7 | 75 | 1031 | 249 | 15 | 6 | 86 | 303 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 345 | 2 | 20 | 268 | 65 | 4 | 2 | 22 | 79 | 2 | 1 |
| Total Analysis Volume [veh/h] | 51 | 1381 | 7 | 78 | 1074 | 259 | 16 | 6 | 90 | 316 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 99 | 99 | 98 | 98 | 98 | 9 | 9 | 18 | 18 |
| g / C, Green / Cycle | 0.05 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.06 | 0.06 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.26 | 0.26 | 0.09 | 0.36 | 0.37 | 0.01 | 0.03 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 899 | 1877 | 1737 | 1833 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 90 | 2520 | 1320 | 650 | 1315 | 1217 | 114 | 176 | 231 | 219 |
| d1, Uniform Delay [s] | 64.84 | 7.91 | 7.91 | 8.27 | 9.87 | 10.01 | 62.26 | 63.54 | 58.56 | 58.56 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.14 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.08 | 0.40 | 0.77 | 0.10 | 1.48 | 1.67 | 0.60 | 1.72 | 3.22 | 3.39 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.36 | 0.36 | 0.12 | 0.52 | 0.53 | 0.19 | 0.51 | 0.73 | 0.73 |
| d, Delay for Lane Group [s/veh] | 68.92 | 8.31 | 8.68 | 8.38 | 11.35 | 11.68 | 62.86 | 65.25 | 61.78 | 61.95 |
| Lane Group LOS | E | A | A | A | B | B | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.88 | 5.14 | 5.52 | 0.38 | 9.73 | 9.39 | 0.77 | 1.61 | 5.97 | 5.67 |
| 50th-Percentile Queue Length [ft/ln] | 46.90 | 128.46 | 137.94 | 9.58 | 243.30 | 234.66 | 19.29 | 40.32 | 149.17 | 141.66 |
| 95th-Percentile Queue Length [veh/ln] | 3.38 | 8.86 | 9.37 | 0.69 | 14.85 | 14.41 | 1.39 | 2.90 | 9.97 | 9.57 |
| 95th-Percentile Queue Length [ft/ln] | 84.42 | 221.40 | 234.25 | 17.24 | 371.20 | 360.27 | 34.73 | 72.58 | 249.32 | 239.26 |

**Movement, Approach, & Intersection Results**

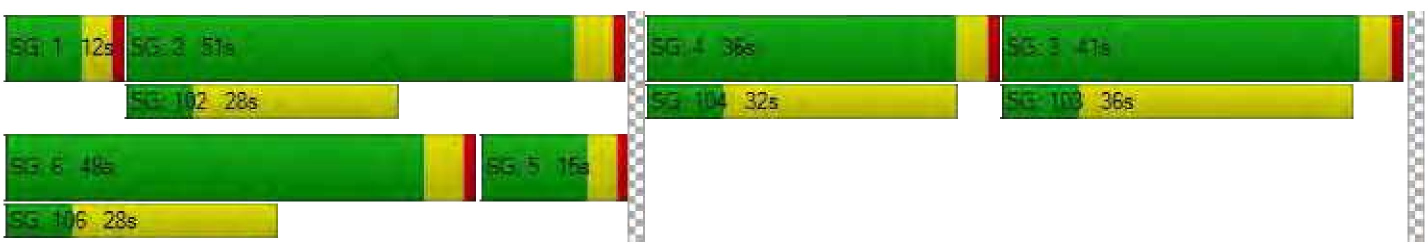
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 68.92 | 8.44 | 8.68 | 8.38 | 11.47 | 11.68 | 62.86 | 62.86 | 65.25 | 61.86 | 61.95 | 61.95 |
| Movement LOS | E | A | A | A | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 10.58 | | | 11.34 | | | 64.78 | | | 61.86 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 17.84 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.586 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.954 | 3.187 | 2.944 | 2.135 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.351 | 2.724 | 2.282 | 2.098 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 51.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.840 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 290 | 675 | 54 | 13 | 989 | 354 | 451 | 34 | 234 | 127 | 85 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 290 | 675 | 54 | 13 | 989 | 354 | 451 | 34 | 60 | 127 | 85 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 78 | 181 | 15 | 3 | 266 | 95 | 121 | 9 | 16 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 312 | 726 | 58 | 14 | 1063 | 381 | 485 | 37 | 65 | 137 | 91 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 87 | 87 | 4 | 71 | 71 | 25 | 25 | 25 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.51 | 0.51 | 0.18 | 0.18 | 0.18 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.40 | 0.42 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 1867 | 1675 | 1774 | 1822 | 1572 | 1751 | 1786 |
| c, Capacity [veh/h] | 252 | 1154 | 1120 | 45 | 946 | 849 | 319 | 328 | 283 | 199 | 203 |
| d1, Uniform Delay [s] | 59.92 | 12.65 | 12.67 | 66.82 | 28.37 | 29.13 | 54.97 | 54.96 | 48.97 | 59.55 | 59.34 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 135.69 | 0.82 | 0.85 | 1.45 | 6.69 | 8.78 | 3.62 | 3.52 | 0.30 | 3.13 | 2.71 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.24 | 0.34 | 0.35 | 0.31 | 0.79 | 0.82 | 0.81 | 0.81 | 0.23 | 0.69 | 0.66 |
| d, Delay for Lane Group [s/veh] | 195.61 | 13.47 | 13.51 | 68.27 | 35.06 | 37.91 | 58.59 | 58.49 | 49.27 | 62.68 | 62.05 |
| Lane Group LOS | F | B | B | E | D | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 18.40 | 6.11 | 5.97 | 0.51 | 21.82 | 21.28 | 9.11 | 9.35 | 2.00 | 4.89 | 4.75 |
| 50th-Percentile Queue Length [ft/ln] | 459.92 | 152.83 | 149.32 | 12.71 | 545.55 | 531.96 | 227.85 | 233.71 | 50.02 | 122.35 | 118.86 |
| 95th-Percentile Queue Length [veh/ln] | 27.89 | 10.17 | 9.98 | 0.91 | 29.48 | 28.84 | 14.06 | 14.36 | 3.60 | 8.52 | 8.33 |
| 95th-Percentile Queue Length [ft/ln] | 697.37 | 254.20 | 249.52 | 22.87 | 737.07 | 721.09 | 351.62 | 359.06 | 90.04 | 213.06 | 208.26 |

**Movement, Approach, & Intersection Results**

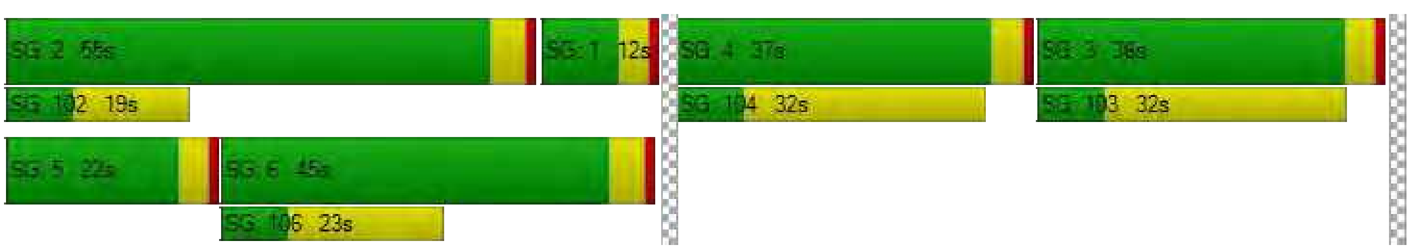
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 195.61 | 13.49 | 13.51 | 68.27 | 35.91 | 37.91 | 58.54 | 58.49 | 49.27 | 62.68 | 62.05 | 62.05 |
| Movement LOS | F | B | B | E | D | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 65.34 | | | 36.74 | | | 57.51 | | | 62.37 | | |
| Approach LOS | E | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 51.54 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.840 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.955 | 3.056 | 2.713 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.464 | 2.762 | 2.815 | 2.007 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 47.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.876 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 61 | 416 | 703 | 68 | 77 | 26 | 2 | 65 | 61 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 61 | 416 | 703 | 68 | 77 | 26 | 2 | 65 | 61 | 339 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 17 | 117 | 197 | 19 | 22 | 7 | 1 | 18 | 17 | 95 |
| Total Analysis Volume [veh/h] | 2 | 837 | 69 | 467 | 790 | 76 | 87 | 29 | 2 | 73 | 69 | 381 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 29 | 29 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.20 | 0.58 | 0.58 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.26 | 0.23 | 0.24 | 0.19 | 0.31 |
| s, saturation flow rate [veh/h] | 1859 | 1644 | 1795 | 1885 | 1818 | 608 | 1673 |
| c, Capacity [veh/h] | 677 | 559 | 361 | 1090 | 1051 | 300 | 661 |
| d1, Uniform Delay [s] | 23.56 | 23.62 | 32.07 | 9.31 | 9.33 | 19.88 | 23.34 |
| k, delay calibration | 0.50 | 0.50 | 0.24 | 0.50 | 0.50 | 0.24 | 0.41 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.23 | 9.56 | 142.67 | 1.11 | 1.17 | 1.86 | 7.82 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.71 | 0.76 | 1.29 | 0.40 | 0.41 | 0.39 | 0.79 |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 29.78 | 33.18 | 174.74 | 10.41 | 10.50 | 21.75 | 31.16 |
| Lane Group LOS | C | C | F | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.67 | 8.16 | 20.92 | 3.92 | 3.84 | 1.86 | 9.88 |
| 50th-Percentile Queue Length [ft/ln] | 216.70 | 203.93 | 523.02 | 98.07 | 96.10 | 46.39 | 247.04 |
| 95th-Percentile Queue Length [veh/ln] | 13.50 | 12.84 | 32.13 | 7.06 | 6.92 | 3.34 | 15.04 |
| 95th-Percentile Queue Length [ft/ln] | 337.41 | 321.03 | 803.19 | 176.53 | 172.97 | 83.51 | 375.92 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.78 | 31.24 | 33.18 | 174.74 | 10.45 | 10.50 | 21.75 | 21.75 | 21.75 | 31.16 | 31.16 | 31.16 |
| Movement LOS | C | C | C | F | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | | 31.38 | | | 68.01 | | | 21.75 | | | 31.16 | |
| Approach LOS | | C | | | E | | | C | | | C | |
| d_I, Intersection Delay [s/veh] | | | | | | 47.89 | | | | | | |
| Intersection LOS | | | | | | D | | | | | | |
| Intersection V/C | | | | | | 0.876 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.82 | 29.82 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.017 | 1.819 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.74 | 8.66 | 17.46 | 17.43 |
| I_b,int, Bicycle LOS Score for Intersection | 2.309 | 2.659 | 1.754 | 2.423 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.287 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 543 | 481 | 634 | 475 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 481 | 634 | 475 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 124 | 163 | 122 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 496 | 654 | 490 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 83 | 83 | 83 | 83 | 83 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 27 | 64 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.32 | 0.77 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.28 | 0.35 | 0.33 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1806 |
| c, Capacity [veh/h] | 267 | 239 | 582 | 1457 | 818 |
| d1, Uniform Delay [s] | 32.56 | 0.00 | 26.18 | 3.35 | 18.57 |
| k, delay calibration | 0.08 | 0.08 | 0.23 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.20 | 0.00 | 7.45 | 0.22 | 5.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.53 | 0.00 | 0.85 | 0.45 | 0.73 |
| d, Delay for Lane Group [s/veh] | 33.76 | 0.00 | 33.64 | 3.57 | 24.25 |
| Lane Group LOS | C | A | C | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.64 | 0.00 | 9.74 | 2.26 | 9.73 |
| 50th-Percentile Queue Length [ft/ln] | 66.11 | 0.00 | 243.60 | 56.47 | 243.33 |
| 95th-Percentile Queue Length [veh/ln] | 4.76 | 0.00 | 14.86 | 4.07 | 14.85 |
| 95th-Percentile Queue Length [ft/ln] | 119.00 | 0.00 | 371.59 | 101.64 | 371.25 |

**Movement, Approach, & Intersection Results**

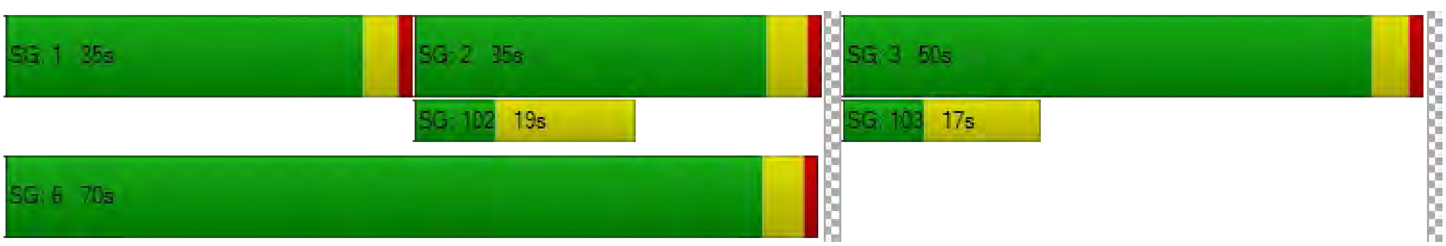
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.76 | 0.00 | 33.64 | 3.57 | 24.25 | 24.25 |
| Movement LOS | C | A | C | A | C | C |
| d_A, Approach Delay [s/veh] | 33.76 | | 16.54 | | 24.25 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 20.26 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 2.287 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.17 | 31.17 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.925 | 2.877 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1105 | 1578 | 734 |
| d_b, Bicycle Delay [s] | 8.34 | 1.87 | 16.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.457 | 2.545 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.532 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 214 | 0 | 287 | 2 | 767 | 135 | 326 | 718 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 214 | 0 | 279 | 2 | 767 | 78 | 326 | 718 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 56 | 0 | 73 | 1 | 202 | 21 | 86 | 189 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 225 | 0 | 294 | 2 | 807 | 82 | 343 | 756 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 34 | 34 | 34 | 34 | 82 | 65 | 65 | 80 | 75 | 75 |
| g / C, Green / Cycle | 0.28 | 0.28 | 0.28 | 0.28 | 0.69 | 0.55 | 0.55 | 0.66 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.20 | 0.19 | 0.00 | 0.23 | 0.05 | 0.39 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1421 | 1719 | 1128 | 1540 | 748 | 3569 | 1559 | 882 | 1873 | 1871 |
| c, Capacity [veh/h] | 156 | 481 | 376 | 431 | 535 | 1946 | 850 | 584 | 1179 | 1177 |
| d1, Uniform Delay [s] | 53.51 | 32.37 | 42.15 | 38.16 | 7.30 | 16.03 | 13.07 | 10.60 | 10.33 | 10.34 |
| k, delay calibration | 0.10 | 0.10 | 0.25 | 0.23 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 0.13 | 3.49 | 3.93 | 0.00 | 0.65 | 0.23 | 4.28 | 0.72 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.14 | 0.60 | 0.68 | 0.00 | 0.41 | 0.10 | 0.59 | 0.32 | 0.32 |
| d, Delay for Lane Group [s/veh] | 54.22 | 32.50 | 45.64 | 42.09 | 7.31 | 16.68 | 13.29 | 14.89 | 11.06 | 11.06 |
| Lane Group LOS | D | C | D | D | A | B | B | B | B | B |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.54 | 6.47 | 8.09 | 0.02 | 6.46 | 1.09 | 4.12 | 4.63 | 4.63 |
| 50th-Percentile Queue Length [ft/ln] | 27.21 | 38.58 | 161.82 | 202.14 | 0.41 | 161.38 | 27.34 | 103.08 | 115.86 | 115.77 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 2.78 | 10.65 | 12.75 | 0.03 | 10.62 | 1.97 | 7.42 | 8.17 | 8.16 |
| 95th-Percentile Queue Length [ft/ln] | 48.99 | 69.44 | 266.13 | 318.73 | 0.75 | 265.55 | 49.21 | 185.55 | 204.13 | 204.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.22 | 32.50 | 32.50 | 45.64 | 45.64 | 42.09 | 7.31 | 16.68 | 13.29 | 14.89 | 11.06 | 11.06 |
| Movement LOS | D | C | C | D | D | D | A | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 40.02 | | | 43.63 | | | 16.35 | | | 12.25 | | |
| Approach LOS | D | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 20.98 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.532 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.979 | 2.568 | 3.240 | 2.876 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.429 | 2.342 | 2.468 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 137.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.158 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3669 | 20 | 389 | 970 | 68 | 1940 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3669 | 20 | 389 | 970 | 68 | 1940 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 936 | 5 | 99 | 247 | 17 | 495 |
| Total Analysis Volume [veh/h] | 3744 | 20 | 397 | 990 | 69 | 1980 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 158 | 158 | 158 | 158 | 158 | 158 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 40 | 132 | 15 | 59 |
| g / C, Green / Cycle | 0.57 | 0.57 | 0.25 | 0.83 | 0.09 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.74 | 0.01 | 0.12 | 0.20 | 0.02 | 0.47 |
| s, saturation flow rate [veh/h] | 5077 | 1398 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2883 | 794 | 853 | 4171 | 309 | 1577 |
| d1, Uniform Delay [s] | 34.25 | 15.02 | 50.19 | 2.82 | 66.37 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 135.10 | 0.02 | 0.15 | 0.04 | 0.13 | 115.33 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.30 | 0.03 | 0.47 | 0.24 | 0.22 | 1.26 |
| d, Delay for Lane Group [s/veh] | 169.36 | 15.03 | 50.34 | 2.86 | 66.50 | 165.08 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 69.40 | 0.31 | 6.52 | 1.42 | 1.30 | 37.39 |
| 50th-Percentile Queue Length [ft/ln] | 1734.89 | 7.69 | 162.93 | 35.52 | 32.51 | 934.71 |
| 95th-Percentile Queue Length [veh/ln] | 100.55 | 0.55 | 10.70 | 2.56 | 2.34 | 54.70 |
| 95th-Percentile Queue Length [ft/ln] | 2513.82 | 13.84 | 267.60 | 63.94 | 58.52 | 1367.62 |

**Movement, Approach, & Intersection Results**

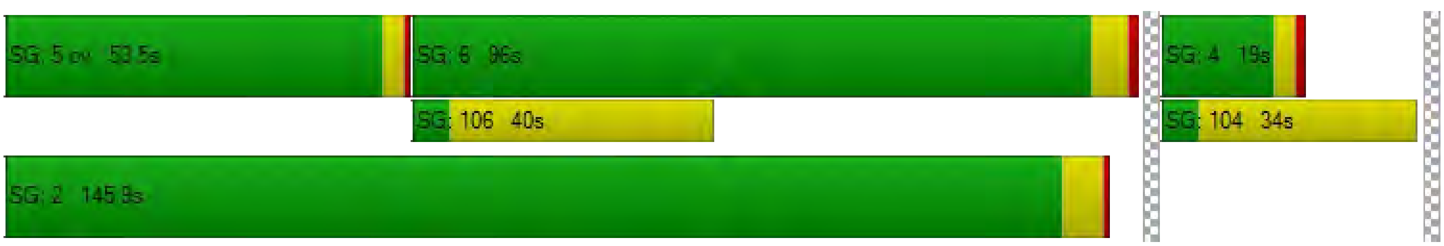
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 169.36 | 15.03 | 50.34 | 2.86 | 66.50 | 165.08 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 168.54 | | 16.45 | | 161.76 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 137.31 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.158 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 70.48 | 0.00 | 70.48 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.853 | 0.000 | 3.104 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 530 | 555 | 189 |
| d_b, Bicycle Delay [s] | 42.79 | 41.35 | 64.93 |
| I_b,int, Bicycle LOS Score for Intersection | 3.630 | 2.322 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 280.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.432 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 213 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 301 | 559 | 827 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 213 | 95 | 1112 | 159 | 332 | 76 | 76 | 2469 | 256 | 559 | 827 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 24 | 287 | 41 | 86 | 20 | 20 | 636 | 66 | 144 | 213 | 9 |
| Total Analysis Volume [veh/h] | 220 | 98 | 1146 | 164 | 342 | 78 | 78 | 2545 | 264 | 576 | 853 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 15 | 14 | 41 | 9 | 9 | 9 | 67 | 40 | 40 | 67 | 58 | 58 |
| g / C, Green / Cycle | 0.14 | 0.13 | 0.39 | 0.09 | 0.09 | 0.09 | 0.64 | 0.38 | 0.38 | 0.64 | 0.55 | 0.55 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.07 | 0.28 | 0.09 | 0.21 | 0.05 | 0.08 | 0.83 | 0.30 | 0.41 | 0.17 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4141 | 1748 | 1606 | 1443 | 967 | 3084 | 889 | 1392 | 4959 | 1615 |
| c, Capacity [veh/h] | 254 | 195 | 1597 | 149 | 137 | 123 | 626 | 1171 | 337 | 927 | 2722 | 887 |
| d1, Uniform Delay [s] | 44.05 | 42.54 | 27.38 | 48.21 | 48.21 | 46.36 | 7.90 | 32.70 | 28.86 | 24.22 | 12.95 | 10.95 |
| k, delay calibration | 0.16 | 0.11 | 0.15 | 0.36 | 0.48 | 0.11 | 0.11 | 0.23 | 0.27 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 11.96 | 1.99 | 0.88 | 91.19 | 693.19 | 5.28 | 0.09 | 529.65 | 9.59 | 0.69 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.50 | 0.72 | 1.10 | 2.49 | 0.63 | 0.12 | 2.17 | 0.78 | 0.62 | 0.31 | 0.04 |
| d, Delay for Lane Group [s/veh] | 56.02 | 44.53 | 28.25 | 139.40 | 741.40 | 51.65 | 7.99 | 562.36 | 38.46 | 24.90 | 13.02 | 10.97 |
| Lane Group LOS | E | D | C | F | F | D | A | F | D | C | B | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 6.30 | 1.21 | 7.84 | 7.75 | 15.02 | 2.17 | 0.33 | 67.00 | 6.63 | 2.79 | 3.55 | 0.36 |
| 50th-Percentile Queue Length [ft/ln] | 157.42 | 30.29 | 195.88 | 193.68 | 375.48 | 54.37 | 8.18 | 1674.97 | 165.63 | 69.83 | 88.87 | 9.05 |
| 95th-Percentile Queue Length [veh/ln] | 10.41 | 2.18 | 12.43 | 12.73 | 25.66 | 3.91 | 0.59 | 110.17 | 10.85 | 5.03 | 6.40 | 0.65 |
| 95th-Percentile Queue Length [ft/ln] | 260.30 | 54.52 | 310.65 | 318.23 | 641.39 | 97.86 | 14.73 | 2754.34 | 271.16 | 125.70 | 159.97 | 16.30 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

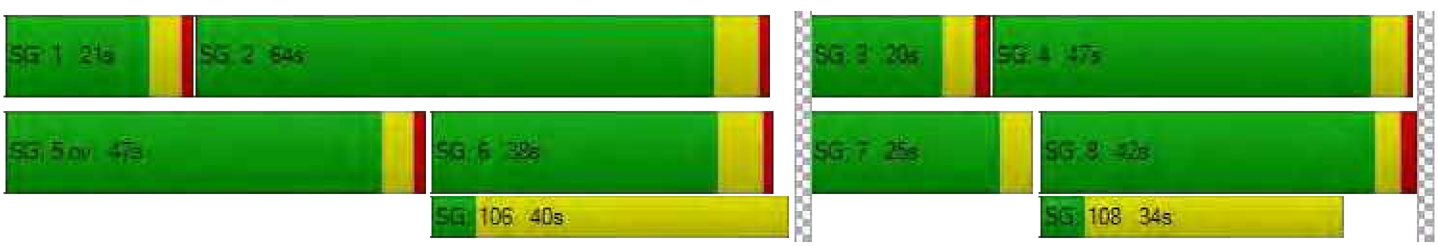
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 56.02 | 44.53 | 28.25 | 139.40 | 741.40 | 51.65 | 7.99 | 562.36 | 38.46 | 24.90 | 13.02 | 10.97 |
| Movement LOS | E | D | C | F | F | D | A | F | D | C | B | B |
| d_A, Approach Delay [s/veh] | | 33.51 | | | 480.22 | | | 499.47 | | | 17.65 | |
| Approach LOS | | C | | | F | | | F | | | B | |
| d_I, Intersection Delay [s/veh] | 280.92 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.432 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.03 | 0.00 | 44.03 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.466 | 0.000 | 3.255 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 809 | 712 | 608 | 1102 |
| d_b, Bicycle Delay [s] | 18.67 | 21.85 | 25.50 | 10.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.767 | 2.099 | 3.172 | 2.365 |
| Bicycle LOS | C | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 535.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.135 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 43 | 1065 | 287 | 138 | 994 | 54 | 123 | 196 | 35 | 193 | 194 | 264 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 1065 | 287 | 138 | 994 | 54 | 123 | 196 | 35 | 193 | 194 | 264 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 303 | 82 | 39 | 282 | 15 | 35 | 56 | 10 | 55 | 55 | 75 |
| Total Analysis Volume [veh/h] | 49 | 1210 | 326 | 157 | 1130 | 61 | 140 | 223 | 40 | 219 | 220 | 300 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 20 | 77 | 74 | 17 | 74 | 77 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 73 | 73 | 90 | 83 | 83 | 33 | 33 |
| g / C, Green / Cycle | 0.69 | 0.56 | 0.56 | 0.69 | 0.64 | 0.64 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.95 | 1.00 | 0.40 | 0.73 | 0.73 | 0.90 | 1.26 |
| s, saturation flow rate [veh/h] | 545 | 826 | 752 | 395 | 826 | 806 | 447 | 587 |
| c, Capacity [veh/h] | 164 | 464 | 422 | 161 | 526 | 514 | 150 | 173 |
| d1, Uniform Delay [s] | 33.67 | 28.46 | 28.46 | 42.72 | 23.56 | 23.56 | 53.59 | 45.14 |
| k, delay calibration | 0.22 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.09 | 320.93 | 360.13 | 64.53 | 83.84 | 88.20 | 775.75 | 1489.35 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.30 | 1.69 | 1.78 | 0.97 | 1.14 | 1.15 | 2.68 | 4.28 |
|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 35.76 | 349.39 | 388.60 | 107.24 | 107.39 | 111.76 | 829.35 | 1534.49 |
| Lane Group LOS | D | F | F | F | F | F | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.49 | 54.57 | 54.21 | 4.51 | 27.06 | 27.03 | 37.40 | 76.77 |
| 50th-Percentile Queue Length [ft/ln] | 12.16 | 1364.25 | 1355.32 | 112.85 | 676.61 | 675.77 | 934.88 | 1919.16 |
| 95th-Percentile Queue Length [veh/ln] | 0.88 | 89.53 | 90.19 | 8.00 | 39.44 | 39.64 | 62.91 | 124.08 |
| 95th-Percentile Queue Length [ft/ln] | 21.90 | 2238.36 | 2254.79 | 199.96 | 986.01 | 991.09 | 1572.73 | 3102.06 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.76 | 363.15 | 388.60 | 107.24 | 109.44 | 111.76 | 829.35 | 829.35 | 829.35 | 1534.49 | 1534.49 | 1534.49 |
| Movement LOS | D | F | F | F | F | F | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 358.26 | | | 109.29 | | | 829.35 | | | 1534.49 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 535.80 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 2.135 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.41 | 54.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.360 | 3.158 | 2.076 | 2.448 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1124 | 1078 | 505 | 508 |
| d_b, Bicycle Delay [s] | 12.47 | 13.93 | 36.42 | 36.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.867 | 2.672 | 2.225 | 2.779 |
| Bicycle LOS | C | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 122.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.231 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | ┐‖ | | ‖┝ | | ┐┌ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 175 | 933 | 1212 | 84 | 85 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 175 | 933 | 1212 | 84 | 85 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 47 | 251 | 326 | 23 | 23 | 31 |
| Total Analysis Volume [veh/h] | 188 | 1003 | 1303 | 90 | 91 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 21 | 103 | 79 | 79 | 20 | 20 |
| g / C, Green / Cycle | 0.16 | 0.79 | 0.61 | 0.61 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.64 | 0.84 | 0.86 | 0.09 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 809 | 1021 | 897 |
| c, Capacity [veh/h] | 203 | 1251 | 508 | 494 | 155 | 136 |
| d1, Uniform Delay [s] | 53.74 | 7.58 | 25.27 | 25.27 | 51.22 | 53.86 |
| k, delay calibration | 0.38 | 0.50 | 0.50 | 0.50 | 0.04 | 0.13 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 38.76 | 5.47 | 179.63 | 196.00 | 1.30 | 20.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.92 | 0.80 | 1.37 | 1.41 | 0.59 | 0.90 |
| d, Delay for Lane Group [s/veh] | 92.50 | 13.05 | 204.90 | 221.27 | 52.52 | 74.54 |
| Lane Group LOS | F | B | F | F | D | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.14 | 6.62 | 39.33 | 40.53 | 2.82 | 4.72 |
| 50th-Percentile Queue Length [ft/ln] | 203.44 | 165.47 | 983.14 | 1013.31 | 70.58 | 117.92 |
| 95th-Percentile Queue Length [veh/ln] | 12.82 | 10.84 | 61.46 | 63.98 | 5.08 | 8.28 |
| 95th-Percentile Queue Length [ft/ln] | 320.40 | 270.95 | 1536.43 | 1599.45 | 127.05 | 206.97 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 92.50 | 13.05 | 212.52 | 221.27 | 52.52 | 74.54 |
| Movement LOS | F | B | F | F | D | E |
| d_A, Approach Delay [s/veh] | 25.59 | | 213.08 | | 65.18 | |
| Approach LOS | C | | F | | E | |
| d_I, Intersection Delay [s/veh] | 121.96 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.231 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.999 | 2.958 | 2.118 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.542 | 2.709 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 445.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.367 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 649 | 57 | 1178 | 274 | 421 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 649 | 57 | 1178 | 274 | 421 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 174 | 15 | 317 | 74 | 113 |
| Total Analysis Volume [veh/h] | 1075 | 698 | 61 | 1267 | 295 | 453 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 1.29 | 0.09 | 0.99 | 0.46 | 0.82 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 555 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 97 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 456.86 | 43.45 | 134.38 | 742.76 | 1666.46 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 1.99 | 0.97 | 1.28 | 2.60 | 4.65 |
| d, Delay for Lane Group [s/veh] | 158.87 | 478.52 | 101.91 | 149.37 | 796.32 | 1720.02 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 53.29 | 2.73 | 29.15 | 27.16 | 48.26 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 1332.32 | 68.17 | 728.81 | 678.96 | 1206.38 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 92.19 | 4.91 | 45.78 | 45.61 | 77.99 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 2304.76 | 122.71 | 1144.45 | 1140.29 | 1949.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 478.52 | 101.91 | 149.37 | 796.32 | 1720.02 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 284.71 | | 147.19 | | 1355.72 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 445.40 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 2.367 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.448 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 3.022 | 2.655 | 2.794 |
| Bicycle LOS | C | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 270.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.603 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 410 | 1313 | 270 | 78 | 1282 | 27 | 50 | 223 | 574 | 399 | 362 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 410 | 1313 | 270 | 78 | 1282 | 27 | 50 | 223 | 399 | 399 | 362 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 113 | 361 | 74 | 21 | 352 | 7 | 14 | 61 | 110 | 110 | 99 | 3 |
| Total Analysis Volume [veh/h] | 451 | 1443 | 297 | 86 | 1409 | 30 | 55 | 245 | 438 | 438 | 398 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 8 | 50 | 50 | 36 | 36 | 36 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.06 | 0.39 | 0.39 | 0.27 | 0.27 | 0.27 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.35 | 0.47 | 0.48 | 0.09 | 0.51 | 0.51 | 0.03 | 0.25 | 0.28 | 0.13 | 0.31 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1191 | 952 | 1853 | 960 | 1810 | 965 | 1548 | 3409 | 1303 | 1416 |
| c, Capacity [veh/h] | 127 | 1056 | 507 | 59 | 718 | 372 | 496 | 265 | 425 | 420 | 160 | 174 |
| d1, Uniform Delay [s] | 58.50 | 37.32 | 37.32 | 61.00 | 39.82 | 39.82 | 35.31 | 45.89 | 46.51 | 57.00 | 57.00 | 50.36 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.32 | 0.41 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1164.26 | 60.85 | 81.09 | 223.20 | 153.48 | 163.32 | 0.04 | 29.04 | 47.73 | 26.02 | 685.03 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 3.54 | 1.10 | 1.13 | 1.47 | 1.32 | 1.32 | 0.11 | 0.93 | 1.03 | 1.04 | 2.48 | 0.07 |
| d, Delay for Lane Group [s/veh] | 1222.76 | 98.17 | 118.41 | 284.20 | 193.31 | 203.14 | 35.35 | 74.92 | 94.24 | 83.02 | 742.03 | 50.42 |
| Lane Group LOS | F | F | F | F | F | F | D | E | F | F | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 45.28 | 24.96 | 26.81 | 5.58 | 26.71 | 28.69 | 1.33 | 9.78 | 19.06 | 8.40 | 35.78 | 0.35 |
| 50th-Percentile Queue Length [ft/ln] | 1131.92 | 623.91 | 670.34 | 139.60 | 667.87 | 717.30 | 33.16 | 244.61 | 476.60 | 210.02 | 894.54 | 8.77 |
| 95th-Percentile Queue Length [veh/ln] | 70.53 | 35.54 | 38.45 | 10.05 | 41.42 | 44.23 | 2.39 | 14.91 | 26.74 | 13.39 | 57.08 | 0.63 |
| 95th-Percentile Queue Length [ft/ln] | 1763.30 | 888.57 | 961.20 | 251.29 | 1035.49 | 1105.70 | 59.69 | 372.86 | 668.56 | 334.85 | 1426.90 | 15.79 |

**Movement, Approach, & Intersection Results**

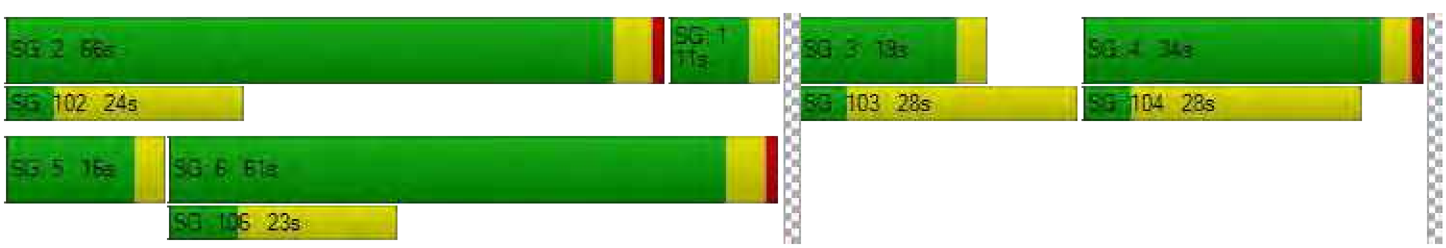
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1222.76 | 102.05 | 118.41 | 284.20 | 196.53 | 203.14 | 35.35 | 74.92 | 94.24 | 83.02 | 742.03 | 50.42 |
| Movement LOS | F | F | F | F | F | F | D | E | F | F | F | D |
| d_A, Approach Delay [s/veh] | 334.96 | | | 201.61 | | | 83.44 | | | 391.86 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 270.69 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.603 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.477 | 2.970 | 2.834 | 2.783 |
| Crosswalk LOS | C | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.54 | 50.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.765 | 2.398 | 3.066 | 3.033 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 227.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.406 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1329 | 804 | 270 | 341 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 40 | 1329 | 804 | 47 | 341 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 343 | 207 | 12 | 88 | 0 |
| Total Analysis Volume [veh/h] | 41 | 1370 | 829 | 48 | 352 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 3 | 42 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.03 | 0.48 | 0.41 | 0.41 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.82 | 0.49 | 0.03 | 0.41 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1574 | 850 | 1596 |
| c, Capacity [veh/h] | 54 | 805 | 690 | 645 | 348 | 654 |
| d1, Uniform Delay [s] | 42.28 | 22.85 | 25.92 | 15.77 | 25.92 | 0.00 |
| k, delay calibration | 0.04 | 0.44 | 0.19 | 0.15 | 0.46 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.54 | 320.27 | 96.10 | 0.07 | 48.58 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 1.70 | 1.20 | 0.07 | 1.01 | 0.00 |
| d, Delay for Lane Group [s/veh] | 49.82 | 343.12 | 122.02 | 15.84 | 74.50 | 0.00 |
| Lane Group LOS | D | F | F | B | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.99 | 43.41 | 15.80 | 0.57 | 11.49 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 24.65 | 1085.27 | 395.03 | 14.25 | 287.35 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.77 | 71.57 | 24.96 | 1.03 | 17.17 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 44.37 | 1789.22 | 623.94 | 25.66 | 429.23 | 0.00 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 49.82 | 343.12 | 122.02 | 15.84 | 74.50 | 0.00 |
| Movement LOS | D | F | F | B | F | A |
| d_A, Approach Delay [s/veh] | 334.60 | | 116.21 | | 74.50 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 227.37 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.406 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 33.58 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.236 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 820 | 820 | 820 |
| d_b, Bicycle Delay [s] | 15.35 | 15.32 | 15.30 |
| I_b,int, Bicycle LOS Score for Intersection | 2.724 | 2.467 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 221.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.276 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 21 | 21 | 8 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 293 | 1 | 8 | 150 | 5 | 39 | 9 | 6 | 6 | 2 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1170 | 4 | 32 | 600 | 20 | 158 | 34 | 23 | 23 | 9 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 4 | 102 | 13 | 13 | 13 | 19 | 19 |
| g / C, Green / Cycle | 0.01 | 0.65 | 0.65 | 0.02 | 0.67 | 0.08 | 0.08 | 0.08 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.92 | 0.92 | 0.02 | 1.04 | 0.05 | 0.05 | 0.05 | 0.01 | 0.11 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1840 | 444 | 1810 | 555 |
| c, Capacity [veh/h] | 10 | 449 | 384 | 43 | 395 | 144 | 151 | 37 | 225 | 69 |
| d1, Uniform Delay [s] | 75.91 | 26.66 | 26.66 | 74.41 | 25.58 | 68.22 | 68.20 | 67.79 | 59.52 | 66.02 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 119.64 | 196.85 | 199.11 | 22.85 | 267.57 | 4.90 | 4.60 | 16.41 | 0.20 | 30.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 1.41 | 1.41 | 0.75 | 1.57 | 0.65 | 0.65 | 0.63 | 0.10 | 0.88 |
| d, Delay for Lane Group [s/veh] | 195.55 | 223.51 | 225.77 | 97.26 | 293.15 | 73.12 | 72.80 | 84.21 | 59.71 | 96.54 |
| Lane Group LOS | F | F | F | F | F | E | E | F | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.74 | 40.19 | 34.63 | 1.54 | 43.03 | 3.87 | 4.04 | 1.06 | 0.82 | 2.96 |
| 50th-Percentile Queue Length [ft/ln] | 18.58 | 1004.71 | 865.80 | 38.44 | 1075.87 | 96.74 | 100.99 | 26.55 | 20.46 | 73.93 |
| 95th-Percentile Queue Length [veh/ln] | 1.34 | 63.76 | 55.65 | 2.77 | 71.06 | 6.97 | 7.27 | 1.91 | 1.47 | 5.32 |
| 95th-Percentile Queue Length [ft/ln] | 33.45 | 1593.98 | 1391.14 | 69.19 | 1776.53 | 174.14 | 181.79 | 47.79 | 36.83 | 133.08 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 195.55 | 224.55 | 225.77 | 97.26 | 293.15 | 293.15 | 72.99 | 72.80 | 84.21 | 59.71 | 96.54 | 96.54 |
| Movement LOS | F | F | F | F | F | F | E | E | F | E | F | F |
| d_A, Approach Delay [s/veh] | | 224.31 | | | 283.54 | | | 74.16 | | | 86.46 | |
| Approach LOS | | F | | | F | | | E | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 221.85 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.276 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 65.98 | 65.98 | 65.98 | 65.98 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.532 | 2.753 | 2.204 | 2.007 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 261 | 261 | 392 | 392 |
| d_b, Bicycle Delay [s] | 57.98 | 58.15 | 49.55 | 49.55 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.635 | 1.944 | 1.698 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.693 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 190 | 1 | 1 | 190 | 31 | 40 | 1 | 13 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 24 | 762 | 5 | 2 | 759 | 123 | 160 | 2 | 53 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 73 | 73 | 73 | 73 | 19 | 19 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.73 | 0.73 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.41 | 0.00 | 0.49 | 0.15 | 0.02 |
| s, saturation flow rate [veh/h] | 639 | 1851 | 712 | 1790 | 1412 | 1536 |
| c, Capacity [veh/h] | 357 | 1355 | 440 | 1310 | 325 | 343 |
| d1, Uniform Delay [s] | 15.96 | 6.13 | 11.73 | 7.07 | 38.63 | 33.61 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.17 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.36 | 1.72 | 0.02 | 2.78 | 3.63 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.07 | 0.57 | 0.00 | 0.67 | 0.66 | 0.08 |
| d, Delay for Lane Group [s/veh] | 16.33 | 7.85 | 11.75 | 9.85 | 42.26 | 33.70 |
| Lane Group LOS | B | A | B | A | D | C |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.35 | 6.90 | 0.02 | 8.91 | 5.31 | 0.56 |
| 50th-Percentile Queue Length [ft/ln] | 8.83 | 172.47 | 0.59 | 222.86 | 132.77 | 13.91 |
| 95th-Percentile Queue Length [veh/ln] | 0.64 | 11.21 | 0.04 | 13.81 | 9.09 | 1.00 |
| 95th-Percentile Queue Length [ft/ln] | 15.90 | 280.16 | 1.05 | 345.28 | 227.26 | 25.03 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.33 | 7.85 | 7.85 | 11.75 | 9.85 | 9.85 | 42.26 | 42.26 | 42.26 | 33.70 | 33.70 | 33.70 |
| Movement LOS | B | A | A | B | A | A | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 8.11 | | | 9.85 | | | 42.26 | | | 33.70 | | |
| Approach LOS | A | | | A | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 13.10 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.693 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.57 | 39.57 | 39.57 | 39.57 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.406 | 2.762 | 1.932 | 1.737 |
| Crosswalk LOS | B | C | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1379 | 1379 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.84 | 4.83 | 29.75 | 29.75 |
| I_b,int, Bicycle LOS Score for Intersection | 2.865 | 3.018 | 1.914 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.563 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 123 | 54 | 705 | 10 | 38 | 123 | 5 | 85 | 53 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 123 | 54 | 705 | 10 | 38 | 123 | 5 | 85 | 53 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 32 | 14 | 184 | 3 | 10 | 32 | 1 | 22 | 14 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 128 | 56 | 734 | 10 | 40 | 128 | 5 | 89 | 55 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 74 | 74 | 74 | 74 | 18 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.74 | 0.74 | 0.18 | 0.18 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.45 | 0.08 | 0.40 | 0.03 | 0.07 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 727 | 1794 | 683 | 1854 | 1258 | 1855 | 1272 | 1682 |
| c, Capacity [veh/h] | 468 | 1322 | 417 | 1366 | 196 | 336 | 194 | 305 |
| d1, Uniform Delay [s] | 10.40 | 6.32 | 13.35 | 5.78 | 41.94 | 36.11 | 43.97 | 35.99 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 2.14 | 0.67 | 1.56 | 0.51 | 0.76 | 1.70 | 0.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.01 | 0.61 | 0.13 | 0.54 | 0.20 | 0.40 | 0.46 | 0.38 |
| d, Delay for Lane Group [s/veh] | 10.42 | 8.45 | 14.02 | 7.34 | 42.45 | 36.87 | 45.67 | 36.76 |
| Lane Group LOS | B | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 7.68 | 0.75 | 6.38 | 0.95 | 2.95 | 2.24 | 2.54 |
| 50th-Percentile Queue Length [ft/ln] | 0.83 | 192.08 | 18.87 | 159.62 | 23.79 | 73.68 | 56.00 | 63.59 |
| 95th-Percentile Queue Length [veh/ln] | 0.06 | 12.23 | 1.36 | 10.53 | 1.71 | 5.30 | 4.03 | 4.58 |
| 95th-Percentile Queue Length [ft/ln] | 1.50 | 305.72 | 33.97 | 263.22 | 42.82 | 132.62 | 100.80 | 114.46 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.42 | 8.45 | 8.45 | 14.02 | 7.34 | 7.34 | 42.45 | 36.87 | 36.87 | 45.67 | 36.76 | 36.76 |
| Movement LOS | B | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 8.46 | | | 7.81 | | | 38.16 | | | 40.65 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 14.08 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.563 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.516 | 2.514 | 2.015 | 2.164 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.903 | 2.880 | 1.845 | 1.896 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 42.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.713 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 286 | 263 | 372 | 125 | 301 | 134 | 483 | 184 | 277 | 681 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 286 | 143 | 372 | 125 | 0 | 134 | 483 | 184 | 277 | 681 | 22 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 75 | 38 | 98 | 33 | 0 | 35 | 127 | 48 | 73 | 179 | 6 |
| Total Analysis Volume [veh/h] | 32 | 301 | 151 | 392 | 132 | 0 | 141 | 508 | 194 | 292 | 717 | 23 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 18 | 18 | 18 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.16 | 0.10 | 0.14 | 0.14 | 0.00 | 0.08 | 0.13 | 0.14 | 0.13 | 0.17 | 0.22 | 0.19 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1452 | 1785 | 1853 | 1584 | 1794 | 1892 | 1892 | 1541 | 1718 | 1900 | 1699 |
| c, Capacity [veh/h] | 349 | 370 | 285 | 344 | 357 | 305 | 325 | 343 | 343 | 279 | 428 | 474 | 423 |
| d1, Uniform Delay [s] | 33.48 | 39.13 | 36.27 | 38.78 | 38.78 | 0.00 | 37.05 | 39.26 | 39.59 | 38.89 | 34.57 | 36.57 | 35.64 |
| k, delay calibration | 0.11 | 0.29 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.13 | 0.24 | 0.19 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 10.84 | 1.52 | 3.27 | 3.15 | 0.00 | 0.91 | 2.86 | 3.49 | 3.10 | 2.32 | 10.02 | 5.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.81 | 0.53 | 0.75 | 0.75 | 0.00 | 0.43 | 0.72 | 0.76 | 0.69 | 0.68 | 0.86 | 0.78 |
| d, Delay for Lane Group [s/veh] | 33.59 | 49.97 | 37.79 | 42.05 | 41.93 | 0.00 | 37.96 | 42.13 | 43.09 | 42.00 | 36.90 | 46.59 | 41.15 |
| Lane Group LOS | C | D | D | D | D | A | D | D | D | D | D | D | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.66 | 8.20 | 3.42 | 6.36 | 6.59 | 0.00 | 3.18 | 6.03 | 6.45 | 4.71 | 6.72 | 10.86 | 8.17 |
| 50th-Percentile Queue Length [ft/ln] | 16.39 | 205.03 | 85.41 | 159.06 | 164.79 | 0.00 | 79.47 | 150.6 | 161.3 | 117.8 | 167.96 | 271.59 | 204.37 |
| 95th-Percentile Queue Length [veh/ln] | 1.18 | 12.90 | 6.15 | 10.50 | 10.80 | 0.00 | 5.72 | 10.05 | 10.62 | 8.27 | 10.97 | 16.27 | 12.86 |
| 95th-Percentile Queue Length [ft/ln] | 29.50 | 322.45 | 153.73 | 262.47 | 270.06 | 0.00 | 143.0 | 251.2 | 265.5 | 206.8 | 274.23 | 406.72 | 321.59 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.59 | 49.97 | 37.79 | 42.01 | 41.93 | 0.00 | 37.96 | 42.62 | 42.00 | 36.90 | 44.25 | 41.15 |
| Movement LOS | C | D | D | D | D | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 45.08 | | | 41.99 | | | 41.70 | | | 42.10 | | |
| Approach LOS | D | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 42.46 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.713 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.51 | 39.51 | 39.51 | 39.51 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.526 | 4.265 | 4.404 | 2.806 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 565 | 813 | 537 | 675 |
| d_b, Bicycle Delay [s] | 26.83 | 18.07 | 27.22 | 22.45 |
| I_b,int, Bicycle LOS Score for Intersection | 2.556 | 4.074 | 3.080 | 2.411 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.994 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1961 | 0 | 0 | 1461 | 570 | 869 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1961 | 0 | 0 | 1461 | 570 | 869 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 495 | 0 | 0 | 369 | 144 | 219 |
| Total Analysis Volume [veh/h] | 1981 | 0 | 0 | 1476 | 576 | 878 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.57 | 0.42 | 0.17 | 0.34 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2070 | 2094 | 1183 | 907 |
| d1, Uniform Delay [s] | 15.28 | 11.36 | 20.28 | 25.47 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.06 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 11.95 | 2.02 | 0.12 | 5.26 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.96 | 0.70 | 0.49 | 0.97 |
| d, Delay for Lane Group [s/veh] | 27.23 | 13.38 | 20.40 | 30.73 |
| Lane Group LOS | C | B | C | C |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 17.50 | 8.38 | 4.02 | 8.33 |
| 50th-Percentile Queue Length [ft/ln] | 437.40 | 209.38 | 100.62 | 208.24 |
| 95th-Percentile Queue Length [veh/ln] | 24.36 | 13.12 | 7.24 | 13.06 |
| 95th-Percentile Queue Length [ft/ln] | 608.89 | 328.03 | 181.11 | 326.57 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

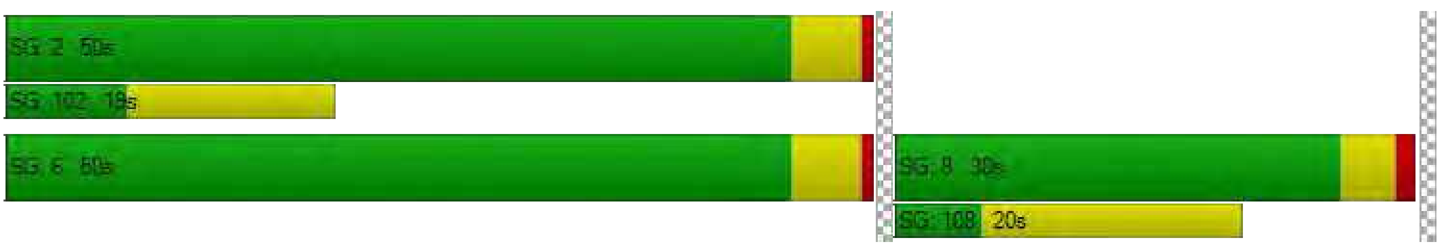
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.23 | 0.00 | 0.00 | 13.38 | 20.40 | 30.73 |
| Movement LOS | C | | | B | C | C |
| d_A, Approach Delay [s/veh] | 27.23 | | 13.38 | | 26.63 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 22.89 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.994 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.46 | 29.71 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.183 | 2.479 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 646 |
| d_b, Bicycle Delay [s] | 7.45 | 7.47 | 18.31 |
| I_b,int, Bicycle LOS Score for Intersection | 3.194 | 2.777 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# Intersection Level Of Service Report
## Intersection 131: Chilco Street/Hamilton Avenue

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 145.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.460 |

### Intersection Setup

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

### Volumes

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 285 | 18 | 143 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 285 | 18 | 143 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 47 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 77 | 5 | 39 | 188 | 10 | 6 | 37 | 6 | 2 | 5 | 13 |
| Total Analysis Volume [veh/h] | 24 | 308 | 19 | 155 | 753 | 39 | 24 | 149 | 24 | 8 | 20 | 51 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 609 | 947 | 533 | 523 |
| Degree of Utilization, x | 0.58 | 1.46 | 0.37 | 0.15 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 3.67 | 45.17 | 1.69 | 0.53 |
| 95th-Percentile Queue Length [ft] | 91.79 | 1129.25 | 42.26 | 13.20 |
| Approach Delay [s/veh] | 16.67 | 231.97 | 13.66 | 11.09 |
| Approach LOS | C | F | B | B |
| Intersection Delay [s/veh] | 145.55 | | | |
| Intersection LOS | F | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 63.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.066 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 752 | 236 | 2552 | 778 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 752 | 236 | 2552 | 778 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 10 | 460 | 3 | 8 | 1 | 2 | 196 | 61 | 665 | 203 | 4 |
| Total Analysis Volume [veh/h] | 205 | 42 | 1840 | 13 | 32 | 5 | 9 | 783 | 246 | 2658 | 810 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 27 | 117 | 10 | 10 | 38 | 38 | 38 | 76 | 76 |
| g / C, Green / Cycle | 0.17 | 0.73 | 0.06 | 0.06 | 0.24 | 0.24 | 0.24 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.44 | 0.02 | 0.01 | 0.22 | 0.22 | 0.16 | 0.52 | 0.49 |
| s, saturation flow rate [veh/h] | 1824 | 4190 | 1707 | 1588 | 1892 | 1724 | 1556 | 5150 | 1678 |
| c, Capacity [veh/h] | 305 | 2956 | 137 | 97 | 447 | 407 | 368 | 2449 | 798 |
| d1, Uniform Delay [s] | 64.18 | 12.37 | 71.59 | 71.56 | 59.74 | 59.74 | 55.21 | 41.95 | 41.95 |
| k, delay calibration | 0.41 | 0.50 | 0.04 | 0.04 | 0.15 | 0.15 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 17.20 | 1.00 | 0.27 | 0.45 | 11.12 | 11.97 | 0.79 | 46.11 | 40.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.62 | 0.20 | 0.23 | 0.93 | 0.93 | 0.67 | 1.09 | 1.03 |
| d, Delay for Lane Group [s/veh] | 81.38 | 13.37 | 71.86 | 72.01 | 70.86 | 71.71 | 56.00 | 88.06 | 82.80 |
| Lane Group LOS | F | B | E | E | E | E | E | F | F |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 11.21 | 11.43 | 1.10 | 0.89 | 17.86 | 16.37 | 9.12 | 42.22 | 40.10 |
| 50th-Percentile Queue Length [ft/ln] | 280.35 | 285.83 | 27.52 | 22.30 | 446.55 | 409.21 | 228.04 | 1055.50 | 1002.61 |
| 95th-Percentile Queue Length [veh/ln] | 16.71 | 16.98 | 1.98 | 1.61 | 24.79 | 23.00 | 14.07 | 56.37 | 51.87 |
| 95th-Percentile Queue Length [ft/ln] | 417.65 | 424.46 | 49.54 | 40.15 | 619.83 | 575.09 | 351.87 | 1409.34 | 1296.83 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

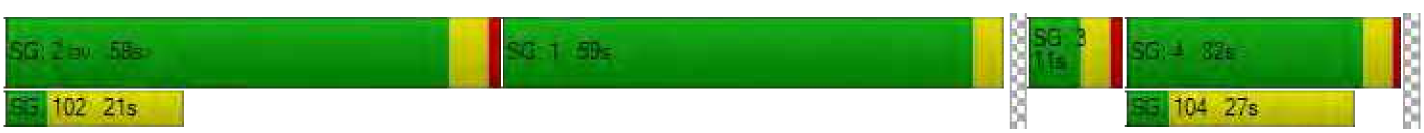
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 81.38 | 81.38 | 13.37 | 71.86 | 71.94 | 72.01 | 70.86 | 71.27 | 56.00 | 88.06 | 82.80 | 82.80 |
| Movement LOS | F | F | B | E | E | E | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | 21.42 | | | 71.93 | | | 67.65 | | | 86.82 | | |
| Approach LOS | C | | | E | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 63.22 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.066 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.661 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 5.003 | 1.601 | 2.416 | 7.307 |
| Bicycle LOS | F | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 163.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.089 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1045 | 199 | 0 | 1132 | 879 | 0 | 0 | 0 | 0 | 777 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1045 | 199 | 0 | 1132 | 879 | 0 | 0 | 0 | 0 | 777 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 281 | 50 | 0 | 304 | 236 | 0 | 0 | 0 | 0 | 194 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1124 | 199 | 0 | 1217 | 945 | 0 | 0 | 0 | 0 | 777 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.24 | 1.36 | | 0.22 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2753 | 2709 | 375 | | 1262 | 457 |
| d1, Uniform Delay [s] | 10.81 | 11.13 | 17.77 | | 21.03 | 23.66 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.45 | 0.54 | 692.46 | | 0.49 | 4.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.41 | 0.45 | 2.52 | | 0.62 | 0.86 |
| d, Delay for Lane Group [s/veh] | 11.26 | 11.67 | 710.23 | | 21.52 | 28.38 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.64 | 4.06 | 77.89 | | 5.73 | 3.50 |
| 50th-Percentile Queue Length [ft/ln] | 90.95 | 101.55 | 1947.21 | | 143.30 | 87.39 |
| 95th-Percentile Queue Length [veh/ln] | 6.55 | 7.31 | 133.25 | | 9.66 | 6.29 |
| 95th-Percentile Queue Length [ft/ln] | 163.71 | 182.79 | 3331.27 | | 241.47 | 157.29 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

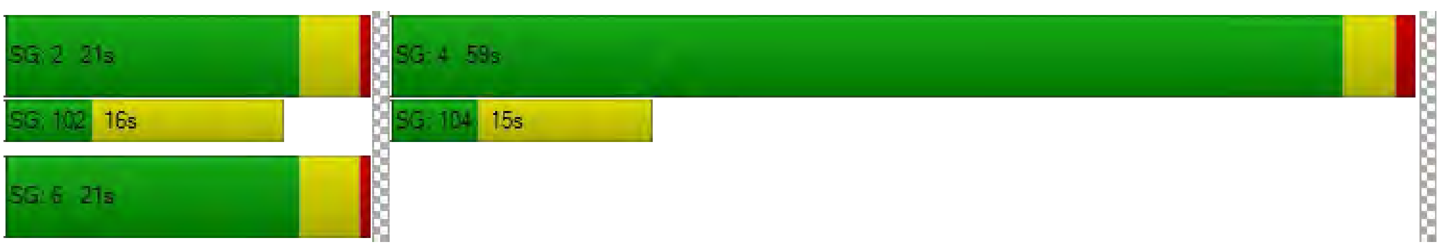
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.26 | 0.00 | 0.00 | 11.67 | 710.23 | 0.00 | 0.00 | 0.00 | 0.00 | 21.52 | 28.38 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | 11.26 | | | 317.01 | | | 0.00 | | | 23.82 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 162.96 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 2.089 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.970 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.178 | 2.749 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 237.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.264 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1309 | 459 | 0 | 1709 | 674 | 0 | 0 | 0 | 296 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1309 | 459 | 0 | 1709 | 674 | 0 | 0 | 0 | 296 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 334 | 117 | 0 | 436 | 169 | 0 | 0 | 0 | 74 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1336 | 468 | 0 | 1744 | 674 | 0 | 0 | 0 | 296 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.44 | 0.30 | 0.57 | | 0.08 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 915 | 474 | 915 | | 2108 | 1011 |
| d1, Uniform Delay [s] | 27.96 | 27.56 | 27.96 | | 6.99 | 14.75 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 212.84 | 38.50 | 411.45 | | 0.03 | 5.34 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.46 | 0.99 | 1.91 | | 0.14 | 0.94 |
| d, Delay for Lane Group [s/veh] | 240.81 | 66.06 | 439.41 | | 7.02 | 20.09 |
| Lane Group LOS | F | E | F | | A | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 23.56 | 13.41 | 40.39 | | 0.98 | 7.34 |
| 50th-Percentile Queue Length [ft/ln] | 589.02 | 335.27 | 1009.85 | | 24.45 | 183.58 |
| 95th-Percentile Queue Length [veh/ln] | 37.95 | 19.42 | 66.16 | | 1.76 | 11.79 |
| 95th-Percentile Queue Length [ft/ln] | 948.79 | 485.42 | 1653.93 | | 44.01 | 294.69 |

**Movement, Approach, & Intersection Results**

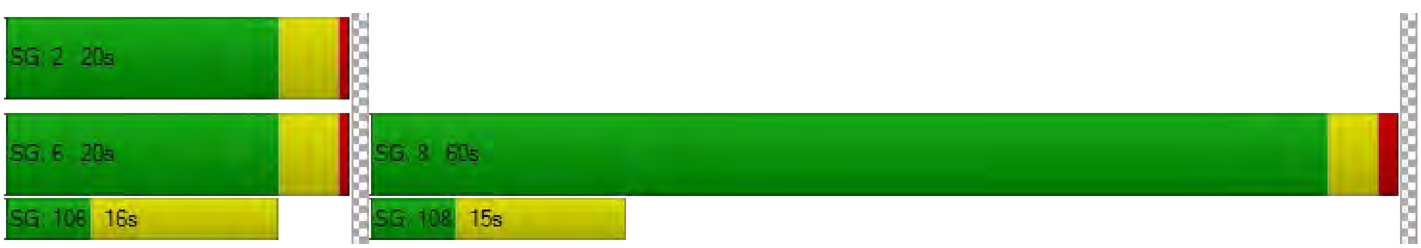
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 240.81 | 66.06 | 0.00 | 439.41 | 0.00 | 0.00 | 0.00 | 0.00 | 7.02 | 0.00 | 20.09 |
| Movement LOS | | F | E | | F | | | | | A | | C |
| d_A, Approach Delay [s/veh] | 195.47 | | | 439.41 | | | 0.00 | | | 16.99 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 237.64 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.264 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.151 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.552 | 2.519 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 68.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.114 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 749 | 582 | 2490 | 348 | 223 | 1819 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 749 | 582 | 2490 | 348 | 223 | 1819 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 201 | 156 | 669 | 94 | 60 | 489 |
| Total Analysis Volume [veh/h] | 805 | 626 | 2677 | 374 | 240 | 1956 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| | | | | | | |
|---|---|---|---|---|---|---|
| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 94 | 94 | 94 | 94 | 94 | 94 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 64 | 64 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.53 | 0.53 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.41 | 0.53 | 0.24 | 0.68 | 0.39 |
| s, saturation flow rate [veh/h] | 3361 | 1543 | 5049 | 1579 | 351 | 4979 |
| c, Capacity [veh/h] | 719 | 330 | 2700 | 844 | 299 | 3387 |
| d1, Uniform Delay [s] | 36.75 | 36.55 | 21.54 | 13.21 | 28.51 | 7.87 |
| k, delay calibration | 0.05 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 56.26 | 414.47 | 3.33 | 0.14 | 19.93 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.12 | 1.90 | 0.99 | 0.44 | 0.80 | 0.58 |
| d, Delay for Lane Group [s/veh] | 93.01 | 451.02 | 24.87 | 13.35 | 48.44 | 7.93 |
| Lane Group LOS | F | F | C | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 13.64 | 45.33 | 18.31 | 4.52 | 3.20 | 5.84 |
| 50th-Percentile Queue Length [ft/ln] | 340.92 | 1133.34 | 457.64 | 113.08 | 80.10 | 145.99 |
| 95th-Percentile Queue Length [veh/ln] | 20.87 | 71.72 | 25.32 | 8.01 | 5.77 | 9.80 |
| 95th-Percentile Queue Length [ft/ln] | 521.78 | 1793.01 | 633.06 | 200.28 | 144.17 | 245.07 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

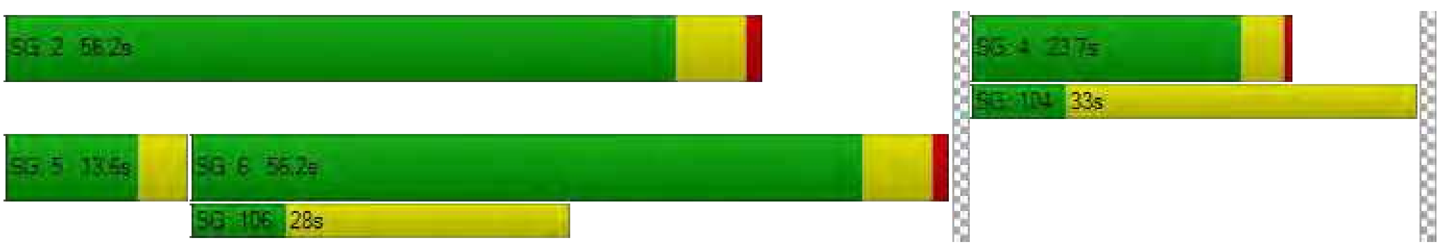
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 93.01 | 451.02 | 24.87 | 13.35 | 48.44 | 7.93 |
| Movement LOS | F | F | C | B | D | A |
| d_A, Approach Delay [s/veh] | 249.63 | | 23.46 | | 12.36 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 68.27 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.114 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.40 | 36.40 | 36.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.976 | 3.405 | 3.361 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 428 | 1070 | 1070 |
| d_b, Bicycle Delay [s] | 29.01 | 10.12 | 10.12 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.238 | 2.767 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 38.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.975 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1019 | 90 | 2679 | 99 | 74 | 2245 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1019 | 90 | 2679 | 99 | 74 | 2245 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 260 | 23 | 683 | 25 | 19 | 573 |
| Total Analysis Volume [veh/h] | 1040 | 92 | 2734 | 101 | 76 | 2291 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 95 | 95 | 95 | 95 | 95 | 95 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 25 | 25 | 50 | 50 | 5 | 59 |
| g / C, Green / Cycle | 0.26 | 0.26 | 0.53 | 0.53 | 0.05 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.06 | 0.54 | 0.06 | 0.04 | 0.46 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 910 | 424 | 2659 | 842 | 100 | 3104 |
| d1, Uniform Delay [s] | 35.09 | 27.43 | 22.59 | 11.44 | 44.32 | 12.48 |
| k, delay calibration | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 66.05 | 0.09 | 14.45 | 0.02 | 4.32 | 0.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.14 | 0.22 | 1.03 | 0.12 | 0.76 | 0.74 |
| d, Delay for Lane Group [s/veh] | 101.14 | 27.53 | 37.04 | 11.46 | 48.64 | 12.61 |
| Lane Group LOS | F | C | F | B | D | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 18.72 | 1.65 | 20.30 | 0.97 | 1.82 | 9.07 |
| 50th-Percentile Queue Length [ft/ln] | 468.11 | 41.29 | 507.45 | 24.30 | 45.47 | 226.68 |
| 95th-Percentile Queue Length [veh/ln] | 27.84 | 2.97 | 28.30 | 1.75 | 3.27 | 14.01 |
| 95th-Percentile Queue Length [ft/ln] | 696.11 | 74.32 | 707.40 | 43.73 | 81.84 | 350.14 |

**Movement, Approach, & Intersection Results**

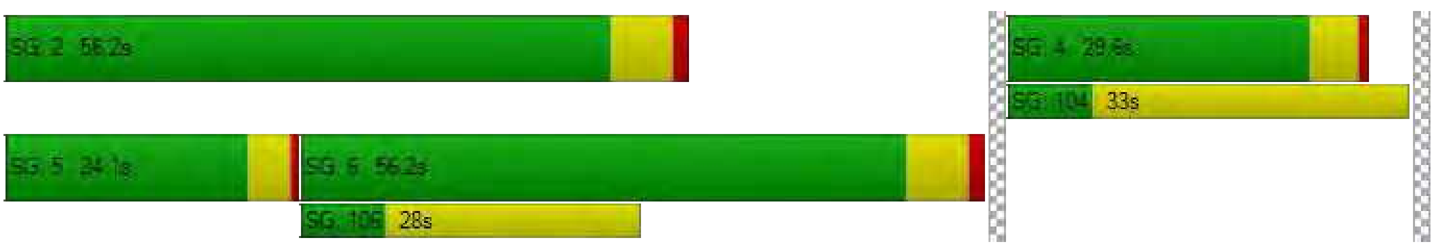
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 101.14 | 27.53 | 37.04 | 11.46 | 48.64 | 12.61 |
| Movement LOS | F | C | F | B | D | B |
| d_A, Approach Delay [s/veh] | 95.15 | | 36.13 | | 13.77 | |
| Approach LOS | F | | D | | B | |
| d_I, Intersection Delay [s/veh] | 38.32 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.975 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 37.19 | 37.19 | 37.19 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.399 | 3.855 | 3.681 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 526 | 1051 | 1051 |
| d_b, Bicycle Delay [s] | 25.84 | 10.70 | 10.70 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.119 | 2.861 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 199: Bafront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.940 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 581 | 164 | 2486 | 60 | 48 | 1264 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 581 | 164 | 2486 | 60 | 48 | 1264 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 148 | 42 | 634 | 15 | 12 | 322 |
| Total Analysis Volume [veh/h] | 593 | 167 | 2537 | 61 | 49 | 1290 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 87 | 87 | 87 | 87 | 87 | 87 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.57 | 0.57 | 0.66 | 0.66 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.56 | 0.04 | 0.10 | 0.29 |
| s, saturation flow rate [veh/h] | 1438 | 1365 | 4507 | 1406 | 471 | 4470 |
| c, Capacity [veh/h] | 330 | 313 | 2588 | 807 | 342 | 2936 |
| d1, Uniform Delay [s] | 33.54 | 33.54 | 18.07 | 8.26 | 20.41 | 7.21 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 104.70 | 112.89 | 2.22 | 0.01 | 0.07 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 1.19 | 0.98 | 0.08 | 0.14 | 0.44 |
| d, Delay for Lane Group [s/veh] | 138.25 | 146.43 | 20.29 | 8.27 | 20.48 | 7.25 |
| Lane Group LOS | F | F | C | A | C | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 16.35 | 16.23 | 14.85 | 0.48 | 0.14 | 3.29 |
| 50th-Percentile Queue Length [ft/ln] | 408.81 | 405.70 | 371.31 | 11.88 | 3.46 | 82.18 |
| 95th-Percentile Queue Length [veh/ln] | 24.96 | 24.97 | 21.17 | 0.86 | 0.25 | 5.92 |
| 95th-Percentile Queue Length [ft/ln] | 624.01 | 624.28 | 529.32 | 21.39 | 6.23 | 147.92 |

**Movement, Approach, & Intersection Results**

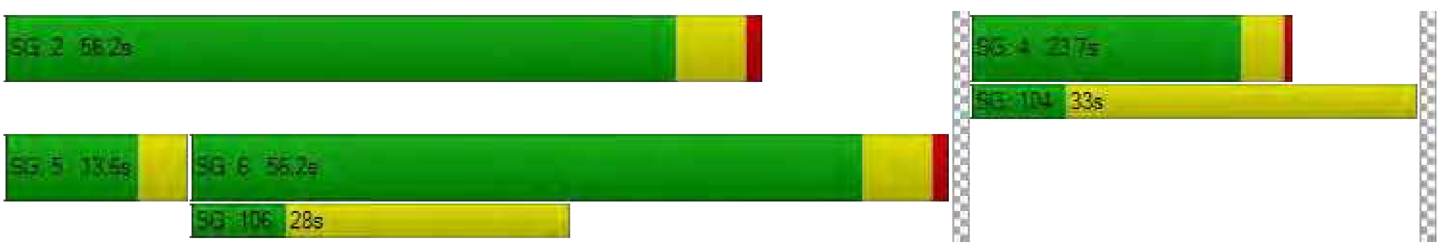
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 141.12 | 146.43 | 20.29 | 8.27 | 20.48 | 7.25 |
| Movement LOS | F | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 142.26 | | 20.01 | | 7.74 | |
| Approach LOS | F | | C | | A | |
| d_I, Intersection Delay [s/veh] | 36.29 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.940 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.21 | 33.21 | 33.21 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.383 | 3.216 | 3.216 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 460 | 1149 | 1149 |
| d_b, Bicycle Delay [s] | 25.81 | 7.88 | 7.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.814 | 2.989 | 2.296 |
| Bicycle LOS | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 157.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.504 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 483 | 399 | 19 | 359 | 191 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 483 | 399 | 19 | 359 | 191 | 20 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 139 | 115 | 5 | 103 | 55 | 6 |
| Total Analysis Volume [veh/h] | 555 | 459 | 22 | 413 | 220 | 23 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 1014 | 616 | 527 |
| Degree of Utilization, x | 1.50 | 0.71 | 0.46 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 50.09 | 5.76 | 2.41 |
| 95th-Percentile Queue Length [ft] | 1252.30 | 144.11 | 60.22 |
| Approach Delay [s/veh] | 250.30 | 21.71 | 15.57 |
| Approach LOS | F | C | C |
| Intersection Delay [s/veh] | 157.82 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.888 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 179 | 2537 | 24 | 49 | 1332 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 179 | 2537 | 24 | 49 | 1332 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 49 | 697 | 7 | 13 | 366 |
| Total Analysis Volume [veh/h] | 0 | 197 | 2788 | 26 | 54 | 1464 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 15 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.18 | 0.61 | 0.61 | 0.70 | 0.70 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.62 | 0.02 | 0.25 | 0.34 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 214 | 4342 |
| c, Capacity [veh/h] | 222 | 2761 | 862 | 224 | 3035 |
| d1, Uniform Delay [s] | 32.75 | 15.91 | 6.31 | 20.33 | 5.59 |
| k, delay calibration | 0.13 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.61 | 7.55 | 0.01 | 0.20 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 1.01 | 0.03 | 0.24 | 0.48 |
| d, Delay for Lane Group [s/veh] | 46.36 | 23.47 | 6.31 | 20.53 | 5.63 |
| Lane Group LOS | D | F | A | C | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.53 | 15.96 | 0.16 | 0.23 | 2.91 |
| 50th-Percentile Queue Length [ft/ln] | 113.26 | 398.99 | 3.96 | 5.83 | 72.78 |
| 95th-Percentile Queue Length [veh/ln] | 8.02 | 22.69 | 0.28 | 0.42 | 5.24 |
| 95th-Percentile Queue Length [ft/ln] | 200.53 | 567.24 | 7.12 | 10.49 | 131.01 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

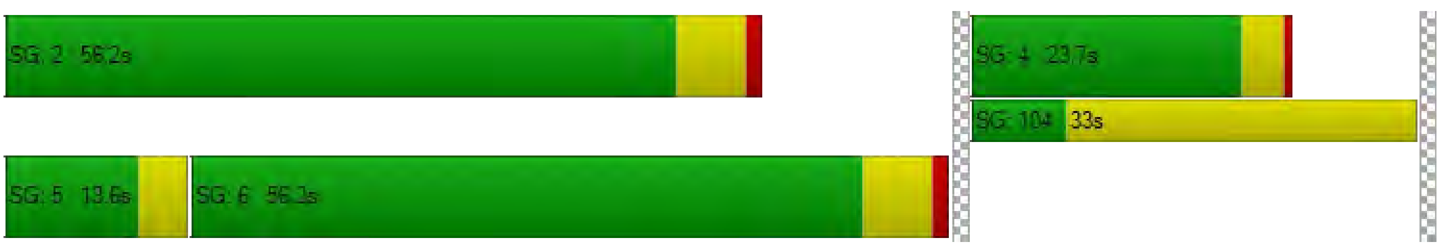
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 46.36 | 23.47 | 6.31 | 20.53 | 5.63 |
| Movement LOS | | D | F | A | C | A |
| d_A, Approach Delay [s/veh] | 46.36 | | 23.31 | | 6.16 | |
| Approach LOS | D | | C | | A | |
| d_I, Intersection Delay [s/veh] | 18.56 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.888 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.30 | 30.60 | 30.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.911 | 3.184 | 3.216 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 489 | 1224 | 1224 |
| d_b, Bicycle Delay [s] | 23.31 | 6.16 | 6.16 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.107 | 2.395 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 251.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.085 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 75 | 367 | 27 | 131 | 414 | 60 | 412 | 21 | 501 | 270 | 18 | 678 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 75 | 367 | 27 | 131 | 414 | 60 | 412 | 21 | 501 | 270 | 18 | 678 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 21 | 104 | 8 | 37 | 118 | 17 | 117 | 6 | 142 | 77 | 5 | 193 |
| Total Analysis Volume [veh/h] | 85 | 417 | 31 | 149 | 470 | 68 | 468 | 24 | 569 | 307 | 20 | 770 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 11 | 46 | 0 | 11 | 46 | 0 | 0 | 36 | 0 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 50 | 0 | 15 | 50 | 0 | 0 | 40 | 0 | 0 | 25 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 11 | 46 | 11 | 46 | 36 | 36 | 21 | 21 |
| g / C, Green / Cycle | 0.08 | 0.35 | 0.08 | 0.35 | 0.28 | 0.28 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.24 | 0.04 | 0.30 | 0.28 | 0.39 | 0.33 | 0.35 |
| s, saturation flow rate [veh/h] | 1767 | 1833 | 3431 | 1781 | 1771 | 1469 | 1687 | 1577 |
| c, Capacity [veh/h] | 149 | 648 | 290 | 630 | 490 | 407 | 273 | 255 |
| d1, Uniform Delay [s] | 57.22 | 35.92 | 56.94 | 38.88 | 47.00 | 45.80 | 54.50 | 54.50 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 14.75 | 5.95 | 6.35 | 13.76 | 41.47 | 193.99 | 468.24 | 531.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.69 | 0.51 | 0.85 | 1.00 | 1.40 | 2.01 | 2.15 |
| d, Delay for Lane Group [s/veh] | 71.97 | 41.87 | 63.29 | 52.64 | 88.47 | 239.78 | 522.74 | 586.45 |
| Lane Group LOS | E | D | E | D | F | F | F | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.31 | 13.20 | 2.61 | 18.17 | 21.40 | 34.64 | 44.36 | 45.96 |
| 50th-Percentile Queue Length [ft/ln] | 82.67 | 329.93 | 65.15 | 454.28 | 535.00 | 866.06 | 1109.03 | 1148.93 |
| 95th-Percentile Queue Length [veh/ln] | 5.95 | 19.15 | 4.69 | 25.16 | 29.05 | 52.72 | 69.54 | 72.39 |
| 95th-Percentile Queue Length [ft/ln] | 148.80 | 478.87 | 117.27 | 629.05 | 726.25 | 1318.02 | 1738.44 | 1809.87 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

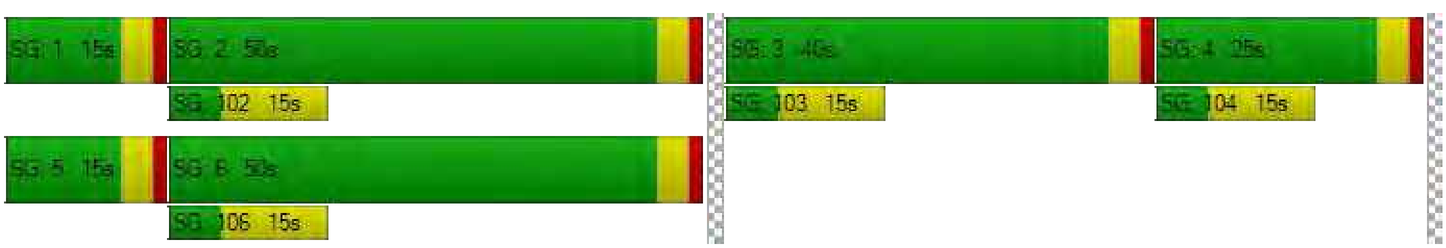
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 71.97 | 41.87 | 41.87 | 63.29 | 52.64 | 52.64 | 88.47 | 88.47 | 239.78 | 522.74 | 522.74 | 568.12 |
| Movement LOS | E | D | D | E | D | D | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 46.67 | | | 54.95 | | | 169.62 | | | 554.59 | | |
| Approach LOS | D | | | D | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 251.92 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.085 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 56.31 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.570 | 2.775 | 2.360 | 2.467 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 708 | 708 | 554 | 323 |
| d_b, Bicycle Delay [s] | 27.14 | 27.14 | 33.98 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.439 | 2.693 | 3.310 | 3.370 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 143.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.375 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 362 | 54 | 39 | 339 | 146 | 3 | 49 | 8 | 242 | 0 | 490 | 74 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 362 | 54 | 39 | 339 | 146 | 3 | 49 | 8 | 242 | 0 | 490 | 74 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 91 | 14 | 10 | 85 | 37 | 1 | 12 | 2 | 61 | 0 | 123 | 19 |
| Total Analysis Volume [veh/h] | 362 | 54 | 39 | 339 | 146 | 3 | 49 | 8 | 242 | 0 | 490 | 74 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 8 | | | 7 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 7 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 38 | 22 | 22 | 18 | 38 | 38 |
| g / C, Green / Cycle | 0.43 | 0.24 | 0.24 | 0.20 | 0.43 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 0.21 | 0.09 | 0.33 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 547 | 1609 | 1680 | 899 | 1629 | 1476 |
| c, Capacity [veh/h] | 305 | 386 | 402 | 181 | 733 | 628 |
| d1, Uniform Delay [s] | 35.80 | 33.03 | 28.61 | 36.00 | 17.96 | 18.20 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.45 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 238.91 | 6.56 | 0.57 | 313.53 | 1.63 | 2.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.49 | 0.88 | 0.37 | 1.65 | 0.40 | 0.43 |
| d, Delay for Lane Group [s/veh] | 274.71 | 39.59 | 29.18 | 349.53 | 19.59 | 20.34 |
| Lane Group LOS | F | D | C | F | B | C |
| Critical Lane Group | Yes | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 26.96 | 7.64 | 2.71 | 19.67 | 4.40 | 4.16 |
| 50th-Percentile Queue Length [ft/ln] | 673.89 | 191.10 | 67.66 | 491.80 | 109.94 | 103.99 |
| 95th-Percentile Queue Length [veh/ln] | 44.10 | 12.18 | 4.87 | 32.64 | 7.84 | 7.49 |
| 95th-Percentile Queue Length [ft/ln] | 1102.57 | 304.46 | 121.78 | 815.91 | 195.92 | 187.17 |

**Movement, Approach, & Intersection Results**

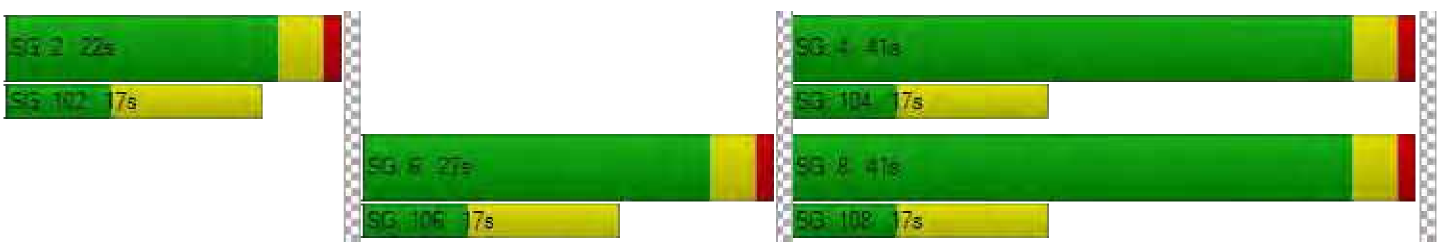
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 274.71 | 274.71 | 274.71 | 39.59 | 29.18 | 29.18 | 349.53 | 349.53 | 349.53 | 19.59 | 19.89 | 20.34 |
| Movement LOS | F | F | F | D | C | C | F | F | F | B | B | C |
| d_A, Approach Delay [s/veh] | 274.71 | | | 36.41 | | | 349.53 | | | 19.95 | | |
| Approach LOS | F | | | D | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 143.15 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.375 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.72 | 34.72 | 34.72 | 34.72 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.436 | 2.114 | 2.659 | 2.158 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 821 | 511 | 400 | 821 |
| d_b, Bicycle Delay [s] | 15.64 | 24.98 | 28.85 | 15.64 |
| I_b,int, Bicycle LOS Score for Intersection | 2.310 | 2.365 | 2.053 | 2.025 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 393.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.521 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 172 | 133 | 260 | 291 | 175 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 172 | 133 | 260 | 291 | 175 | 50 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 52 | 40 | 78 | 88 | 53 | 15 |
| Total Analysis Volume [veh/h] | 207 | 160 | 313 | 351 | 211 | 60 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 1.52 | 0.20 | 0.25 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 393.16 | 371.28 | 8.75 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 24.80 | 24.80 | 0.97 | 0.97 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 620.07 | 620.07 | 24.29 | 24.29 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 383.62 | | 4.13 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 110.24 | | | | | |
| Intersection LOS | F | | | | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/ Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.086 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 99 | 210 | 35 | 15 | 30 | 217 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 99 | 210 | 35 | 15 | 30 | 217 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 31 | 65 | 11 | 5 | 9 | 67 |
| Total Analysis Volume [veh/h] | 122 | 259 | 43 | 19 | 37 | 268 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.08 | 0.00 | 0.00 | 0.00 | 0.09 | 0.28 |
| d_M, Delay for Movement [s/veh] | 7.60 | 0.00 | 0.00 | 0.00 | 15.78 | 11.10 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.26 | 0.26 | 0.00 | 0.00 | 1.66 | 1.66 |
| 95th-Percentile Queue Length [ft/ln] | 6.61 | 6.61 | 0.00 | 0.00 | 41.48 | 41.48 |
| d_A, Approach Delay [s/veh] | 2.44 | | 0.00 | | 11.67 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 6.00 | | | | | |
| Intersection LOS | C | | | | | |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro
Report File: \...\Cumulative PM_DUMB.pdf

Scenario 21 Cumulative w/dumbarton PM (2040 vols)
12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 959 | 1145 | 1338 | 444 | 3886 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 49 | 1326 | 7 | 75 | 1031 | 249 | 15 | 6 | 412 | 303 | 6 | 4 | 3483 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 290 | 675 | 54 | 13 | 989 | 354 | 451 | 34 | 234 | 127 | 85 | 40 | 3346 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 61 | 416 | 703 | 68 | 77 | 26 | 2 | 65 | 61 | 339 | 2565 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 543 | 481 | 634 | 475 | 104 | 2374 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 214 | 0 | 287 | 2 | 767 | 135 | 326 | 718 | 2 | 2549 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3669 | 20 | 389 | 970 | 68 | 1940 | 7056 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 213 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 301 | 559 | 827 | 34 | 6323 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 43 | 1065 | 287 | 138 | 994 | 54 | 123 | 196 | 35 | 193 | 194 | 264 | 3586 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 175 | 933 | 1212 | 84 | 85 | 114 | 2603 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 649 | 57 | 1178 | 274 | 421 | 3579 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 410 | 1313 | 270 | 78 | 1282 | 27 | 50 | 223 | 574 | 399 | 362 | 56 | 5044 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 40 | 1329 | 804 | 270 | 341 | 40 | 2824 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 | 1941 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 | 1746 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 123 | 54 | 705 | 10 | 38 | 123 | 5 | 85 | 53 | 58 | 1913 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 286 | 263 | 372 | 125 | 301 | 134 | 483 | 184 | 277 | 681 | 22 | 3158 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1961 | 1461 | 570 | 869 | 4861 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 285 | 18 | 143 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 47 | 1446 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 752 | 236 | 2552 | 778 | 14 | 6392 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1045 | 199 | 1132 | 879 | 777 | 352 | 4384 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1309 | 459 | 1709 | 674 | 296 | 859 | 5306 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 749 | 582 | 2490 | 348 | 223 | 1819 | 6211 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 1019 | 90 | 2679 | 99 | 74 | 2245 | 6206 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 581 | 164 | 2486 | 60 | 48 | 1264 | 4603 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 483 | 399 | 19 | 359 | 191 | 20 | 1471 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 179 | 2537 | 24 | 49 | 1332 | 4121 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 75 | 367 | 27 | 131 | 414 | 60 | 412 | 21 | 501 | 270 | 18 | 678 | 2974 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 362 | 54 | 39 | 339 | 146 | 3 | 49 | 8 | 242 | 0 | 490 | 74 | 1806 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 172 | 133 | 260 | 291 | 175 | 50 | 1081 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 99 | 210 | 35 | 15 | 30 | 217 | 606 |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro | Scenario 21 Cumulative w/dumbarton PM (2040 vols)
Report File: \...\Cumulative PM_DUMB.pdf | 12/9/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 959 | 1145 | 1338 | 444 | 3886 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **959** | **1145** | **1338** | **444** | **3886** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 49 | 1326 | 7 | 75 | 1031 | 249 | 15 | 6 | 412 | 303 | 6 | 4 | 3483 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **49** | **1326** | **7** | **75** | **1031** | **249** | **15** | **6** | **412** | **303** | **6** | **4** | **3483** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 290 | 675 | 54 | 13 | 989 | 354 | 451 | 34 | 234 | 127 | 85 | 40 | 3346 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **290** | **675** | **54** | **13** | **989** | **354** | **451** | **34** | **234** | **127** | **85** | **40** | **3346** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 61 | 416 | 703 | 68 | 77 | 26 | 2 | 65 | 61 | 339 | 2565 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **61** | **416** | **703** | **68** | **77** | **26** | **2** | **65** | **61** | **339** | **2565** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 543 | 481 | 634 | 475 | 104 | 2374 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **543** | **481** | **634** | **475** | **104** | **2374** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 214 | 0 | 287 | 2 | 767 | 135 | 326 | 718 | 2 | 2549 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **214** | **0** | **287** | **2** | **767** | **135** | **326** | **718** | **2** | **2549** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3669 | 20 | 389 | 970 | 68 | 1940 | 7056 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3669** | **20** | **389** | **970** | **68** | **1940** | **7056** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 213 | 95 | 1112 | 159 | 332 | 146 | 76 | 2469 | 301 | 559 | 827 | 34 | 6323 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **213** | **95** | **1112** | **159** | **332** | **146** | **76** | **2469** | **301** | **559** | **827** | **34** | **6323** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 43 | 1065 | 287 | 138 | 994 | 54 | 123 | 196 | 35 | 193 | 194 | 264 | 3586 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **43** | **1065** | **287** | **138** | **994** | **54** | **123** | **196** | **35** | **193** | **194** | **264** | **3586** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 175 | 933 | 1212 | 84 | 85 | 114 | 2603 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **175** | **933** | **1212** | **84** | **85** | **114** | **2603** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 649 | 57 | 1178 | 274 | 421 | 3579 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **649** | **57** | **1178** | **274** | **421** | **3579** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 410 | 1313 | 270 | 78 | 1282 | 27 | 50 | 223 | 574 | 399 | 362 | 56 | 5044 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **410** | **1313** | **270** | **78** | **1282** | **27** | **50** | **223** | **574** | **399** | **362** | **56** | **5044** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 40 | 1329 | 804 | 270 | 341 | 40 | 2824 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1329** | **804** | **270** | **341** | **40** | **2824** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1053 | 4 | 29 | 540 | 18 | 142 | 31 | 39 | 21 | 8 | 47 | 1941 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1053** | **4** | **29** | **540** | **18** | **142** | **31** | **39** | **21** | **8** | **47** | **1941** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 22 | 693 | 5 | 2 | 691 | 112 | 146 | 2 | 48 | 15 | 4 | 6 | 1746 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **693** | **5** | **2** | **691** | **112** | **146** | **2** | **48** | **15** | **4** | **6** | **1746** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 123 | 54 | 705 | 10 | 38 | 123 | 5 | 85 | 53 | 58 | 1913 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **123** | **54** | **705** | **10** | **38** | **123** | **5** | **85** | **53** | **58** | **1913** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 286 | 263 | 372 | 125 | 301 | 134 | 483 | 184 | 277 | 681 | 22 | 3158 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **286** | **263** | **372** | **125** | **301** | **134** | **483** | **184** | **277** | **681** | **22** | **3158** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1961 | 1461 | 570 | 869 | 4861 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1961** | **1461** | **570** | **869** | **4861** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 285 | 18 | 143 | 696 | 36 | 21 | 132 | 21 | 7 | 18 | 47 | 1446 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **285** | **18** | **143** | **696** | **36** | **21** | **132** | **21** | **7** | **18** | **47** | **1446** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 197 | 40 | 1766 | 12 | 31 | 5 | 9 | 752 | 236 | 2552 | 778 | 14 | 6392 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **197** | **40** | **1766** | **12** | **31** | **5** | **9** | **752** | **236** | **2552** | **778** | **14** | **6392** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1045 | 199 | 1132 | 879 | 777 | 352 | 4384 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1045** | **199** | **1132** | **879** | **777** | **352** | **4384** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1309 | 459 | 1709 | 674 | 296 | 859 | 5306 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1309** | **459** | **1709** | **674** | **296** | **859** | **5306** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 749 | 582 | 2490 | 348 | 223 | 1819 | 6211 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **749** | **582** | **2490** | **348** | **223** | **1819** | **6211** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 1019 | 90 | 2679 | 99 | 74 | 2245 | 6206 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1019** | **90** | **2679** | **99** | **74** | **2245** | **6206** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 581 | 164 | 2486 | 60 | 48 | 1264 | 4603 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **581** | **164** | **2486** | **60** | **48** | **1264** | **4603** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 483 | 399 | 19 | 359 | 191 | 20 | 1471 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **483** | **399** | **19** | **359** | **191** | **20** | **1471** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 179 | 2537 | 24 | 49 | 1332 | 4121 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **2537** | **24** | **49** | **1332** | **4121** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 75 | 367 | 27 | 131 | 414 | 60 | 412 | 21 | 501 | 270 | 18 | 678 | 2974 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **75** | **367** | **27** | **131** | **414** | **60** | **412** | **21** | **501** | **270** | **18** | **678** | **2974** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 362 | 54 | 39 | 339 | 146 | 3 | 49 | 8 | 242 | 0 | 490 | 74 | 1806 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **362** | **54** | **39** | **339** | **146** | **3** | **49** | **8** | **242** | **0** | **490** | **74** | **1806** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 172 | 133 | 260 | 291 | 175 | 50 | 1081 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **172** | **133** | **260** | **291** | **175** | **50** | **1081** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 99 | 210 | 35 | 15 | 30 | 217 | 606 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **99** | **210** | **35** | **15** | **30** | **217** | **606** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 325 | 875 | 72 | 174 |
| 2 | 315 | 849 | 70 | 169 |
| 3 | 309 | 831 | 68 | 165 |
| 4 | 289 | 779 | 64 | 155 |
| 5 | 257 | 691 | 57 | 137 |
| 6 | 254 | 683 | 56 | 136 |
| 7 | 250 | 674 | 55 | 134 |
| 8 | 227 | 613 | 50 | 122 |
| 9 | 224 | 604 | 50 | 120 |
| 10 | 221 | 595 | 49 | 118 |
| 11 | 192 | 516 | 42 | 103 |
| 12 | 179 | 481 | 40 | 96 |
| 13 | 176 | 473 | 39 | 94 |
| 14 | 130 | 350 | 29 | 70 |
| 15 | 130 | 350 | 29 | 70 |
| 16 | 91 | 245 | 20 | 49 |
| 17 | 52 | 140 | 12 | 28 |
| 18 | 52 | 140 | 12 | 28 |
| 19 | 29 | 79 | 6 | 16 |
| 20 | 16 | 44 | 4 | 9 |
| 21 | 10 | 26 | 2 | 5 |
| 22 | 3 | 9 | 1 | 2 |
| 23 | 3 | 9 | 1 | 2 |
| 24 | 3 | 9 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1200 | 1 | 174 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1164 | 1 | 169 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1140 | 1 | 165 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1068 | 1 | 155 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 948 | 1 | 137 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 937 | 1 | 136 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 924 | 1 | 134 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 840 | 1 | 122 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 9 | 1 | 828 | 1 | 120 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 816 | 1 | 118 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 708 | 1 | 103 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 660 | 1 | 96 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 649 | 1 | 94 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 480 | 1 | 70 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 480 | 1 | 70 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 336 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 192 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 192 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 108 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 60 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 36 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 9 | 10 | 13 | 10 | 13 | 13 | 15 | 7 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.1 | 13.7 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 | 0:39 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 72 | 174 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1446 | 1446 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 378 | 882 | 211 |
| 2 | 367 | 856 | 205 |
| 3 | 359 | 838 | 200 |
| 4 | 336 | 785 | 188 |
| 5 | 299 | 697 | 167 |
| 6 | 295 | 688 | 165 |
| 7 | 291 | 679 | 162 |
| 8 | 265 | 617 | 148 |
| 9 | 261 | 609 | 146 |
| 10 | 257 | 600 | 143 |
| 11 | 223 | 520 | 124 |
| 12 | 208 | 485 | 116 |
| 13 | 204 | 476 | 114 |
| 14 | 151 | 353 | 84 |
| 15 | 151 | 353 | 84 |
| 16 | 106 | 247 | 59 |
| 17 | 60 | 141 | 34 |
| 18 | 60 | 141 | 34 |
| 19 | 34 | 79 | 19 |
| 20 | 19 | 44 | 11 |
| 21 | 11 | 26 | 6 |
| 22 | 4 | 9 | 2 |
| 23 | 4 | 9 | 2 |
| 24 | 4 | 9 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1260 | 1 | 211 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1223 | 1 | 205 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1197 | 1 | 200 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1121 | 1 | 188 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 996 | 1 | 167 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 983 | 1 | 165 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 970 | 1 | 162 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 882 | 1 | 148 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 870 | 1 | 146 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 857 | 1 | 143 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 743 | 1 | 124 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 693 | 1 | 116 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 680 | 1 | 114 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 504 | 1 | 84 | No | No | No | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 504 | 1 | 84 | No | No | No | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 353 | 1 | 59 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 201 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 201 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 113 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 63 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 37 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 7 | 11 | 13 | 15 | 10 | 13 | 13 | 15 | 10 | 1 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | E |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 15.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:54 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 211 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1471 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 225 | 551 | 305 |
| 2 | 218 | 534 | 296 |
| 3 | 214 | 523 | 290 |
| 4 | 200 | 490 | 271 |
| 5 | 178 | 435 | 241 |
| 6 | 176 | 430 | 238 |
| 7 | 173 | 424 | 235 |
| 8 | 158 | 386 | 214 |
| 9 | 155 | 380 | 210 |
| 10 | 153 | 375 | 207 |
| 11 | 133 | 325 | 180 |
| 12 | 124 | 303 | 168 |
| 13 | 122 | 298 | 165 |
| 14 | 90 | 220 | 122 |
| 15 | 90 | 220 | 122 |
| 16 | 63 | 154 | 85 |
| 17 | 36 | 88 | 49 |
| 18 | 36 | 88 | 49 |
| 19 | 20 | 50 | 27 |
| 20 | 11 | 28 | 15 |
| 21 | 7 | 17 | 9 |
| 22 | 2 | 6 | 3 |
| 23 | 2 | 6 | 3 |
| 24 | 2 | 6 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 776 | 1 | 305 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 752 | 1 | 296 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 737 | 1 | 290 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 690 | 1 | 271 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 613 | 1 | 241 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 606 | 1 | 238 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 597 | 1 | 235 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No |
| 8 | 1 | 544 | 1 | 214 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 535 | 1 | 210 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 528 | 1 | 207 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 458 | 1 | 180 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 427 | 1 | 168 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 420 | 1 | 165 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 310 | 1 | 122 | No | No | No | Yes | No | No | No | No | No | No |
| 15 | 1 | 310 | 1 | 122 | No | No | No | Yes | No | No | No | No | No | No |
| 16 | 1 | 217 | 1 | 85 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 124 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 124 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 70 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 39 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 24 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 10 | 13 | 13 | 15 | 2 | 6 | 10 | 13 | 7 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 383.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 32:30 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 305 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1081 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 309 | 50 | 247 |
| 2 | 300 | 49 | 240 |
| 3 | 294 | 48 | 235 |
| 4 | 275 | 45 | 220 |
| 5 | 244 | 40 | 195 |
| 6 | 241 | 39 | 193 |
| 7 | 238 | 39 | 190 |
| 8 | 216 | 35 | 173 |
| 9 | 213 | 35 | 170 |
| 10 | 210 | 34 | 168 |
| 11 | 182 | 30 | 146 |
| 12 | 170 | 28 | 136 |
| 13 | 167 | 27 | 133 |
| 14 | 124 | 20 | 99 |
| 15 | 124 | 20 | 99 |
| 16 | 87 | 14 | 69 |
| 17 | 49 | 8 | 40 |
| 18 | 49 | 8 | 40 |
| 19 | 28 | 5 | 22 |
| 20 | 15 | 3 | 12 |
| 21 | 9 | 2 | 7 |
| 22 | 3 | 1 | 2 |
| 23 | 3 | 1 | 2 |
| 24 | 3 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 359 | 1 | 247 | No | No | Yes | Yes | No | No | No | No | No | No |
| 2 | 1 | 349 | 1 | 240 | No | No | No | Yes | No | No | No | No | No | No |
| 3 | 1 | 342 | 1 | 235 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 320 | 1 | 220 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 1 | 284 | 1 | 195 | No | No | No | Yes | No | No | No | No | No | No |
| 6 | 1 | 280 | 1 | 193 | No | No | No | Yes | No | No | No | No | No | No |
| 7 | 1 | 277 | 1 | 190 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 251 | 1 | 173 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 248 | 1 | 170 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 244 | 1 | 168 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 212 | 1 | 146 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 198 | 1 | 136 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 194 | 1 | 133 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 144 | 1 | 99 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 144 | 1 | 99 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 101 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 57 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 57 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 33 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 18 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 11 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:48 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 247 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 606 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

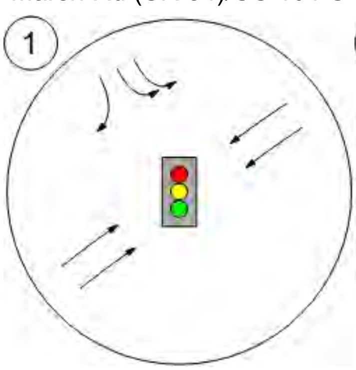
Study Intersections

Generated with PTV VISTRO

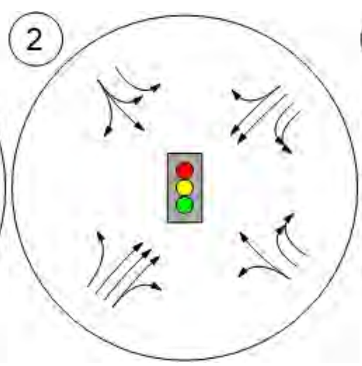
Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control

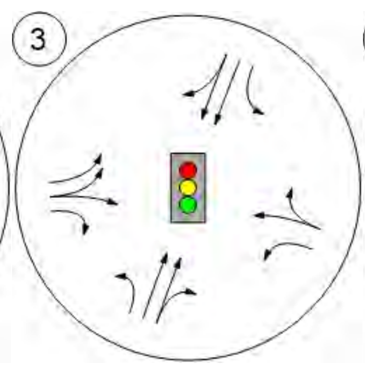

Marsh Rd (SR 84)/US 101 S



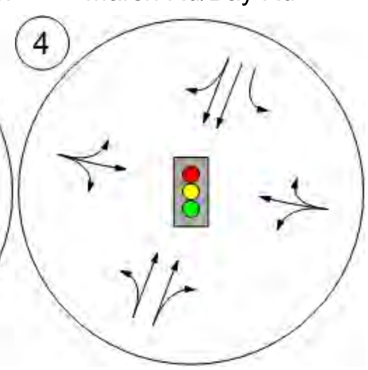

Marsh Rd/Rolison Rd-Scott D



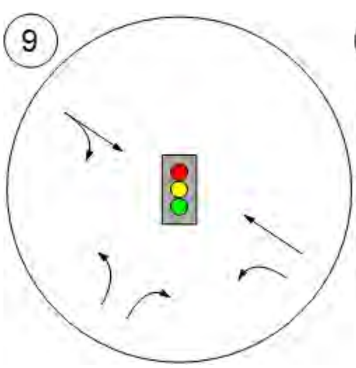

Marsh Rd/Florence St-Bohan



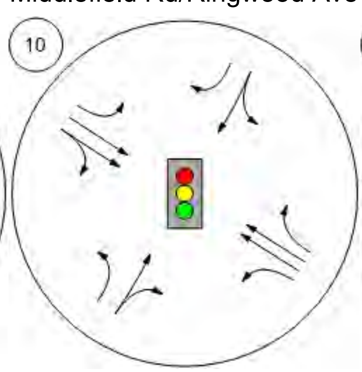

Marsh Rd/Bay Rd



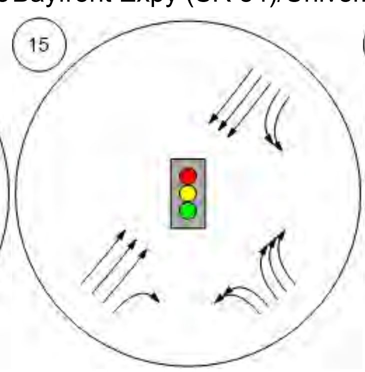

Middlefield Rd/Ravenswood



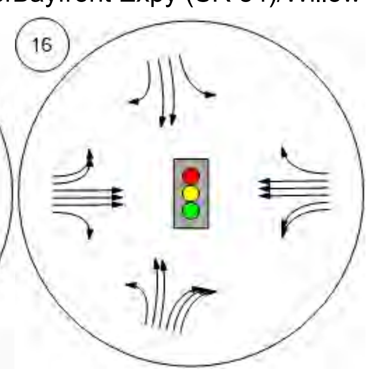

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

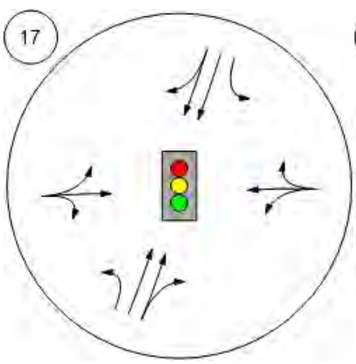


Generated with PTV VISTRO

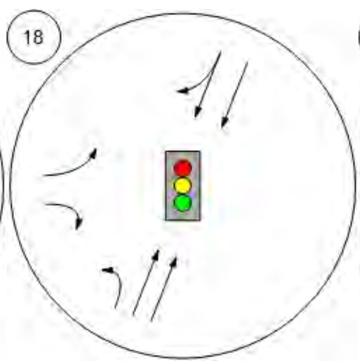
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

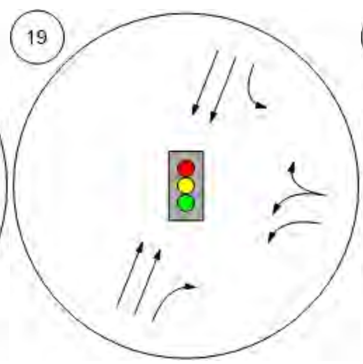

Willow Rd (SR 114)/Hamilton



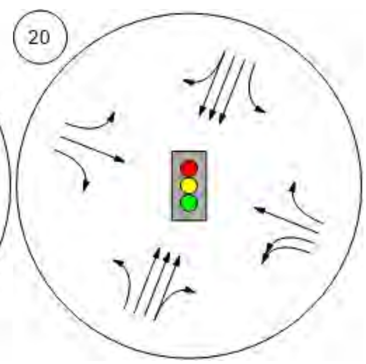

Willow Rd (SR 114)/Ivy Dr



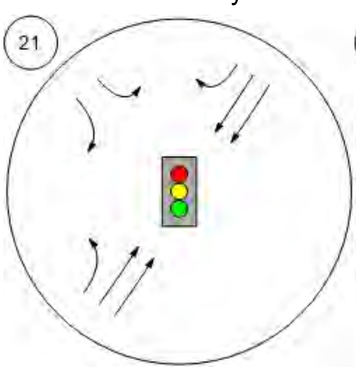

Willow Rd (SR 114)/O'Brien



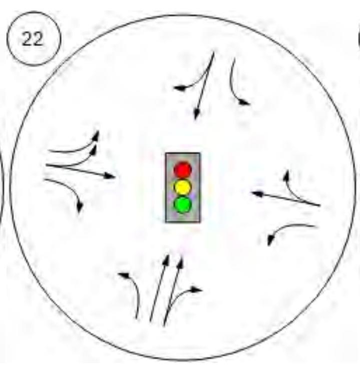

Willow Rd (SR 114)/Newbrid



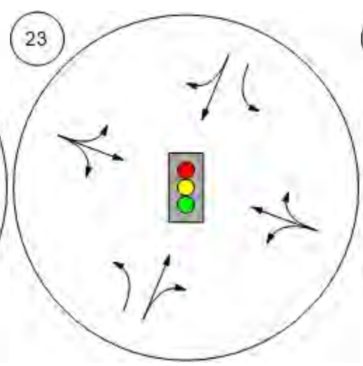

Willow Rd/Bay Rd



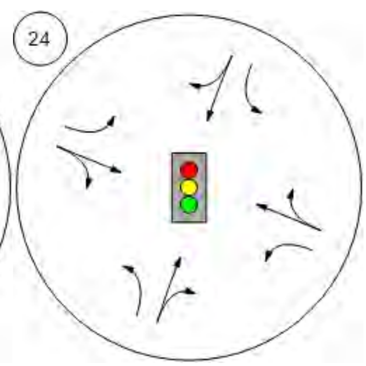

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

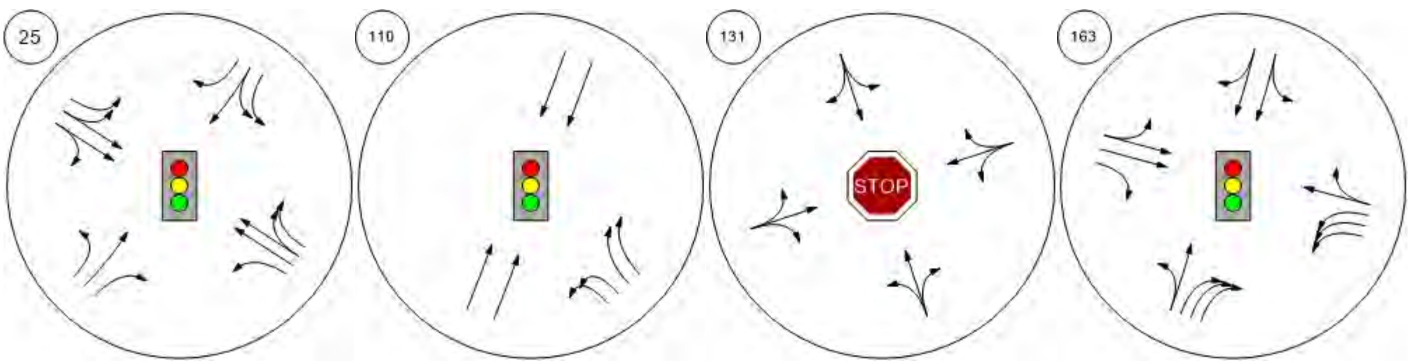



Willow Rd/Gilbert Ave

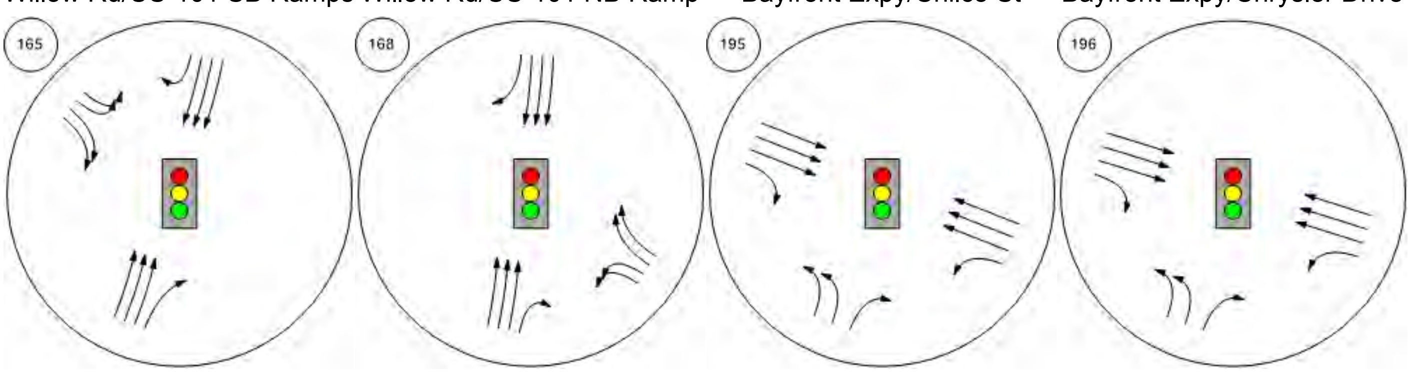


## Lane Configuration and Traffic Control


Middlefield Rd-Willow Rd | Marsh Road/101 NB Ramps | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd



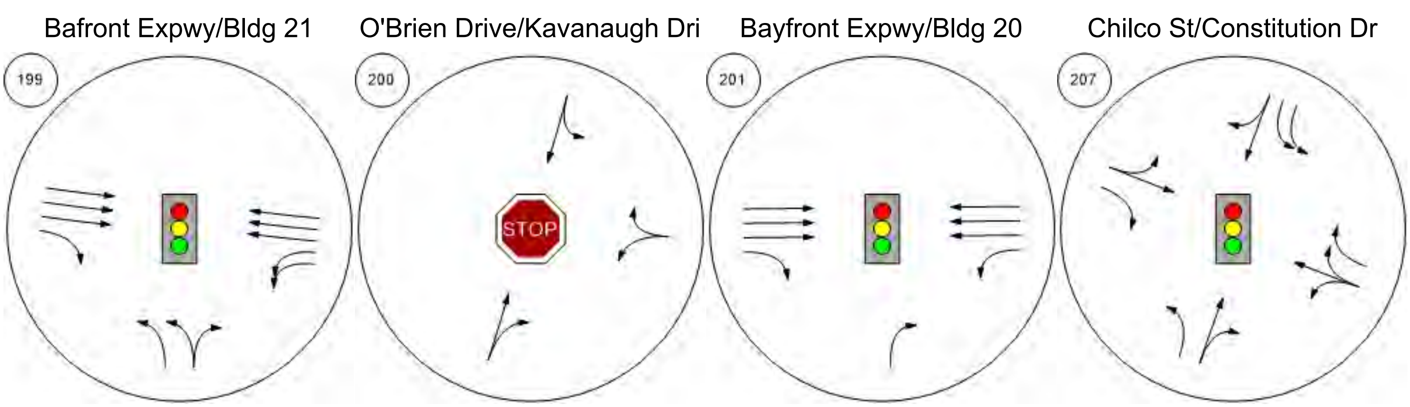

Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive

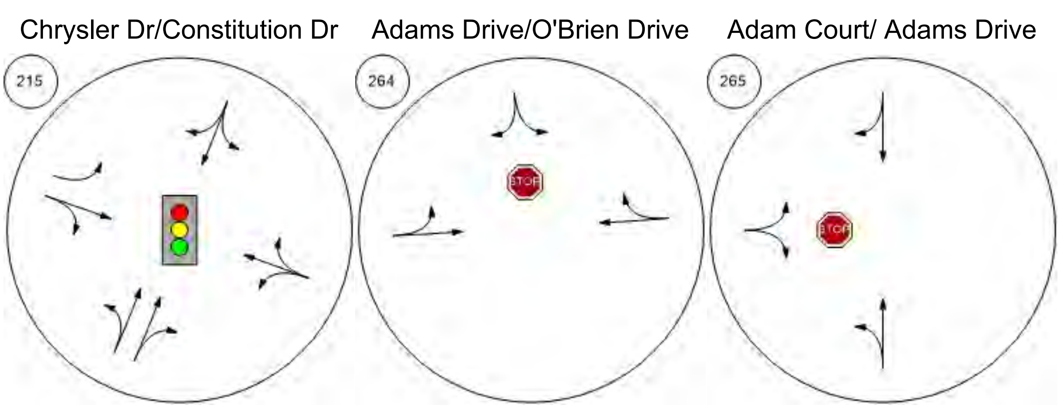


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

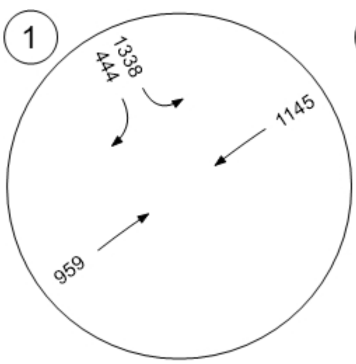



Generated with PTV VISTRO

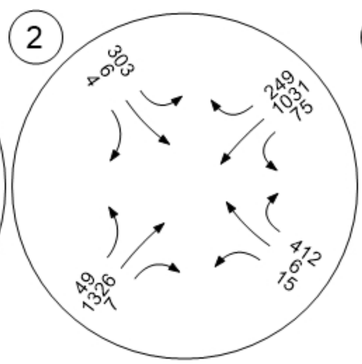
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

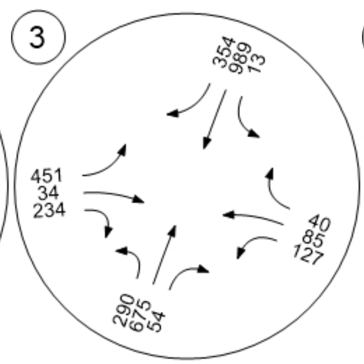

Marsh Rd (SR 84)/US 101 S



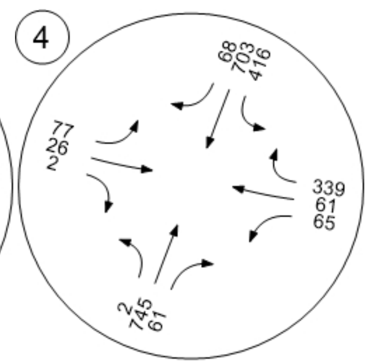

Marsh Rd/Rolison Rd-Scott D



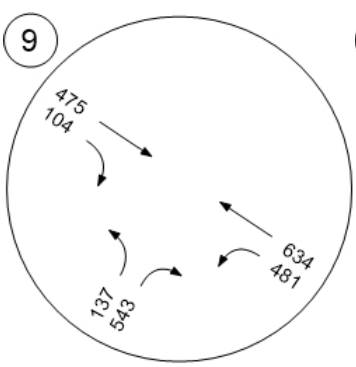

Marsh Rd/Florence St-Bohan



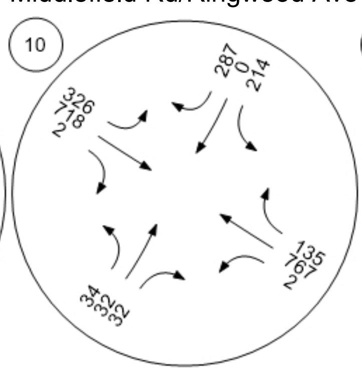

Marsh Rd/Bay Rd



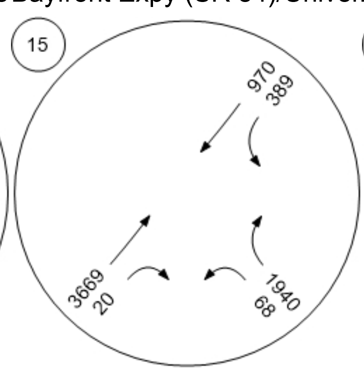

Middlefield Rd/Ravenswood



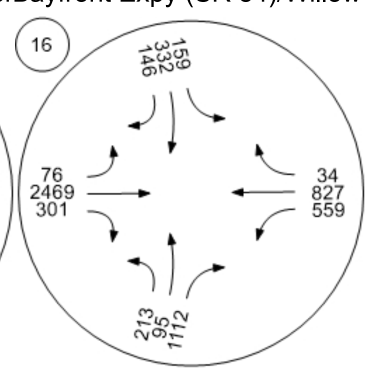

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

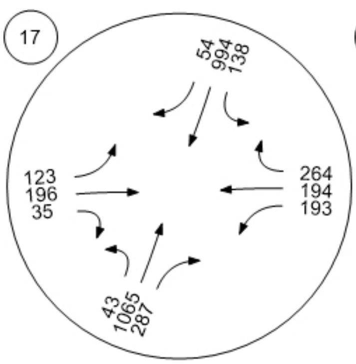


Generated with PTV VISTRO

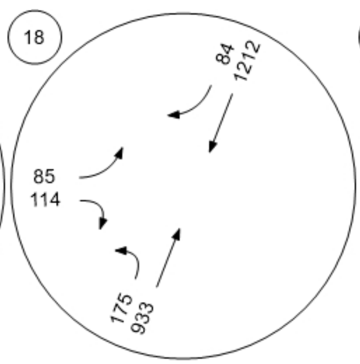
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

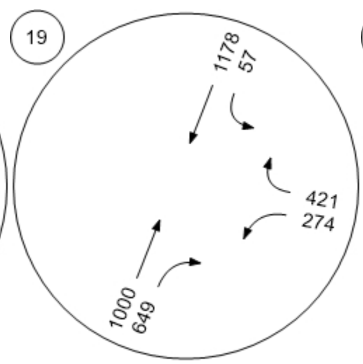

Willow Rd (SR 114)/Hamilton



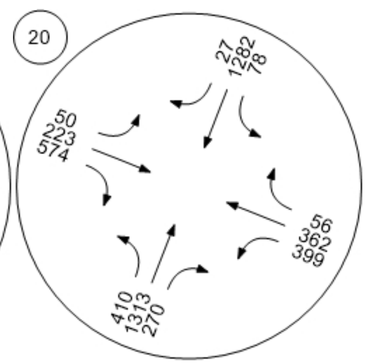

Willow Rd (SR 114)/Ivy Dr



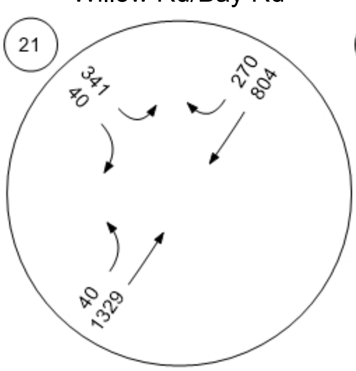

Willow Rd (SR 114)/O'Brien



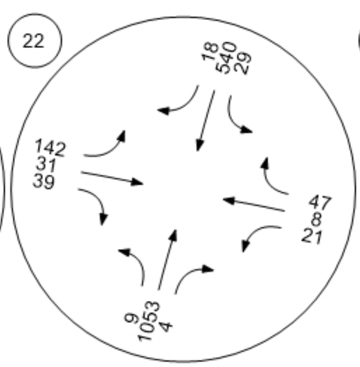

Willow Rd (SR 114)/Newbrid



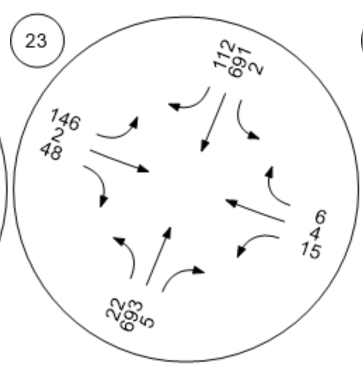

Willow Rd/Bay Rd



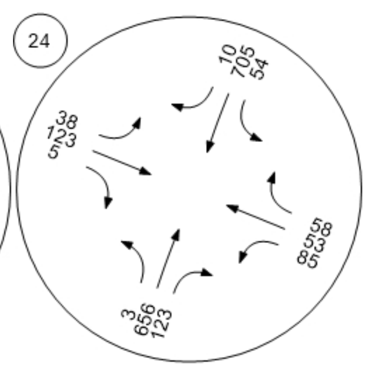

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

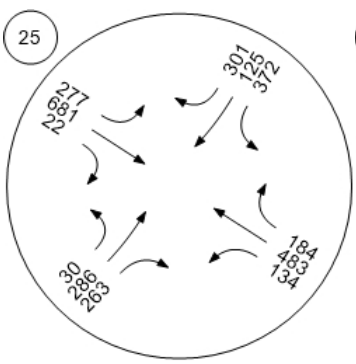


Generated with PTV VISTRO

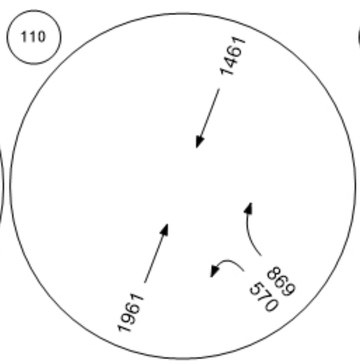
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

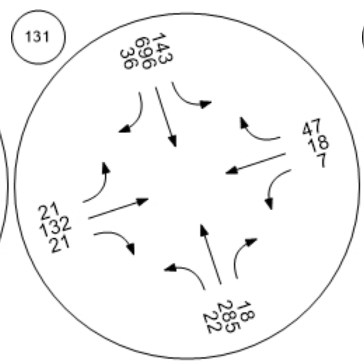

Middlefield Rd-Willow Rd



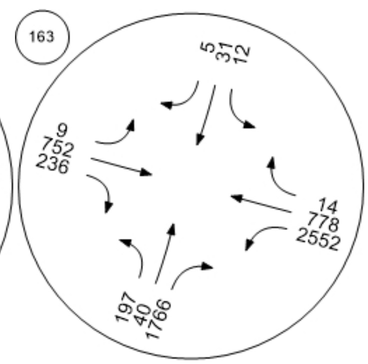

Marsh Road/101 NB Ramps



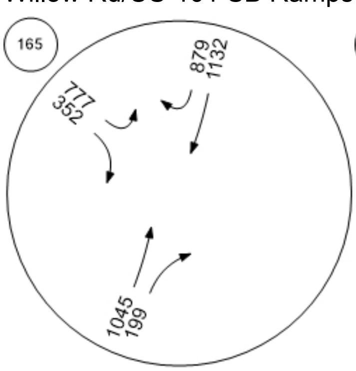

Chilco Street/Hamilton Avenu



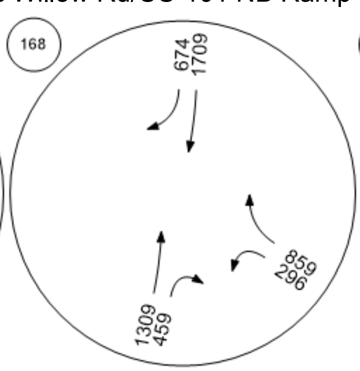

Bayfront Expy/Marsh Rd



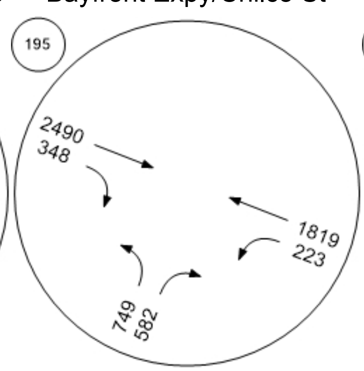

Willow Rd/US-101 SB Ramps



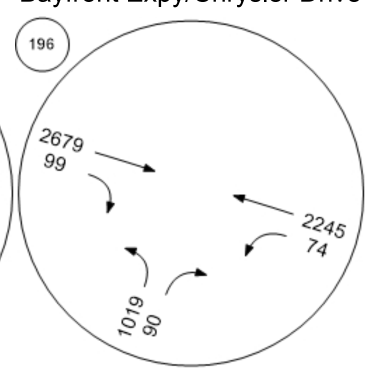

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St

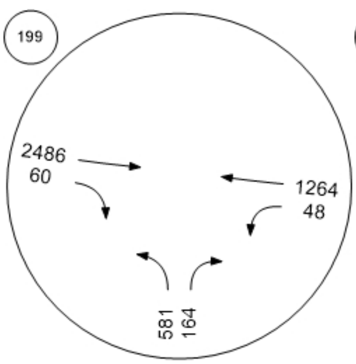



Bayfront Expy/Chrysler Drive

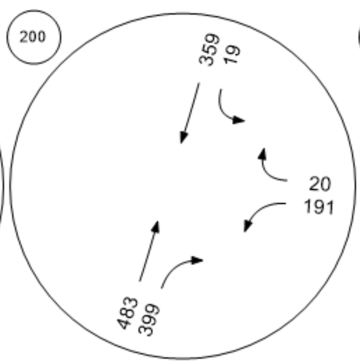


Traffic Volume - Base Volume

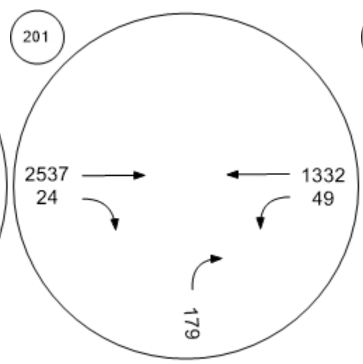

Bafront Expwy/Bldg 21



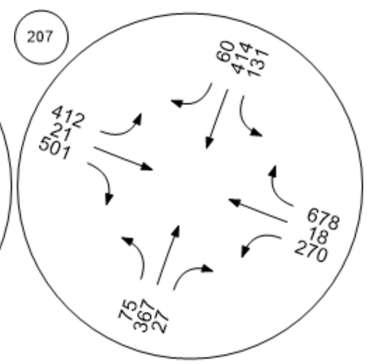

O'Brien Drive/Kavanaugh Dri



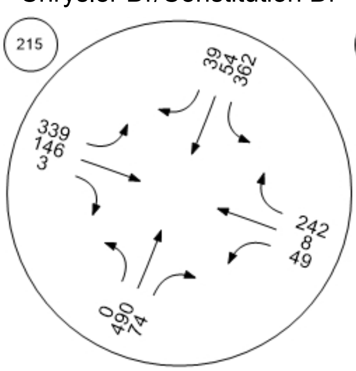

Bayfront Expwy/Bldg 20



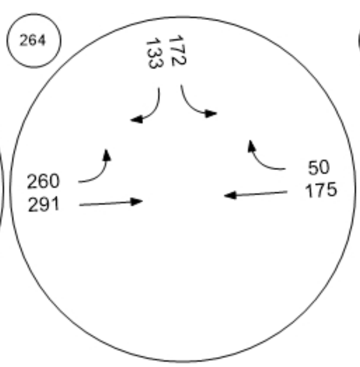

Chilco St/Constitution Dr



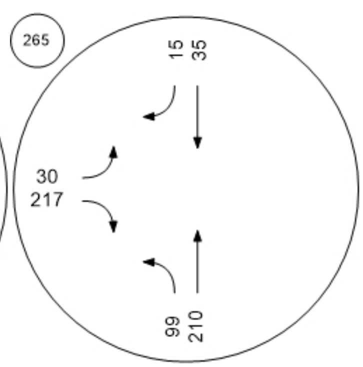

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

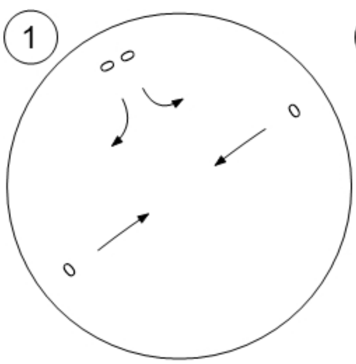


Generated with PTV VISTRO

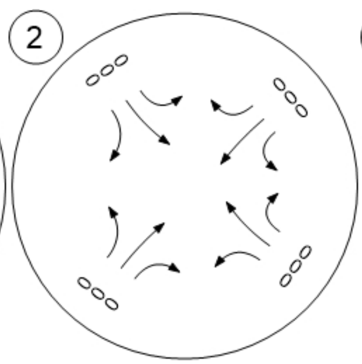
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

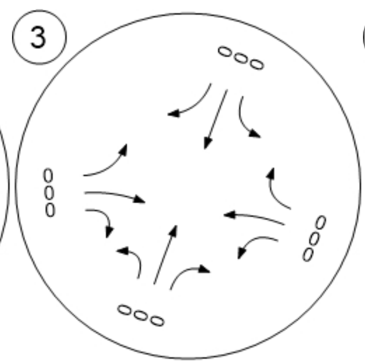

Marsh Rd (SR 84)/US 101 S



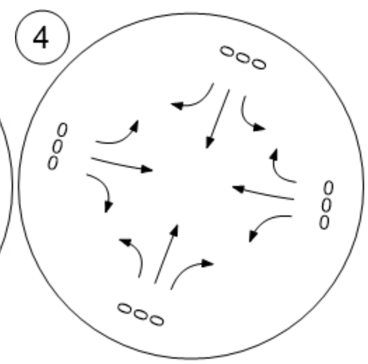

Marsh Rd/Rolison Rd-Scott D



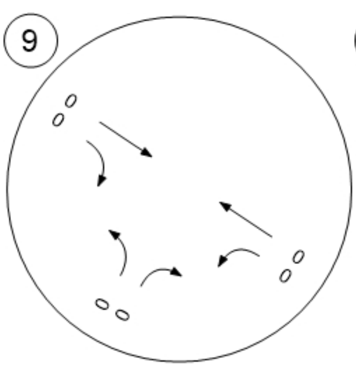

Marsh Rd/Florence St-Bohan



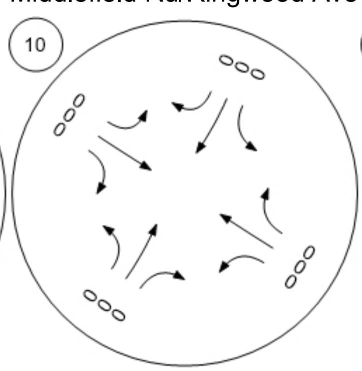

Marsh Rd/Bay Rd



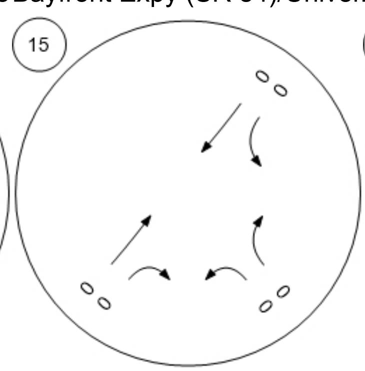

Middlefield Rd/Ravenswood



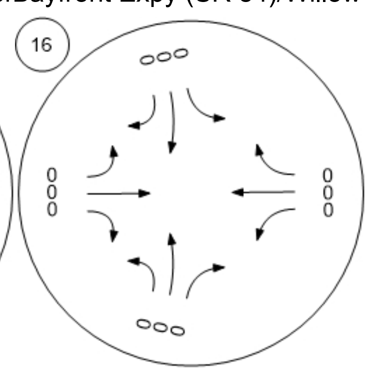

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

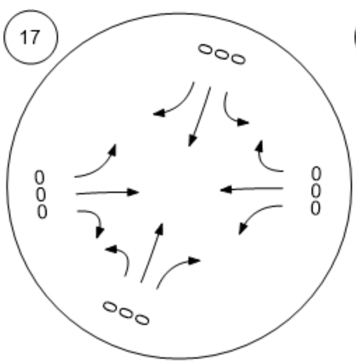


Generated with PTV VISTRO

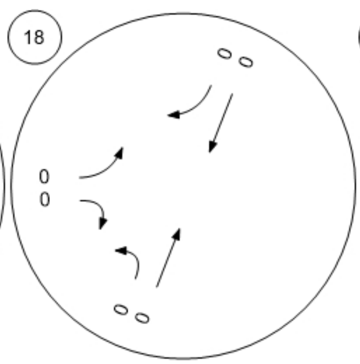
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

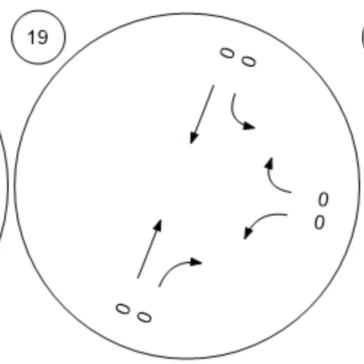

Willow Rd (SR 114)/Hamilton



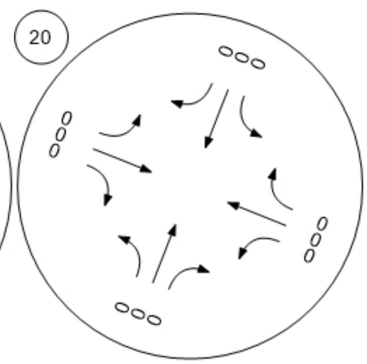

Willow Rd (SR 114)/Ivy Dr



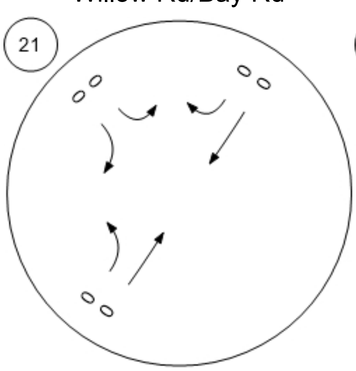

Willow Rd (SR 114)/O'Brien



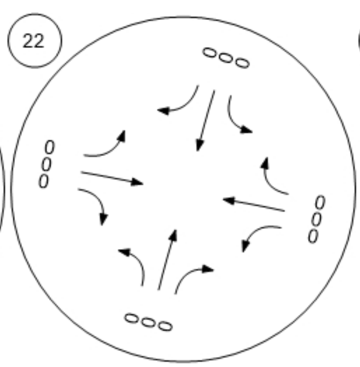

Willow Rd (SR 114)/Newbrid



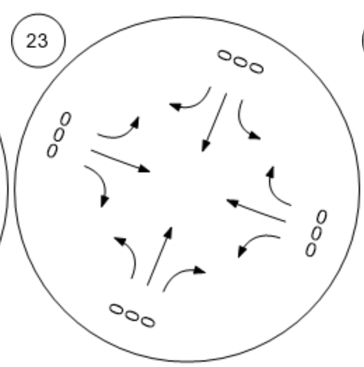

Willow Rd/Bay Rd



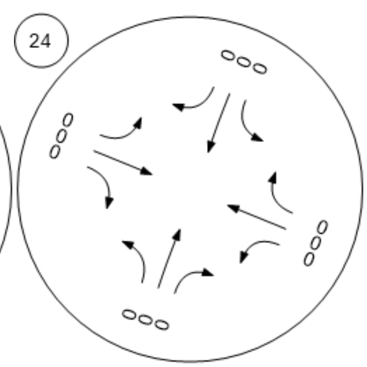

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



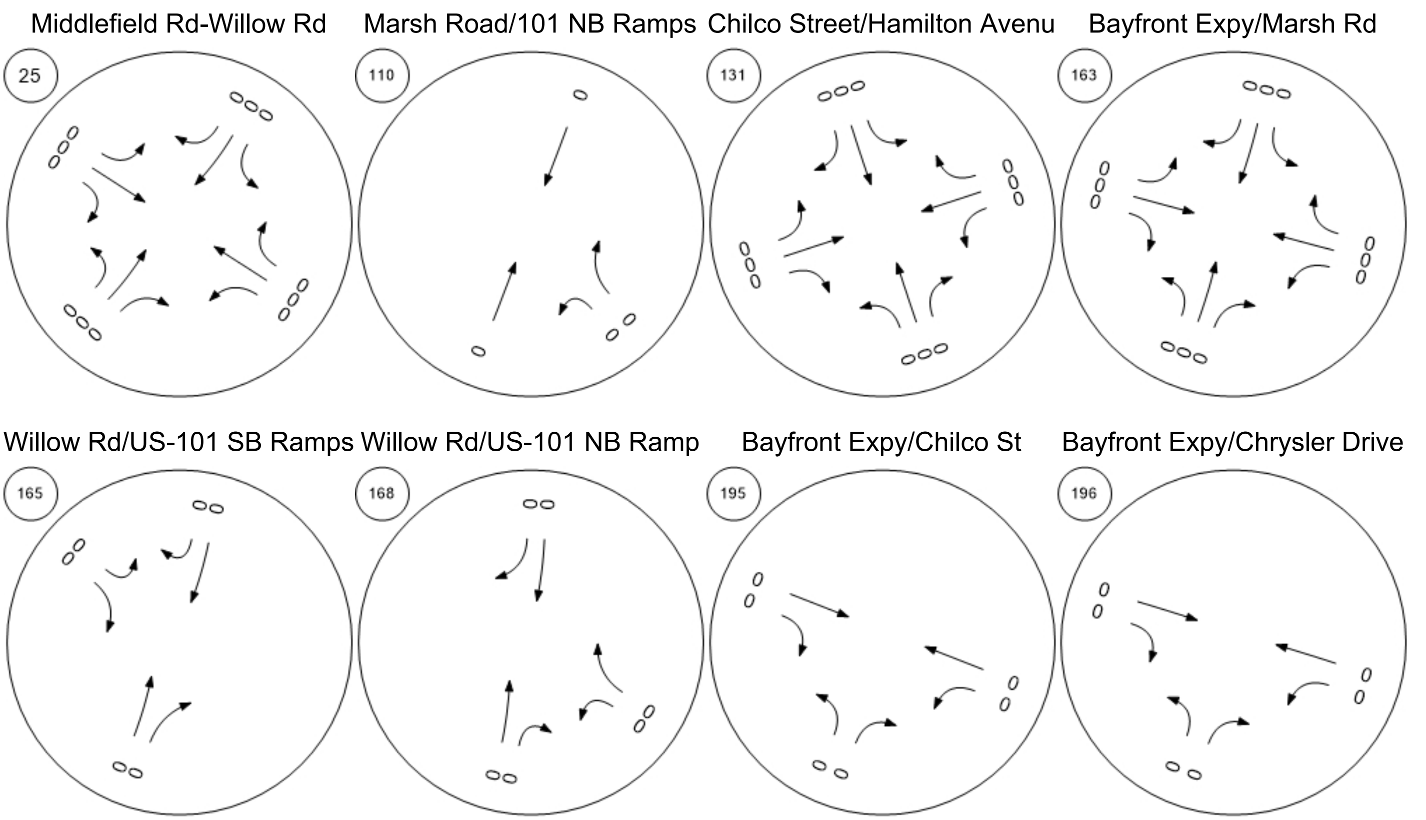

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

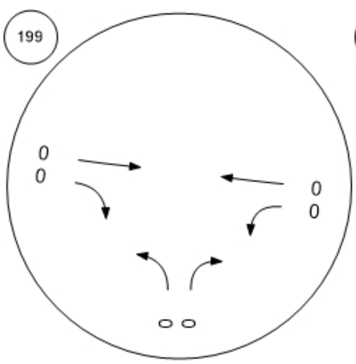



Generated with PTV VISTRO

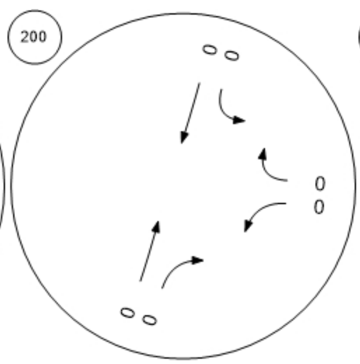
Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

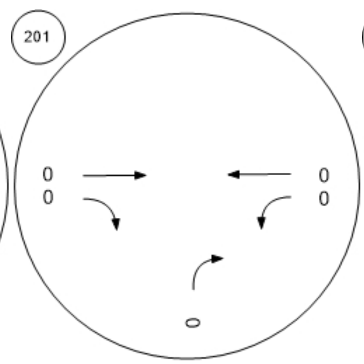

Bafront Expwy/Bldg 21



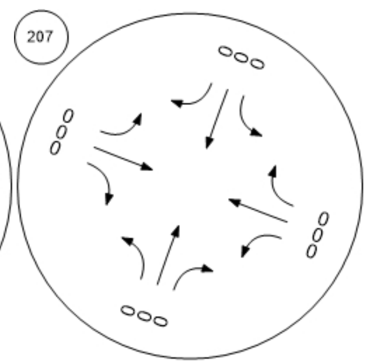

O'Brien Drive/Kavanaugh Dri



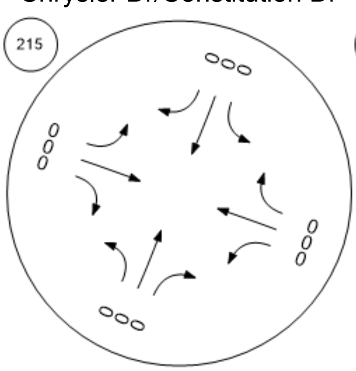

Bayfront Expwy/Bldg 20



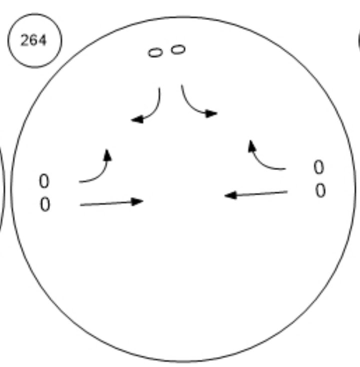

Chilco St/Constitution Dr



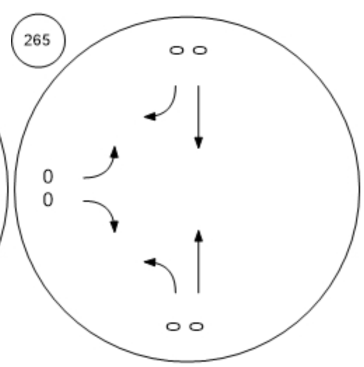

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive




Adam Court/ Adams Drive

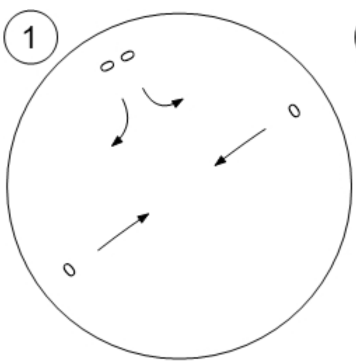


Generated with PTV VISTRO

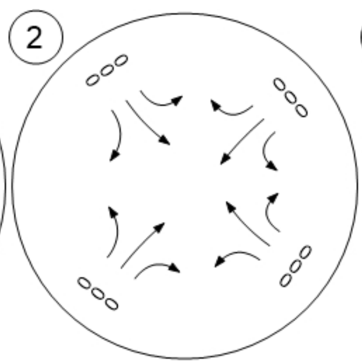
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

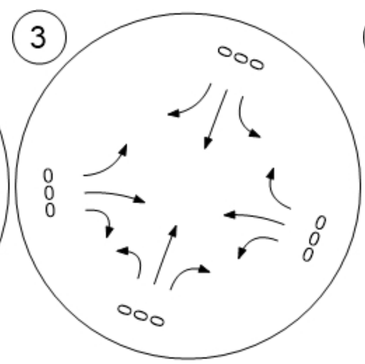

Marsh Rd (SR 84)/US 101 S



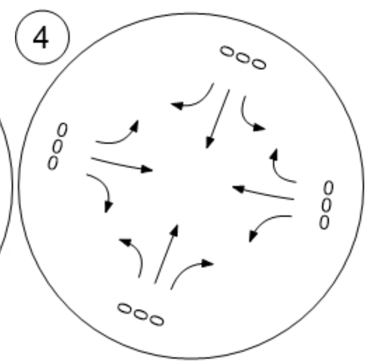

Marsh Rd/Rolison Rd-Scott D



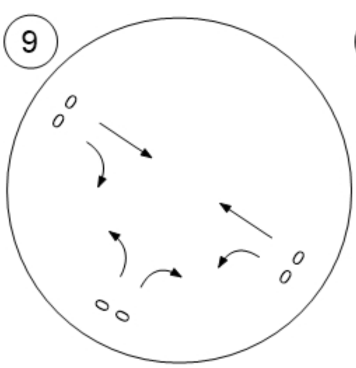

Marsh Rd/Florence St-Bohan



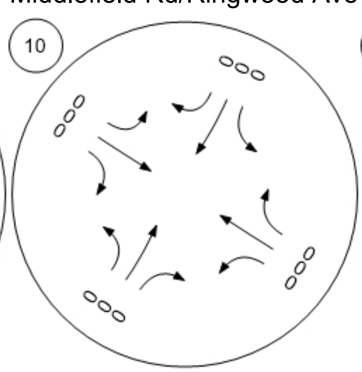

Marsh Rd/Bay Rd



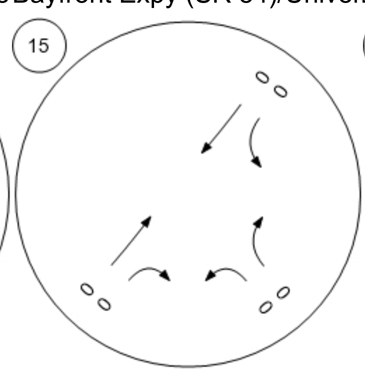

Middlefield Rd/Ravenswood



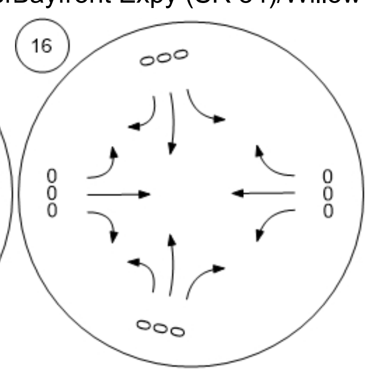

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

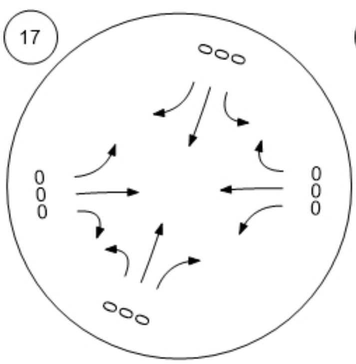


Generated with PTV VISTRO

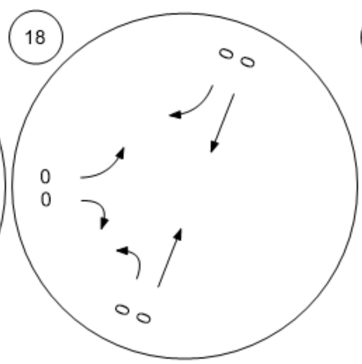
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

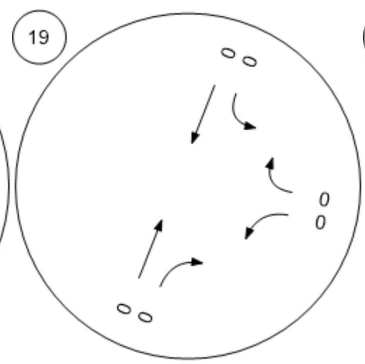

Willow Rd (SR 114)/Hamilton



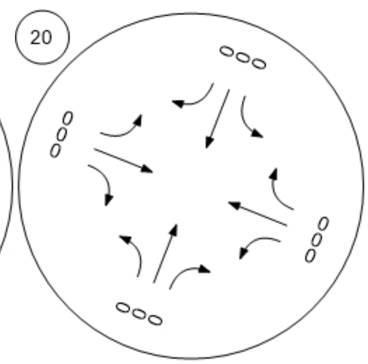

Willow Rd (SR 114)/Ivy Dr



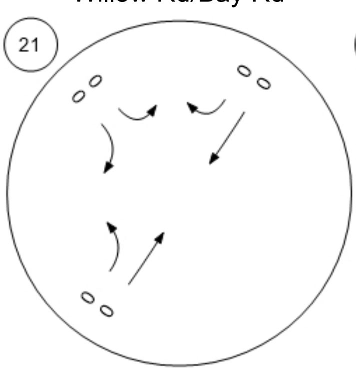

Willow Rd (SR 114)/O'Brien



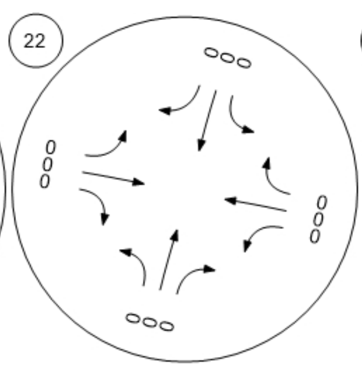

Willow Rd (SR 114)/Newbrid



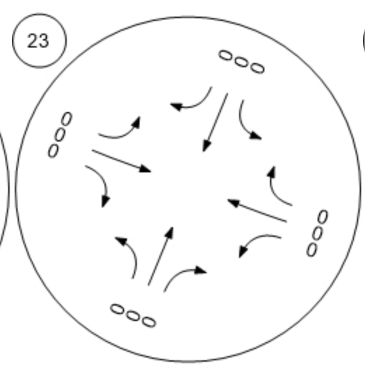

Willow Rd/Bay Rd



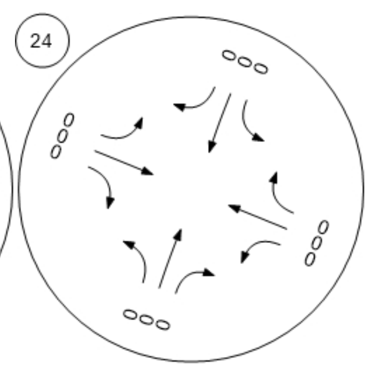

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

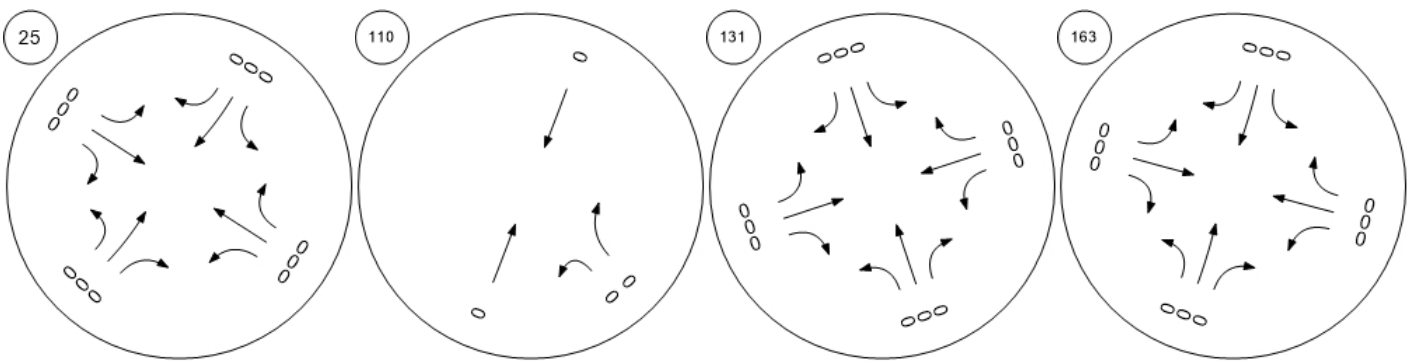


Generated with PTV VISTRO

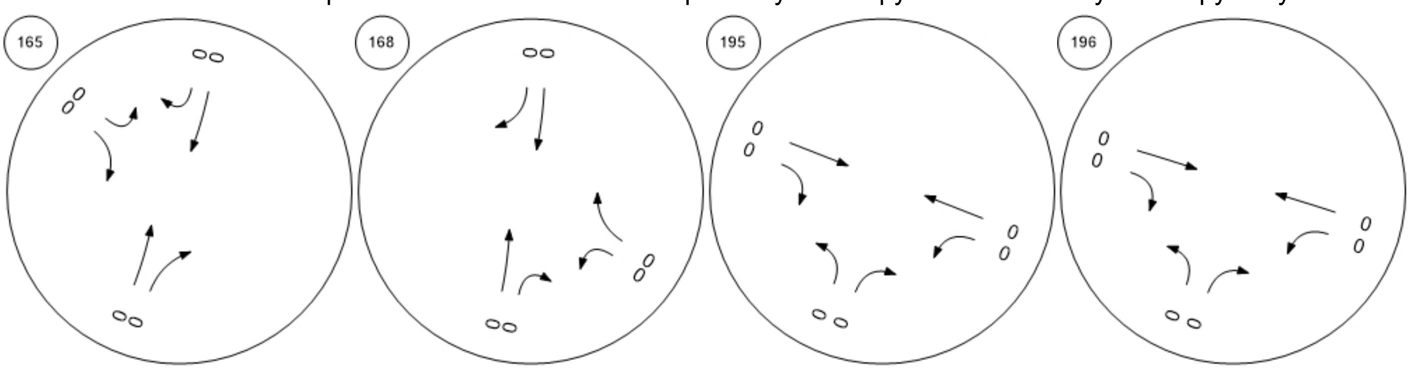
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips


Middlefield Rd-Willow Rd | Marsh Road/101 NB Ramps | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd



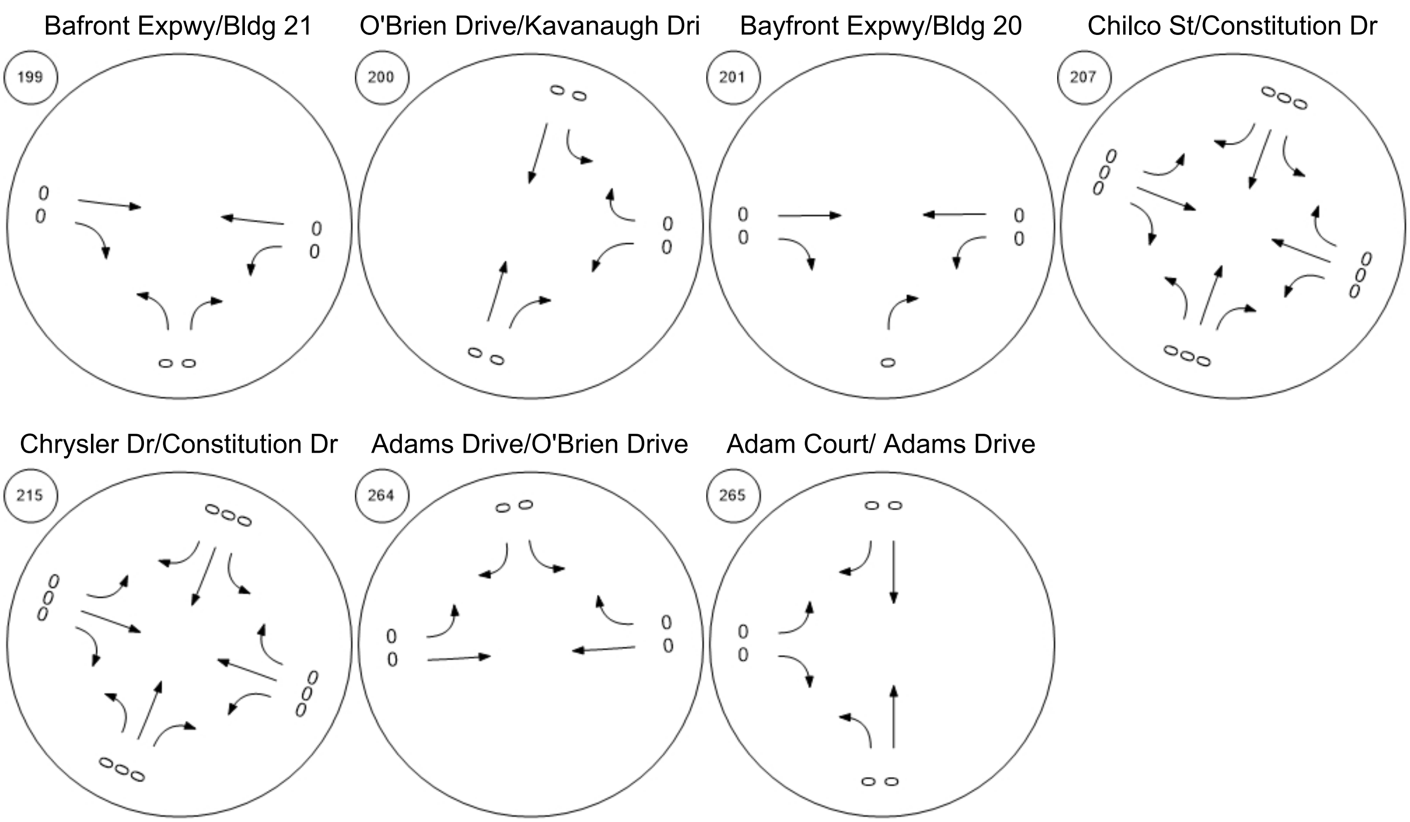

Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive



Generated with PTV VISTRO

Version 2021 (SP 0-4)

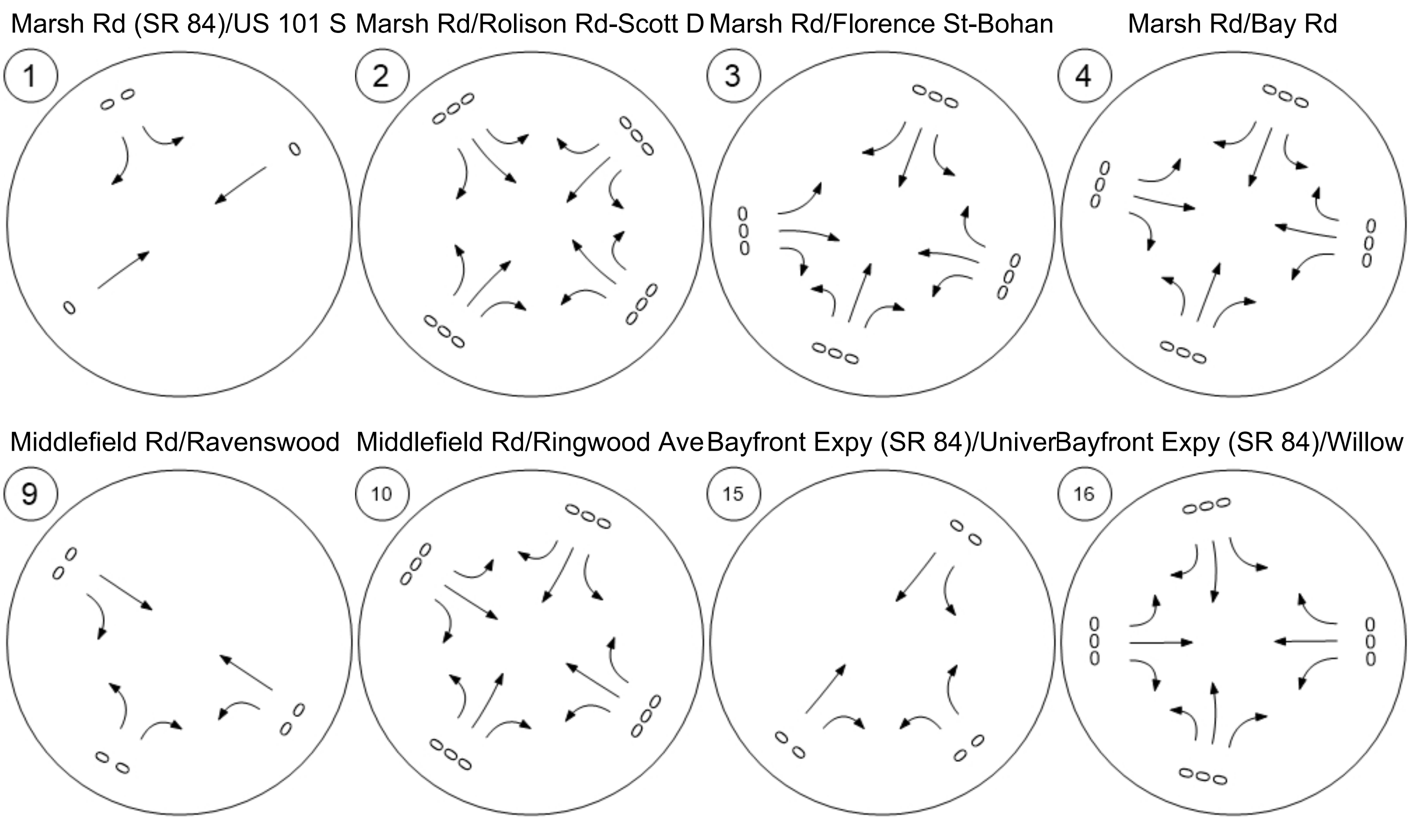
Traffic Volume - Net New Site Trips

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

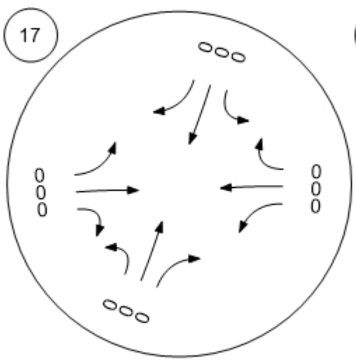
Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Traffic Volume - Other Volume

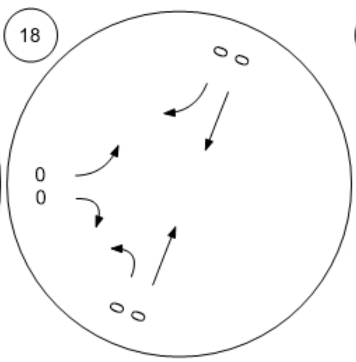

Willow Rd (SR 114)/Hamilton

17



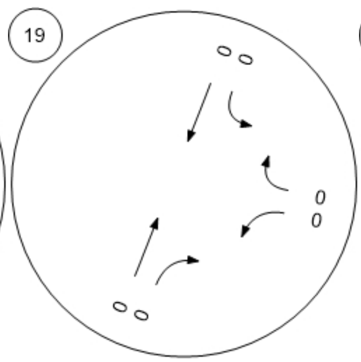
Willow Rd (SR 114)/Ivy Dr

18



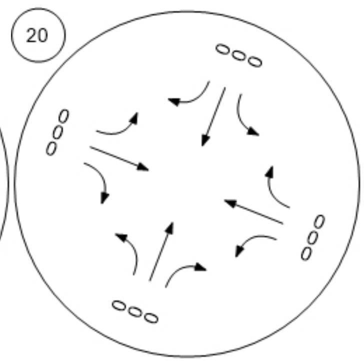
Willow Rd (SR 114)/O'Brien

19



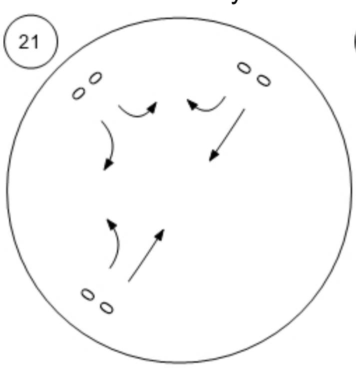
Willow Rd (SR 114)/Newbrid

20



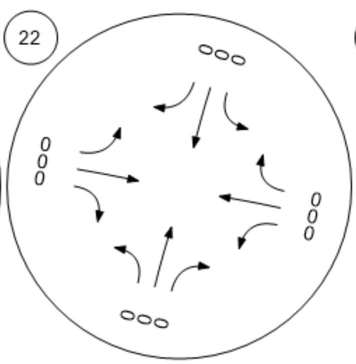
Willow Rd/Bay Rd

21



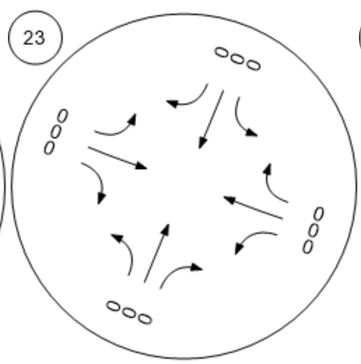
Willow Rd/Durham St-VA Me

22



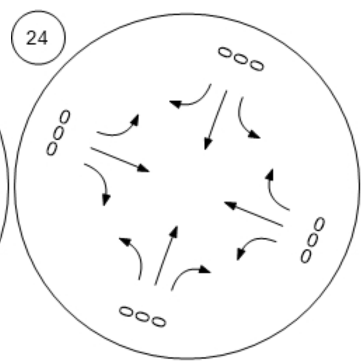
Willow Rd/Coleman Ave

23



Willow Rd/Gilbert Ave

24

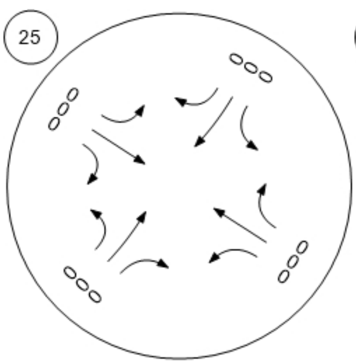


Generated with PTV VISTRO

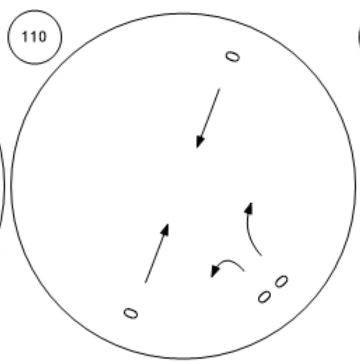
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

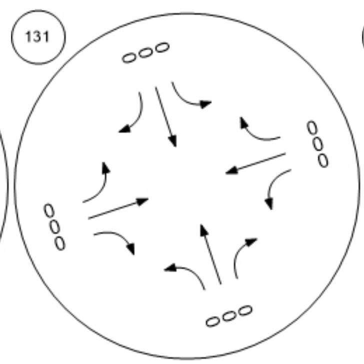

Middlefield Rd-Willow Rd



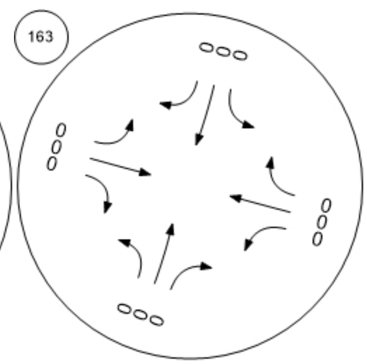

Marsh Road/101 NB Ramps



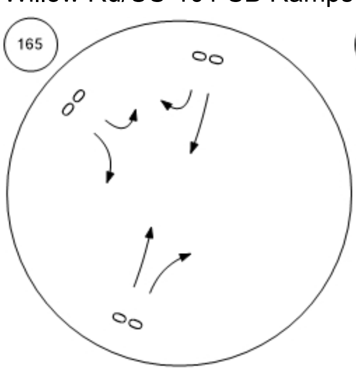

Chilco Street/Hamilton Avenu



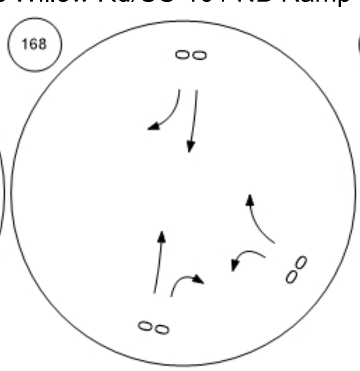

Bayfront Expy/Marsh Rd



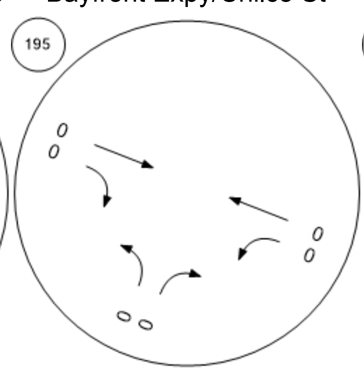

Willow Rd/US-101 SB Ramps



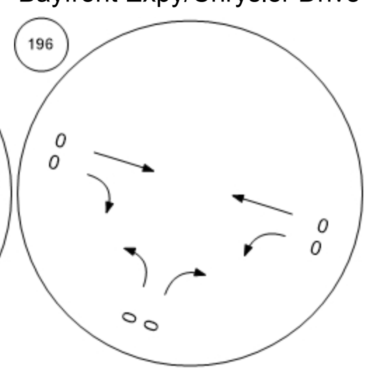

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

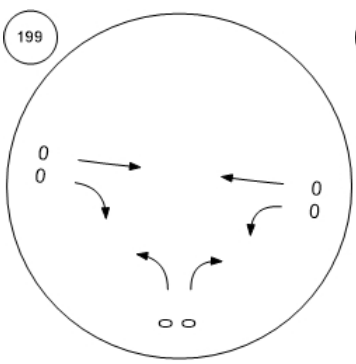


Generated with PTV VISTRO

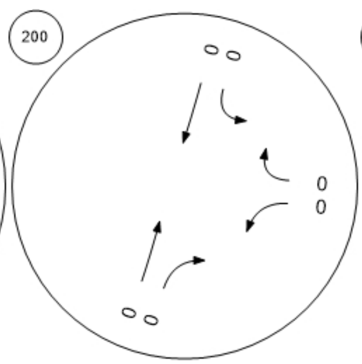
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

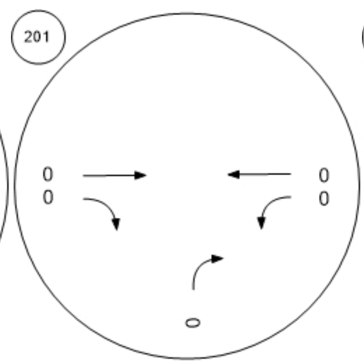

Bafront Expwy/Bldg 21



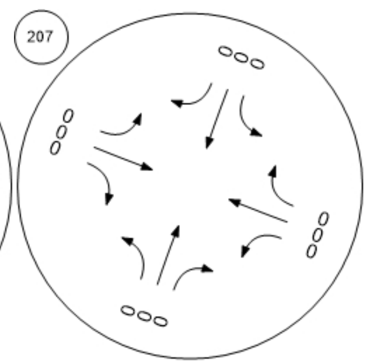

O'Brien Drive/Kavanaugh Dri



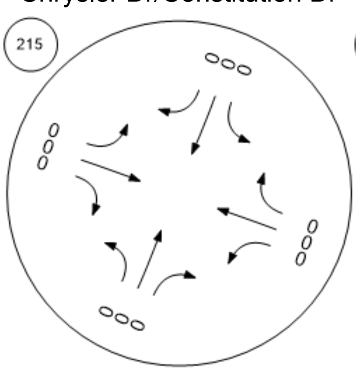

Bayfront Expwy/Bldg 20



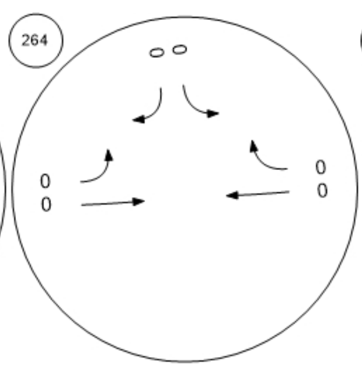

Chilco St/Constitution Dr



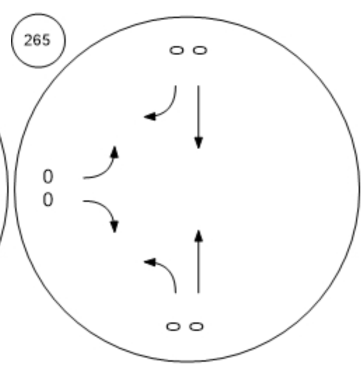

Chrysler Dr/Constitution Dr




Adams Drive/O'Brien Drive



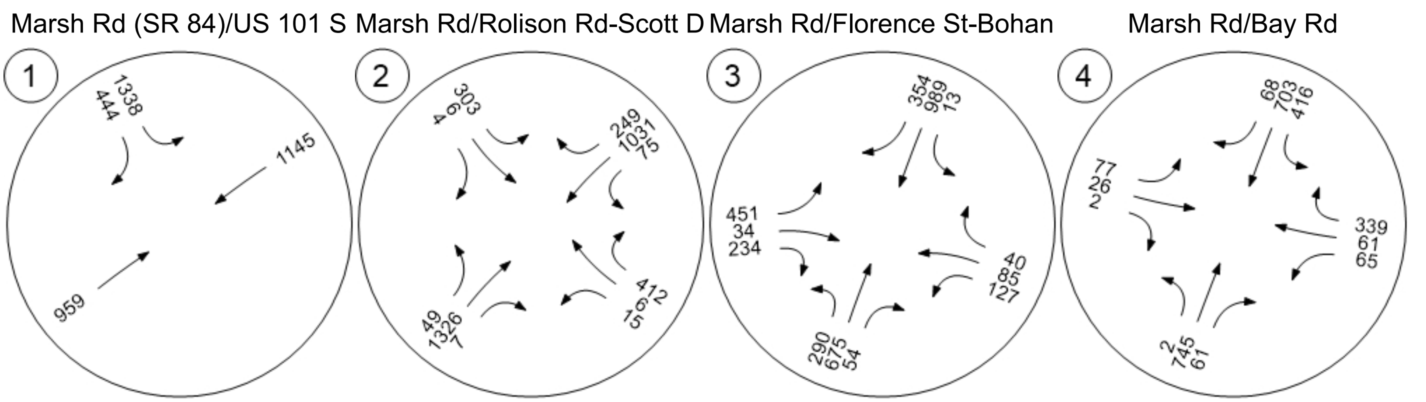

Adam Court/ Adams Drive

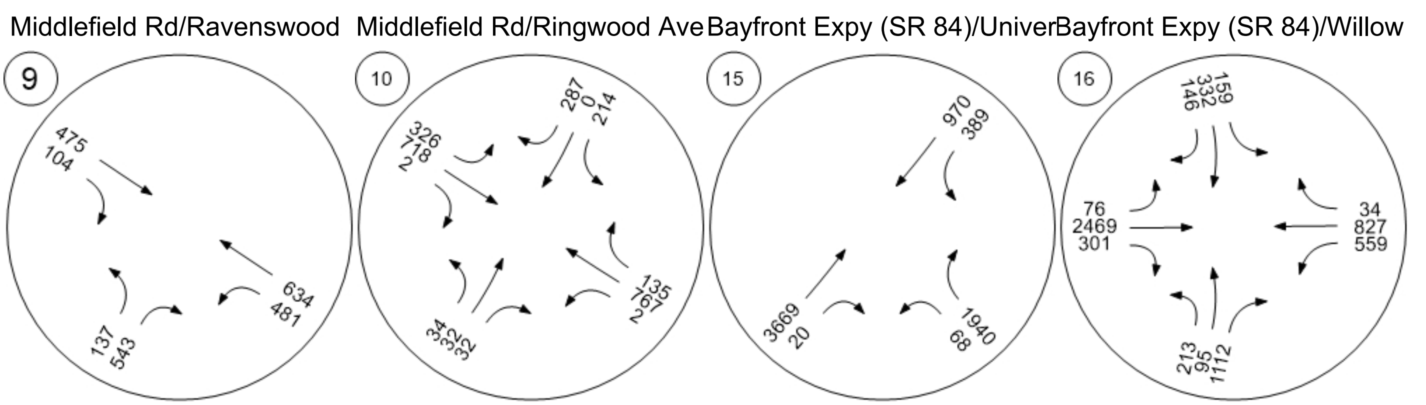


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

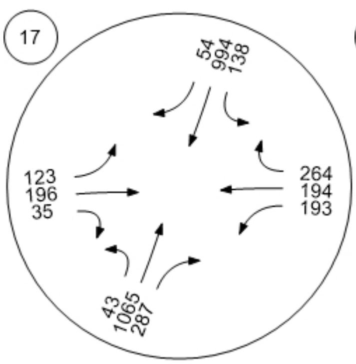



Generated with PTV VISTRO

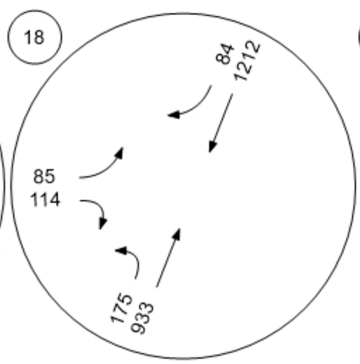
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

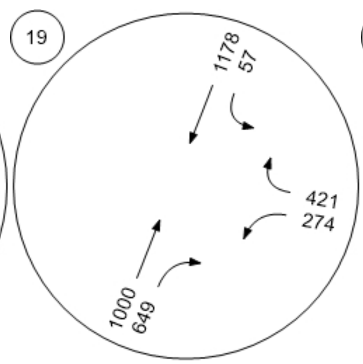

Willow Rd (SR 114)/Hamilton



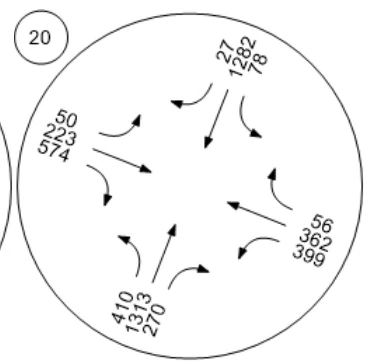

Willow Rd (SR 114)/Ivy Dr



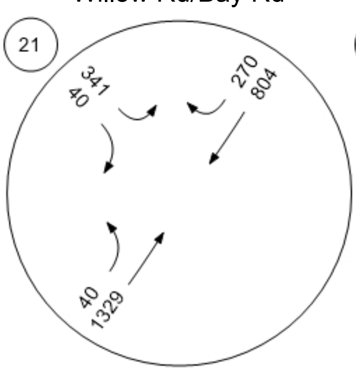

Willow Rd (SR 114)/O'Brien



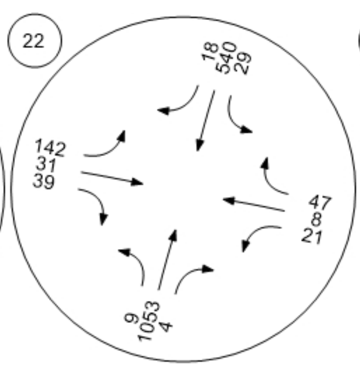

Willow Rd (SR 114)/Newbrid



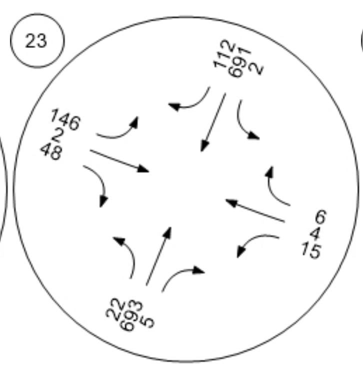

Willow Rd/Bay Rd



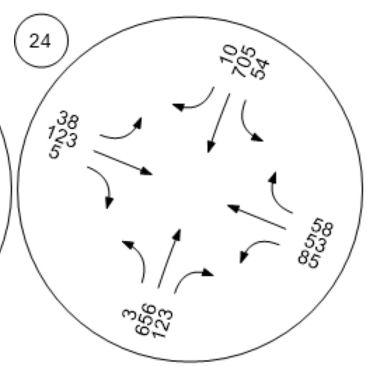

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

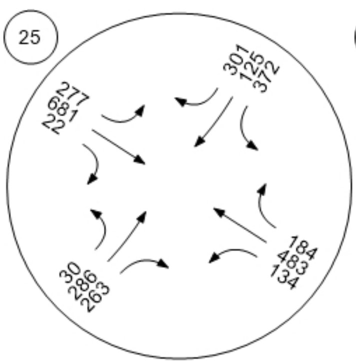


Generated with PTV VISTRO

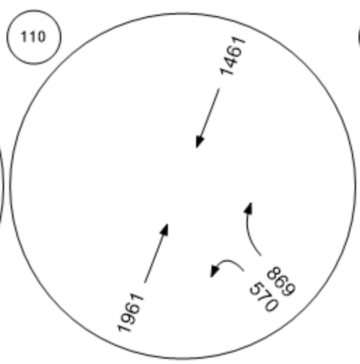
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

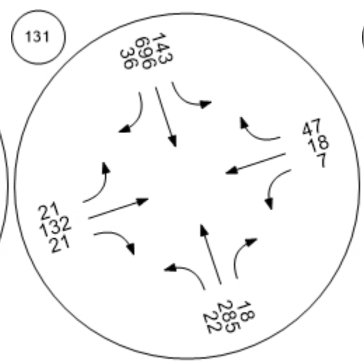

Middlefield Rd-Willow Rd



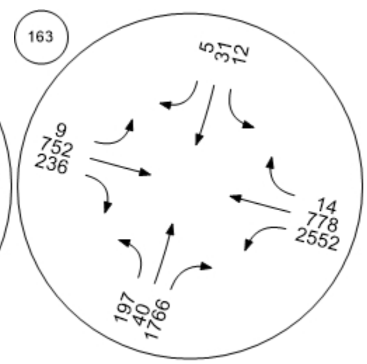

Marsh Road/101 NB Ramps



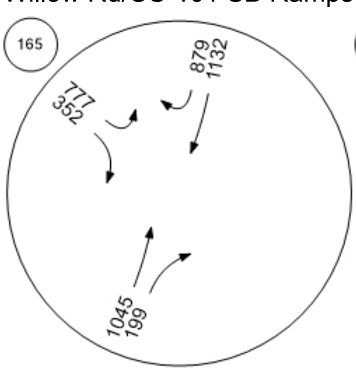

Chilco Street/Hamilton Avenu



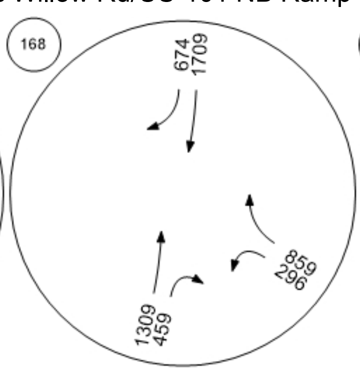

Bayfront Expy/Marsh Rd



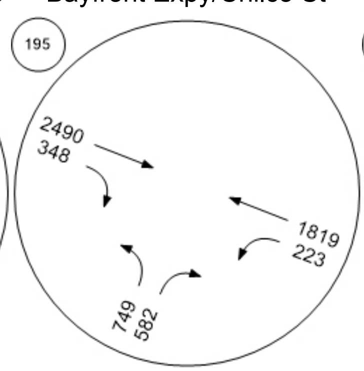

Willow Rd/US-101 SB Ramps



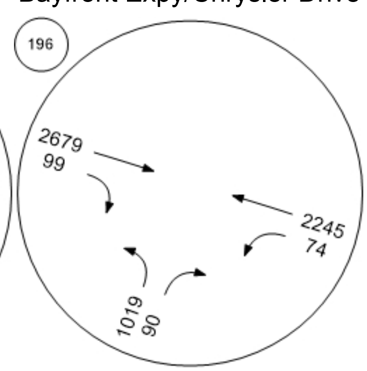

Willow Rd/US-101 NB Ramp



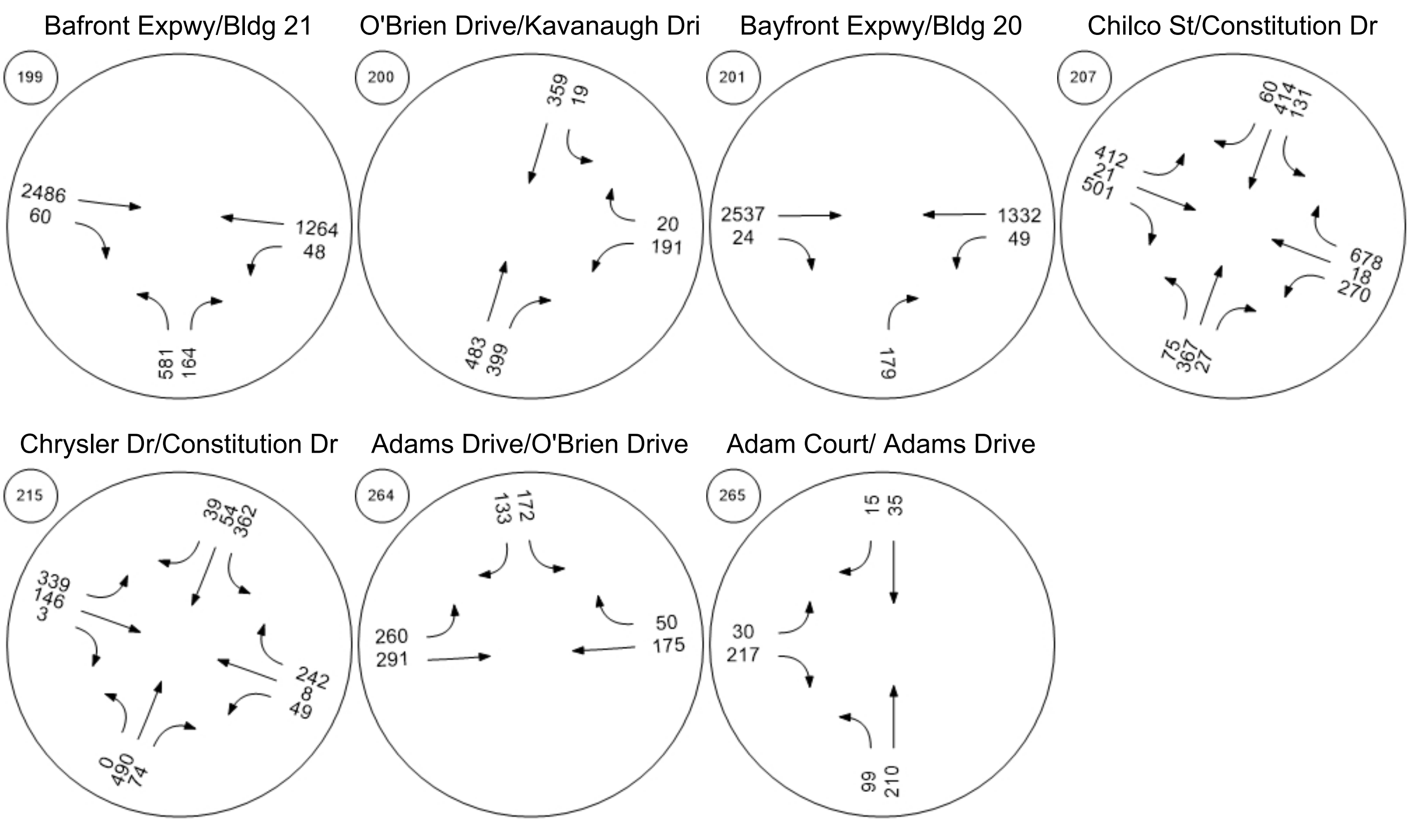

Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



Traffic Volume - Future Total Volume

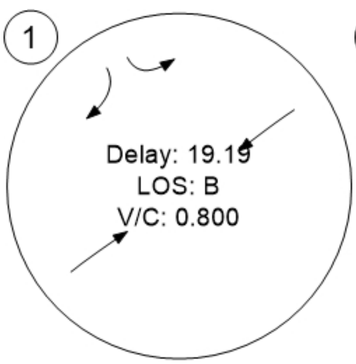



Generated with PTV VISTRO

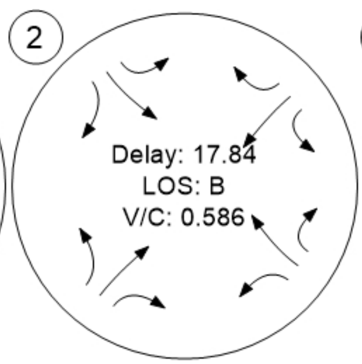
Version 2021 (SP 0-4)

Traffic Conditions

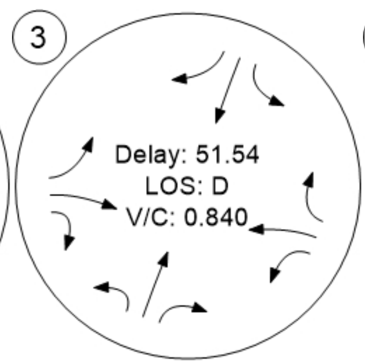

Marsh Rd (SR 84)/US 101 S



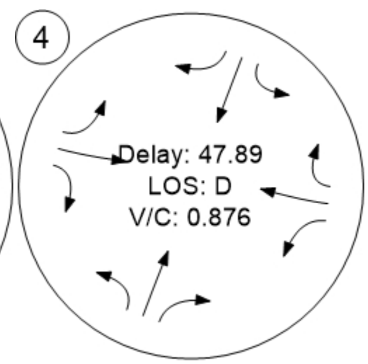

Marsh Rd/Rolison Rd-Scott D



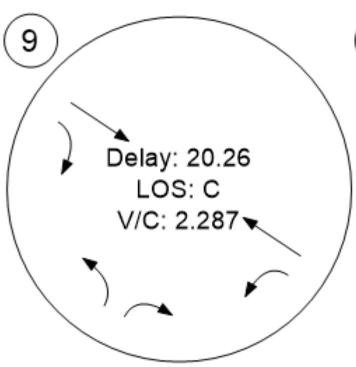

Marsh Rd/Florence St-Bohan



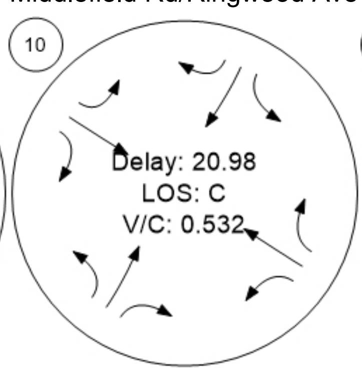

Marsh Rd/Bay Rd



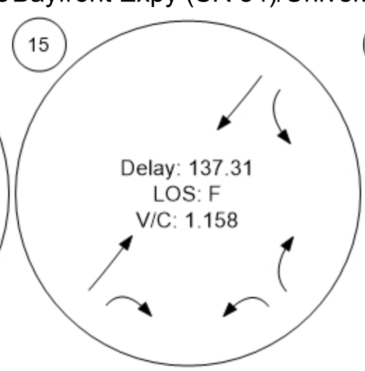

Middlefield Rd/Ravenswood



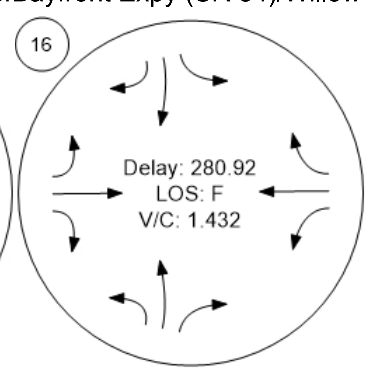

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer

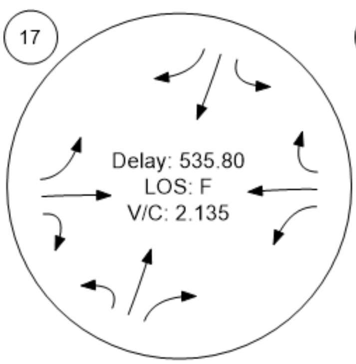



Bayfront Expy (SR 84)/Willow

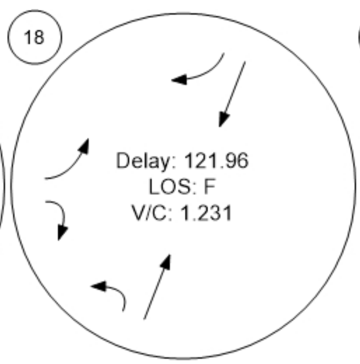


## Traffic Conditions

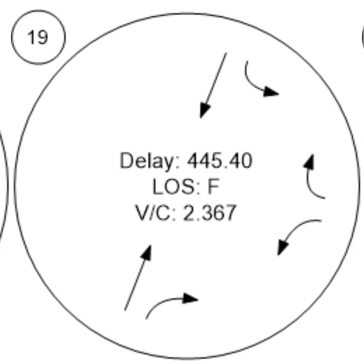

Willow Rd (SR 114)/Hamilton



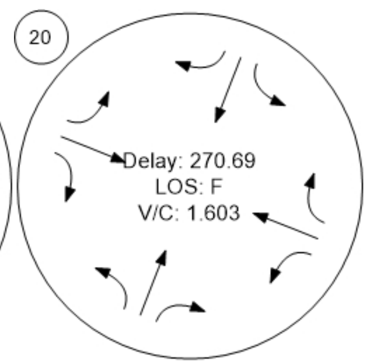

Willow Rd (SR 114)/Ivy Dr



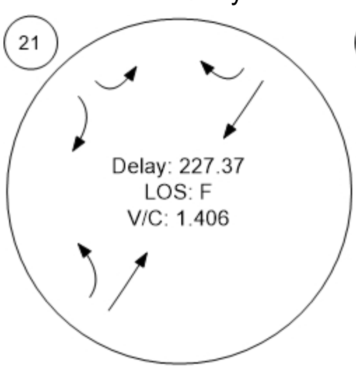

Willow Rd (SR 114)/O'Brien



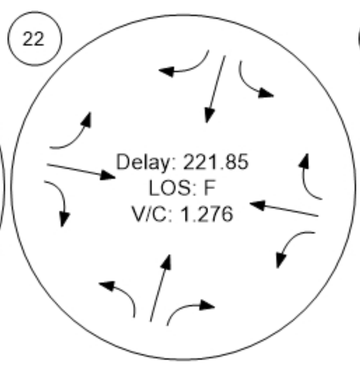

Willow Rd (SR 114)/Newbrid



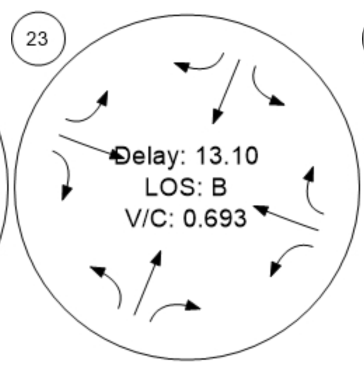

Willow Rd/Bay Rd



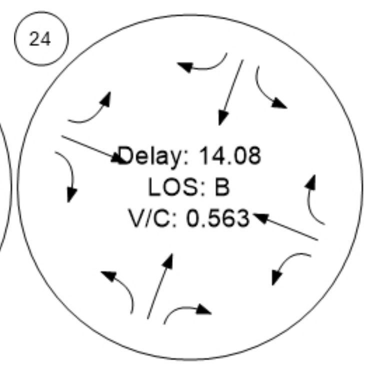

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

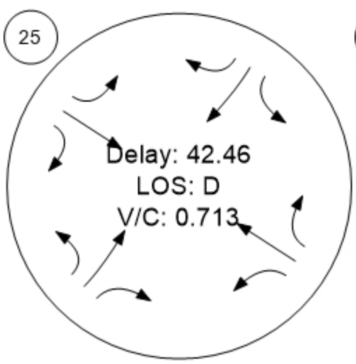


Generated with PTV VISTRO

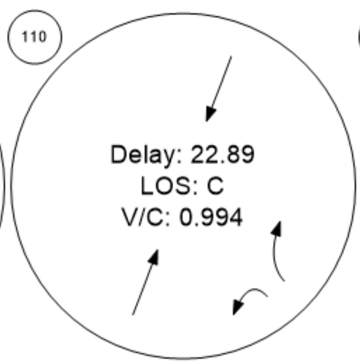
Version 2021 (SP 0-4)

Traffic Conditions

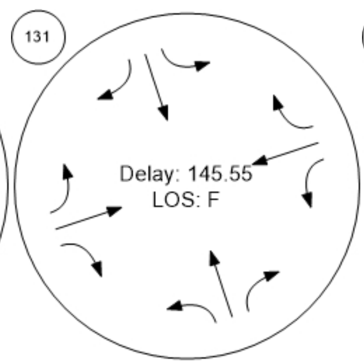

Middlefield Rd-Willow Rd



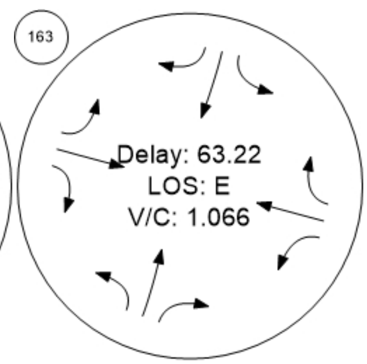

Marsh Road/101 NB Ramps



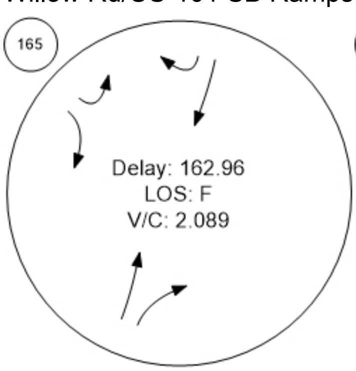

Chilco Street/Hamilton Avenu



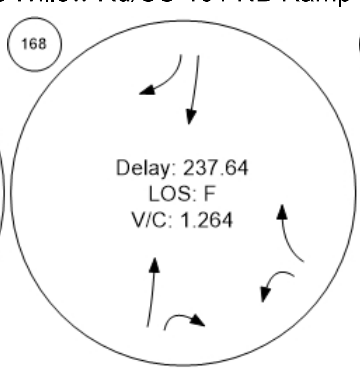

Bayfront Expy/Marsh Rd



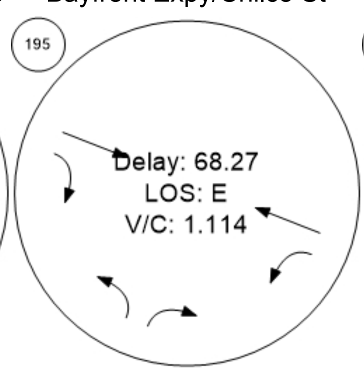

Willow Rd/US-101 SB Ramps



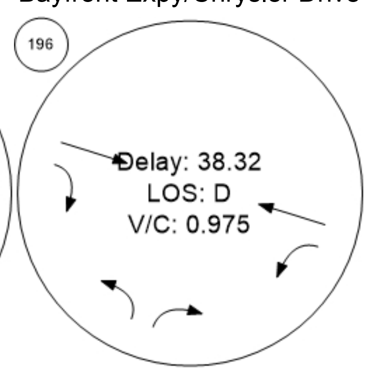

Willow Rd/US-101 NB Ramp



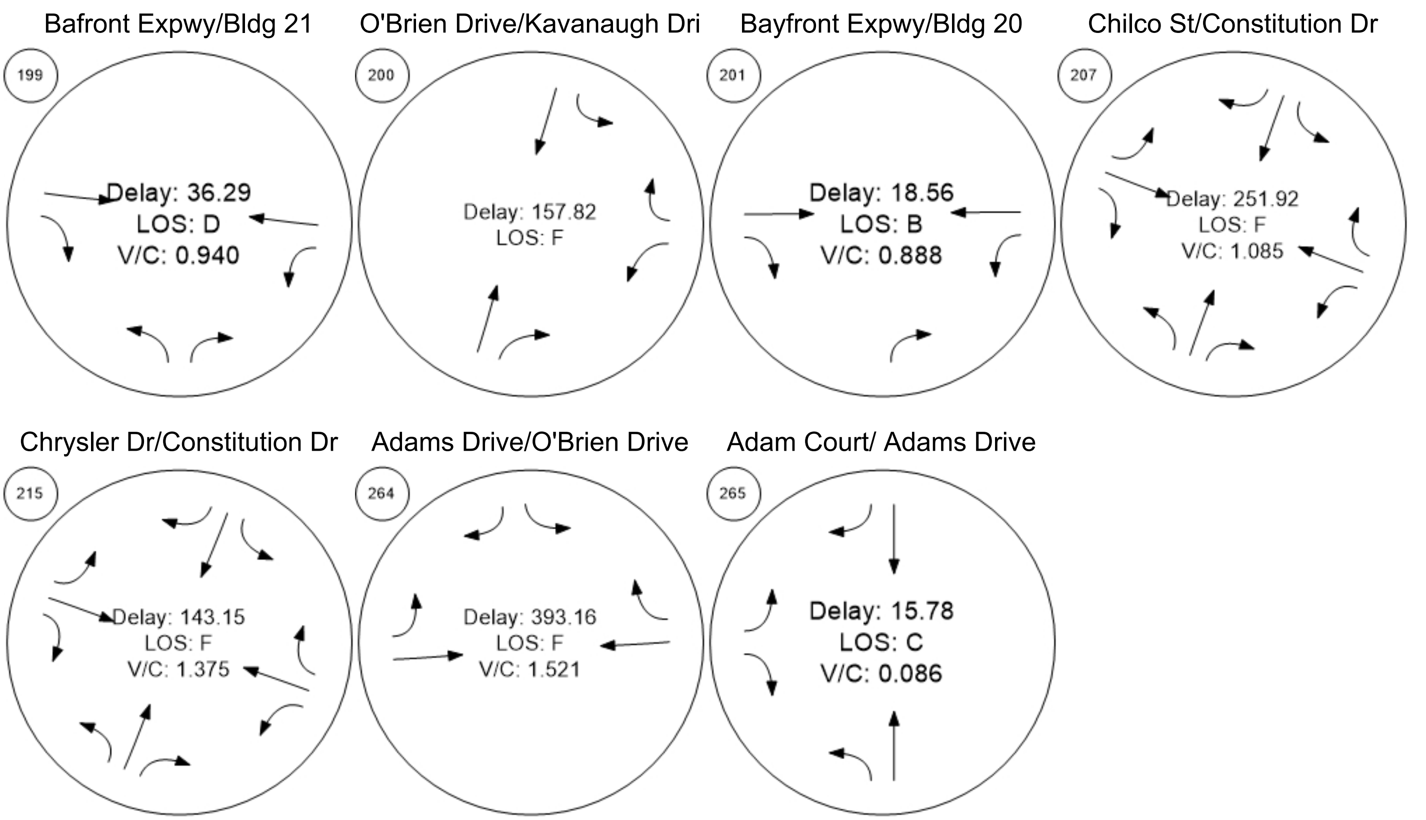

Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive



## Traffic Conditions

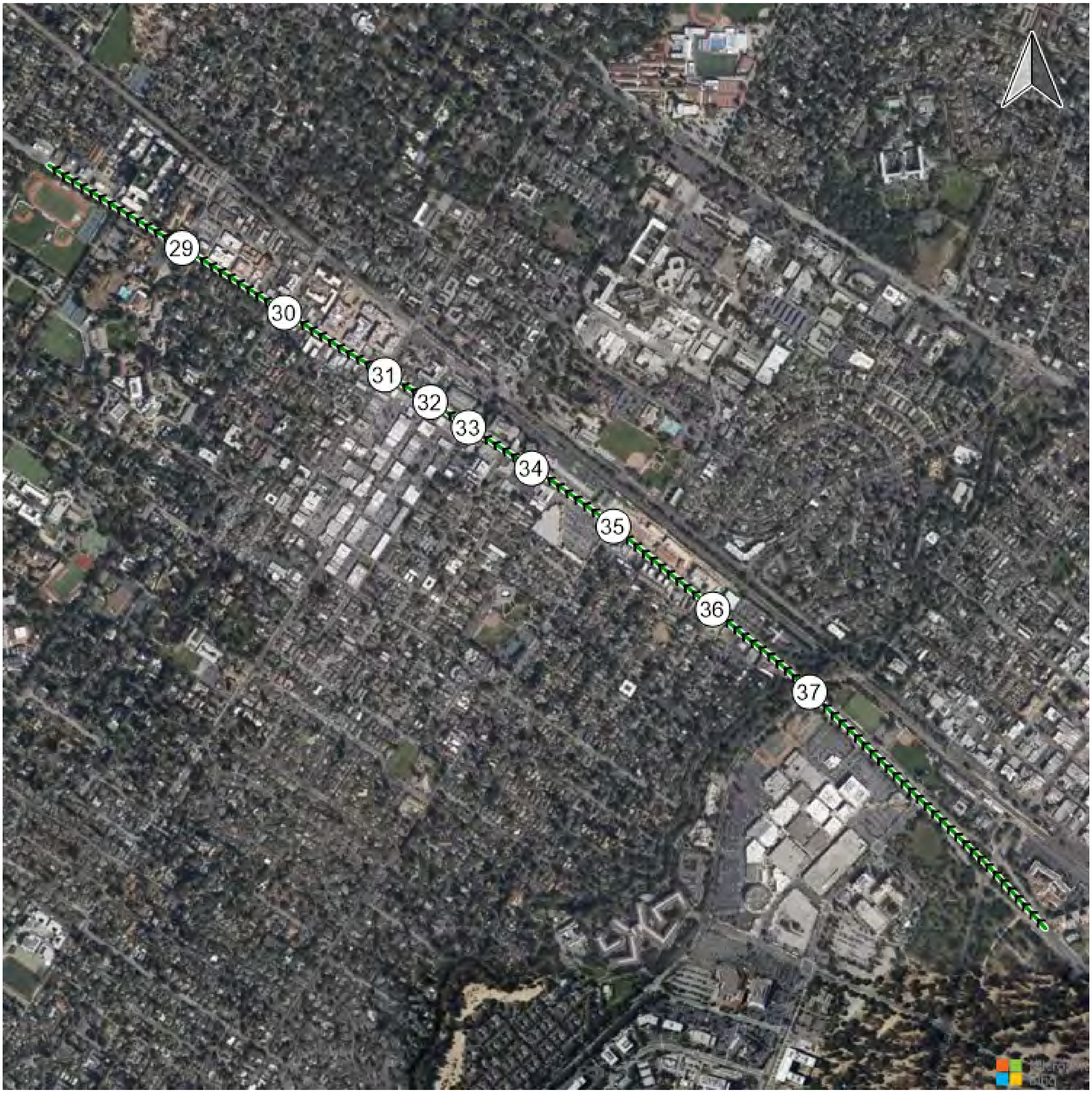



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



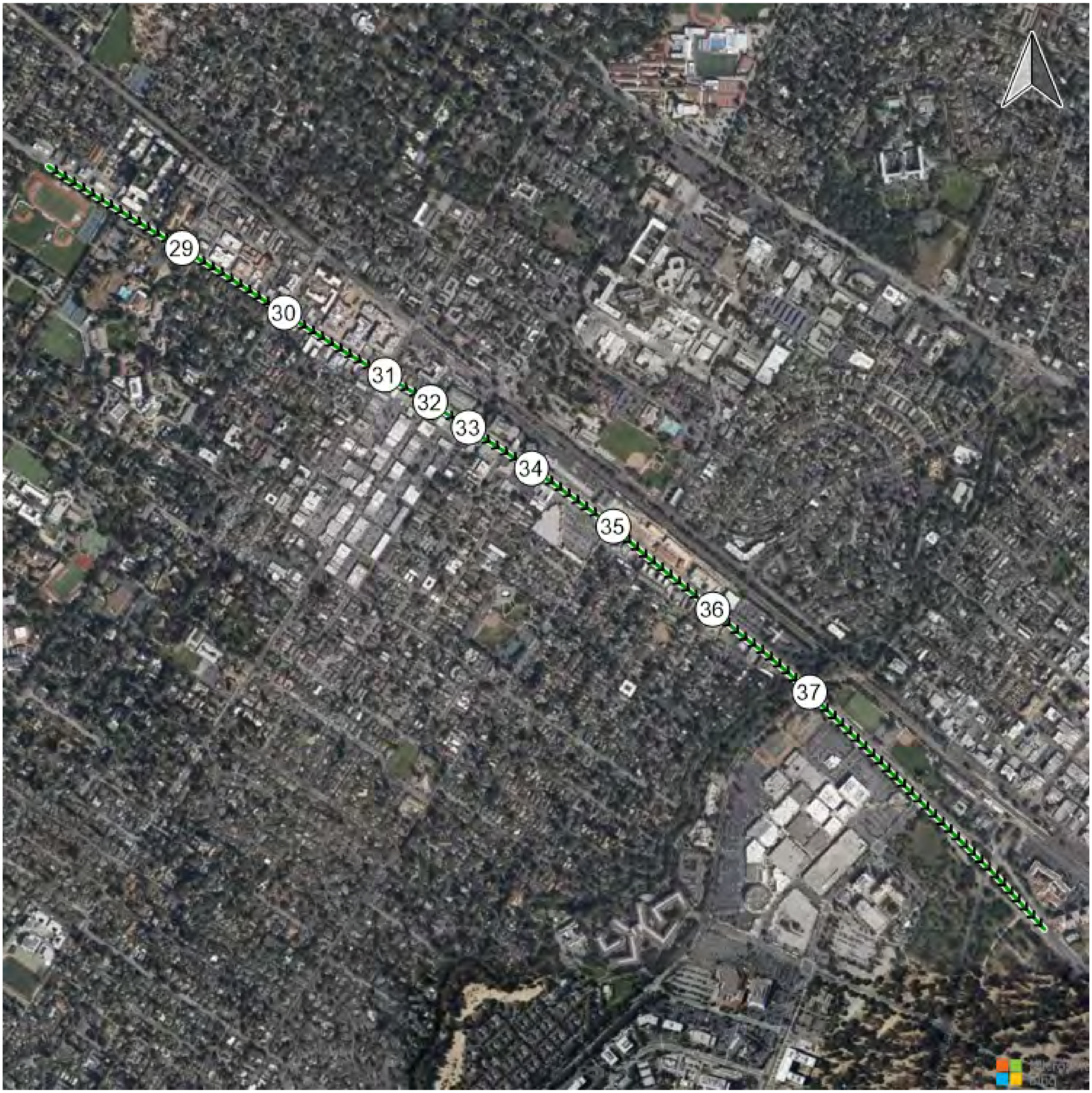
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



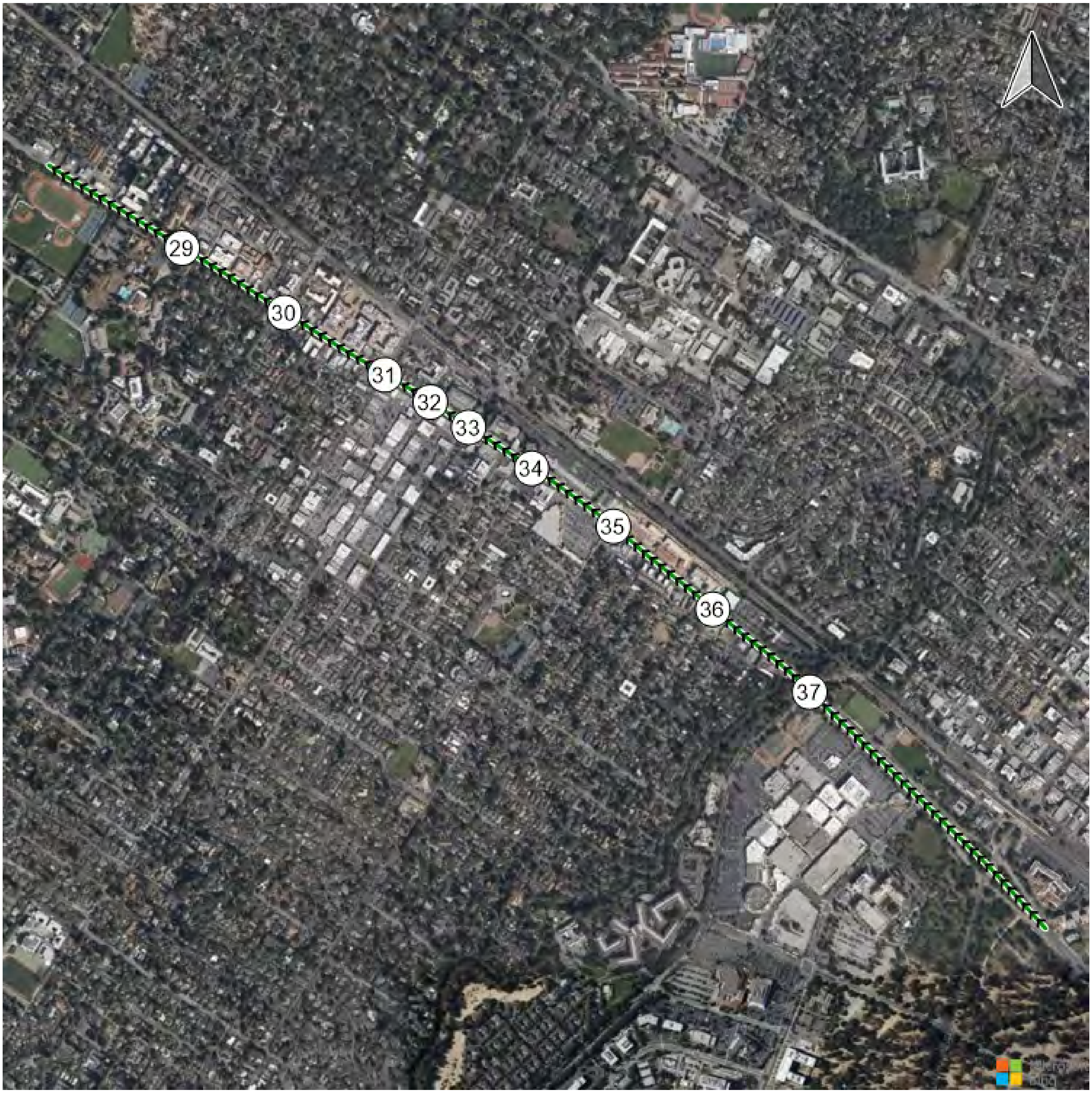
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



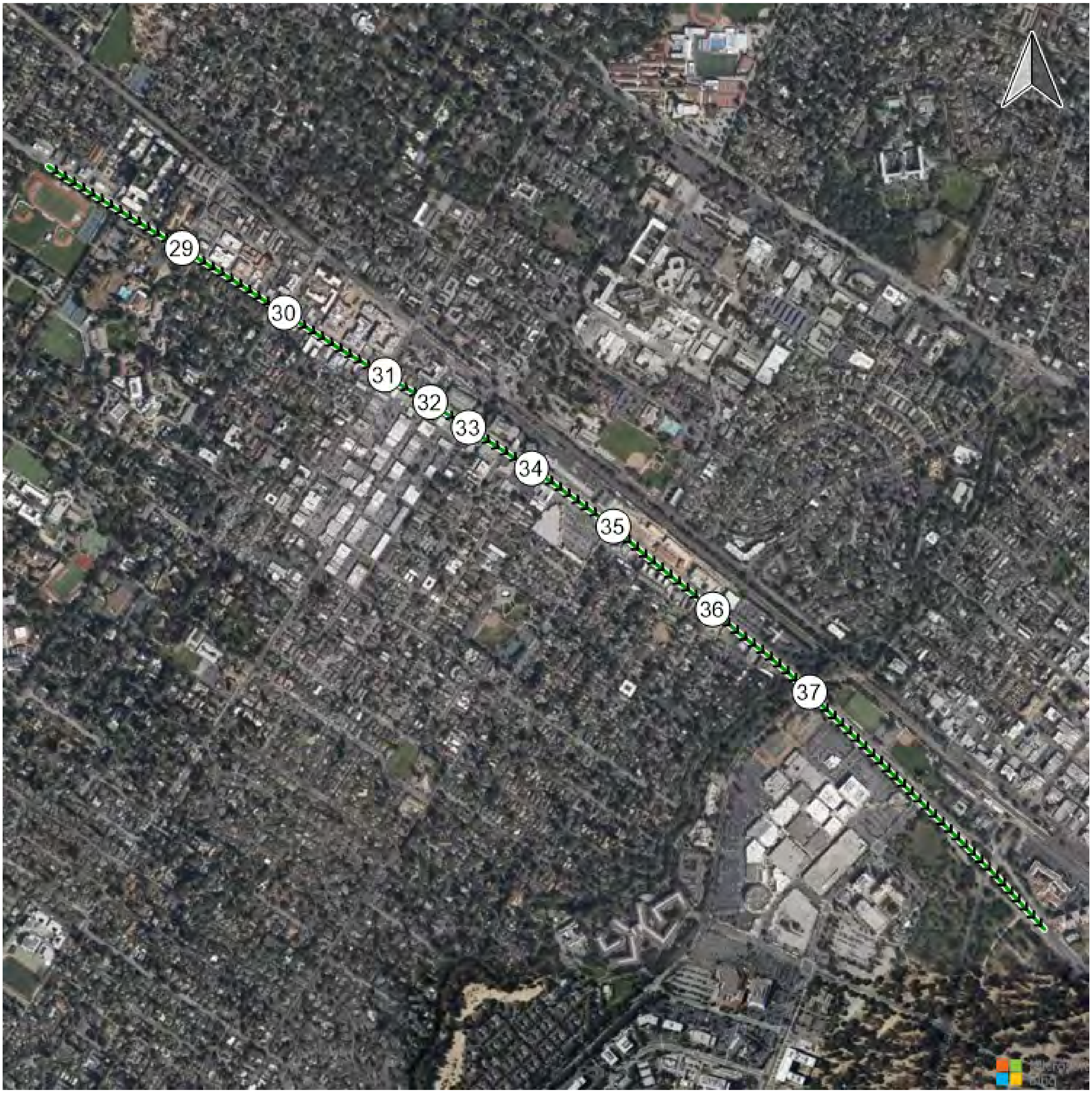
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project AM (RedTripCap).pdf

Scenario 22 Cumulative w/Dumbarton AM (2040 vols)+ Project
12/9/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Right | 0.910 | 22.6 | C |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | SEB Left | 0.825 | 30.4 | C |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.831 | 58.7 | E |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | EB Left | 1.212 | 63.5 | E |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NWB Left | 0.757 | 49.7 | D |
| 10 | Middlefield Rd/Ringswood Ave | Signalized | HCM 6th Edition | NEB Left | 0.408 | 13.2 | B |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NWB Left | 0.770 | 13.1 | B |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | WB Left | 1.278 | 258.8 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | SB Left | 1.167 | 163.5 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.619 | 251.1 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | NB Thru | 1.149 | 76.6 | E |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | WB Right | 1.611 | 230.1 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | SEB Left | 1.172 | 77.4 | E |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | WB Right | 1.124 | 122.9 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.925 | 33.6 | C |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.694 | 23.4 | C |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.625 | 64.8 | E |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road and US 101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 1.110 | 61.9 | E |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | NB Thru | 0.833 | 24.3 | C |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | NB Left | 0.847 | 65.3 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 1.711 | 96.4 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.569 | 129.0 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.038 | 45.5 | D |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | WB Left | 0.751 | 12.5 | B |
| 199 | Bayfront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.722 | 5.6 | A |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.983 | 266.3 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.933 | 9.9 | A |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | NB Left | 0.733 | 86.7 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | SB Thru | 1.586 | 325.6 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 0.915 | 285.6 | F |
| 265 | Adam Court/Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.047 | 17.3 | C |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.509 | 33.6 | C |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | WB Right | | 8.4 | A |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.910 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1038 | 1462 | 217 | 1343 | 532 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.30 | 3.60 | 2.15 | 5.10 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1038 | 1462 | 217 | 1343 | 532 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 265 | 373 | 54 | 343 | 136 |
| Total Analysis Volume [veh/h] | 0 | 1059 | 1492 | 217 | 1370 | 543 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 7 | 10 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 16 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.42 | 0.41 | 0.35 |
| s, saturation flow rate [veh/h] | 4000 | 3515 | 3373 | 1572 |
| c, Capacity [veh/h] | 2121 | 1772 | 1394 | 650 |
| d1, Uniform Delay [s] | 11.98 | 17.07 | 23.15 | 21.01 |
| k, delay calibration | 0.50 | 0.50 | 0.05 | 0.37 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.84 | 5.06 | 4.39 | 9.36 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.84 | 0.98 | 0.84 |
| d, Delay for Lane Group [s/veh] | 12.82 | 22.13 | 27.55 | 30.37 |
| Lane Group LOS | B | C | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.51 | 11.47 | 12.56 | 10.11 |
| 50th-Percentile Queue Length [ft/ln] | 137.79 | 286.87 | 314.07 | 252.82 |
| 95th-Percentile Queue Length [veh/ln] | 9.36 | 17.03 | 18.38 | 15.33 |
| 95th-Percentile Queue Length [ft/ln] | 234.04 | 425.75 | 459.39 | 383.20 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.82 | 22.13 | 0.00 | 27.55 | 30.37 |
| Movement LOS | | B | C | | C | C |
| d_A, Approach Delay [s/veh] | 12.82 | | 22.13 | | 28.35 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 22.59 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.910 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 14.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.48 | 0.00 | 27.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.007 | 0.000 | 2.587 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 773 |
| d_b, Bicycle Delay [s] | 9.79 | 9.78 | 15.04 |
| I_b,int, Bicycle LOS Score for Intersection | 2.433 | 2.791 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

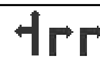
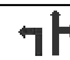
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 30.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.825 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 42 | 1307 | 7 | 448 | 1225 | 328 | 13 | 4 | 68 | 341 | 19 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.60 | 3.00 | 7.10 | 3.90 | 4.00 | 1.00 | 0.00 | 0.00 | 12.70 | 1.70 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 1307 | 7 | 448 | 1225 | 328 | 13 | 4 | 9 | 341 | 19 | 0 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 363 | 2 | 124 | 340 | 91 | 4 | 1 | 3 | 95 | 5 | 0 |
| Total Analysis Volume [veh/h] | 47 | 1452 | 8 | 498 | 1361 | 364 | 14 | 4 | 10 | 379 | 21 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 1 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 1 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 0 | | | 1 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 70.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 3 | 8 | 4 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 0 | 6 | 0 | 4 | 4 | 4 |
| Maximum Green [s] | 15 | 40 | 40 | 15 | 40 | 40 | 0 | 20 | 0 | 20 | 20 | 20 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 12 | 51 | 51 | 31 | 70 | 70 | 0 | 41 | 0 | 37 | 37 | 37 |
| Vehicle Extension [s] | 2.5 | 3.5 | 3.5 | 2.0 | 3.5 | 3.5 | 0.0 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 21 | 21 | 0 | 21 | 21 | 0 | 28 | 0 | 24 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 96 | 96 | 112 | 102 | 102 | 7 | 7 | 35 | 35 |
| g / C, Green / Cycle | 0.05 | 0.60 | 0.60 | 0.70 | 0.64 | 0.64 | 0.04 | 0.04 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.27 | 0.27 | 0.48 | 0.47 | 0.50 | 0.01 | 0.00 | 0.21 | 0.01 |
| s, saturation flow rate [veh/h] | 1758 | 3532 | 1849 | 1027 | 1840 | 1712 | 1829 | 2555 | 1785 | 1900 |
| c, Capacity [veh/h] | 82 | 2122 | 1111 | 699 | 1177 | 1096 | 82 | 115 | 390 | 415 |
| d1, Uniform Delay [s] | 74.70 | 17.49 | 17.49 | 16.14 | 19.52 | 20.89 | 73.64 | 73.20 | 61.96 | 49.35 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.08 | 0.08 | 0.50 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.69 | 0.70 | 1.33 | 6.09 | 4.05 | 5.73 | 0.98 | 0.24 | 38.80 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.58 | 0.45 | 0.45 | 0.71 | 0.73 | 0.79 | 0.22 | 0.09 | 0.97 | 0.05 |
| d, Delay for Lane Group [s/veh] | 79.39 | 18.18 | 18.82 | 22.23 | 23.57 | 26.63 | 74.62 | 73.44 | 100.76 | 49.39 |
| Lane Group LOS | E | B | B | C | C | C | E | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.00 | 9.82 | 10.48 | 3.83 | 22.25 | 24.14 | 0.75 | 0.20 | 19.63 | 0.68 |
| 50th-Percentile Queue Length [ft/ln] | 50.05 | 245.45 | 261.99 | 95.74 | 556.28 | 603.56 | 18.64 | 5.09 | 490.77 | 17.12 |
| 95th-Percentile Queue Length [veh/ln] | 3.60 | 14.96 | 15.79 | 6.89 | 29.99 | 32.20 | 1.34 | 0.37 | 26.90 | 1.23 |
| 95th-Percentile Queue Length [ft/ln] | 90.09 | 373.92 | 394.72 | 172.33 | 749.68 | 805.02 | 33.55 | 9.16 | 672.43 | 30.82 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

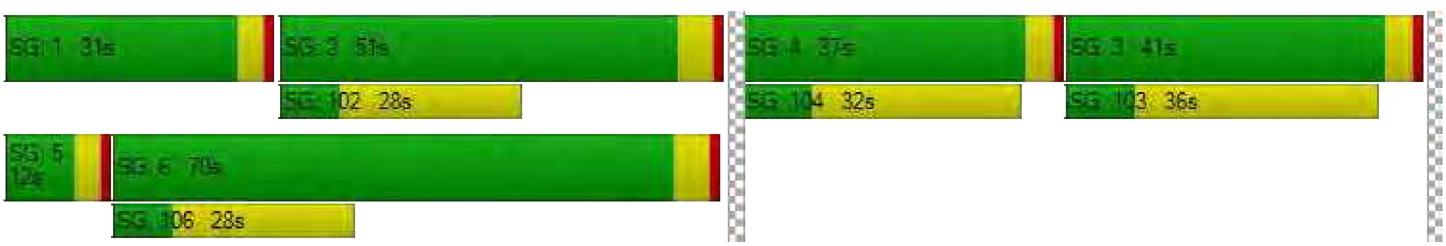
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 79.39 | 18.40 | 18.82 | 22.23 | 24.69 | 26.63 | 74.62 | 74.62 | 73.44 | 100.76 | 49.39 | 49.39 |
| Movement LOS | E | B | B | C | C | C | E | E | E | F | D | D |
| d_A, Approach Delay [s/veh] | 20.30 | | | 24.46 | | | 74.20 | | | 98.07 | | |
| Approach LOS | C | | | C | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 30.37 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.825 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.43 | 68.43 | 69.35 | 69.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.089 | 3.291 | 2.945 | 2.188 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 575 | 813 | 460 | 410 |
| d_b, Bicycle Delay [s] | 40.61 | 28.18 | 47.41 | 50.54 |
| I_b,int, Bicycle LOS Score for Intersection | 2.388 | 3.394 | 1.703 | 2.220 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report
### Intersection 3: Marsh Rd/Florence St-Bohannon Dr

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 58.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.831 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 209 | 38 | 21 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 58 | 251 | 32 | 7 | 261 | 106 | 157 | 20 | 54 | 10 | 5 | 6 |
| Total Analysis Volume [veh/h] | 231 | 1004 | 130 | 30 | 1045 | 426 | 630 | 79 | 215 | 39 | 22 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 96 | 96 | 5 | 89 | 89 | 38 | 38 | 38 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.56 | 0.56 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.31 | 0.31 | 0.02 | 0.42 | 0.43 | 0.21 | 0.21 | 0.14 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1792 | 1704 | 1823 | 1648 | 1717 | 1706 | 1526 | 1439 | 1212 |
| c, Capacity [veh/h] | 142 | 1132 | 1081 | 58 | 1015 | 917 | 409 | 407 | 364 | 106 | 90 |
| d1, Uniform Delay [s] | 73.44 | 18.16 | 18.25 | 75.88 | 27.02 | 27.61 | 58.55 | 58.41 | 53.79 | 70.46 | 71.37 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.17 | 0.16 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 310.01 | 1.64 | 1.76 | 2.58 | 5.12 | 6.31 | 8.69 | 8.10 | 1.14 | 1.56 | 3.65 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.62 | 0.51 | 0.52 | 0.51 | 0.75 | 0.77 | 0.87 | 0.87 | 0.59 | 0.37 | 0.54 |
| d, Delay for Lane Group [s/veh] | 383.45 | 19.80 | 20.01 | 78.45 | 32.14 | 33.91 | 67.24 | 66.52 | 54.93 | 72.02 | 75.03 |
| Lane Group LOS | F | B | C | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 18.10 | 12.62 | 12.29 | 1.26 | 23.20 | 22.29 | 15.04 | 14.73 | 7.89 | 1.59 | 2.01 |
| 50th-Percentile Queue Length [ft/ln] | 452.52 | 315.39 | 307.21 | 31.42 | 579.89 | 557.14 | 375.96 | 368.25 | 197.19 | 39.71 | 50.35 |
| 95th-Percentile Queue Length [veh/ln] | 28.88 | 18.44 | 18.04 | 2.26 | 31.09 | 30.03 | 21.40 | 21.02 | 12.49 | 2.86 | 3.63 |
| 95th-Percentile Queue Length [ft/ln] | 722.05 | 461.01 | 450.94 | 56.56 | 777.36 | 750.70 | 534.95 | 525.61 | 312.33 | 71.48 | 90.63 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

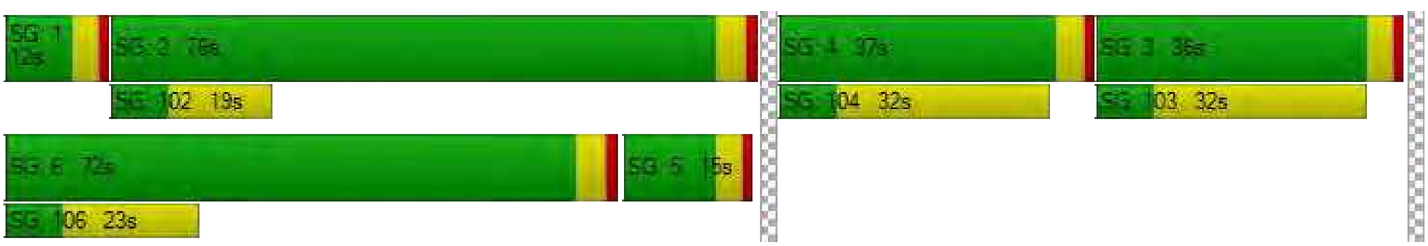
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 383.45 | 19.89 | 20.01 | 78.45 | 32.62 | 33.91 | 66.93 | 66.52 | 54.93 | 72.02 | 75.03 | 75.03 |
| Movement LOS | F | B | C | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 81.43 | | | 33.90 | | | 64.10 | | | 73.68 | | |
| Approach LOS | F | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 58.72 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.831 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.988 | 3.079 | 2.508 | 2.056 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.686 | 2.798 | 3.109 | 1.703 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 63.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.212 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 839 | 82 | 425 | 755 | 47 | 334 | 69 | 2 | 44 | 53 | 339 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 1.20 | 2.40 | 7.10 | 6.20 | 3.20 | 3.50 | 2.60 | 0.00 | 0.00 | 5.30 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 839 | 82 | 425 | 755 | 47 | 334 | 69 | 2 | 44 | 53 | 339 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 214 | 21 | 108 | 193 | 12 | 85 | 18 | 1 | 11 | 14 | 86 |
| Total Analysis Volume [veh/h] | 0 | 856 | 84 | 434 | 770 | 48 | 341 | 70 | 2 | 45 | 54 | 346 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 5 | | | 0 | | | 5 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 5 | | | 0 | | | 5 | |
| v_co, Outbound Pedestrian Volume crossing | | 1 | | | 1 | | | 1 | | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 1 | | | 1 | | | 1 | | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 12 | | | 9 | | | 2 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 30 | 30 |
| g / C, Green / Cycle | 0.33 | 0.33 | 0.20 | 0.57 | 0.57 | 0.37 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.25 | 0.23 | 0.23 | 0.63 | 0.26 |
| s, saturation flow rate [veh/h] | 1882 | 1656 | 1708 | 1807 | 1763 | 654 | 1708 |
| c, Capacity [veh/h] | 669 | 549 | 343 | 1030 | 1005 | 326 | 686 |
| d1, Uniform Delay [s] | 24.41 | 24.42 | 32.07 | 9.62 | 9.64 | 31.09 | 21.81 |
| k, delay calibration | 0.50 | 0.50 | 0.23 | 0.50 | 0.50 | 0.50 | 0.34 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.46 | 11.69 | 129.85 | 1.16 | 1.21 | 142.63 | 3.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 0.80 | 1.26 | 0.40 | 0.40 | 1.27 | 0.65 |
| d, Delay for Lane Group [s/veh] | 31.87 | 36.11 | 161.92 | 10.79 | 10.84 | 173.72 | 25.00 |
| Lane Group LOS | C | D | F | B | B | F | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.40 | 8.84 | 18.68 | 3.80 | 3.74 | 19.29 | 7.38 |
| 50th-Percentile Queue Length [ft/ln] | 234.97 | 220.99 | 467.07 | 94.97 | 93.56 | 482.29 | 184.44 |
| 95th-Percentile Queue Length [veh/ln] | 14.43 | 13.72 | 28.83 | 6.84 | 6.74 | 30.40 | 11.83 |
| 95th-Percentile Queue Length [ft/ln] | 360.67 | 342.89 | 720.64 | 170.94 | 168.42 | 759.99 | 295.80 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.87 | 33.63 | 36.11 | 161.92 | 10.81 | 10.84 | 173.72 | 173.72 | 173.72 | 25.00 | 25.00 | 25.00 |
| Movement LOS | C | C | D | F | B | B | F | F | F | C | C | C |
| d_A, Approach Delay [s/veh] | 33.86 | | | 63.20 | | | 173.72 | | | 25.00 | | |
| Approach LOS | C | | | E | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 63.55 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.212 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 23.9 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.82 | 29.82 | 29.82 | 19.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.688 | 3.414 | 1.918 | 2.195 |
| Crosswalk LOS | B | C | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 596 | 1071 | 681 | 681 |
| d_b, Bicycle Delay [s] | 19.73 | 8.70 | 17.50 | 17.44 |
| I_b,int, Bicycle LOS Score for Intersection | 2.335 | 2.593 | 2.241 | 2.294 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.757 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 87 | 590 | 520 | 507 | 501 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 11.80 | 4.20 | 3.10 | 2.50 | 3.30 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 87 | 0 | 520 | 507 | 501 | 104 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 23 | 0 | 138 | 135 | 133 | 28 |
| Total Analysis Volume [veh/h] | 93 | 0 | 553 | 539 | 533 | 111 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | 11 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | 10 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 22 | | 39 | | 37 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 10 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | Yes | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 13 | 33 | 100 | 68 |
| g / C, Green / Cycle | 0.11 | 0.11 | 0.28 | 0.84 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.00 | 0.31 | 0.29 | 0.36 |
| s, saturation flow rate [veh/h] | 1641 | 1561 | 1765 | 1862 | 1779 |
| c, Capacity [veh/h] | 180 | 172 | 485 | 1555 | 1005 |
| d1, Uniform Delay [s] | 50.42 | 0.00 | 43.52 | 2.30 | 17.79 |
| k, delay calibration | 0.08 | 0.08 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.69 | 0.00 | 84.97 | 0.61 | 3.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 1.14 | 0.35 | 0.64 |
| d, Delay for Lane Group [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 |
| Lane Group LOS | D | A | F | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.73 | 0.00 | 25.56 | 2.06 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 68.20 | 0.00 | 639.03 | 51.51 | 308.77 |
| 95th-Percentile Queue Length [veh/ln] | 4.91 | 0.00 | 36.59 | 3.71 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 122.76 | 0.00 | 914.81 | 92.72 | 452.86 |

**Movement, Approach, & Intersection Results**

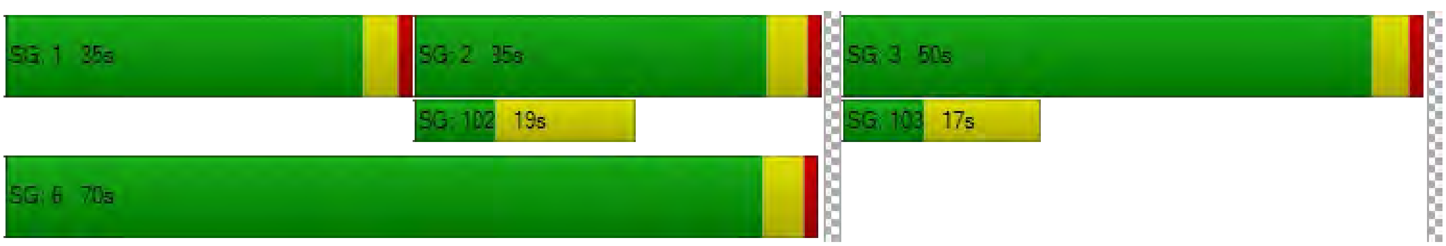
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 52.11 | 0.00 | 128.49 | 2.91 | 20.92 | 20.92 |
| Movement LOS | D | A | F | A | C | C |
| d_A, Approach Delay [s/veh] | 52.11 | | 66.50 | | 20.92 | |
| Approach LOS | D | | E | | C | |
| d_I, Intersection Delay [s/veh] | 49.72 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.757 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.52 | 49.52 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.948 | 2.891 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 763 | 1090 | 507 |
| d_b, Bicycle Delay [s] | 23.21 | 12.68 | 34.09 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.361 | 2.622 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.408 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 675 | 211 | 301 | 756 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 8.30 | 4.40 | 0.00 | 4.00 | 0.00 | 3.20 | 0.00 | 4.60 | 4.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 96 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 11 | 9 | 129 | 28 | 120 | 21 | 675 | 115 | 301 | 756 | 56 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 3 | 2 | 34 | 7 | 32 | 6 | 180 | 31 | 80 | 201 | 15 |
| Total Analysis Volume [veh/h] | 6 | 12 | 10 | 137 | 30 | 128 | 22 | 718 | 122 | 320 | 804 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 5 | | | 2 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | | 6 | | | 1 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | | 41 | | | 40 | | | 8 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 40 | | | 41 | | | 9 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 23 | | | 15 | | | 38 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 61.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.6 | 2.9 | 3.6 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 22 | 22 | 22 | 22 | 94 | 79 | 79 | 91 | 85 | 85 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.19 | 0.19 | 0.78 | 0.66 | 0.66 | 0.76 | 0.71 | 0.71 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.01 | 0.13 | 0.09 | 0.03 | 0.20 | 0.08 | 0.37 | 0.24 | 0.24 |
| s, saturation flow rate [veh/h] | 1397 | 1736 | 1310 | 1477 | 701 | 3526 | 1473 | 856 | 1840 | 1780 |
| c, Capacity [veh/h] | 124 | 325 | 300 | 277 | 574 | 2331 | 974 | 673 | 1301 | 1258 |
| d1, Uniform Delay [s] | 54.83 | 40.14 | 46.93 | 43.16 | 4.13 | 8.65 | 7.45 | 5.19 | 6.75 | 6.77 |
| k, delay calibration | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 0.08 | 1.54 | 1.15 | 0.03 | 0.34 | 0.26 | 2.40 | 0.70 | 0.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.07 | 0.56 | 0.46 | 0.04 | 0.31 | 0.13 | 0.48 | 0.34 | 0.34 |
| d, Delay for Lane Group [s/veh] | 54.98 | 40.22 | 48.47 | 44.31 | 4.16 | 8.99 | 7.72 | 7.59 | 7.45 | 7.51 |
| Lane Group LOS | D | D | D | D | A | A | A | A | A | A |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 0.56 | 4.82 | 3.46 | 0.11 | 3.79 | 1.15 | 2.39 | 4.06 | 3.99 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 13.93 | 120.51 | 86.61 | 2.87 | 94.76 | 28.72 | 59.78 | 101.53 | 99.71 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 1.00 | 8.42 | 6.24 | 0.21 | 6.82 | 2.07 | 4.30 | 7.31 | 7.18 |
| 95th-Percentile Queue Length [ft/ln] | 8.20 | 25.07 | 210.53 | 155.89 | 5.16 | 170.57 | 51.69 | 107.61 | 182.75 | 179.48 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.98 | 40.22 | 40.22 | 48.47 | 48.47 | 44.31 | 4.16 | 8.99 | 7.72 | 7.59 | 7.48 | 7.51 |
| Movement LOS | D | D | D | D | D | D | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 43.38 | | | 46.67 | | | 8.69 | | | 7.51 | | |
| Approach LOS | D | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 13.24 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.408 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.008 | 2.916 | 3.160 | 2.836 |
| Crosswalk LOS | B | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.29 | 33.54 | 23.36 | 34.10 |
| I_b,int, Bicycle LOS Score for Intersection | 1.606 | 2.413 | 2.350 | 2.536 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.770 |

**Intersection Setup**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expy (SR84) | | Bayfront Expy (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 834 | 67 | 1319 | 2912 | 241 | 416 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 3.50 | 1.60 | 3.10 | 2.20 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 834 | 67 | 1319 | 2912 | 241 | 416 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 215 | 17 | 340 | 751 | 62 | 107 |
| Total Analysis Volume [veh/h] | 860 | 69 | 1360 | 3002 | 248 | 429 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 7 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 35 | 110 | 75 | 110 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 3.9 | 1.5 | 3.9 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 74 | 74 | 74 | 74 | 74 | 74 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 5.90 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 3.90 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 20 | 32 | 56 | 8 | 45 |
| g / C, Green / Cycle | 0.27 | 0.27 | 0.44 | 0.76 | 0.11 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.04 | 0.39 | 0.59 | 0.07 | 0.10 |
| s, saturation flow rate [veh/h] | 4955 | 1548 | 3470 | 5049 | 3453 | 4166 |
| c, Capacity [veh/h] | 1344 | 420 | 1515 | 3819 | 381 | 2503 |
| d1, Uniform Delay [s] | 23.85 | 20.61 | 19.38 | 5.44 | 31.65 | 6.60 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.62 | 0.22 | 0.82 | 0.45 | 0.70 | 0.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.64 | 0.16 | 0.90 | 0.79 | 0.65 | 0.17 |
| d, Delay for Lane Group [s/veh] | 24.47 | 20.83 | 20.20 | 5.89 | 32.36 | 6.61 |
| Lane Group LOS | C | C | C | A | C | A |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.89 | 0.82 | 8.66 | 2.63 | 2.07 | 0.82 |
| 50th-Percentile Queue Length [ft/ln] | 97.19 | 20.46 | 216.40 | 65.68 | 51.73 | 20.45 |
| 95th-Percentile Queue Length [veh/ln] | 7.00 | 1.47 | 13.48 | 4.73 | 3.72 | 1.47 |
| 95th-Percentile Queue Length [ft/ln] | 174.95 | 36.83 | 337.03 | 118.22 | 93.12 | 36.81 |

**Movement, Approach, & Intersection Results**

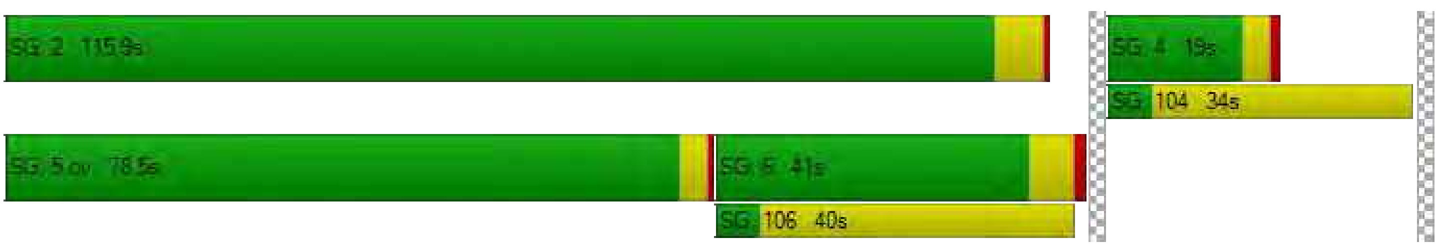
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.47 | 20.83 | 20.20 | 5.89 | 32.36 | 6.61 |
| Movement LOS | C | C | C | A | C | A |
| d_A, Approach Delay [s/veh] | 24.20 | | 10.35 | | 16.04 | |
| Approach LOS | C | | B | | B | |
| d_I, Intersection Delay [s/veh] | 13.15 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.770 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 28.61 | 0.00 | 28.61 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.653 | 0.000 | 2.928 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 944 | 378 | 405 |
| d_b, Bicycle Delay [s] | 10.33 | 24.40 | 23.58 |
| I_b,int, Bicycle LOS Score for Intersection | 2.071 | 3.959 | 1.670 |
| Bicycle LOS | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 258.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.278 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Bayfront Expy (SR 84) | | | Bayfront Expy (SR 84) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 247 | 596 | 277 | 35 | 75 | 72 | 386 | 423 | 213 | 1160 | 2475 | 72 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 10.90 | 4.20 | 10.20 | 37.50 | 30.50 | 40.50 | 4.60 | 6.20 | 12.30 | 6.70 | 3.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 106 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 247 | 596 | 277 | 35 | 75 | 56 | 386 | 423 | 107 | 1160 | 2475 | 72 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 63 | 152 | 71 | 9 | 19 | 14 | 98 | 108 | 27 | 296 | 631 | 18 |
| Total Analysis Volume [veh/h] | 252 | 608 | 283 | 36 | 77 | 57 | 394 | 432 | 109 | 1184 | 2526 | 73 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 3 | | | 2 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 0 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 0 | | | 4 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 6 | 8 | 8 | 15 | 15 | 8 | 6 | 10 | 10 | 6 | 10 | 10 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 15 | 25 | 25 | 20 | 20 | 25 | 25 | 55 | 70 | 40 | 70 | 55 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 5 | 7 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 10 | 10 | 0 | 29 | 10 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 3.1 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | No | Yes | | No | Yes | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 5.10 | 5.10 | 4.60 | 6.00 | 6.00 | 4.60 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 3.10 | 3.10 | 2.60 | 4.00 | 4.00 | 2.60 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 22 | 21 | 51 | 9 | 9 | 9 | 26 | 51 | 51 | 25 | 50 | 50 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.40 | 0.07 | 0.07 | 0.07 | 0.21 | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.34 | 0.28 | 0.07 | 0.05 | 0.03 | 0.05 | 0.26 | 0.09 | 0.07 | 0.44 | 0.50 | 0.05 |
| s, saturation flow rate [veh/h] | 740 | 2209 | 3942 | 670 | 2746 | 1075 | 1515 | 4922 | 1458 | 2715 | 5020 | 1615 |
| c, Capacity [veh/h] | 128 | 369 | 1578 | 48 | 196 | 77 | 312 | 1989 | 589 | 538 | 1990 | 640 |
| d1, Uniform Delay [s] | 52.15 | 52.54 | 24.45 | 57.49 | 55.96 | 57.37 | 50.10 | 24.56 | 24.22 | 50.58 | 38.08 | 24.08 |
| k, delay calibration | 0.50 | 0.50 | 0.11 | 0.16 | 0.11 | 0.15 | 0.17 | 0.11 | 0.11 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 460.96 | 302.81 | 0.05 | 28.36 | 1.27 | 17.48 | 127.00 | 0.05 | 0.15 | 546.40 | 122.26 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.96 | 1.65 | 0.18 | 0.75 | 0.39 | 0.74 | 1.26 | 0.22 | 0.19 | 2.20 | 1.27 | 0.11 |
| d, Delay for Lane Group [s/veh] | 513.11 | 355.34 | 24.50 | 85.85 | 57.23 | 74.85 | 177.10 | 24.62 | 24.37 | 596.98 | 160.34 | 24.16 |
| Lane Group LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 20.40 | 21.26 | 1.81 | 1.52 | 1.23 | 2.18 | 10.40 | 2.85 | 2.15 | 49.29 | 42.62 | 1.41 |
| 50th-Percentile Queue Length [ft/ln] | 510.06 | 531.54 | 45.13 | 38.07 | 30.70 | 54.61 | 260.10 | 71.35 | 53.68 | 1232.32 | 1065.38 | 35.31 |
| 95th-Percentile Queue Length [veh/ln] | 34.42 | 34.60 | 3.25 | 2.74 | 2.21 | 3.93 | 17.40 | 5.14 | 3.86 | 78.56 | 62.16 | 2.54 |
| 95th-Percentile Queue Length [ft/ln] | 860.59 | 865.09 | 81.24 | 68.53 | 55.27 | 98.31 | 435.04 | 128.43 | 96.62 | 1963.92 | 1554.07 | 63.56 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

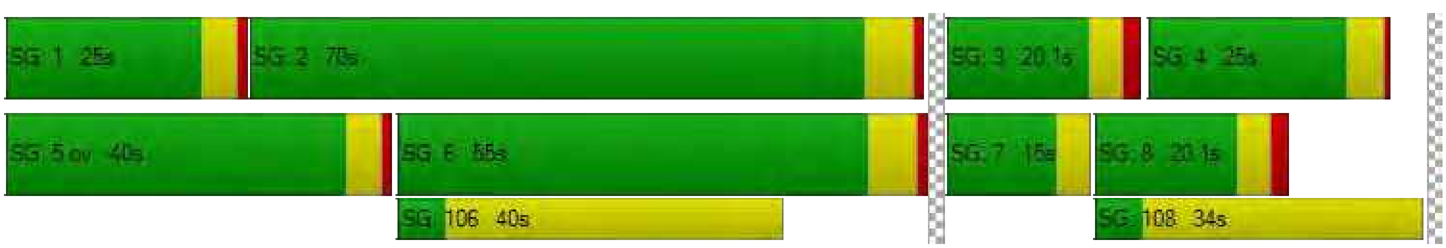
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 513.11 | 355.34 | 24.50 | 85.85 | 57.23 | 74.85 | 177.10 | 24.62 | 24.37 | 596.98 | 160.34 | 24.16 |
| Movement LOS | F | F | C | F | E | E | F | C | C | F | F | C |
| d_A, Approach Delay [s/veh] | | 308.21 | | | 69.20 | | | 88.84 | | | 294.37 | |
| Approach LOS | | F | | | E | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 258.78 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.278 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 54.44 | 0.00 | 54.44 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.142 | 0.000 | 3.342 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 326 | 238 | 776 | 1014 |
| d_b, Bicycle Delay [s] | 44.20 | 49.01 | 23.63 | 15.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.503 | 1.713 | 2.132 | 3.640 |
| Bicycle LOS | B | A | B | D |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 163.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.167 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 100 | 897 | 77 | 466 | 1351 | 48 | 47 | 15 | 48 | 17 | 6 | 153 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 6.30 | 7.00 | 9.10 | 8.40 | 10.50 | 1.30 | 4.50 | 6.00 | 23.10 | 12.50 | 30.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 100 | 897 | 77 | 466 | 1351 | 48 | 47 | 15 | 48 | 17 | 6 | 153 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 241 | 21 | 125 | 363 | 13 | 13 | 4 | 13 | 5 | 2 | 41 |
| Total Analysis Volume [veh/h] | 108 | 965 | 83 | 501 | 1453 | 52 | 51 | 16 | 52 | 18 | 6 | 165 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 57 | | | 5 | | | 57 | | |
| v_di, Inbound Pedestrian Volume crossing m | 5 | | | 57 | | | 6 | | | 57 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 18 | | | 18 | | | 6 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 6 | | | 18 | | | 18 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 38 | | | 5 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 10 | 10 | 4 | 10 | 10 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 50 | 100 | 74 | 24 | 74 | 100 | 36 | 36 | 36 | 36 | 36 | 36 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 0 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 120 | 96 | 96 | 120 | 104 | 104 | 33 | 33 | 33 | 33 |
| g / C, Green / Cycle | 0.75 | 0.60 | 0.60 | 0.75 | 0.65 | 0.65 | 0.21 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.66 | 0.66 | 0.45 | 0.81 | 0.82 | 0.04 | 0.10 | 0.02 | 0.24 |
| s, saturation flow rate [veh/h] | 404 | 808 | 782 | 1119 | 934 | 917 | 1221 | 703 | 1093 | 727 |
| c, Capacity [veh/h] | 132 | 485 | 470 | 312 | 604 | 593 | 45 | 144 | 151 | 150 |
| d1, Uniform Delay [s] | 50.44 | 31.92 | 31.92 | 51.79 | 28.23 | 28.23 | 80.00 | 55.97 | 64.61 | 63.50 |
| k, delay calibration | 0.42 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 35.97 | 68.88 | 71.49 | 286.58 | 123.99 | 133.65 | 102.82 | 0.89 | 0.35 | 115.92 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 1.09 | 1.10 | 1.60 | 1.25 | 1.27 | 1.13 | 0.47 | 0.12 | 1.14 |
| d, Delay for Lane Group [s/veh] | 86.41 | 100.80 | 103.41 | 338.36 | 152.22 | 161.89 | 182.82 | 56.86 | 64.95 | 179.42 |
| Lane Group LOS | F | F | F | F | F | F | F | E | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.29 | 26.82 | 26.31 | 14.00 | 42.71 | 43.55 | 3.17 | 2.50 | 0.61 | 11.00 |
| 50th-Percentile Queue Length [ft/ln] | 57.14 | 670.59 | 657.83 | 349.94 | 1067.85 | 1088.63 | 79.15 | 62.38 | 15.34 | 274.94 |
| 95th-Percentile Queue Length [veh/ln] | 4.11 | 37.95 | 37.45 | 25.20 | 63.13 | 64.95 | 5.70 | 4.49 | 1.10 | 17.51 |
| 95th-Percentile Queue Length [ft/ln] | 102.85 | 948.65 | 936.19 | 629.89 | 1578.37 | 1623.70 | 142.46 | 112.29 | 27.62 | 437.79 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

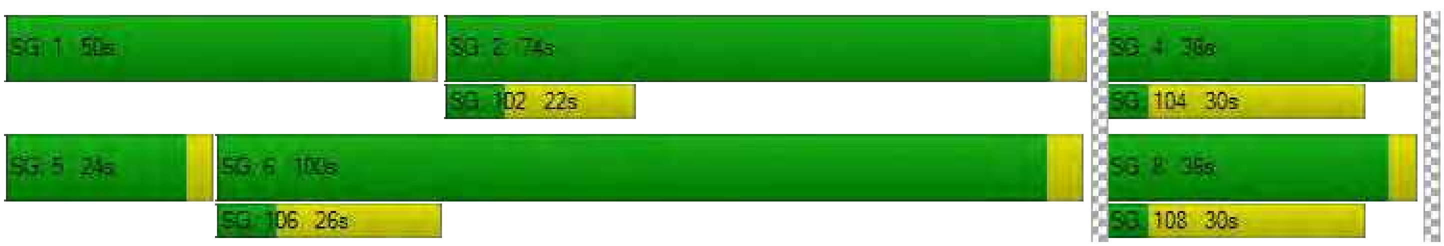
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 86.41 | 101.98 | 103.41 | 338.36 | 156.88 | 161.89 | 182.82 | 56.86 | 56.86 | 64.95 | 179.42 | 179.42 |
| Movement LOS | F | F | F | F | F | F | F | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 100.62 | | | 202.34 | | | 110.84 | | | 168.52 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 163.47 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.167 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 71.25 | 71.25 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.145 | 3.139 | 2.146 | 2.756 |
| Crosswalk LOS | C | C | B | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1200 | 875 | 410 | 413 |
| d_b, Bicycle Delay [s] | 12.90 | 25.80 | 50.69 | 50.68 |
| I_b,int, Bicycle LOS Score for Intersection | 2.513 | 3.215 | 1.756 | 1.871 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 251.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.619 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 266 | 1221 | 1418 | 25 | 172 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 266 | 1221 | 1418 | 25 | 172 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 332 | 385 | 7 | 47 | 26 |
| Total Analysis Volume [veh/h] | 289 | 1327 | 1541 | 27 | 187 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 103 | 87 | 87 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.80 | 0.67 | 0.67 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.86 | 1.00 | 1.01 | 0.11 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 775 | 1745 | 779 |
| c, Capacity [veh/h] | 80 | 1229 | 525 | 521 | 263 | 117 |
| d1, Uniform Delay [s] | 58.39 | 13.28 | 21.30 | 21.30 | 52.44 | 53.73 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.16 | 0.30 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1210.33 | 49.99 | 232.39 | 237.07 | 5.25 | 38.44 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.62 | 1.08 | 1.49 | 1.50 | 0.71 | 0.88 |
| d, Delay for Lane Group [s/veh] | 1268.72 | 63.27 | 253.69 | 258.37 | 57.69 | 92.16 |
| Lane Group LOS | F | F | F | F | E | F |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 29.41 | 20.72 | 47.47 | 47.81 | 6.20 | 4.53 |
| 50th-Percentile Queue Length [ft/ln] | 735.22 | 517.97 | 1186.64 | 1195.27 | 154.90 | 113.35 |
| 95th-Percentile Queue Length [veh/ln] | 47.55 | 30.09 | 76.42 | 77.16 | 10.28 | 8.03 |
| 95th-Percentile Queue Length [ft/ln] | 1188.82 | 752.28 | 1910.62 | 1928.99 | 256.96 | 200.65 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1268.72 | 63.27 | 255.99 | 258.37 | 57.69 | 92.16 |
| Movement LOS | F | F | F | F | E | F |
| d_A, Approach Delay [s/veh] | 278.85 | | 256.03 | | 69.93 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 251.11 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.619 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.166 | 3.152 | 2.155 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.893 | 2.853 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 76.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.149 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1316 | 981 | 42 | 1163 | 237 | 138 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.40 | 5.30 | 7.40 | 9.70 | 10.30 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1316 | 981 | 42 | 1163 | 237 | 138 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 350 | 261 | 11 | 309 | 63 | 37 |
| Total Analysis Volume [veh/h] | 1400 | 1044 | 45 | 1237 | 252 | 147 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | 0 | | 14 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 14 | | 0 | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 14 | | 1 | | 1 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 95 | 95 | 4 | 103 | 20 | 20 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.03 | 0.79 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.90 | 0.71 | 0.03 | 0.83 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1549 | 1478 | 1704 | 1494 | 1312 | 1559 |
| c, Capacity [veh/h] | 1138 | 1085 | 57 | 1182 | 201 | 239 |
| d1, Uniform Delay [s] | 17.24 | 14.07 | 62.26 | 13.55 | 54.04 | 54.06 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.50 | 0.27 | 0.27 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 111.51 | 19.56 | 8.38 | 39.10 | 27.94 | 25.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.23 | 0.96 | 0.78 | 1.05 | 0.91 | 0.91 |
| d, Delay for Lane Group [s/veh] | 128.76 | 33.63 | 70.64 | 52.66 | 81.98 | 79.13 |
| Lane Group LOS | F | C | E | F | F | E |
| Critical Lane Group | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 31.02 | 25.96 | 1.59 | 18.33 | 7.41 | 8.63 |
| 50th-Percentile Queue Length [ft/ln] | 775.40 | 648.97 | 39.79 | 458.32 | 185.26 | 215.83 |
| 95th-Percentile Queue Length [veh/ln] | 47.14 | 34.31 | 2.86 | 26.37 | 11.87 | 13.45 |
| 95th-Percentile Queue Length [ft/ln] | 1178.39 | 857.87 | 71.61 | 659.15 | 296.87 | 336.29 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 128.76 | 33.63 | 70.64 | 52.66 | 81.30 | 79.13 |
| Movement LOS | F | C | E | F | F | E |
| d_A, Approach Delay [s/veh] | 88.12 | | 53.29 | | 80.43 | |
| Approach LOS | F | | D | | F | |
| d_I, Intersection Delay [s/veh] | 76.55 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.149 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.441 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.17 | 3.45 | 44.18 |
| I_b,int, Bicycle LOS Score for Intersection | 3.576 | 2.617 | 2.218 |
| Bicycle LOS | D | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 230.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.611 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 377 | 260 | 114 | 271 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 495 | 113 | 11 | 363 | 2 | 5 | 25 | 100 | 69 | 30 | 72 |
| Total Analysis Volume [veh/h] | 152 | 1982 | 450 | 43 | 1452 | 7 | 18 | 99 | 401 | 277 | 121 | 288 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 55 | 55 | 4 | 47 | 47 | 36 | 36 | 36 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.10 | 0.43 | 0.43 | 0.03 | 0.36 | 0.36 | 0.27 | 0.27 | 0.27 | 0.15 | 0.15 | 0.15 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.47 | 0.50 | 0.02 | 0.64 | 0.64 | 0.01 | 0.06 | 0.30 | 0.18 | 0.15 | 0.43 |
| s, saturation flow rate [veh/h] | 1781 | 3455 | 1626 | 1781 | 1491 | 781 | 1420 | 1577 | 1322 | 1536 | 800 | 668 |
| c, Capacity [veh/h] | 176 | 1481 | 697 | 55 | 538 | 281 | 385 | 428 | 359 | 236 | 123 | 103 |
| d1, Uniform Delay [s] | 57.69 | 37.14 | 37.14 | 62.54 | 41.56 | 41.56 | 34.95 | 36.82 | 46.80 | 55.02 | 54.87 | 54.28 |
| k, delay calibration | 0.04 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 | 0.04 | 0.46 | 0.07 | 0.40 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.17 | 52.38 | 91.74 | 8.43 | 358.99 | 365.90 | 0.02 | 0.10 | 81.80 | 85.01 | 69.09 | 838.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 1.09 | 1.17 | 0.78 | 1.78 | 1.78 | 0.05 | 0.23 | 1.12 | 1.17 | 0.99 | 2.81 |
| d, Delay for Lane Group [s/veh] | 62.85 | 89.52 | 128.88 | 70.97 | 400.55 | 407.46 | 34.97 | 36.92 | 128.60 | 140.02 | 123.96 | 892.96 |
| Lane Group LOS | E | F | F | E | F | F | C | D | F | F | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.11 | 33.27 | 38.95 | 1.55 | 35.42 | 37.63 | 0.43 | 2.48 | 19.51 | 6.64 | 6.30 | 27.23 |
| 50th-Percentile Queue Length [ft/ln] | 127.63 | 831.78 | 973.74 | 38.85 | 885.41 | 940.85 | 10.70 | 61.99 | 487.83 | 166.08 | 157.59 | 680.79 |
| 95th-Percentile Queue Length [veh/ln] | 8.81 | 45.56 | 54.94 | 2.80 | 58.66 | 62.03 | 0.77 | 4.46 | 28.56 | 11.58 | 10.42 | 45.44 |
| 95th-Percentile Queue Length [ft/ln] | 220.27 | 1138.94 | 1373.43 | 69.93 | 1466.51 | 1550.74 | 19.25 | 111.58 | 714.09 | 289.54 | 260.53 | 1135.91 |

**Movement, Approach, & Intersection Results**

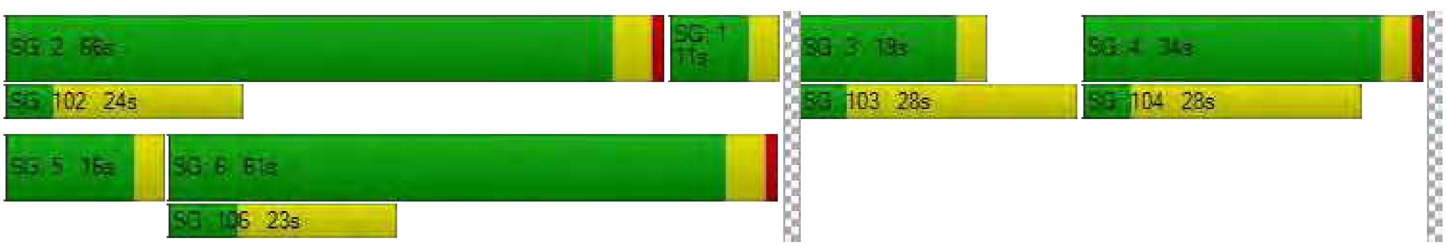
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.85 | 96.79 | 128.88 | 70.97 | 402.90 | 407.46 | 34.97 | 36.92 | 128.60 | 140.02 | 123.96 | 892.96 |
| Movement LOS | E | F | F | E | F | F | C | D | F | F | F | F |
| d_A, Approach Delay [s/veh] | 100.38 | | | 393.42 | | | 107.82 | | | 453.29 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 230.08 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.611 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.496 | 3.057 | 2.417 | 2.623 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.33 | 21.07 | 38.56 | 50.34 |
| I_b,int, Bicycle LOS Score for Intersection | 2.981 | 2.386 | 2.487 | 2.748 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# Intersection Level Of Service Report
## Intersection 21: Willow Rd/Bay Rd

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 77.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.172 |

### Intersection Setup

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1387 | 1211 | 627 | 463 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1387 | 1211 | 328 | 463 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 347 | 303 | 82 | 116 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1387 | 1211 | 328 | 463 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| | | | | | | |
|---|---|---|---|---|---|---|
| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 5 | 45 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.06 | 0.49 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.53 | 0.44 | 0.27 | 0.50 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1229 | 928 | 1597 |
| c, Capacity [veh/h] | 78 | 1296 | 1101 | 489 | 369 | 635 |
| d1, Uniform Delay [s] | 42.15 | 22.85 | 27.29 | 22.25 | 27.29 | 0.00 |
| k, delay calibration | 0.04 | 0.23 | 0.15 | 0.23 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 8.15 | 39.46 | 50.08 | 3.40 | 135.56 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.83 | 1.07 | 1.10 | 0.67 | 1.26 | 0.00 |
| d, Delay for Lane Group [s/veh] | 50.30 | 62.31 | 77.37 | 25.66 | 162.85 | 0.00 |
| Lane Group LOS | D | F | F | C | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.60 | 19.70 | 18.64 | 5.80 | 21.38 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 39.96 | 492.46 | 465.97 | 144.97 | 534.39 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.88 | 28.36 | 27.41 | 9.75 | 33.23 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 71.92 | 709.10 | 685.14 | 243.70 | 830.68 | 0.00 |

**Movement, Approach, & Intersection Results**

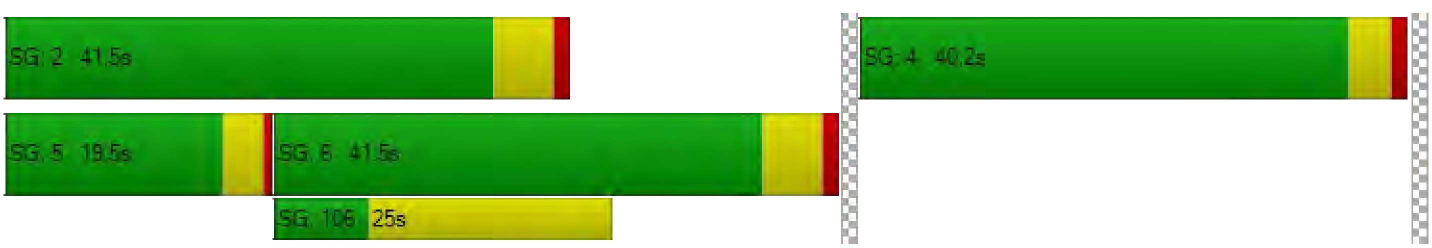
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.30 | 62.31 | 77.37 | 25.66 | 162.85 | 0.00 |
| Movement LOS | D | F | F | C | F | A |
| d_A, Approach Delay [s/veh] | 61.77 | | 66.35 | | 162.85 | |
| Approach LOS | E | | E | | F | |
| d_I, Intersection Delay [s/veh] | 77.36 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.172 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 34.91 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.450 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 796 | 796 | 796 |
| d_b, Bicycle Delay [s] | 16.41 | 16.42 | 16.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.758 | 3.076 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 122.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.124 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 26 | 59 | 12 | 348 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 237 | 2 | 9 | 242 | 28 | 17 | 4 | 7 | 15 | 3 | 91 |
| Total Analysis Volume [veh/h] | 23 | 947 | 7 | 38 | 967 | 113 | 70 | 15 | 27 | 61 | 13 | 363 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 8 | | | 3 | | | 3 | | | 9 | |
| v_di, Inbound Pedestrian Volume crossing m | | 9 | | | 3 | | | 3 | | | 8 | |
| v_co, Outbound Pedestrian Volume crossing | | 11 | | | 4 | | | 11 | | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 11 | | | 4 | | | 11 | | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 2 | | | 1 | | | 6 | | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 | 166 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 4 | 97 | 97 | 7 | 100 | 14 | 14 | 14 | 30 | 30 |
| g / C, Green / Cycle | 0.02 | 0.58 | 0.58 | 0.04 | 0.60 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.29 | 0.29 | 0.04 | 0.70 | 0.04 | 0.04 | 0.02 | 0.06 | 0.31 |
| s, saturation flow rate [veh/h] | 952 | 1445 | 1895 | 952 | 1537 | 952 | 1396 | 1335 | 952 | 1202 |
| c, Capacity [veh/h] | 23 | 844 | 1106 | 42 | 927 | 79 | 116 | 111 | 172 | 217 |
| d1, Uniform Delay [s] | 80.83 | 20.10 | 20.10 | 78.94 | 32.90 | 72.37 | 72.35 | 70.92 | 59.42 | 67.90 |
| k, delay calibration | 0.11 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 82.44 | 0.94 | 0.72 | 44.69 | 86.18 | 3.80 | 2.57 | 1.13 | 1.23 | 346.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.98 | 0.49 | 0.49 | 0.91 | 1.17 | 0.44 | 0.44 | 0.24 | 0.35 | 1.73 |
| d, Delay for Lane Group [s/veh] | 163.27 | 21.04 | 20.82 | 123.63 | 119.08 | 76.17 | 74.92 | 72.06 | 60.65 | 414.57 |
| Lane Group LOS | F | C | C | F | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.53 | 9.74 | 12.71 | 2.16 | 58.59 | 1.53 | 2.18 | 1.14 | 2.34 | 30.24 |
| 50th-Percentile Queue Length [ft/ln] | 38.27 | 243.40 | 317.67 | 53.89 | 1464.63 | 38.25 | 54.62 | 28.49 | 58.55 | 756.01 |
| 95th-Percentile Queue Length [veh/ln] | 2.76 | 14.85 | 18.55 | 3.88 | 80.57 | 2.75 | 3.93 | 2.05 | 4.22 | 48.18 |
| 95th-Percentile Queue Length [ft/ln] | 68.89 | 371.33 | 463.82 | 97.00 | 2014.21 | 68.85 | 98.31 | 51.29 | 105.39 | 1204.48 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 163.27 | 20.92 | 20.82 | 123.63 | 119.08 | 119.08 | 75.56 | 74.92 | 72.06 | 60.65 | 414.57 | 414.57 |
| Movement LOS | F | C | C | F | F | F | E | E | E | E | F | F |
| d_A, Approach Delay [s/veh] | 24.27 | | | 119.23 | | | 74.62 | | | 365.16 | | |
| Approach LOS | C | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 122.90 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.124 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 72.20 | 72.20 | 72.20 | 72.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.574 | 2.820 | 2.190 | 2.104 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 241 | 241 | 362 | 362 |
| d_b, Bicycle Delay [s] | 64.11 | 64.08 | 55.72 | 55.61 |
| I_b,int, Bicycle LOS Score for Intersection | 2.366 | 3.404 | 1.754 | 2.281 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.925 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | Coleman Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 37 | 783 | 7 | 4 | 878 | 168 | 280 | 6 | 64 | 1 | 2 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 4.70 | 0.00 | 0.00 | 3.90 | 3.30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 37 | 783 | 7 | 4 | 878 | 168 | 280 | 6 | 64 | 1 | 2 | 6 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 206 | 2 | 1 | 231 | 44 | 74 | 2 | 17 | 0 | 1 | 2 |
| Total Analysis Volume [veh/h] | 39 | 824 | 7 | 4 | 924 | 177 | 295 | 6 | 67 | 1 | 2 | 6 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 20 | | | 8 | | | 20 | | |
| v_di, Inbound Pedestrian Volume crossing m | 8 | | | 20 | | | 8 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 4 | | | 2 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 2 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 2 | | | 13 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 30.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 109 | 109 | 109 | 109 | 109 | 109 | 41 | 41 | 41 | 0 | 41 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 105 | 105 | 105 | 105 | 37 | 37 |
| g / C, Green / Cycle | 0.70 | 0.70 | 0.70 | 0.70 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.46 | 0.01 | 0.62 | 0.26 | 0.01 |
| s, saturation flow rate [veh/h] | 502 | 1826 | 671 | 1783 | 1393 | 1744 |
| c, Capacity [veh/h] | 152 | 1278 | 342 | 1248 | 385 | 455 |
| d1, Uniform Delay [s] | 51.06 | 12.39 | 23.78 | 17.65 | 57.54 | 42.92 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.04 | 2.58 | 0.06 | 9.22 | 35.98 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.26 | 0.65 | 0.01 | 0.88 | 0.96 | 0.02 |
| d, Delay for Lane Group [s/veh] | 55.10 | 14.96 | 23.85 | 26.88 | 93.53 | 42.93 |
| Lane Group LOS | E | B | C | C | F | D |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.45 | 15.94 | 0.09 | 30.92 | 18.11 | 0.26 |
| 50th-Percentile Queue Length [ft/ln] | 36.36 | 398.50 | 2.21 | 772.95 | 452.87 | 6.56 |
| 95th-Percentile Queue Length [veh/ln] | 2.62 | 22.49 | 0.16 | 40.04 | 25.09 | 0.47 |
| 95th-Percentile Queue Length [ft/ln] | 65.45 | 562.20 | 3.98 | 1000.93 | 627.37 | 11.81 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 55.10 | 14.96 | 14.96 | 23.85 | 26.88 | 26.88 | 93.53 | 93.53 | 93.53 | 42.93 | 42.93 | 42.93 |
| Movement LOS | E | B | B | C | C | C | F | F | F | D | D | D |
| d_A, Approach Delay [s/veh] | 16.76 | | | 26.87 | | | 93.53 | | | 42.93 | | |
| Approach LOS | B | | | C | | | F | | | D | | |
| d_I, Intersection Delay [s/veh] | 33.62 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.925 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.38 | 64.38 | 64.38 | 64.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.470 | 3.109 | 2.080 | 1.755 |
| Crosswalk LOS | B | C | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1399 | 1399 | 492 | 492 |
| d_b, Bicycle Delay [s] | 6.79 | 6.77 | 42.89 | 42.63 |
| I_b,int, Bicycle LOS Score for Intersection | 2.995 | 3.383 | 2.167 | 1.574 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.694 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 103 | 11 | 141 | 96 | 93 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.20 | 10.00 | 7.40 | 3.60 | 0.00 | 2.70 | 0.00 | 0.00 | 2.60 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 103 | 11 | 141 | 96 | 93 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 186 | 40 | 14 | 248 | 0 | 5 | 28 | 3 | 38 | 26 | 25 |
| Total Analysis Volume [veh/h] | 8 | 746 | 161 | 57 | 993 | 0 | 22 | 112 | 12 | 153 | 104 | 101 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 4 | | | 6 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 3 | | | 6 | | | 4 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 2 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 2 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 9 | | | 12 | | | 11 | | | 11 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 68.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 116 | 116 | 116 | 116 | 116 | 116 | 34 | 34 | 34 | 0 | 34 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 112 | 112 | 112 | 112 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.75 | 0.75 | 0.75 | 0.75 | 0.20 | 0.20 | 0.20 | 0.20 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.52 | 0.10 | 0.54 | 0.02 | 0.07 | 0.12 | 0.12 |
| s, saturation flow rate [veh/h] | 576 | 1757 | 588 | 1846 | 1168 | 1853 | 1241 | 1715 |
| c, Capacity [veh/h] | 301 | 1312 | 320 | 1378 | 137 | 369 | 206 | 341 |
| d1, Uniform Delay [s] | 23.94 | 9.96 | 23.90 | 10.43 | 65.14 | 51.50 | 65.11 | 54.58 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.17 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 3.01 | 1.21 | 3.29 | 0.54 | 0.53 | 8.01 | 2.42 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.69 | 0.18 | 0.72 | 0.16 | 0.34 | 0.74 | 0.60 |
| d, Delay for Lane Group [s/veh] | 24.11 | 12.97 | 25.11 | 13.72 | 65.69 | 52.04 | 73.11 | 57.00 |
| Lane Group LOS | C | B | C | B | E | D | E | E |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 15.92 | 1.35 | 18.26 | 0.82 | 4.13 | 6.34 | 7.37 |
| 50th-Percentile Queue Length [ft/ln] | 4.54 | 398.09 | 33.77 | 456.44 | 20.58 | 103.32 | 158.38 | 184.35 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 22.47 | 2.43 | 25.26 | 1.48 | 7.44 | 10.46 | 11.83 |
| 95th-Percentile Queue Length [ft/ln] | 8.18 | 561.70 | 60.79 | 631.62 | 37.05 | 185.97 | 261.57 | 295.68 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.11 | 12.97 | 12.97 | 25.11 | 13.72 | 13.72 | 65.69 | 52.04 | 52.04 | 73.11 | 57.00 | 57.00 |
| Movement LOS | C | B | B | C | B | B | E | D | D | E | E | E |
| d_A, Approach Delay [s/veh] | 13.07 | | | 14.33 | | | 54.09 | | | 63.89 | | |
| Approach LOS | B | | | B | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 23.40 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.694 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 64.35 | 64.35 | 64.35 | 64.35 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.744 | 2.576 | 2.046 | 2.232 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1493 | 1493 | 399 | 399 |
| d_b, Bicycle Delay [s] | 4.84 | 4.84 | 48.29 | 48.29 |
| I_b,int, Bicycle LOS Score for Intersection | 3.069 | 3.292 | 1.801 | 2.150 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 64.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.625 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 27 | 300 | 153 | 374 | 136 | 448 | 132 | 462 | 170 | 344 | 329 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 5.00 | 3.60 | 2.60 | 2.70 | 3.80 | 2.50 | 0.50 | 5.50 | 5.30 | 3.70 | 13.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 119 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 300 | 34 | 374 | 136 | 0 | 132 | 462 | 170 | 344 | 329 | 20 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 78 | 9 | 97 | 35 | 0 | 34 | 120 | 44 | 90 | 86 | 5 |
| Total Analysis Volume [veh/h] | 28 | 313 | 35 | 390 | 142 | 0 | 138 | 481 | 177 | 358 | 343 | 21 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 10 | | | 2 | | | 10 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 10 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 3 | | | 2 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 2 | | | 3 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 29 | | | 22 | | | 6 | | | 20 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 3 | 0 | 3 | 3 | 3 | 0 | 3 | 0 | 3 | 3 | 3 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | Yes | |
| Maximum Recall | | No | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 20.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 28 | 28 | 28 | 57 | 57 | 57 | 23 | 23 | 23 | 23 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.18 | 0.38 | 0.38 | 0.38 | 0.15 | 0.15 | 0.15 | 0.15 | 0.16 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.17 | 0.02 | 0.15 | 0.15 | 0.00 | 0.08 | 0.12 | 0.13 | 0.12 | 0.14 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1810 | 1825 | 1448 | 1772 | 1817 | 1567 | 1774 | 1892 | 1892 | 1491 | 1734 | 1803 | 1634 |
| c, Capacity [veh/h] | 333 | 336 | 267 | 670 | 686 | 592 | 268 | 285 | 285 | 225 | 285 | 297 | 269 |
| d1, Uniform Delay [s] | 50.69 | 60.24 | 51.05 | 34.06 | 34.06 | 0.00 | 58.62 | 61.66 | 62.20 | 61.06 | 60.81 | 60.79 | 60.89 |
| k, delay calibration | 0.11 | 0.37 | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.20 | 0.23 | 0.18 | 0.14 | 0.14 | 0.15 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 28.04 | 0.22 | 1.72 | 1.68 | 0.00 | 1.54 | 10.02 | 15.11 | 9.73 | 8.97 | 8.54 | 10.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.93 | 0.13 | 0.39 | 0.39 | 0.00 | 0.52 | 0.82 | 0.87 | 0.79 | 0.85 | 0.85 | 0.85 |
| d, Delay for Lane Group [s/veh] | 50.80 | 88.28 | 51.27 | 35.79 | 35.74 | 0.00 | 60.16 | 71.68 | 77.31 | 70.78 | 69.77 | 69.33 | 71.02 |
| Lane Group LOS | D | F | D | D | D | A | E | E | E | E | E | E | E |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.89 | 14.36 | 1.13 | 7.50 | 7.68 | 0.00 | 4.98 | 9.44 | 10.46 | 7.10 | 9.67 | 10.00 | 9.29 |
| 50th-Percentile Queue Length [ft/ln] | 22.36 | 359.10 | 28.24 | 187.53 | 191.96 | 0.00 | 124.3 | 235.9 | 261.4 | 177.5 | 241.72 | 250.00 | 232.14 |
| 95th-Percentile Queue Length [veh/ln] | 1.61 | 20.58 | 2.03 | 11.99 | 12.22 | 0.00 | 8.63 | 14.48 | 15.76 | 11.47 | 14.77 | 15.19 | 14.28 |
| 95th-Percentile Queue Length [ft/ln] | 40.24 | 514.49 | 50.83 | 299.83 | 305.57 | 0.00 | 215.8 | 361.9 | 393.9 | 286.7 | 369.21 | 379.66 | 357.07 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.80 | 88.28 | 51.27 | 35.77 | 35.74 | 0.00 | 60.16 | 74.58 | 70.78 | 69.62 | 70.36 | 71.02 |
| Movement LOS | D | F | D | D | D | A | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 82.04 | | | 35.76 | | | 71.24 | | | 70.02 | | |
| Approach LOS | F | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 64.77 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.625 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 63.46 | 63.46 | 63.46 | 63.46 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.518 | 4.295 | 4.335 | 2.759 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 383 | 551 | 364 | 457 |
| d_b, Bicycle Delay [s] | 49.75 | 39.81 | 50.32 | 45.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.376 | 4.087 | 3.041 | 2.155 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 110: Marsh Road and US 101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 61.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.110 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1841 | 0 | 0 | 896 | 771 | 1256 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.50 | 0.00 | 0.00 | 5.20 | 1.90 | 4.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1841 | 0 | 0 | 896 | 771 | 1256 |
| Peak Hour Factor | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 474 | 0 | 0 | 231 | 199 | 324 |
| Total Analysis Volume [veh/h] | 1898 | 0 | 0 | 924 | 795 | 1295 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | 0 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 2 | | 0 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 2 | | 1 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 10 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 10 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.54 | 0.27 | 0.23 | 0.47 |
| s, saturation flow rate [veh/h] | 3489 | 3469 | 3461 | 2761 |
| c, Capacity [veh/h] | 2070 | 2058 | 1213 | 968 |
| d1, Uniform Delay [s] | 14.50 | 9.01 | 21.88 | 25.95 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.24 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.93 | 0.71 | 0.23 | 155.63 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.92 | 0.45 | 0.66 | 1.34 |
| d, Delay for Lane Group [s/veh] | 22.43 | 9.72 | 22.10 | 181.58 |
| Lane Group LOS | C | A | C | F |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 15.07 | 4.07 | 6.00 | 29.52 |
| 50th-Percentile Queue Length [ft/ln] | 376.64 | 101.80 | 149.89 | 738.03 |
| 95th-Percentile Queue Length [veh/ln] | 21.43 | 7.33 | 10.01 | 45.37 |
| 95th-Percentile Queue Length [ft/ln] | 535.78 | 183.25 | 250.29 | 1134.13 |

**Movement, Approach, & Intersection Results**

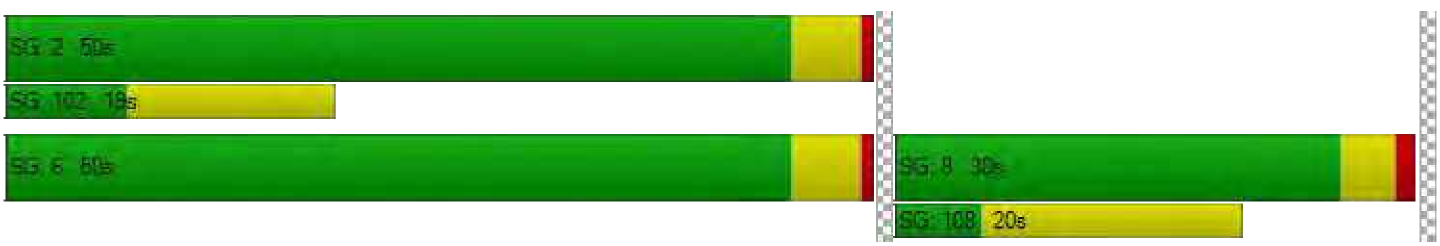
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 22.43 | 0.00 | 0.00 | 9.72 | 22.10 | 181.58 |
| Movement LOS | C | | | A | C | F |
| d_A, Approach Delay [s/veh] | 22.43 | | 9.72 | | 120.92 | |
| Approach LOS | C | | A | | F | |
| d_I, Intersection Delay [s/veh] | 61.94 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.110 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.130 | 2.634 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.47 | 7.47 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.125 | 2.322 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 24.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.833 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 118 | 3 | 24 | 69 | 14 | 12 | 13 | 7 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 473 | 10 | 95 | 276 | 56 | 47 | 52 | 27 | 24 | 56 | 144 |
| Pedestrian Volume [ped/h] | 3 | | | 3 | | | 9 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 597 | 587 | 490 | 538 |
| Degree of Utilization, x | 0.83 | 0.73 | 0.26 | 0.42 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 8.79 | 6.14 | 1.02 | 2.04 |
| 95th-Percentile Queue Length [ft] | 219.69 | 153.45 | 25.41 | 50.96 |
| Approach Delay [s/veh] | 32.12 | 23.80 | 12.88 | 14.40 |
| Approach LOS | D | C | B | B |
| Intersection Delay [s/veh] | 24.31 | | | |
| Intersection LOS | C | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.847 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 500 | 296 | 2094 | 710 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.00 | 0.00 | 4.60 | 0.00 | 0.00 | 16.70 | 0.00 | 18.20 | 9.10 | 4.70 | 4.90 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 500 | 296 | 2094 | 710 | 34 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 42 | 7 | 362 | 3 | 8 | 2 | 2 | 130 | 77 | 545 | 185 | 9 |
| Total Analysis Volume [veh/h] | 169 | 28 | 1447 | 10 | 31 | 7 | 8 | 521 | 308 | 2181 | 740 | 35 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 1 | | | 1 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 1 | | | 1 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 22 | | | 0 | | | 22 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 1 | | | 13 | | | 25 | | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 7 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | 3 | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | - | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 0 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 69 | 11 | 11 | 0 | 32 | 25 | 32 | 48 | 32 | 48 | 69 | 0 |
| Vehicle Extension [s] | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 0 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | Yes | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 18 | 87 | 29 | 29 | 36 | 36 | 36 | 67 | 67 |
| g / C, Green / Cycle | 0.11 | 0.54 | 0.18 | 0.18 | 0.23 | 0.23 | 0.23 | 0.42 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.35 | 0.01 | 0.01 | 0.17 | 0.17 | 0.21 | 0.43 | 0.43 |
| s, saturation flow rate [veh/h] | 1822 | 4114 | 1863 | 1610 | 1624 | 1480 | 1444 | 5075 | 1805 |
| c, Capacity [veh/h] | 208 | 2142 | 339 | 293 | 368 | 335 | 327 | 2120 | 754 |
| d1, Uniform Delay [s] | 70.41 | 28.24 | 54.28 | 54.32 | 57.70 | 57.70 | 60.25 | 46.58 | 46.58 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.18 | 0.18 | 0.30 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 50.35 | 1.73 | 0.03 | 0.04 | 5.14 | 5.61 | 26.41 | 27.34 | 40.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.95 | 0.68 | 0.07 | 0.08 | 0.75 | 0.75 | 0.94 | 1.03 | 1.03 |
| d, Delay for Lane Group [s/veh] | 120.77 | 29.97 | 54.31 | 54.36 | 62.84 | 63.31 | 86.66 | 73.92 | 86.77 |
| Lane Group LOS | F | C | D | D | E | E | F | F | F |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.97 | 14.00 | 0.86 | 0.78 | 11.03 | 10.10 | 14.61 | 33.25 | 38.15 |
| 50th-Percentile Queue Length [ft/ln] | 274.27 | 350.08 | 21.43 | 19.47 | 275.80 | 252.44 | 365.20 | 831.14 | 953.77 |
| 95th-Percentile Queue Length [veh/ln] | 16.40 | 20.14 | 1.54 | 1.40 | 16.48 | 15.31 | 20.88 | 43.64 | 49.34 |
| 95th-Percentile Queue Length [ft/ln] | 410.07 | 503.50 | 38.58 | 35.04 | 411.98 | 382.72 | 521.90 | 1091.11 | 1233.51 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 120.77 | 120.77 | 29.97 | 54.31 | 54.34 | 54.36 | 62.84 | 63.07 | 86.66 | 73.92 | 86.77 | 86.77 |
| Movement LOS | F | F | C | D | D | D | E | E | F | F | F | F |
| d_A, Approach Delay [s/veh] | 40.85 | | | 54.33 | | | 71.75 | | | 77.29 | | |
| Approach LOS | D | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 65.32 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.847 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.007 | 2.587 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 555 | 791 |
| d_b, Bicycle Delay [s] | 73.76 | 54.89 | 42.29 | 29.24 |
| I_b,int, Bicycle LOS Score for Intersection | 4.272 | 1.599 | 2.250 | 6.437 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 96.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.711 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1360 | 623 | 0 | 1264 | 888 | 0 | 0 | 0 | 1143 | 0 | 415 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1360 | 623 | 0 | 1264 | 888 | 0 | 0 | 0 | 1143 | 0 | 415 |
| Peak Hour Factor | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 351 | 156 | 0 | 326 | 229 | 0 | 0 | 0 | 286 | 0 | 115 |
| Total Analysis Volume [veh/h] | 0 | 1402 | 623 | 0 | 1303 | 915 | 0 | 0 | 0 | 1143 | 0 | 461 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 6 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 42 | 42 | 42 | | 30 | 30 |
| g / C, Green / Cycle | 0.52 | 0.52 | 0.52 | | 0.38 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.26 | 1.04 | | 0.33 | 0.16 |
| s, saturation flow rate [veh/h] | 5053 | 5053 | 877 | | 3514 | 2859 |
| c, Capacity [veh/h] | 2650 | 2650 | 460 | | 1319 | 1073 |
| d1, Uniform Delay [s] | 12.49 | 12.16 | 18.55 | | 23.07 | 18.56 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.76 | 0.66 | 452.75 | | 1.86 | 0.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.53 | 0.49 | 1.99 | | 0.87 | 0.43 |
| d, Delay for Lane Group [s/veh] | 13.25 | 12.82 | 471.31 | | 24.93 | 18.83 |
| Lane Group LOS | B | B | F | | C | B |
| Critical Lane Group | No | No | Yes | | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.16 | 4.66 | 65.12 | | 9.63 | 3.05 |
| 50th-Percentile Queue Length [ft/ln] | 128.91 | 116.45 | 1628.11 | | 240.67 | 76.34 |
| 95th-Percentile Queue Length [veh/ln] | 8.88 | 8.20 | 108.99 | | 14.72 | 5.50 |
| 95th-Percentile Queue Length [ft/ln] | 222.02 | 204.93 | 2724.68 | | 367.88 | 137.42 |

**Movement, Approach, & Intersection Results**

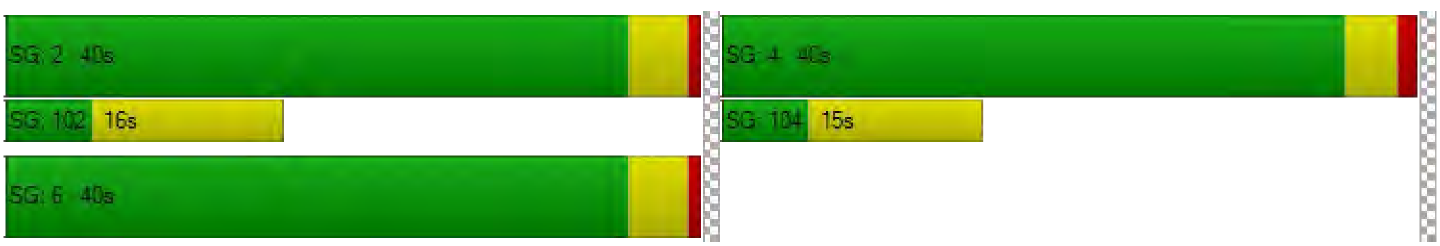
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 13.25 | 0.00 | 0.00 | 12.82 | 471.31 | 0.00 | 0.00 | 0.00 | 24.93 | 0.00 | 18.83 |
| Movement LOS | | B | | | B | F | | | | C | | B |
| d_A, Approach Delay [s/veh] | 13.25 | | | 201.96 | | | 0.00 | | | 23.18 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 96.42 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.711 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.030 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.10 | 12.07 | 39.95 | 12.06 |
| I_b,int, Bicycle LOS Score for Intersection | 2.331 | 2.780 | 4.132 | 1.560 |
| Bicycle LOS | B | C | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 129.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.569 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1787 | 738 | 0 | 1831 | 424 | 0 | 0 | 0 | 395 | 0 | 789 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 4.00 | 2.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1787 | 738 | 0 | 1831 | 424 | 0 | 0 | 0 | 395 | 0 | 789 |
| Peak Hour Factor | 1.0000 | 0.9700 | 0.9700 | 1.0000 | 0.9700 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 461 | 190 | 0 | 472 | 106 | 0 | 0 | 0 | 99 | 0 | 219 |
| Total Analysis Volume [veh/h] | 0 | 1842 | 761 | 0 | 1888 | 424 | 0 | 0 | 0 | 395 | 0 | 877 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 3 | | | 0 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 40 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | | 36 | 36 |
| g / C, Green / Cycle | 0.45 | 0.45 | 0.45 | | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.37 | 0.49 | 0.70 | | 0.11 | 0.56 |
| s, saturation flow rate [veh/h] | 5012 | 1551 | 2715 | | 3514 | 1567 |
| c, Capacity [veh/h] | 2253 | 697 | 1220 | | 1582 | 706 |
| d1, Uniform Delay [s] | 19.12 | 21.54 | 21.97 | | 13.58 | 21.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.18 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.44 | 61.75 | 250.39 | | 0.08 | 113.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 1.09 | 1.55 | | 0.25 | 1.24 |
| d, Delay for Lane Group [s/veh] | 22.56 | 83.30 | 272.36 | | 13.66 | 135.29 |
| Lane Group LOS | C | F | F | | B | F |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 9.77 | 23.54 | 35.18 | | 2.09 | 17.06 |
| 50th-Percentile Queue Length [ft/ln] | 244.34 | 588.58 | 879.52 | | 52.29 | 426.40 |
| 95th-Percentile Queue Length [veh/ln] | 14.90 | 33.55 | 57.06 | | 3.76 | 27.23 |
| 95th-Percentile Queue Length [ft/ln] | 372.52 | 838.65 | 1426.42 | | 94.12 | 680.82 |

**Movement, Approach, & Intersection Results**

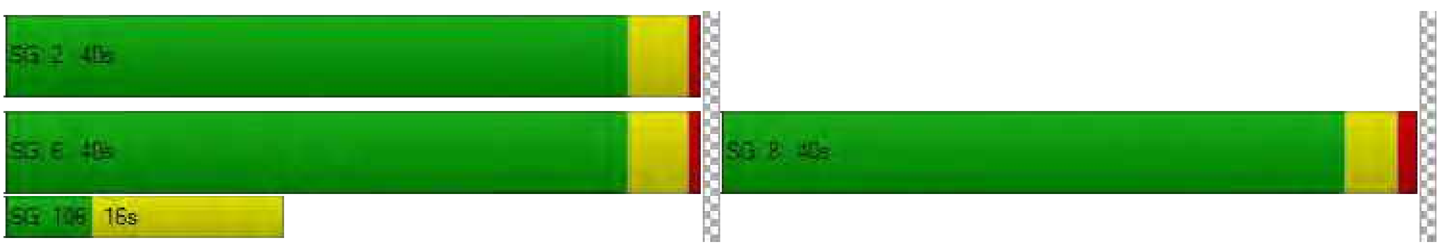
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 22.56 | 83.30 | 0.00 | 272.36 | 0.00 | 0.00 | 0.00 | 0.00 | 13.66 | 0.00 | 135.29 |
| Movement LOS | | C | F | | F | | | | | B | | F |
| d_A, Approach Delay [s/veh] | 40.32 | | | 272.36 | | | 0.00 | | | 97.52 | | |
| Approach LOS | D | | | F | | | A | | | F | | |
| d_I, Intersection Delay [s/veh] | 128.96 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.569 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | F | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 901 | 901 | 0 | 901 |
| d_b, Bicycle Delay [s] | 12.09 | 12.08 | 39.95 | 12.07 |
| I_b,int, Bicycle LOS Score for Intersection | 2.991 | 2.598 | 4.132 | 1.560 |
| Bicycle LOS | C | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 45.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.038 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 50.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 283 | 1268 | 778 | 616 | 1963 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 23.10 | 5.10 | 5.30 | 6.30 | 3.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 283 | 1268 | 778 | 616 | 1963 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 73 | 74 | 334 | 205 | 162 | 517 |
| Total Analysis Volume [veh/h] | 291 | 298 | 1335 | 819 | 648 | 2066 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 109 | 109 | 109 | 109 | 109 | 109 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 79 | 79 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.46 | 0.46 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.23 | 0.27 | 0.53 | 0.76 | 0.41 |
| s, saturation flow rate [veh/h] | 3420 | 1320 | 4967 | 1547 | 849 | 5020 |
| c, Capacity [veh/h] | 627 | 242 | 2278 | 710 | 635 | 3643 |
| d1, Uniform Delay [s] | 39.71 | 44.50 | 21.84 | 29.50 | 29.58 | 6.97 |
| k, delay calibration | 0.04 | 0.50 | 0.04 | 0.50 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.20 | 134.20 | 0.09 | 84.76 | 41.13 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.46 | 1.23 | 0.59 | 1.15 | 1.02 | 0.57 |
| d, Delay for Lane Group [s/veh] | 39.91 | 178.70 | 21.93 | 114.26 | 70.71 | 7.02 |
| Lane Group LOS | D | F | C | F | F | A |
| Critical Lane Group | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.49 | 15.51 | 7.68 | 33.23 | 12.02 | 5.57 |
| 50th-Percentile Queue Length [ft/ln] | 87.26 | 387.75 | 192.11 | 830.74 | 300.51 | 139.13 |
| 95th-Percentile Queue Length [veh/ln] | 6.28 | 24.18 | 12.23 | 47.28 | 18.01 | 9.43 |
| 95th-Percentile Queue Length [ft/ln] | 157.06 | 604.44 | 305.76 | 1182.03 | 450.18 | 235.85 |

**Movement, Approach, & Intersection Results**

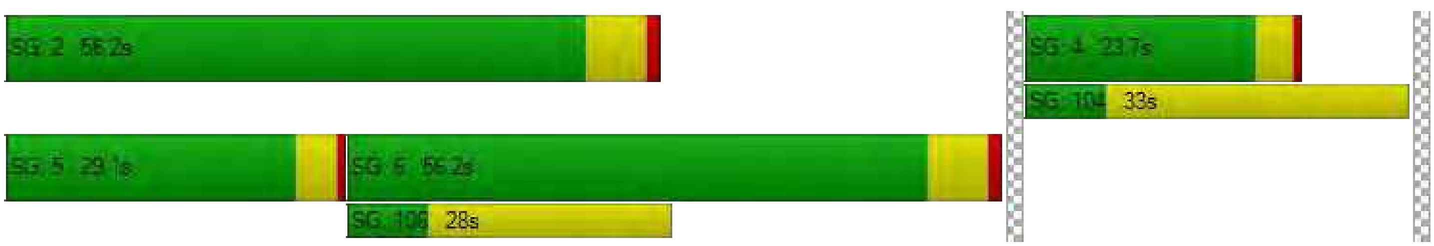
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 39.91 | 178.70 | 21.93 | 114.26 | 70.71 | 7.02 |
| Movement LOS | D | F | C | F | F | A |
| d_A, Approach Delay [s/veh] | 110.13 | | 57.03 | | 22.23 | |
| Approach LOS | F | | E | | C | |
| d_I, Intersection Delay [s/veh] | 45.45 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 1.038 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 44.06 | 44.06 | 44.06 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.236 | 3.651 | 3.511 |
| Crosswalk LOS | C | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 367 | 917 | 917 |
| d_b, Bicycle Delay [s] | 36.33 | 15.97 | 15.97 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.744 | 3.052 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.751 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 442 | 93 | 1821 | 459 | 164 | 2217 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.30 | 8.30 | 5.30 | 7.10 | 0.00 | 3.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 442 | 93 | 1821 | 459 | 164 | 2217 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 114 | 24 | 469 | 118 | 42 | 571 |
| Total Analysis Volume [veh/h] | 456 | 96 | 1877 | 473 | 169 | 2286 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 50 | 50 | 50 | 50 | 50 | 50 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 9 | 9 | 20 | 20 | 6 | 30 |
| g / C, Green / Cycle | 0.18 | 0.18 | 0.40 | 0.40 | 0.12 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.06 | 0.38 | 0.32 | 0.09 | 0.45 |
| s, saturation flow rate [veh/h] | 3173 | 1509 | 4959 | 1493 | 1810 | 5024 |
| c, Capacity [veh/h] | 568 | 270 | 2008 | 604 | 216 | 3044 |
| d1, Uniform Delay [s] | 19.75 | 18.06 | 14.30 | 12.88 | 21.47 | 7.15 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.02 | 0.29 | 0.99 | 0.85 | 2.36 | 0.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.80 | 0.36 | 0.93 | 0.78 | 0.78 | 0.75 |
| d, Delay for Lane Group [s/veh] | 20.78 | 18.36 | 15.29 | 13.73 | 23.83 | 7.30 |
| Lane Group LOS | C | B | B | B | C | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.41 | 0.92 | 4.93 | 3.38 | 1.76 | 2.73 |
| 50th-Percentile Queue Length [ft/ln] | 60.34 | 23.01 | 123.26 | 84.39 | 44.01 | 68.14 |
| 95th-Percentile Queue Length [veh/ln] | 4.34 | 1.66 | 8.57 | 6.08 | 3.17 | 4.91 |
| 95th-Percentile Queue Length [ft/ln] | 108.60 | 41.41 | 214.30 | 151.90 | 79.22 | 122.65 |

**Movement, Approach, & Intersection Results**

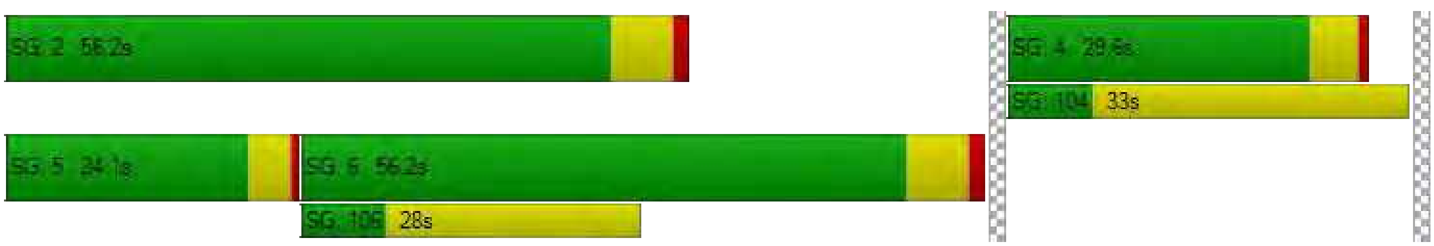
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.78 | 18.36 | 15.29 | 13.73 | 23.83 | 7.30 |
| Movement LOS | C | B | B | B | C | A |
| d_A, Approach Delay [s/veh] | 20.35 | | 14.98 | | 8.43 | |
| Approach LOS | C | | B | | A | |
| d_I, Intersection Delay [s/veh] | 12.53 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.751 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 15.24 | 15.24 | 15.24 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.340 | 3.623 | 3.486 |
| Crosswalk LOS | B | D | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 999 | 1998 | 1998 |
| d_b, Bicycle Delay [s] | 6.27 | 0.00 | 0.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.852 | 2.910 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 199: Bayfront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.722 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 66 | 51 | 1135 | 396 | 247 | 2441 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 35.50 | 35.50 | 11.60 | 11.60 | 4.40 | 4.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 66 | 51 | 1135 | 396 | 247 | 2441 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 13 | 296 | 103 | 64 | 636 |
| Total Analysis Volume [veh/h] | 69 | 53 | 1182 | 413 | 257 | 2543 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 65 | 65 | 65 | 65 | 65 | 65 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 5 | 5 | 41 | 41 | 50 | 50 |
| g / C, Green / Cycle | 0.08 | 0.08 | 0.63 | 0.63 | 0.77 | 0.77 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.06 | 0.28 | 0.31 | 0.23 | 0.57 |
| s, saturation flow rate [veh/h] | 1172 | 1058 | 4231 | 1320 | 1134 | 4496 |
| c, Capacity [veh/h] | 92 | 83 | 2656 | 829 | 953 | 3457 |
| d1, Uniform Delay [s] | 29.06 | 29.16 | 6.23 | 6.53 | 2.99 | 3.98 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.26 | 4.28 | 0.04 | 0.17 | 0.06 | 0.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.68 | 0.72 | 0.45 | 0.50 | 0.27 | 0.74 |
| d, Delay for Lane Group [s/veh] | 32.33 | 33.44 | 6.27 | 6.71 | 3.05 | 4.10 |
| Lane Group LOS | C | C | A | A | A | A |
| Critical Lane Group | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.99 | 0.96 | 1.71 | 1.90 | 0.09 | 1.16 |
| 50th-Percentile Queue Length [ft/ln] | 24.64 | 24.06 | 42.69 | 47.62 | 2.21 | 29.03 |
| 95th-Percentile Queue Length [veh/ln] | 1.77 | 1.73 | 3.07 | 3.43 | 0.16 | 2.09 |
| 95th-Percentile Queue Length [ft/ln] | 44.35 | 43.30 | 76.84 | 85.72 | 3.97 | 52.26 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

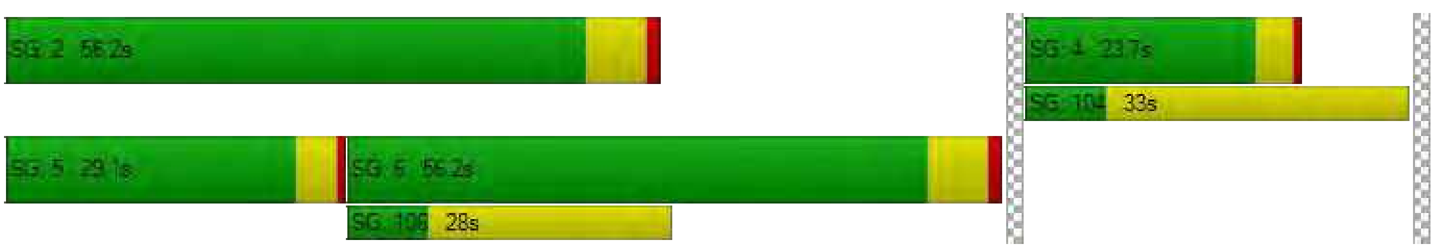
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.45 | 33.44 | 6.27 | 6.71 | 3.05 | 4.10 |
| Movement LOS | C | C | A | A | A | A |
| d_A, Approach Delay [s/veh] | 32.87 | | 6.39 | | 4.00 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.62 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.722 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 22.26 | 22.26 | 22.26 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.547 | 3.455 | 3.445 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 619 | 1547 | 1547 |
| d_b, Bicycle Delay [s] | 15.42 | 1.66 | 1.66 |
| I_b,int, Bicycle LOS Score for Intersection | 1.761 | 2.437 | 3.100 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 266.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.983 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | ┣ | | ┫ | | ┳ | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 646 | 270 | 74 | 384 | 210 | 257 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 646 | 270 | 74 | 384 | 210 | 257 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 184 | 77 | 21 | 109 | 60 | 73 |
| Total Analysis Volume [veh/h] | 734 | 307 | 84 | 436 | 239 | 292 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 1041 | 520 | 531 |
| Degree of Utilization, x | 1.98 | 1.02 | 1.00 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 70.09 | 14.64 | 14.19 |
| 95th-Percentile Queue Length [ft] | 1752.14 | 366.11 | 354.77 |
| Approach Delay [s/veh] | 465.78 | 71.94 | 65.71 |
| Approach LOS | F | F | F |
| Intersection Delay [s/veh] | 266.34 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**

**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 9.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.933 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 980.00 | 760.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 15.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Bldg 20 | | Bayfront Expy (SR 84) | | Bayfront Expy (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 48 | 989 | 234 | 86 | 2729 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 88.60 | 11.70 | 11.70 | 6.30 | 6.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 48 | 989 | 234 | 86 | 2729 |
| Peak Hour Factor | 0.9500 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 13 | 263 | 62 | 23 | 726 |
| Total Analysis Volume [veh/h] | 0 | 51 | 1052 | 249 | 91 | 2903 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 25 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 52 | 52 | 52 | 52 | 52 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 3 | 31 | 31 | 39 | 39 |
| g / C, Green / Cycle | 0.06 | 0.59 | 0.59 | 0.75 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.25 | 0.19 | 0.14 | 0.66 |
| s, saturation flow rate [veh/h] | 436 | 4227 | 1319 | 640 | 4426 |
| c, Capacity [veh/h] | 29 | 2485 | 775 | 611 | 3301 |
| d1, Uniform Delay [s] | 24.50 | 5.93 | 5.49 | 2.39 | 4.92 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 366.15 | 0.04 | 0.09 | 0.04 | 0.32 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 1.79 | 0.42 | 0.32 | 0.15 | 0.88 |
| d, Delay for Lane Group [s/veh] | 390.66 | 5.97 | 5.58 | 2.44 | 5.24 |
| Lane Group LOS | F | A | A | A | A |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.25 | 1.14 | 0.76 | 0.02 | 0.45 |
| 50th-Percentile Queue Length [ft/ln] | 81.16 | 28.55 | 19.08 | 0.48 | 11.25 |
| 95th-Percentile Queue Length [veh/ln] | 5.84 | 2.06 | 1.37 | 0.03 | 0.81 |
| 95th-Percentile Queue Length [ft/ln] | 146.10 | 51.39 | 34.35 | 0.86 | 20.25 |

**Movement, Approach, & Intersection Results**

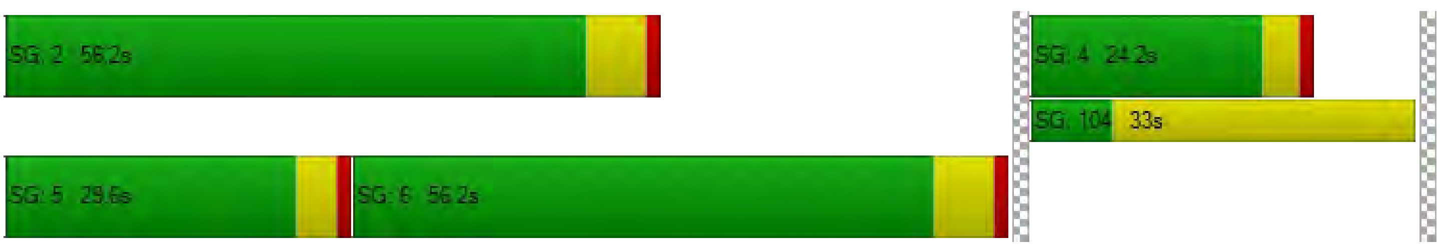
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 390.66 | 5.97 | 5.58 | 2.44 | 5.24 |
| Movement LOS | | F | A | A | A | A |
| d_A, Approach Delay [s/veh] | 390.66 | | 5.90 | | 5.15 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 9.90 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.933 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 16.31 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.441 | 0.000 |
| Crosswalk LOS | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 765 | 1912 | 1912 |
| d_b, Bicycle Delay [s] | 9.97 | 0.05 | 0.05 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.275 | 3.206 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 86.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.733 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Constitution Drive | | | Constitution Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 274 | 347 | 196 | 766 | 312 | 423 | 80 | 10 | 116 | 42 | 24 | 84 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 274 | 347 | 196 | 766 | 312 | 423 | 80 | 10 | 116 | 42 | 24 | 84 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 70 | 89 | 50 | 195 | 80 | 108 | 20 | 3 | 30 | 11 | 6 | 21 |
| Total Analysis Volume [veh/h] | 280 | 354 | 200 | 782 | 318 | 432 | 82 | 10 | 118 | 43 | 24 | 86 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 76 | | | 0 | | | 0 | | | 76 | | |
| v_di, Inbound Pedestrian Volume crossing m | 76 | | | 0 | | | 0 | | | 76 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 0 | | | 10 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 10 | | | 0 | | | 11 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 30 | 30 | 0 | 30 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 16 | 53 | 0 | 38 | 75 | 0 | 0 | 19 | 0 | 0 | 20 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 12 | 49 | 34 | 71 | 15 | 15 | 16 | 16 |
| g / C, Green / Cycle | 0.09 | 0.38 | 0.26 | 0.55 | 0.12 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.34 | 0.23 | 0.45 | 0.05 | 0.08 | 0.04 | 0.05 |
| s, saturation flow rate [veh/h] | 1767 | 1653 | 3431 | 1684 | 1776 | 1433 | 1760 | 1577 |
| c, Capacity [veh/h] | 163 | 623 | 897 | 920 | 205 | 165 | 217 | 194 |
| d1, Uniform Delay [s] | 59.00 | 37.95 | 45.91 | 24.14 | 53.64 | 54.98 | 52.33 | 52.45 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 347.22 | 17.22 | 11.37 | 7.90 | 6.96 | 23.01 | 4.68 | 5.62 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.72 | 0.89 | 0.87 | 0.82 | 0.45 | 0.71 | 0.36 | 0.38 |
| d, Delay for Lane Group [s/veh] | 406.22 | 55.18 | 57.28 | 32.04 | 60.61 | 77.99 | 57.01 | 58.07 |
| Lane Group LOS | F | E | E | C | E | E | E | E |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 21.10 | 19.33 | 13.46 | 20.28 | 3.22 | 4.76 | 2.66 | 2.54 |
| 50th-Percentile Queue Length [ft/ln] | 527.47 | 483.16 | 336.53 | 507.05 | 80.40 | 119.08 | 66.43 | 63.57 |
| 95th-Percentile Queue Length [veh/ln] | 33.58 | 26.54 | 19.48 | 27.67 | 5.79 | 8.34 | 4.78 | 4.58 |
| 95th-Percentile Queue Length [ft/ln] | 839.45 | 663.40 | 486.96 | 691.69 | 144.72 | 208.57 | 119.57 | 114.43 |

**Movement, Approach, & Intersection Results**

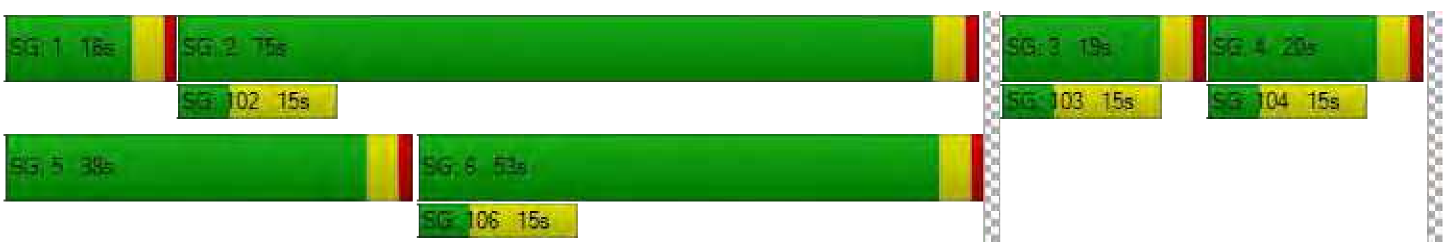
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 406.22 | 55.18 | 55.18 | 57.28 | 32.04 | 32.04 | 60.61 | 60.61 | 77.99 | 57.01 | 57.01 | 57.95 |
| Movement LOS | F | E | E | E | C | C | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 173.03 | | | 44.93 | | | 70.37 | | | 57.52 | | |
| Approach LOS | F | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 86.74 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 0.733 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 56.31 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.386 | 2.719 | 2.267 | 2.429 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 754 | 1092 | 231 | 246 |
| d_b, Bicycle Delay [s] | 25.23 | 13.39 | 50.87 | 49.98 |
| I_b,int, Bicycle LOS Score for Intersection | 2.936 | 4.087 | 1.906 | 1.812 |
| Bicycle LOS | C | D | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 325.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.586 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 176 | 332 | 115 | 192 | 314 | 305 | 39 | 34 | 190 | 0 | 255 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 13.00 | 8.50 | 8.30 | 21.10 | 0.80 | 3.10 | 5.30 | 40.00 | 9.80 | 0.00 | 17.90 | 100.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 176 | 332 | 115 | 192 | 314 | 305 | 39 | 34 | 190 | 0 | 255 | 25 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 49 | 92 | 32 | 53 | 87 | 85 | 11 | 9 | 53 | 0 | 71 | 7 |
| Total Analysis Volume [veh/h] | 196 | 369 | 128 | 213 | 349 | 339 | 43 | 38 | 211 | 0 | 283 | 28 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 5 | | | 5 | | |
| v_di, Inbound Pedestrian Volume crossing m | 14 | | | 13 | | | 5 | | | 5 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 1 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 25 | 0 | 0 | 19 | 0 | 0 | 46 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.86 | 0.16 | 0.44 | 0.28 | 0.12 | 0.12 |
| s, saturation flow rate [veh/h] | 804 | 1357 | 1560 | 1031 | 1371 | 1289 |
| c, Capacity [veh/h] | 282 | 399 | 459 | 302 | 439 | 380 |
| d1, Uniform Delay [s] | 42.73 | 30.09 | 35.94 | 35.49 | 28.43 | 28.75 |
| k, delay calibration | 0.50 | 0.11 | 0.50 | 0.42 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 665.98 | 1.11 | 235.27 | 39.70 | 0.50 | 0.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 2.46 | 0.53 | 1.50 | 0.97 | 0.36 | 0.40 |
| d, Delay for Lane Group [s/veh] | 708.70 | 31.19 | 271.22 | 75.19 | 28.93 | 29.43 |
| Lane Group LOS | F | C | F | E | C | C |
| Critical Lane Group | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 59.36 | 4.44 | 41.15 | 10.31 | 3.11 | 3.02 |
| 50th-Percentile Queue Length [ft/ln] | 1484.12 | 111.08 | 1028.72 | 257.70 | 77.68 | 75.53 |
| 95th-Percentile Queue Length [veh/ln] | 97.33 | 7.90 | 63.38 | 15.57 | 5.59 | 5.44 |
| 95th-Percentile Queue Length [ft/ln] | 2433.35 | 197.51 | 1584.41 | 389.33 | 139.83 | 135.95 |

**Movement, Approach, & Intersection Results**

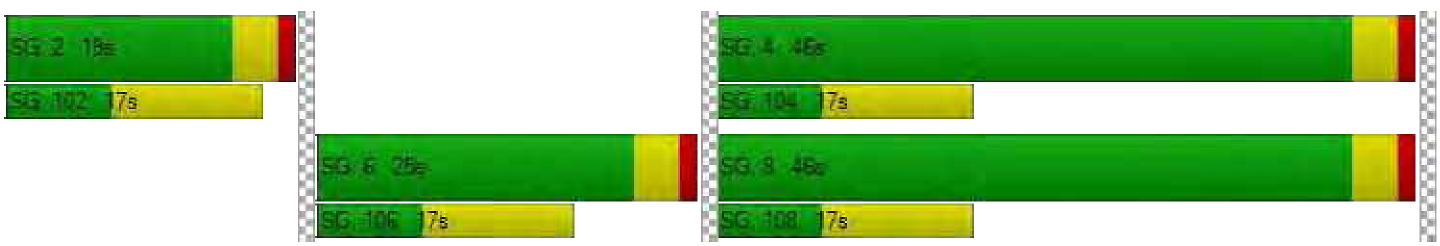
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 708.70 | 708.70 | 708.70 | 31.19 | 271.22 | 271.22 | 75.19 | 75.19 | 75.19 | 28.93 | 29.15 | 29.43 |
| Movement LOS | F | F | F | C | F | F | E | E | E | C | C | C |
| d_A, Approach Delay [s/veh] | 708.70 | | | 214.47 | | | 75.19 | | | 29.18 | | |
| Approach LOS | F | | | F | | | E | | | C | | |
| d_I, Intersection Delay [s/veh] | 325.63 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.586 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 40.56 | 40.56 | 40.56 | 40.56 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.401 | 2.293 | 2.421 | 2.291 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 824 | 412 | 294 | 824 |
| d_b, Bicycle Delay [s] | 17.62 | 32.13 | 37.07 | 17.62 |
| I_b,int, Bicycle LOS Score for Intersection | 2.703 | 3.046 | 2.041 | 1.816 |
| Bicycle LOS | B | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 285.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.915 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 72 | 149 | 336 | 738 | 110 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 72 | 149 | 336 | 738 | 110 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 23 | 48 | 109 | 240 | 36 |
| Total Analysis Volume [veh/h] | 43 | 94 | 194 | 436 | 958 | 143 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.92 | 0.34 | 0.31 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 285.62 | 221.85 | 13.38 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | B | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 9.09 | 9.09 | 1.33 | 1.33 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 227.30 | 227.30 | 33.13 | 33.13 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 241.86 | | 4.12 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 19.13 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.047 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 184 | 42 | 60 | 128 | 13 | 68 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 12.50 | 12.50 | 15.60 | 15.60 | 46.80 | 46.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 184 | 42 | 60 | 128 | 13 | 68 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 54 | 12 | 18 | 38 | 4 | 20 |
| Total Analysis Volume [veh/h] | 216 | 49 | 71 | 151 | 15 | 80 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.17 | 0.00 | 0.00 | 0.00 | 0.05 | 0.10 |
| d_M, Delay for Movement [s/veh] | 8.36 | 0.00 | 0.00 | 0.00 | 17.34 | 10.50 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.60 | 0.60 | 0.00 | 0.00 | 0.52 | 0.52 |
| 95th-Percentile Queue Length [ft/ln] | 15.05 | 15.05 | 0.00 | 0.00 | 12.93 | 12.93 |
| d_A, Approach Delay [s/veh] | 6.81 | | 0.00 | | 11.58 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 4.99 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.509 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1046 | 352 | 54 | 1362 | 280 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1046 | 352 | 54 | 1362 | 280 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 262 | 88 | 14 | 341 | 70 | 6 |
| Total Analysis Volume [veh/h] | 1046 | 352 | 54 | 1362 | 280 | 25 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 90 | 0 | 10 | 100 | 60 | 0 |
| Amber [s] | 3.5 | 0.0 | 3.5 | 3.5 | 3.5 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 81 | 0 | 24 | 105 | 55 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 77 | 77 | 20 | 101 | 51 | 51 |
| g / C, Green / Cycle | 0.48 | 0.48 | 0.12 | 0.63 | 0.32 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.37 | 0.41 | 0.02 | 0.38 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1870 | 1717 | 3459 | 3560 | 1781 | 1746 |
| c, Capacity [veh/h] | 894 | 821 | 422 | 2236 | 562 | 551 |
| d1, Uniform Delay [s] | 34.79 | 36.74 | 62.67 | 17.92 | 41.01 | 41.02 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.75 | 10.80 | 0.63 | 1.24 | 1.20 | 1.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.78 | 0.85 | 0.13 | 0.61 | 0.27 | 0.27 |
| d, Delay for Lane Group [s/veh] | 41.54 | 47.55 | 63.29 | 19.16 | 42.21 | 42.25 |
| Lane Group LOS | D | D | E | B | D | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 23.84 | 25.87 | 1.02 | 14.93 | 4.82 | 4.75 |
| 50th-Percentile Queue Length [ft/ln] | 596.04 | 646.78 | 25.39 | 373.35 | 120.56 | 118.64 |
| 95th-Percentile Queue Length [veh/ln] | 31.85 | 34.21 | 1.83 | 21.27 | 8.42 | 8.32 |
| 95th-Percentile Queue Length [ft/ln] | 796.23 | 855.32 | 45.70 | 531.79 | 210.60 | 207.96 |

**Movement, Approach, & Intersection Results**

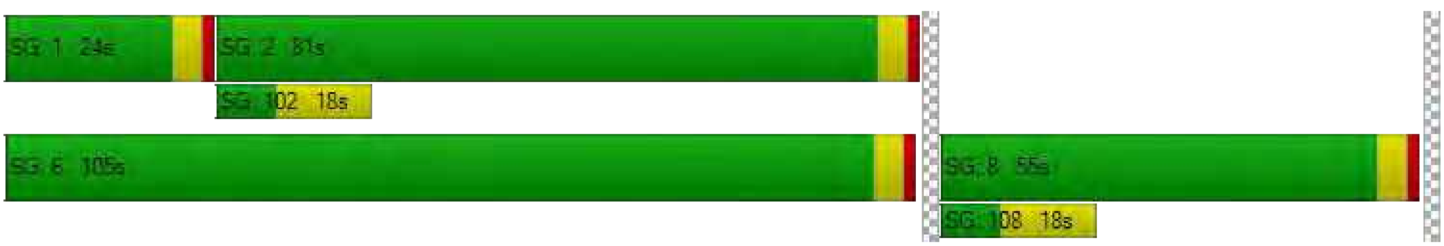
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 43.54 | 47.55 | 63.29 | 19.16 | 42.23 | 42.25 |
| Movement LOS | D | D | E | B | D | D |
| d_A, Approach Delay [s/veh] | 44.55 | | 20.85 | | 42.23 | |
| Approach LOS | D | | C | | D | |
| d_I, Intersection Delay [s/veh] | 33.56 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.509 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.38 | 69.38 | 69.38 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.146 | 3.019 | 2.332 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 956 | 1256 | 631 |
| d_b, Bicycle Delay [s] | 21.79 | 11.06 | 37.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.713 | 2.728 | 2.063 |
| Bicycle LOS | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 8.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 78 | 56 | 15 | 17 | 7 | 30 | 17 | 17 | 24 | 7 | 68 |
| Total Analysis Volume [veh/h] | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 252 | | | 136 | | | 226 | | | 452 | | |
| Exiting Flow Rate [veh/h] | 234 | | | 716 | | | 68 | | | 357 | | |
| Demand Flow Rate [veh/h] | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 |
| Adjusted Demand Flow Rate [veh/h] | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 557 | 160 | 260 | 400 |
| Capacity of Entry and Bypass Lanes [veh/h] | 1068 | 1202 | 1096 | 871 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 1047 | 1179 | 1074 | 854 |
| X, volume / capacity | 0.52 | 0.13 | 0.24 | 0.46 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | A | A | B |
| 95th-Percentile Queue Length [veh] | 3.12 | 0.46 | 0.92 | 2.45 |
| 95th-Percentile Queue Length [ft] | 77.96 | 11.41 | 23.03 | 61.14 |
| Approach Delay [s/veh] | 9.74 | 4.18 | 5.57 | 10.05 |
| Approach LOS | A | A | A | B |
| Intersection Delay [s/veh] | 8.40 | | | |
| Intersection LOS | A | | | |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project AM (RedTripCap).pdf

Scenario 22 Cumulative w/Dumbarton AM (2040 vols)+ Project
12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 1038 | 1462 | 1343 | 532 | 4375 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 42 | 1307 | 7 | 448 | 1225 | 328 | 13 | 4 | 68 | 341 | 19 | 0 | 3802 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 | 3776 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 0 | 839 | 82 | 425 | 755 | 47 | 334 | 69 | 2 | 44 | 53 | 339 | 2989 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 87 | 590 | 520 | 507 | 501 | 104 | 2309 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 675 | 211 | 301 | 756 | 56 | 2545 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 834 | 67 | 1319 | 2912 | 241 | 416 | 5789 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 247 | 596 | 277 | 35 | 75 | 72 | 386 | 423 | 213 | 1160 | 2475 | 72 | 6031 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 100 | 897 | 77 | 466 | 1351 | 48 | 47 | 15 | 48 | 17 | 6 | 153 | 3225 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 266 | 1221 | 1418 | 25 | 172 | 95 | 3197 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1316 | 981 | 42 | 1163 | 237 | 138 | 3877 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 | 5051 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1387 | 1211 | 627 | 463 | 60 | 3813 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 | 2542 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 37 | 783 | 7 | 4 | 878 | 168 | 280 | 6 | 64 | 1 | 2 | 6 | 2236 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 103 | 11 | 141 | 96 | 93 | 2271 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 27 | 300 | 153 | 374 | 136 | 448 | 132 | 462 | 170 | 344 | 329 | 20 | 2895 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | 1841 | 896 | 771 | 1256 | 4764 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 | 1121 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 500 | 296 | 2094 | 710 | 34 | 5267 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1360 | 623 | 1264 | 888 | 1143 | 415 | 5693 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1787 | 738 | 1831 | 424 | 395 | 789 | 5964 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 276 | 283 | 1268 | 778 | 616 | 1963 | 5184 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 442 | 93 | 1821 | 459 | 164 | 2217 | 5196 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | 66 | 51 | 1135 | 396 | 247 | 2441 | 4336 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 646 | 270 | 74 | 384 | 210 | 257 | 1841 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 48 | 989 | 234 | 86 | 2729 | 4086 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 274 | 347 | 196 | 766 | 312 | 423 | 80 | 10 | 116 | 42 | 24 | 84 | 2674 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 176 | 332 | 115 | 192 | 314 | 305 | 39 | 34 | 190 | 0 | 255 | 25 | 1977 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 33 | 72 | 149 | 336 | 738 | 110 | 1438 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | 184 | 42 | 60 | 128 | 13 | 68 | 495 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1046 | 352 | 54 | 1362 | 280 | 25 | 3119 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 | 1348 |

Vistro File: \...\Vistro_AllScenarios_AM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project AM (RedTripCap).pdf

Scenario 22 Cumulative w/Dumbarton AM (2040 vols)+ Project

12/9/2021

# Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 1038 | 1462 | 1343 | 532 | 4375 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1038** | **1462** | **1343** | **532** | **4375** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 42 | 1307 | 7 | 448 | 1225 | 328 | 13 | 4 | 68 | 341 | 19 | 0 | 3802 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **42** | **1307** | **7** | **448** | **1225** | **328** | **13** | **4** | **68** | **341** | **19** | **0** | **3802** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 | 3776 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **224** | **974** | **126** | **29** | **1014** | **413** | **611** | **77** | **224** | **38** | **21** | **25** | **3776** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 0 | 839 | 82 | 425 | 755 | 47 | 334 | 69 | 2 | 44 | 53 | 339 | 2989 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **839** | **82** | **425** | **755** | **47** | **334** | **69** | **2** | **44** | **53** | **339** | **2989** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 87 | 590 | 520 | 507 | 501 | 104 | 2309 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **87** | **590** | **520** | **507** | **501** | **104** | **2309** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringswood Ave | Final Base | 6 | 11 | 9 | 129 | 28 | 342 | 21 | 675 | 211 | 301 | 756 | 56 | 2545 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **11** | **9** | **129** | **28** | **342** | **21** | **675** | **211** | **301** | **756** | **56** | **2545** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 834 | 67 | 1319 | 2912 | 241 | 416 | 5789 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **834** | **67** | **1319** | **2912** | **241** | **416** | **5789** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 247 | 596 | 277 | 35 | 75 | 72 | 386 | 423 | 213 | 1160 | 2475 | 72 | 6031 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **247** | **596** | **277** | **35** | **75** | **72** | **386** | **423** | **213** | **1160** | **2475** | **72** | **6031** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 100 | 897 | 77 | 466 | 1351 | 48 | 47 | 15 | 48 | 17 | 6 | 153 | 3225 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **100** | **897** | **77** | **466** | **1351** | **48** | **47** | **15** | **48** | **17** | **6** | **153** | **3225** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 266 | 1221 | 1418 | 25 | 172 | 95 | 3197 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **266** | **1221** | **1418** | **25** | **172** | **95** | **3197** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1316 | 981 | 42 | 1163 | 237 | 138 | 3877 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1316** | **981** | **42** | **1163** | **237** | **138** | **3877** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 | 5051 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1863** | **423** | **40** | **1365** | **7** | **17** | **93** | **421** | **260** | **114** | **305** | **5051** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1387 | 1211 | 627 | 463 | 60 | 3813 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1387** | **1211** | **627** | **463** | **60** | **3813** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 | 2542 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **909** | **7** | **36** | **928** | **108** | **67** | **14** | **32** | **59** | **12** | **348** | **2542** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 37 | 783 | 7 | 4 | 878 | 168 | 280 | 6 | 64 | 1 | 2 | 6 | 2236 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **37** | **783** | **7** | **4** | **878** | **168** | **280** | **6** | **64** | **1** | **2** | **6** | **2236** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 7 | 686 | 148 | 52 | 914 | 0 | 20 | 103 | 11 | 141 | 96 | 93 | 2271 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **7** | **686** | **148** | **52** | **914** | **0** | **20** | **103** | **11** | **141** | **96** | **93** | **2271** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 27 | 300 | 153 | 374 | 136 | 448 | 132 | 462 | 170 | 344 | 329 | 20 | 2895 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **27** | **300** | **153** | **374** | **136** | **448** | **132** | **462** | **170** | **344** | **329** | **20** | **2895** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road and US 101 NB Ramps | Final Base | 1841 | 896 | 771 | 1256 | 4764 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1841** | **896** | **771** | **1256** | **4764** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 | 1121 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **453** | **10** | **76** | **221** | **45** | **37** | **41** | **21** | **22** | **51** | **131** | **1121** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 162 | 27 | 1389 | 10 | 30 | 7 | 8 | 500 | 296 | 2094 | 710 | 34 | 5267 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **162** | **27** | **1389** | **10** | **30** | **7** | **8** | **500** | **296** | **2094** | **710** | **34** | **5267** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | Left | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1360 | 623 | 1264 | 888 | 1143 | 415 | 5693 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1360** | **623** | **1264** | **888** | **1143** | **415** | **5693** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1787 | 738 | 1831 | 424 | 395 | 789 | 5964 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1787** | **738** | **1831** | **424** | **395** | **789** | **5964** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 276 | 283 | 1268 | 778 | 616 | 1963 | 5184 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **276** | **283** | **1268** | **778** | **616** | **1963** | **5184** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 442 | 93 | 1821 | 459 | 164 | 2217 | 5196 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **442** | **93** | **1821** | **459** | **164** | **2217** | **5196** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bayfront Expwy/Bldg 21 | Final Base | 66 | 51 | 1135 | 396 | 247 | 2441 | 4336 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **66** | **51** | **1135** | **396** | **247** | **2441** | **4336** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 646 | 270 | 74 | 384 | 210 | 257 | 1841 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **646** | **270** | **74** | **384** | **210** | **257** | **1841** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 48 | 989 | 234 | 86 | 2729 | 4086 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **989** | **234** | **86** | **2729** | **4086** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 274 | 347 | 196 | 766 | 312 | 423 | 80 | 10 | 116 | 42 | 24 | 84 | 2674 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **274** | **347** | **196** | **766** | **312** | **423** | **80** | **10** | **116** | **42** | **24** | **84** | **2674** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 176 | 332 | 115 | 192 | 314 | 305 | 39 | 34 | 190 | 0 | 255 | 25 | 1977 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **176** | **332** | **115** | **192** | **314** | **305** | **39** | **34** | **190** | **0** | **255** | **25** | **1977** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 33 | 72 | 149 | 336 | 738 | 110 | 1438 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **33** | **72** | **149** | **336** | **738** | **110** | **1438** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/Adams Drive | Final Base | 184 | 42 | 60 | 128 | 13 | 68 | 495 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **184** | **42** | **60** | **128** | **13** | **68** | **495** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1046 | 352 | 54 | 1362 | 280 | 25 | 3119 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1046** | **352** | **54** | **1362** | **280** | **25** | **3119** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 13 | 311 | 222 | 60 | 68 | 28 | 119 | 68 | 67 | 94 | 26 | 272 | 1348 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **311** | **222** | **60** | **68** | **28** | **119** | **68** | **67** | **94** | **26** | **272** | **1348** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 476 | 342 | 204 | 99 |
| 2 | 462 | 332 | 198 | 96 |
| 3 | 452 | 325 | 194 | 94 |
| 4 | 424 | 304 | 182 | 88 |
| 5 | 376 | 270 | 161 | 78 |
| 6 | 371 | 267 | 159 | 77 |
| 7 | 367 | 263 | 157 | 76 |
| 8 | 333 | 239 | 143 | 69 |
| 9 | 328 | 236 | 141 | 68 |
| 10 | 324 | 233 | 139 | 67 |
| 11 | 281 | 202 | 120 | 58 |
| 12 | 262 | 188 | 112 | 54 |
| 13 | 257 | 185 | 110 | 53 |
| 14 | 190 | 137 | 82 | 40 |
| 15 | 190 | 137 | 82 | 40 |
| 16 | 133 | 96 | 57 | 28 |
| 17 | 76 | 55 | 33 | 16 |
| 18 | 76 | 55 | 33 | 16 |
| 19 | 43 | 31 | 18 | 9 |
| 20 | 24 | 17 | 10 | 5 |
| 21 | 14 | 10 | 6 | 3 |
| 22 | 5 | 3 | 2 | 1 |
| 23 | 5 | 3 | 2 | 1 |
| 24 | 5 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 818 | 1 | 204 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 794 | 1 | 198 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 777 | 1 | 194 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 728 | 1 | 182 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 646 | 1 | 161 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 6 | 1 | 638 | 1 | 159 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 7 | 1 | 630 | 1 | 157 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 8 | 1 | 572 | 1 | 143 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 9 | 1 | 564 | 1 | 141 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 10 | 1 | 557 | 1 | 139 | No | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 11 | 1 | 483 | 1 | 120 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 12 | 1 | 450 | 1 | 112 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 13 | 1 | 442 | 1 | 110 | No | No | Yes | Yes | No | No | No | Yes | No | No |
| 14 | 1 | 327 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 327 | 1 | 82 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 229 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 131 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 131 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 74 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 41 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 24 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 8 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 7 | 11 | 13 | 13 | 3 | 7 | 10 | 13 | 4 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 14.4 | 12.9 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:48 | 0:21 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 204 | 99 |
| High Minor Volume Condition Met | Yes | No |
| Total Entering Volume on All Approaches During Same Hour | 1121 | 1121 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 458 | 916 | 467 |
| 2 | 444 | 889 | 453 |
| 3 | 435 | 870 | 444 |
| 4 | 408 | 815 | 416 |
| 5 | 362 | 724 | 369 |
| 6 | 357 | 714 | 364 |
| 7 | 353 | 705 | 360 |
| 8 | 321 | 641 | 327 |
| 9 | 316 | 632 | 322 |
| 10 | 311 | 623 | 318 |
| 11 | 270 | 540 | 276 |
| 12 | 252 | 504 | 257 |
| 13 | 247 | 495 | 252 |
| 14 | 183 | 366 | 187 |
| 15 | 183 | 366 | 187 |
| 16 | 128 | 256 | 131 |
| 17 | 73 | 147 | 75 |
| 18 | 73 | 147 | 75 |
| 19 | 41 | 82 | 42 |
| 20 | 23 | 46 | 23 |
| 21 | 14 | 27 | 14 |
| 22 | 5 | 9 | 5 |
| 23 | 5 | 9 | 5 |
| 24 | 5 | 9 | 5 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1374 | 1 | 467 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1333 | 1 | 453 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1305 | 1 | 444 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1223 | 1 | 416 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 1086 | 1 | 369 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 6 | 1 | 1071 | 1 | 364 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 7 | 1 | 1058 | 1 | 360 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 8 | 1 | 962 | 1 | 327 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 9 | 1 | 948 | 1 | 322 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 10 | 1 | 934 | 1 | 318 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 11 | 1 | 810 | 1 | 276 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 756 | 1 | 257 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 13 | 1 | 742 | 1 | 252 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 14 | 1 | 549 | 1 | 187 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 15 | 1 | 549 | 1 | 187 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 16 | 1 | 384 | 1 | 131 | No | No | Yes | Yes | No | No | No | No | No | No |
| 17 | 1 | 220 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 220 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 123 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 69 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 41 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 15 | 15 | 16 | 16 | 12 | 13 | 15 | 15 | 13 | 10 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 65.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 8:31 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 467 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1841 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 848 | 485 | 105 |
| 2 | 823 | 470 | 102 |
| 3 | 806 | 461 | 100 |
| 4 | 755 | 432 | 93 |
| 5 | 670 | 383 | 83 |
| 6 | 661 | 378 | 82 |
| 7 | 653 | 373 | 81 |
| 8 | 594 | 340 | 74 |
| 9 | 585 | 335 | 72 |
| 10 | 577 | 330 | 71 |
| 11 | 500 | 286 | 62 |
| 12 | 466 | 267 | 58 |
| 13 | 458 | 262 | 57 |
| 14 | 339 | 194 | 42 |
| 15 | 339 | 194 | 42 |
| 16 | 237 | 136 | 29 |
| 17 | 136 | 78 | 17 |
| 18 | 136 | 78 | 17 |
| 19 | 76 | 44 | 9 |
| 20 | 42 | 24 | 5 |
| 21 | 25 | 15 | 3 |
| 22 | 8 | 5 | 1 |
| 23 | 8 | 5 | 1 |
| 24 | 8 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1333 | 1 | 105 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1293 | 1 | 102 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1267 | 1 | 100 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1187 | 1 | 93 | No | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 1053 | 1 | 83 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 6 | 1 | 1039 | 1 | 82 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 7 | 1 | 1026 | 1 | 81 | No | No | No | No | Yes | Yes | Yes | Yes | No | No |
| 8 | 1 | 934 | 1 | 74 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 9 | 1 | 920 | 1 | 72 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 10 | 1 | 907 | 1 | 71 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 11 | 1 | 786 | 1 | 62 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 733 | 1 | 58 | No | No | No | No | No | No | Yes | Yes | No | No |
| 13 | 1 | 720 | 1 | 57 | No | No | No | No | No | No | Yes | Yes | No | No |
| 14 | 1 | 533 | 1 | 42 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 533 | 1 | 42 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 373 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 214 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 214 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 120 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 66 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 40 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 1 | 4 | 7 | 11 | 13 | 15 | 4 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 241.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 7:03 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 105 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1438 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 226 | 188 | 81 |
| 2 | 219 | 182 | 79 |
| 3 | 215 | 179 | 77 |
| 4 | 201 | 167 | 72 |
| 5 | 179 | 149 | 64 |
| 6 | 176 | 147 | 63 |
| 7 | 174 | 145 | 62 |
| 8 | 158 | 132 | 57 |
| 9 | 156 | 130 | 56 |
| 10 | 154 | 128 | 55 |
| 11 | 133 | 111 | 48 |
| 12 | 124 | 103 | 45 |
| 13 | 122 | 102 | 44 |
| 14 | 90 | 75 | 32 |
| 15 | 90 | 75 | 32 |
| 16 | 63 | 53 | 23 |
| 17 | 36 | 30 | 13 |
| 18 | 36 | 30 | 13 |
| 19 | 20 | 17 | 7 |
| 20 | 11 | 9 | 4 |
| 21 | 7 | 6 | 2 |
| 22 | 2 | 2 | 1 |
| 23 | 2 | 2 | 1 |
| 24 | 2 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 414 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 401 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 394 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 368 | 1 | 72 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 328 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 323 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 319 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 290 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 286 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 282 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 244 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 227 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 224 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 165 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 165 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 116 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 66 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 66 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 37 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 20 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

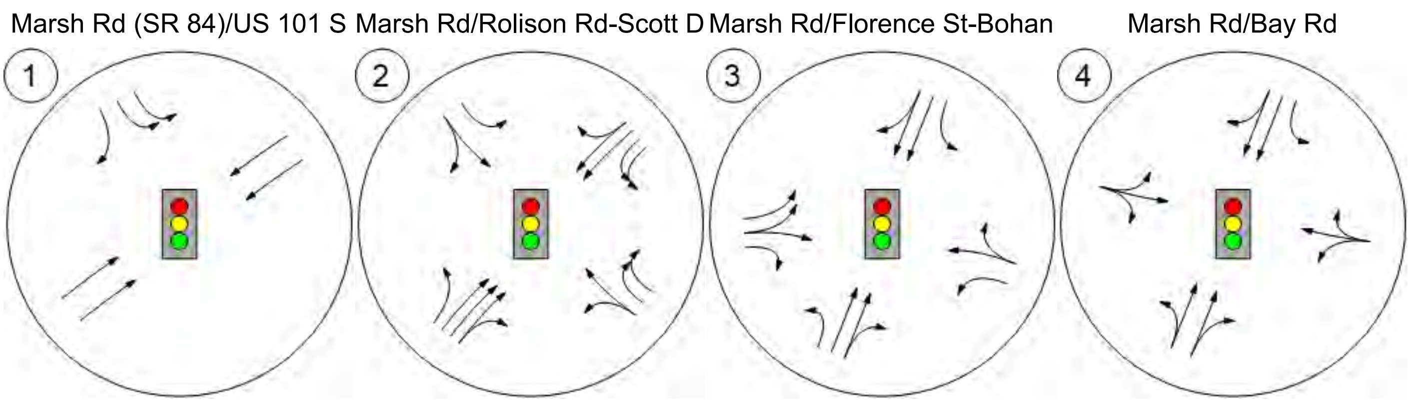
| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:15 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 81 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 495 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

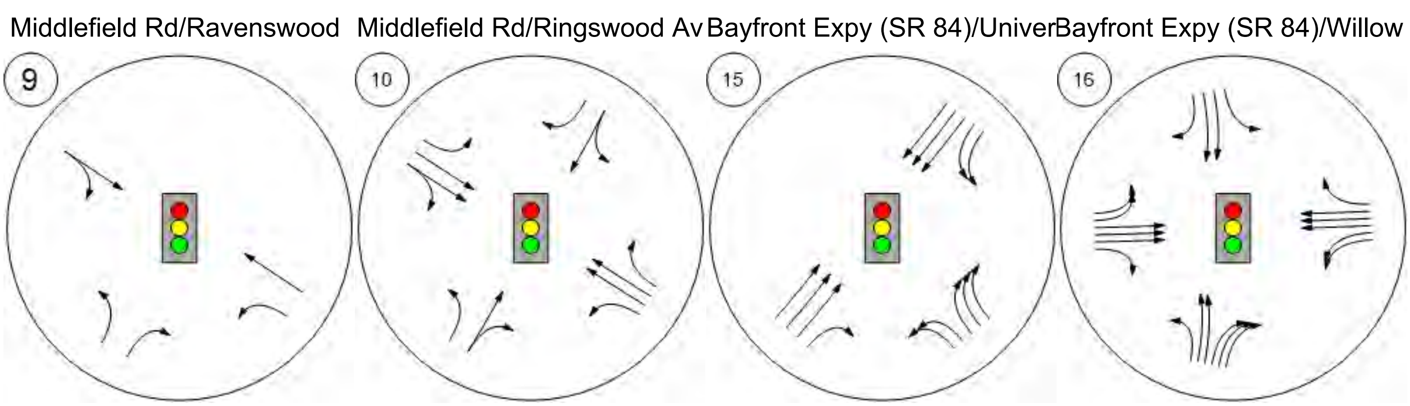
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Study Intersections

## Lane Configuration and Traffic Control

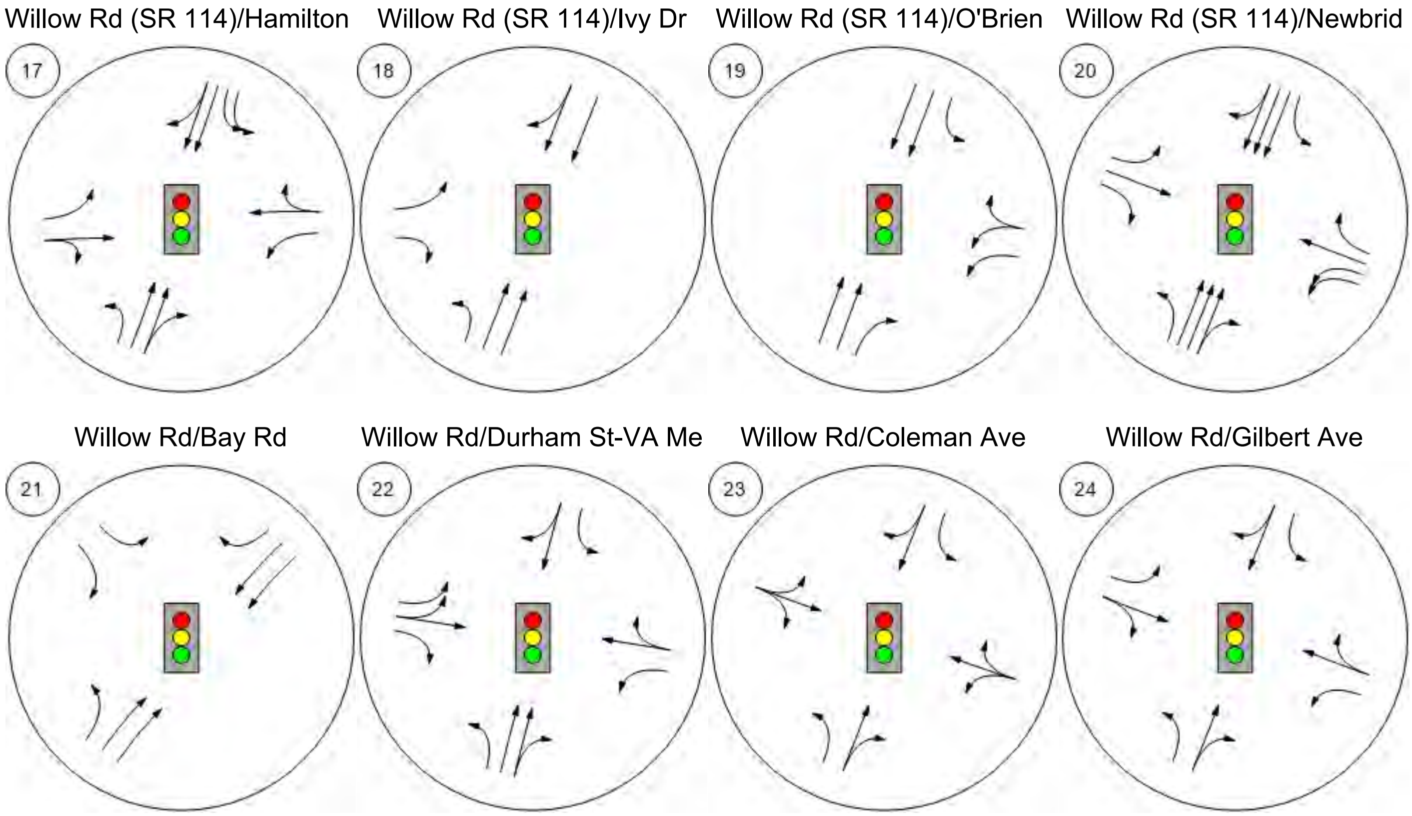


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

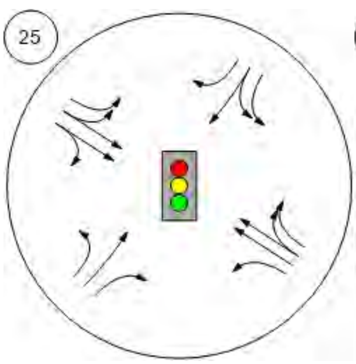



Generated with PTV VISTRO

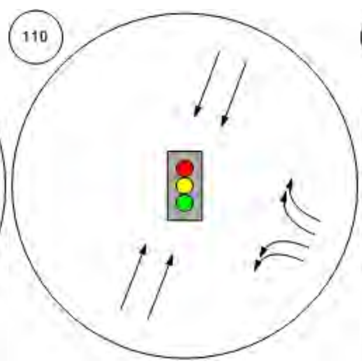
Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control

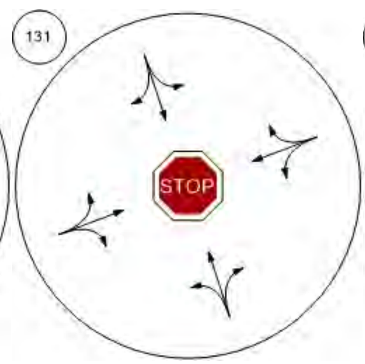

Middlefield Rd-Willow Rd



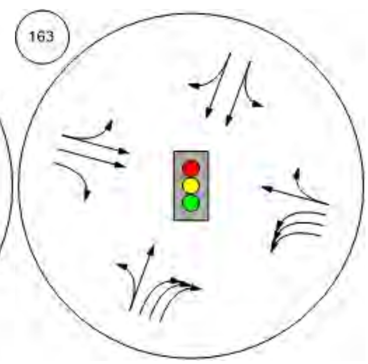

Marsh Road and US 101 NB



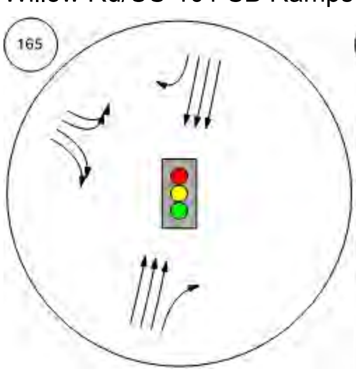

Chilco Street/Hamilton Avenu



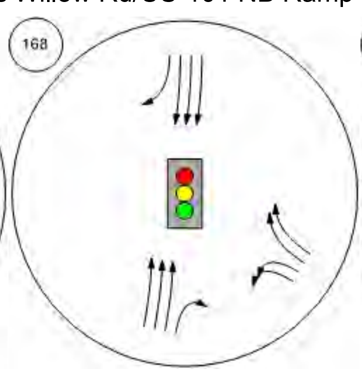

Bayfront Expy/Marsh Rd



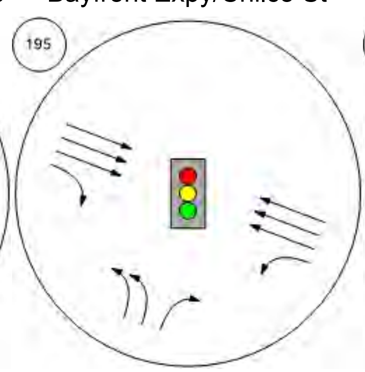

Willow Rd/US-101 SB Ramps



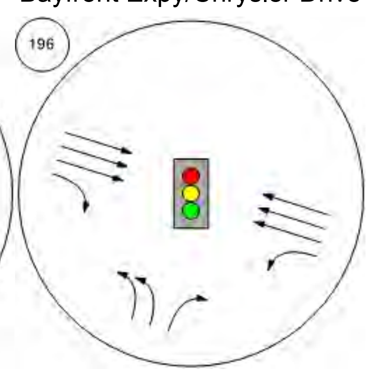

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

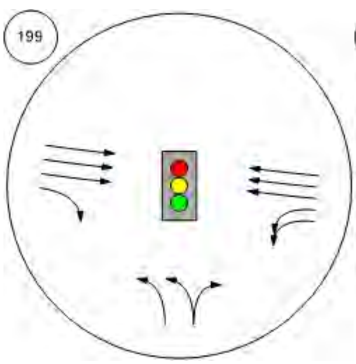


Generated with PTV VISTRO

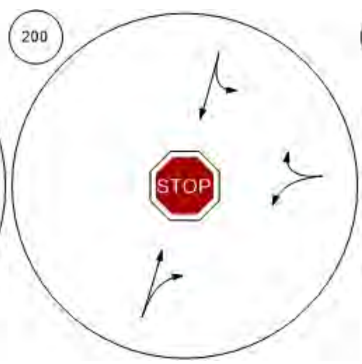
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

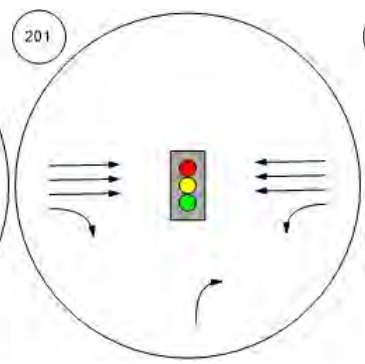

Bayfront Expwy/Bldg 21



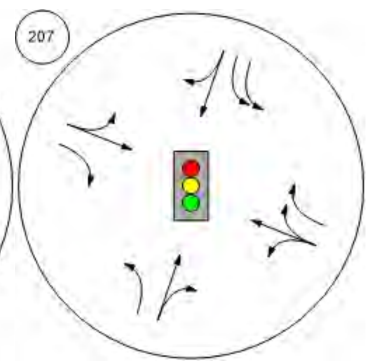

O'Brien Drive/Kavanaugh Dri



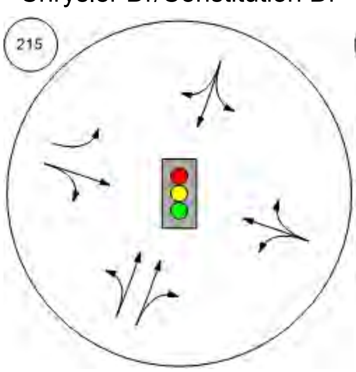

Bayfront Expwy/Bldg 20



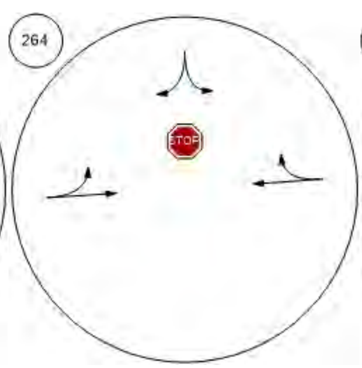

Chilco St/Constitution Dr



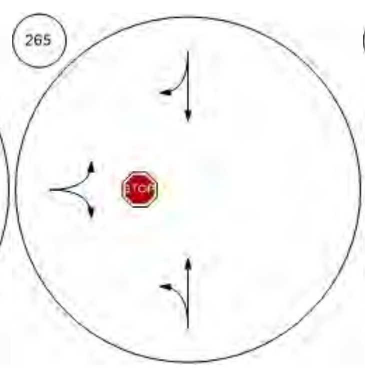

Chrysler Dr/Constitution Dr



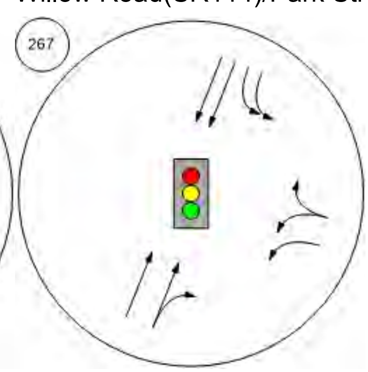

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

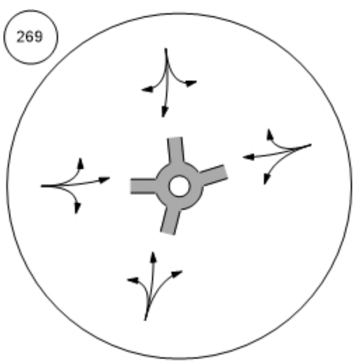


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control


O'Brien Drive/Loop Road

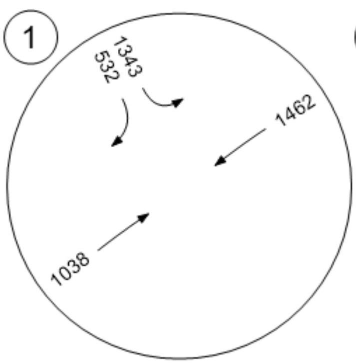


Generated with PTV VISTRO

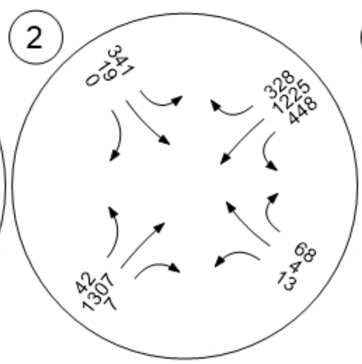
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

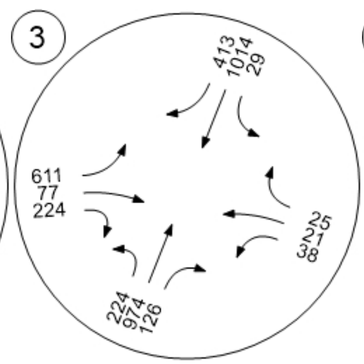

Marsh Rd (SR 84)/US 101 S



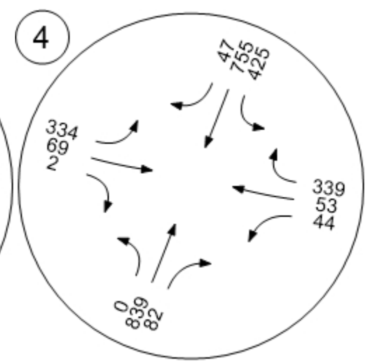

Marsh Rd/Rolison Rd-Scott D



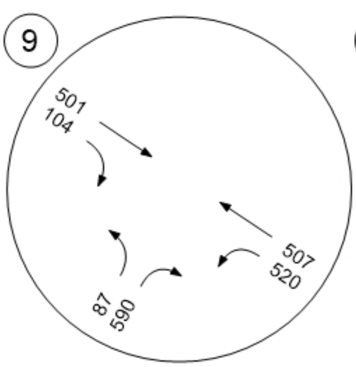

Marsh Rd/Florence St-Bohan



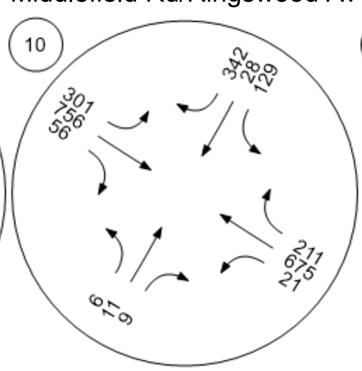

Marsh Rd/Bay Rd



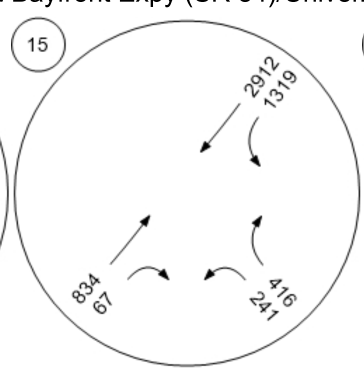

Middlefield Rd/Ravenswood



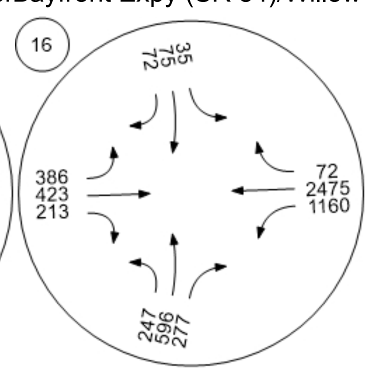

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

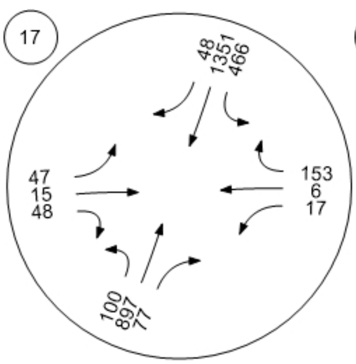


Generated with PTV VISTRO

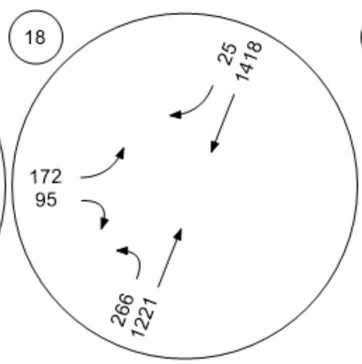
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

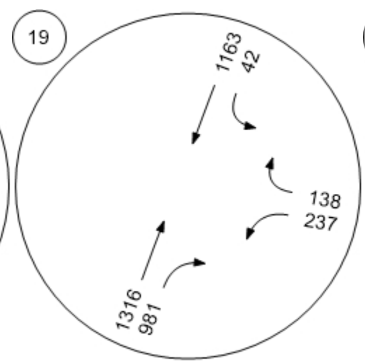

Willow Rd (SR 114)/Hamilton



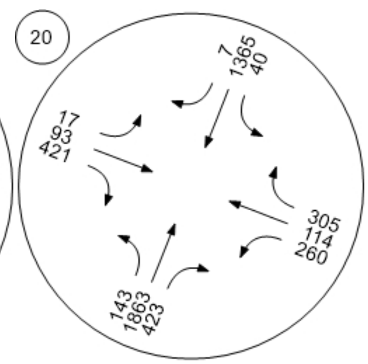

Willow Rd (SR 114)/Ivy Dr



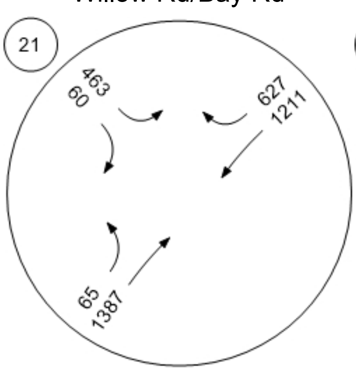

Willow Rd (SR 114)/O'Brien



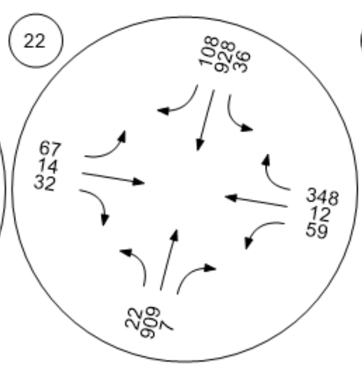

Willow Rd (SR 114)/Newbrid



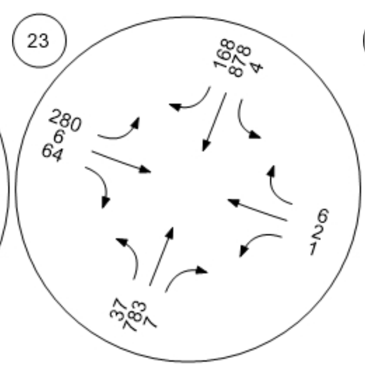

Willow Rd/Bay Rd



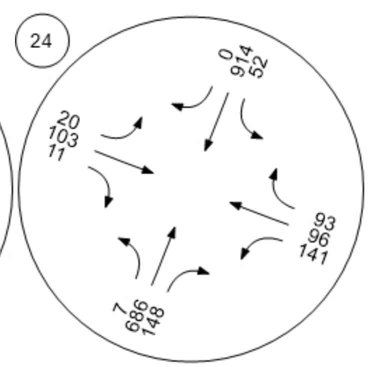

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-4)

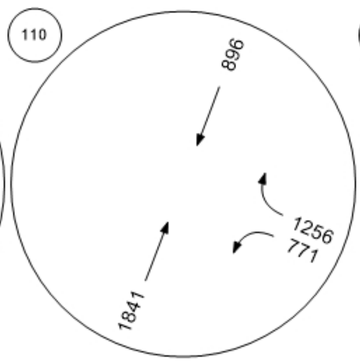
## Traffic Volume - Base Volume


Middlefield Rd-Willow Rd

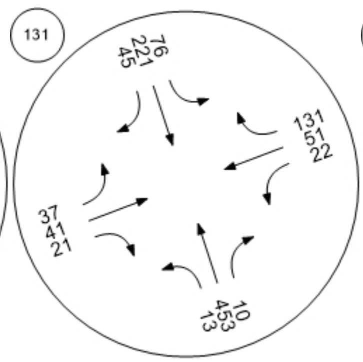
25

344
329
20
448
136
374
170
462
132
27
300
153

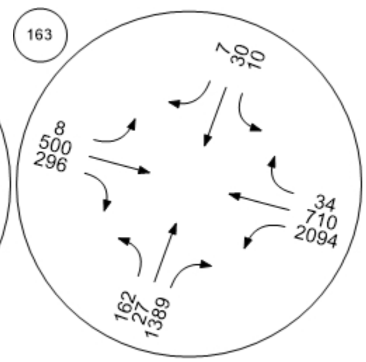
Marsh Road and US 101 NB



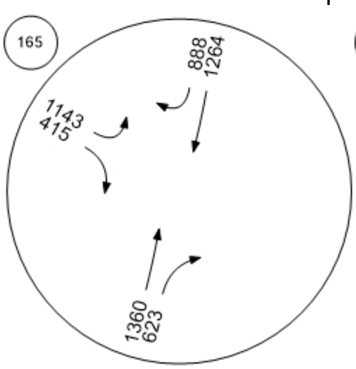

Chilco Street/Hamilton Avenu



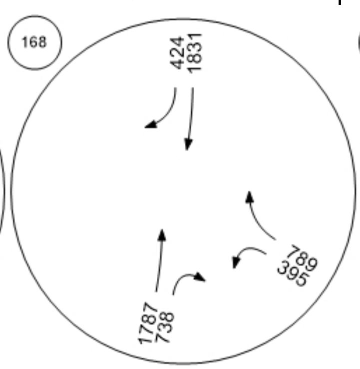

Bayfront Expy/Marsh Rd



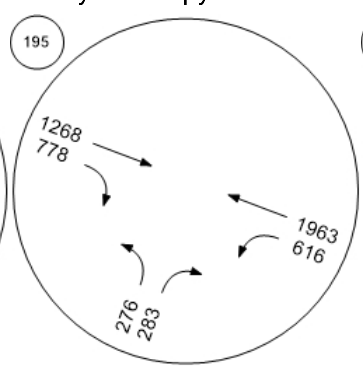

Willow Rd/US-101 SB Ramps



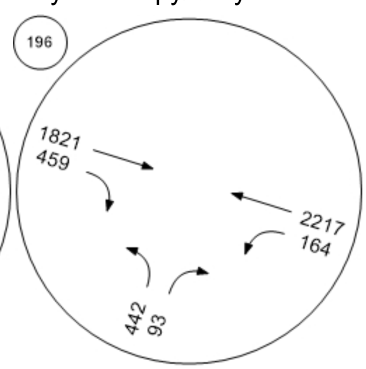

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

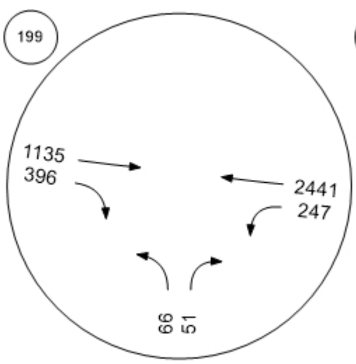


Generated with PTV VISTRO

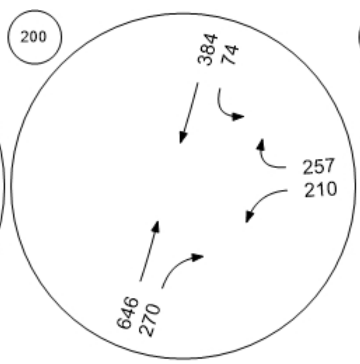
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

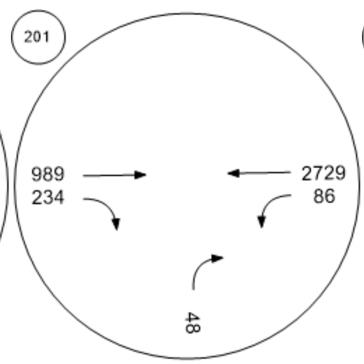

Bayfront Expwy/Bldg 21



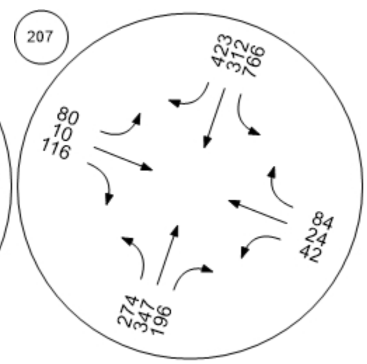

O'Brien Drive/Kavanaugh Dri



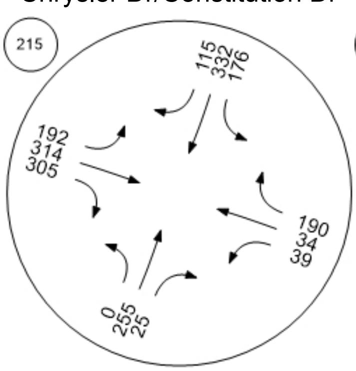

Bayfront Expwy/Bldg 20



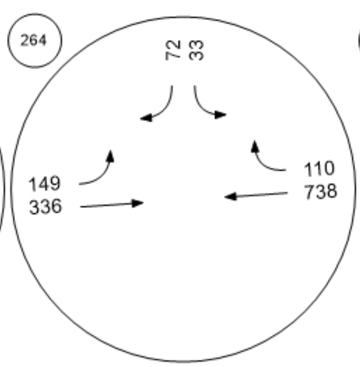

Chilco St/Constitution Dr



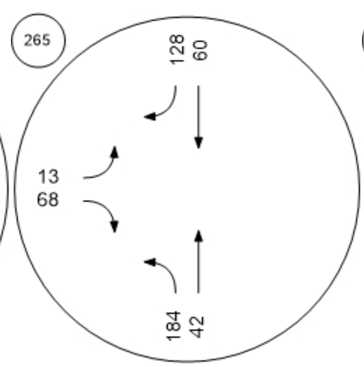

Chrysler Dr/Constitution Dr



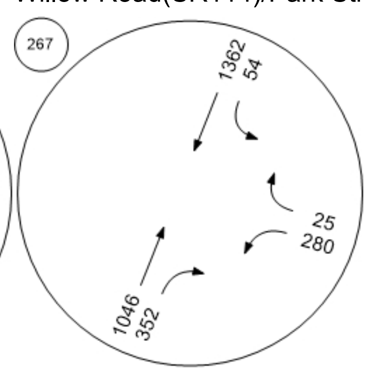

Adams Drive/O'Brien Drive




Adam Court/Adams Drive

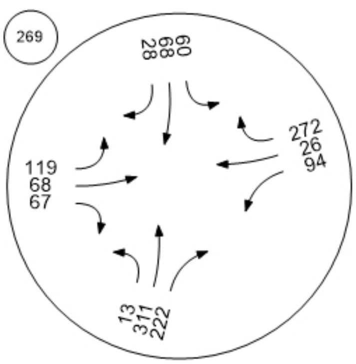



Willow Road(SR114)/Park Str

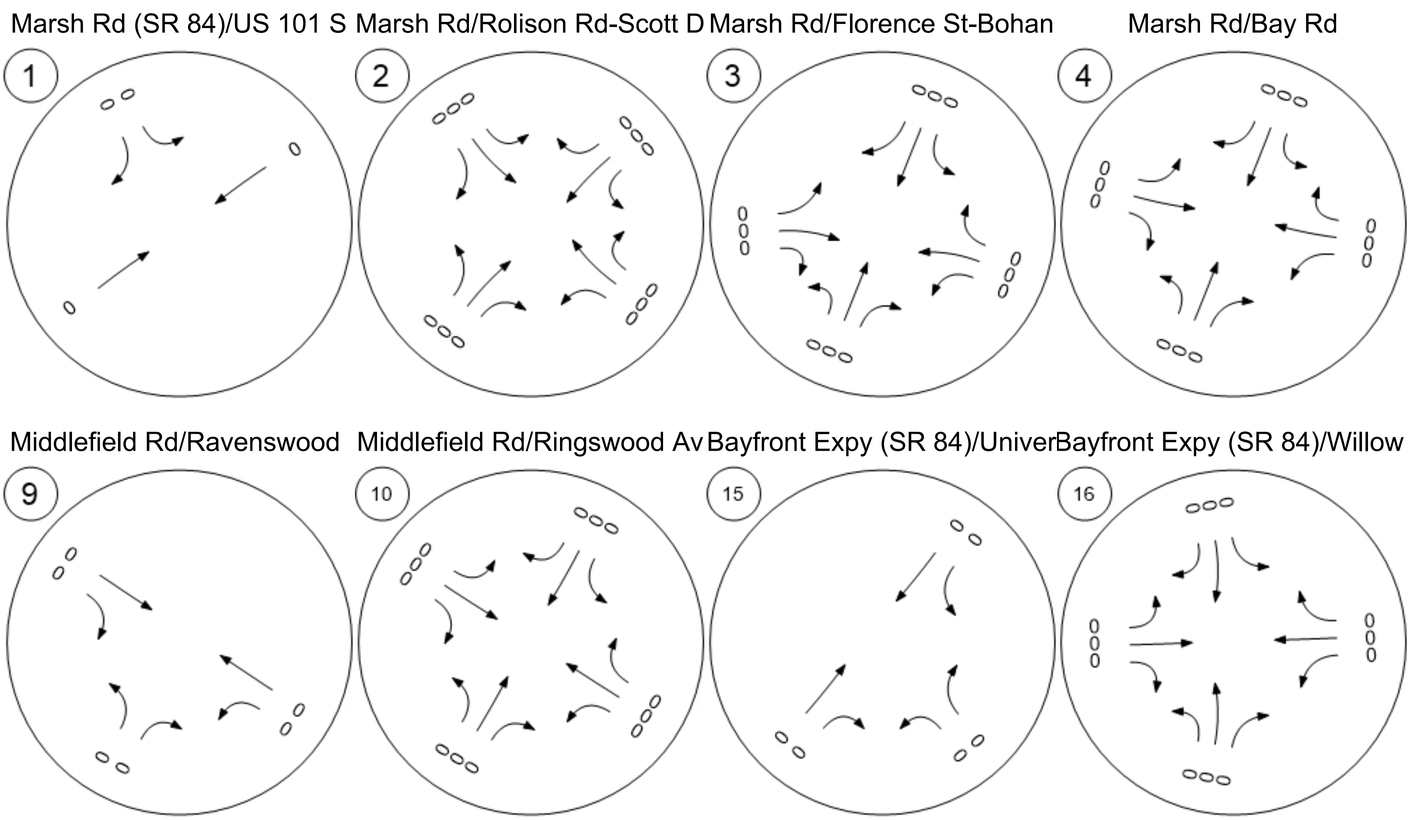


Traffic Volume - Base Volume


O'Brien Drive/Loop Road



Traffic Volume - In-Process Volume

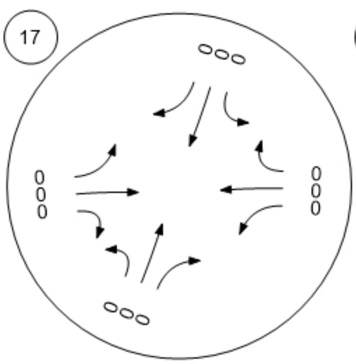



Generated with PTV VISTRO

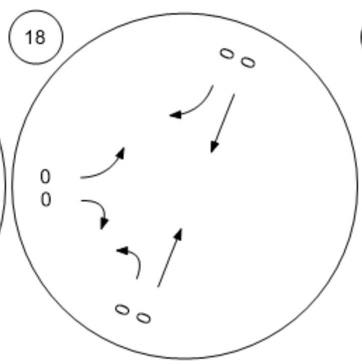
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

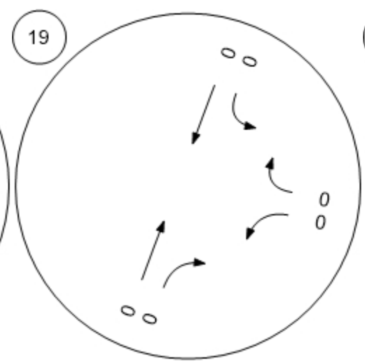

Willow Rd (SR 114)/Hamilton



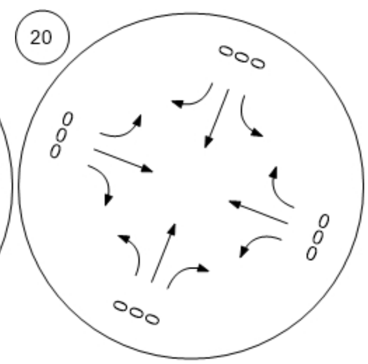

Willow Rd (SR 114)/Ivy Dr



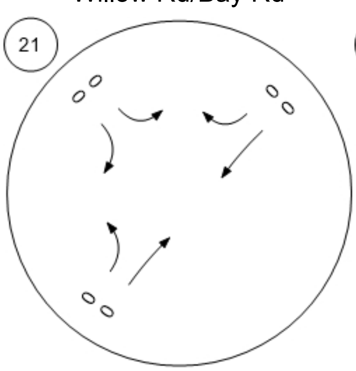

Willow Rd (SR 114)/O'Brien



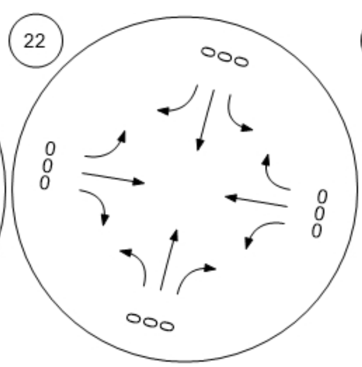

Willow Rd (SR 114)/Newbrid



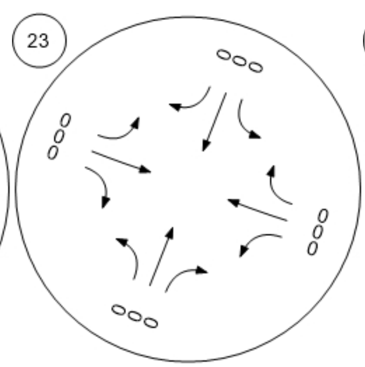

Willow Rd/Bay Rd



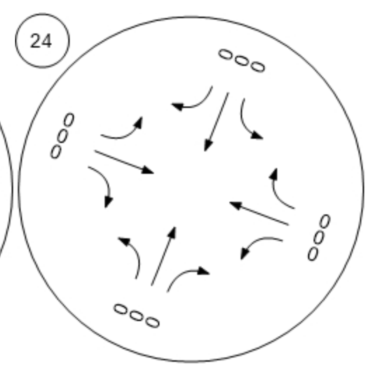

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

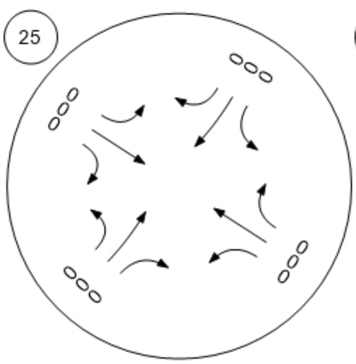


Generated with PTV VISTRO

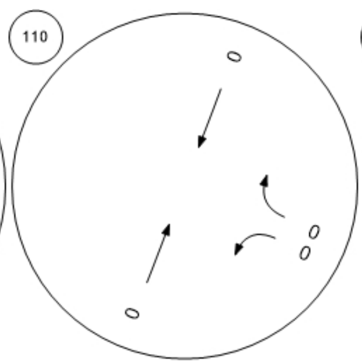
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

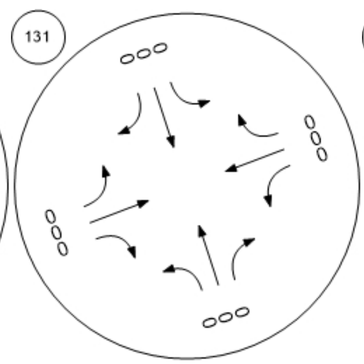

Middlefield Rd-Willow Rd



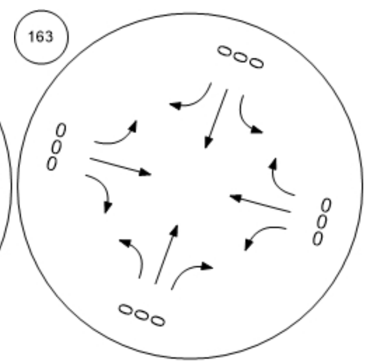

Marsh Road and US 101 NB



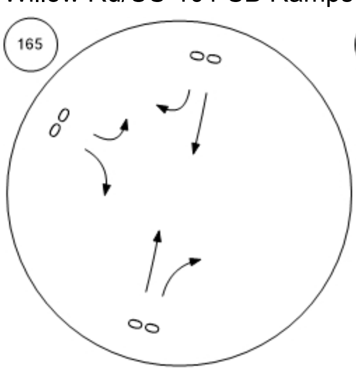

Chilco Street/Hamilton Avenu



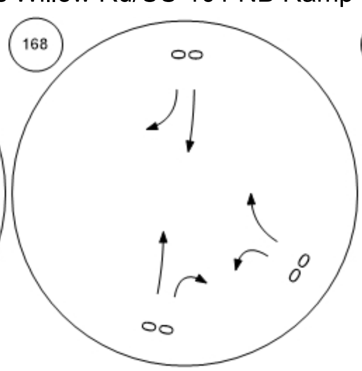

Bayfront Expy/Marsh Rd



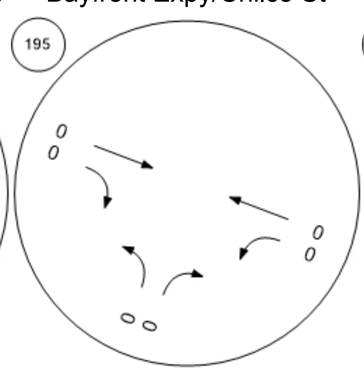

Willow Rd/US-101 SB Ramps



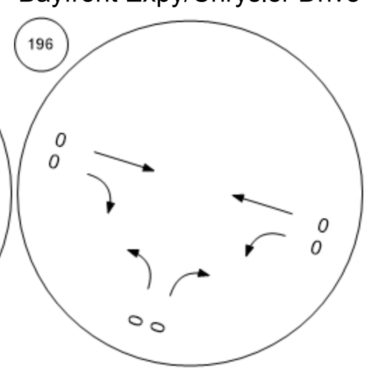

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

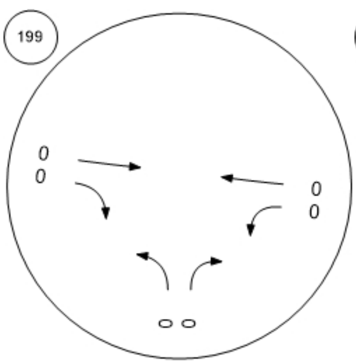


Generated with PTV VISTRO

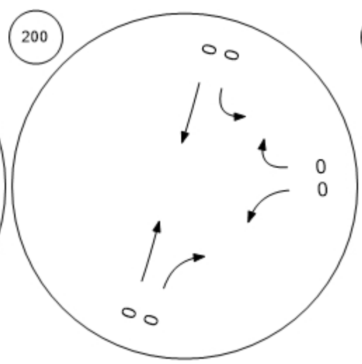
Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

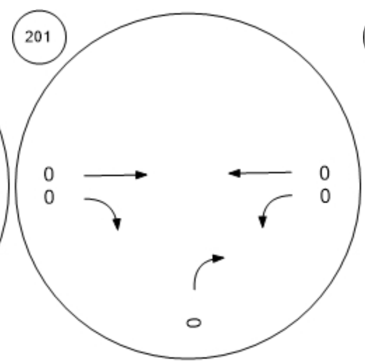

Bayfront Expwy/Bldg 21



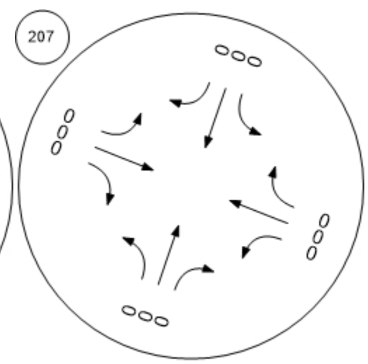

O'Brien Drive/Kavanaugh Dri



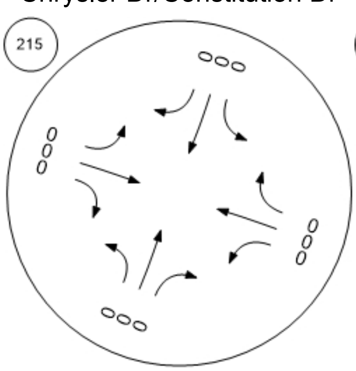

Bayfront Expwy/Bldg 20



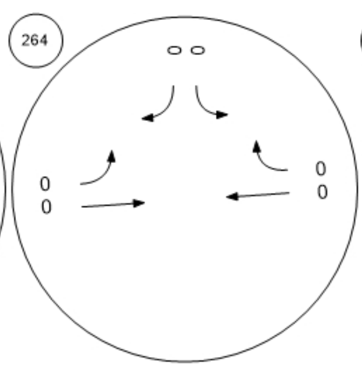

Chilco St/Constitution Dr



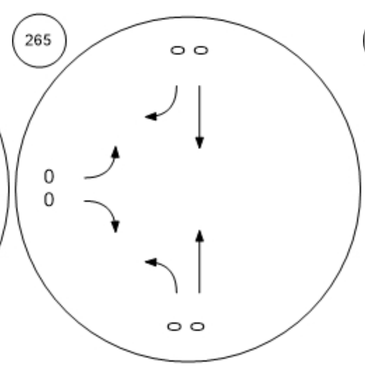

Chrysler Dr/Constitution Dr



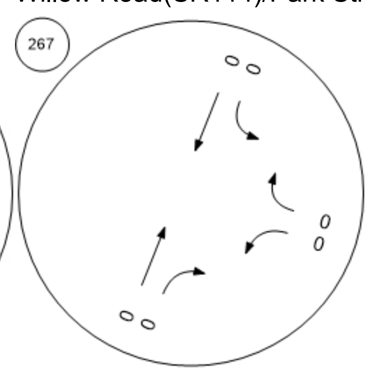

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

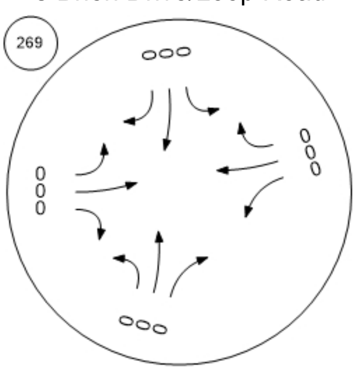


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume


O'Brien Drive/Loop Road



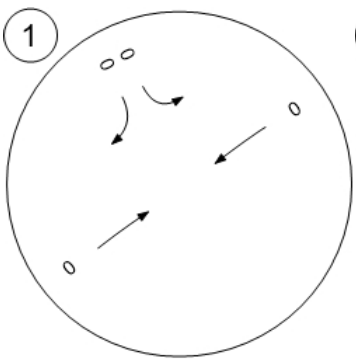
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

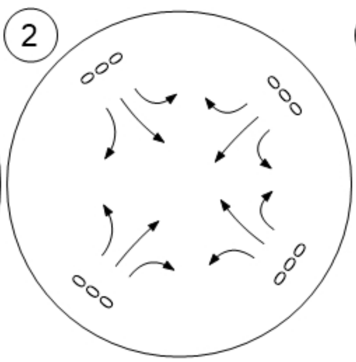

Marsh Rd (SR 84)/US 101 S

1



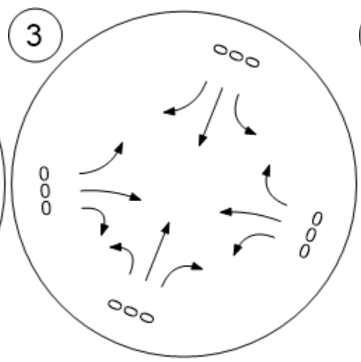
Marsh Rd/Rolison Rd-Scott D

2



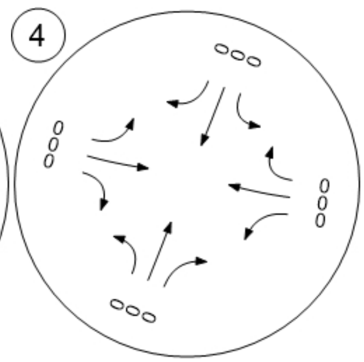
Marsh Rd/Florence St-Bohan

3



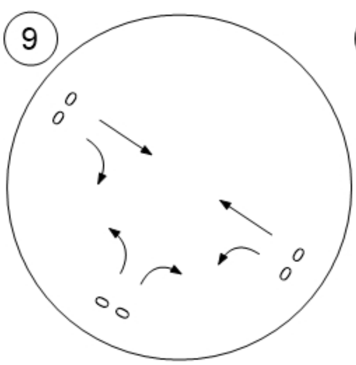
Marsh Rd/Bay Rd

4



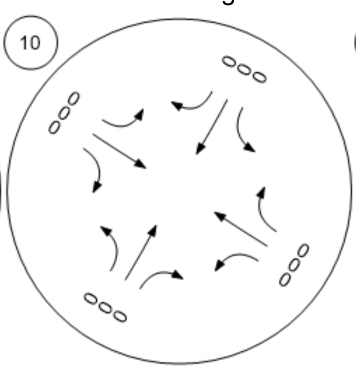
Middlefield Rd/Ravenswood

9



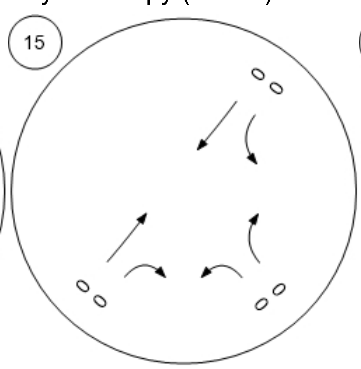
Middlefield Rd/Ringswood Av

10



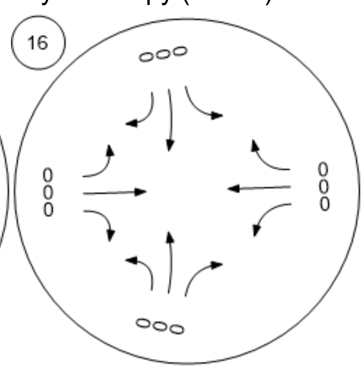
Bayfront Expy (SR 84)/Univer

15



Bayfront Expy (SR 84)/Willow

16

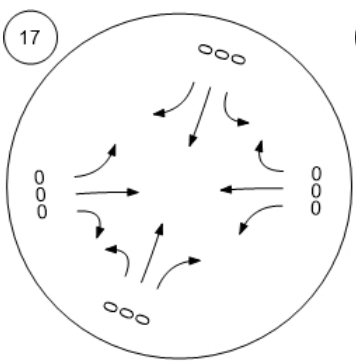


Generated with PTV VISTRO

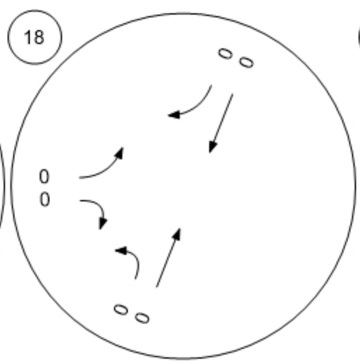
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

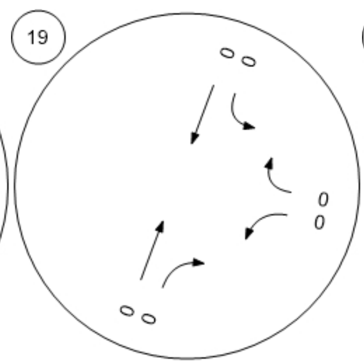

Willow Rd (SR 114)/Hamilton



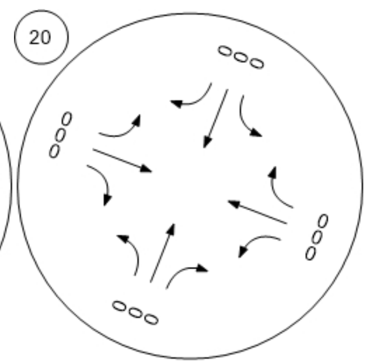

Willow Rd (SR 114)/Ivy Dr



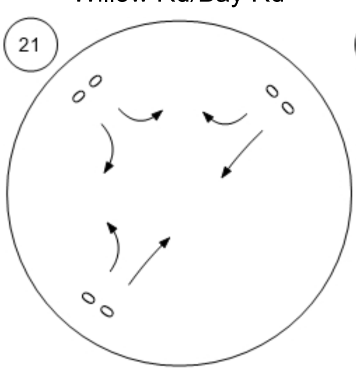

Willow Rd (SR 114)/O'Brien



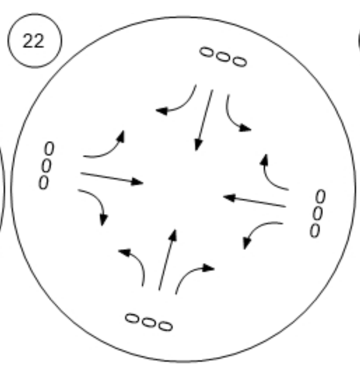

Willow Rd (SR 114)/Newbrid



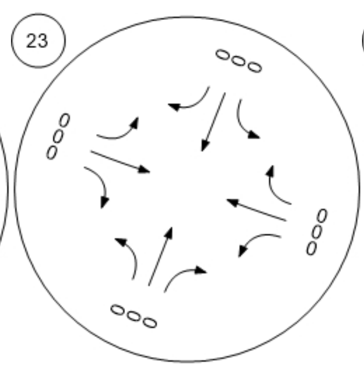

Willow Rd/Bay Rd



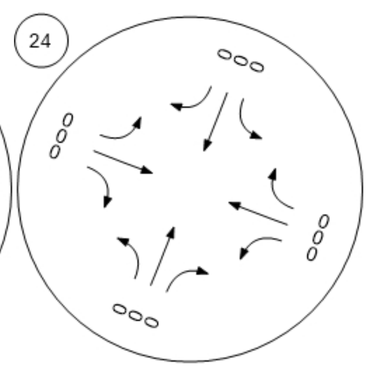

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

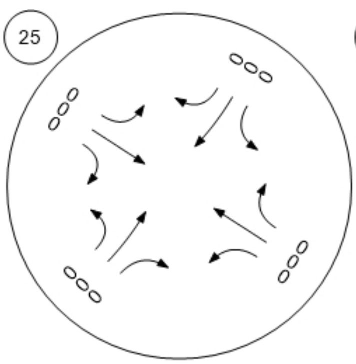


Generated with PTV VISTRO

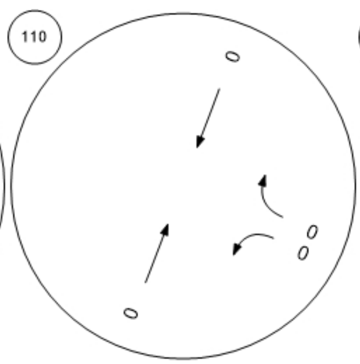
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

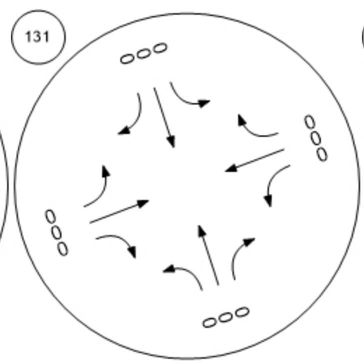

Middlefield Rd-Willow Rd



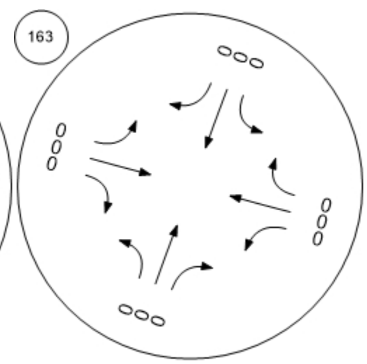

Marsh Road and US 101 NB



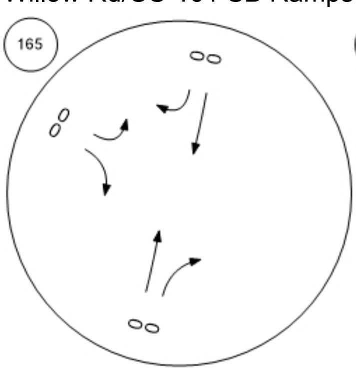

Chilco Street/Hamilton Avenu



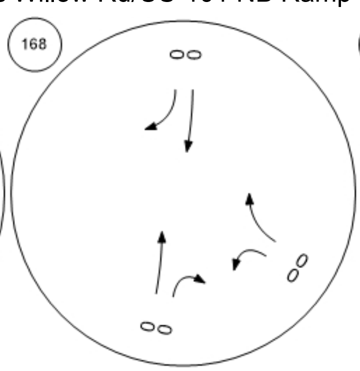

Bayfront Expy/Marsh Rd



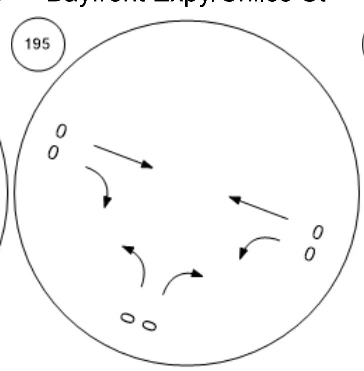

Willow Rd/US-101 SB Ramps



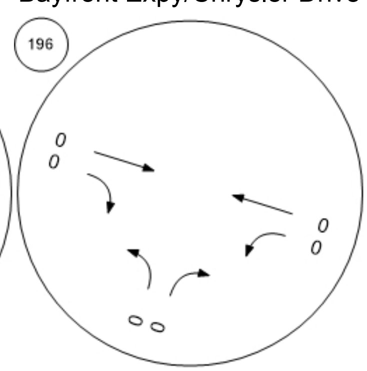

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

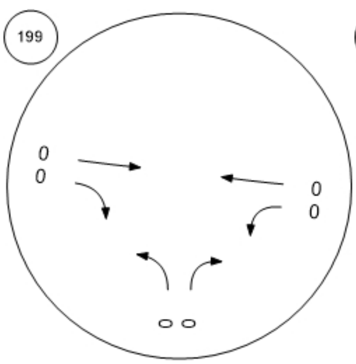


Generated with PTV VISTRO

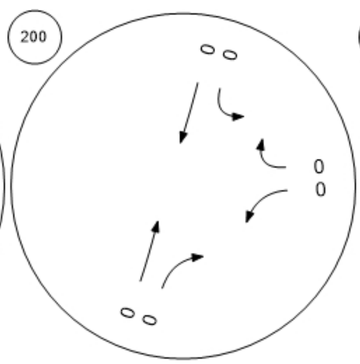
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

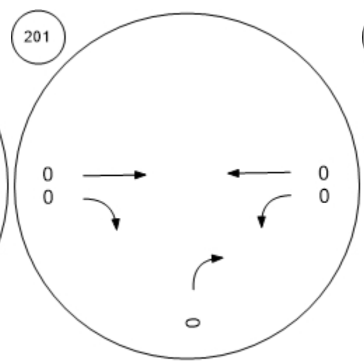

Bayfront Expwy/Bldg 21



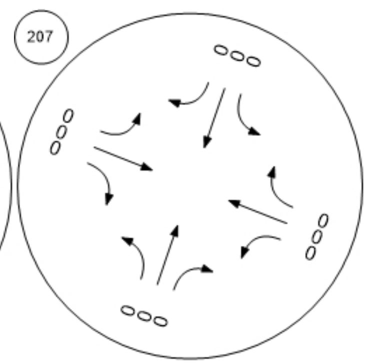

O'Brien Drive/Kavanaugh Dri



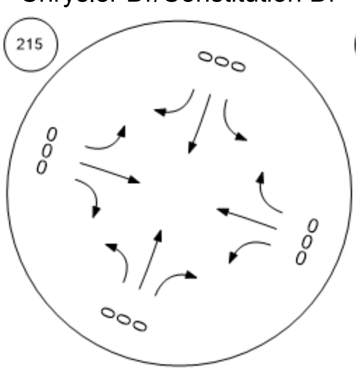

Bayfront Expwy/Bldg 20



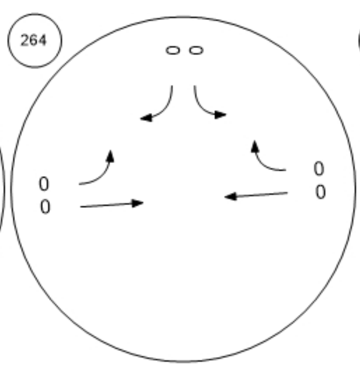

Chilco St/Constitution Dr



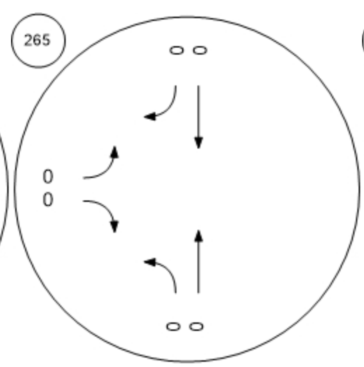

Chrysler Dr/Constitution Dr



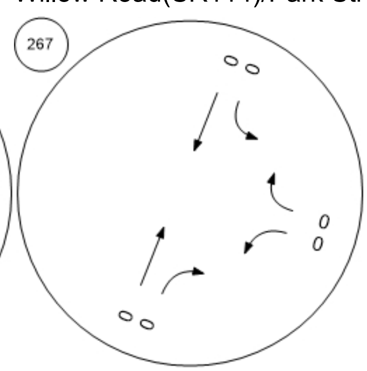

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

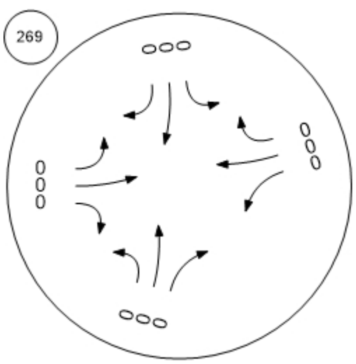


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

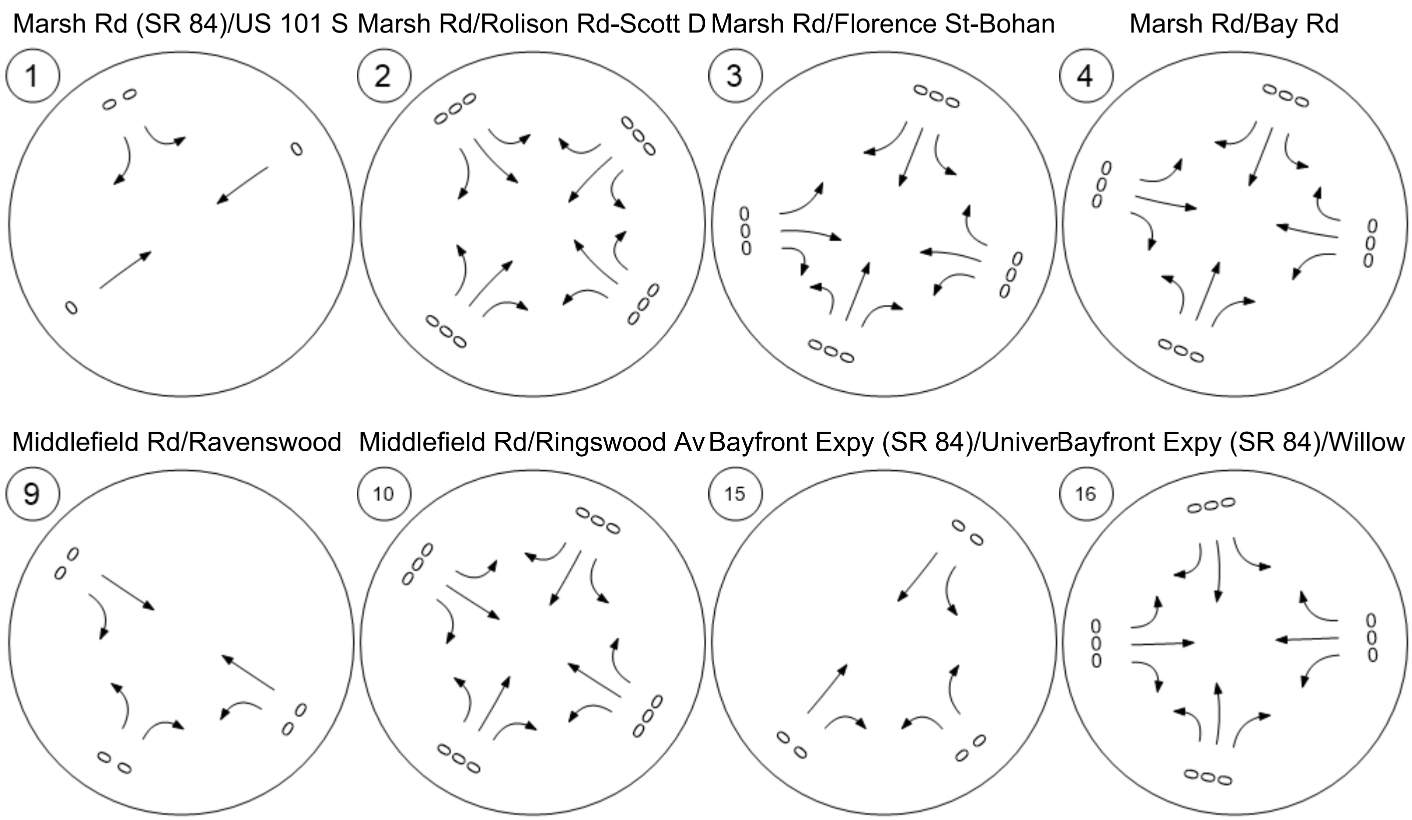

O'Brien Drive/Loop Road



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

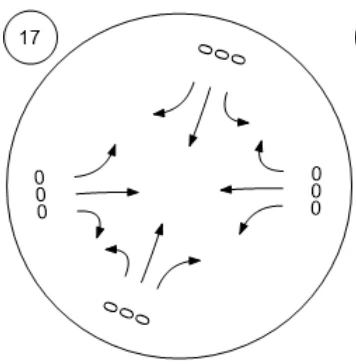



Generated with PTV VISTRO

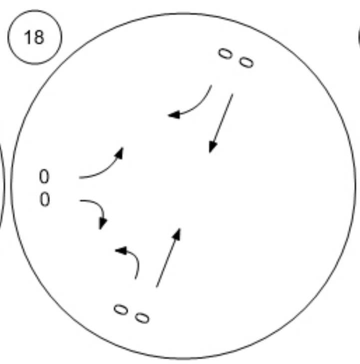
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

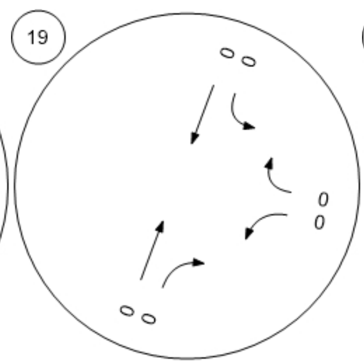

Willow Rd (SR 114)/Hamilton



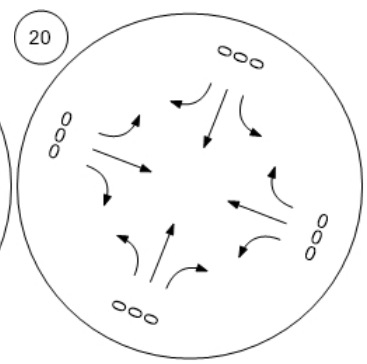

Willow Rd (SR 114)/Ivy Dr



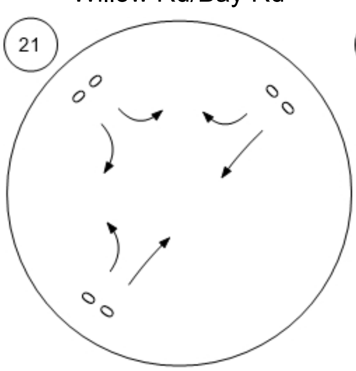

Willow Rd (SR 114)/O'Brien



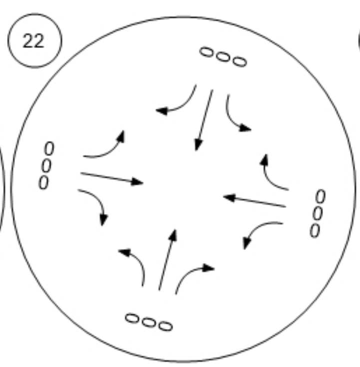

Willow Rd (SR 114)/Newbrid



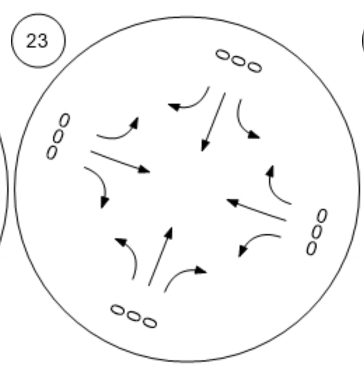

Willow Rd/Bay Rd



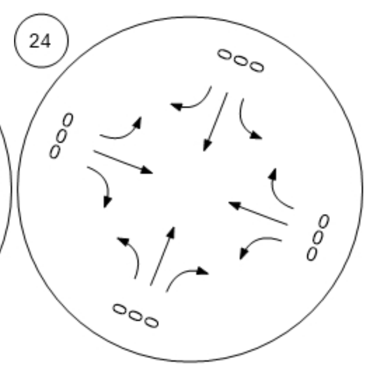

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



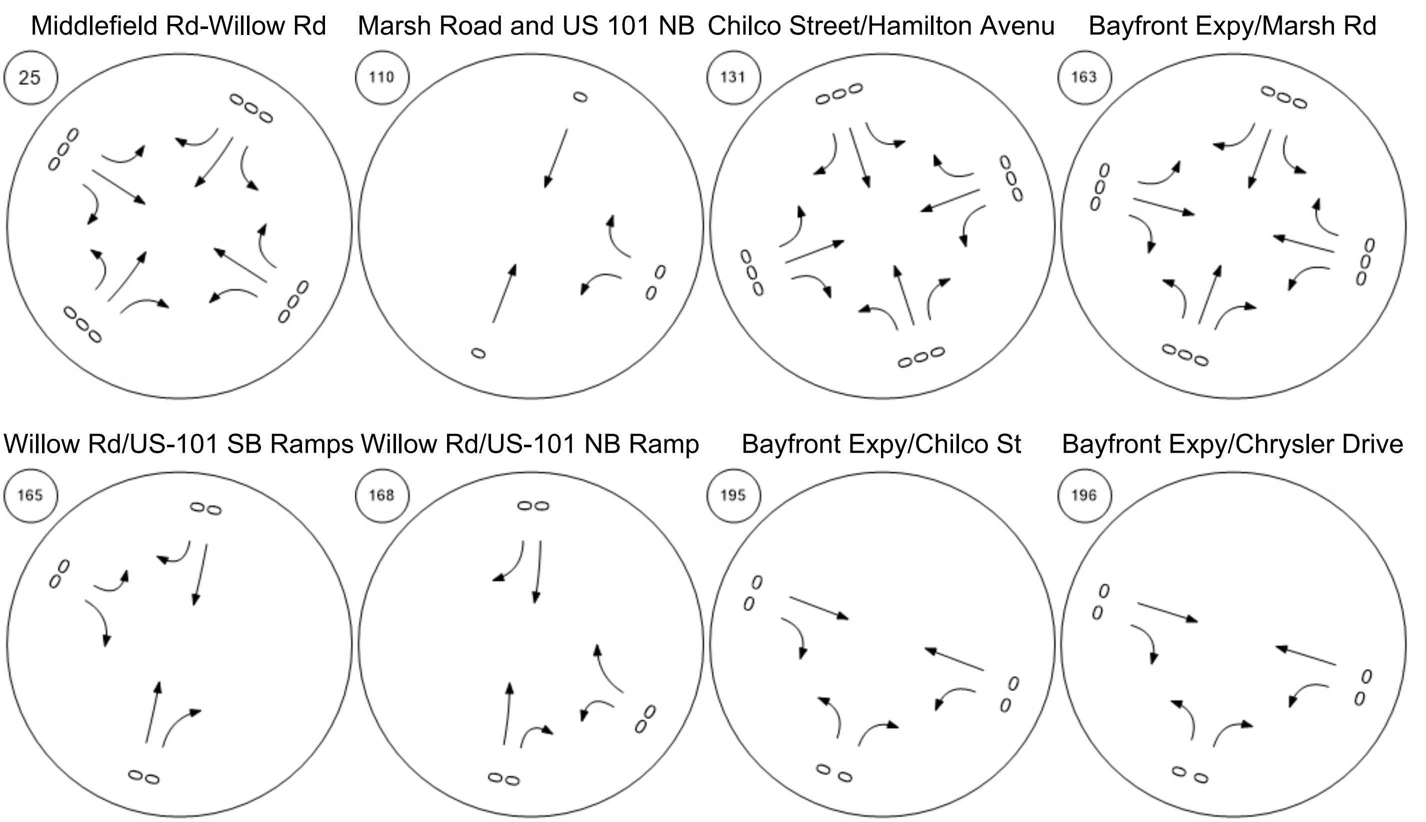

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

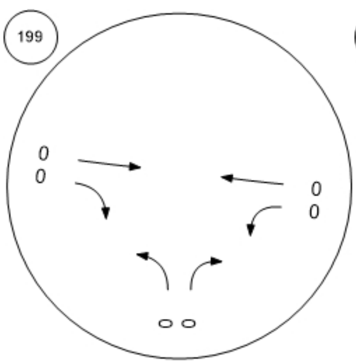



Generated with PTV VISTRO

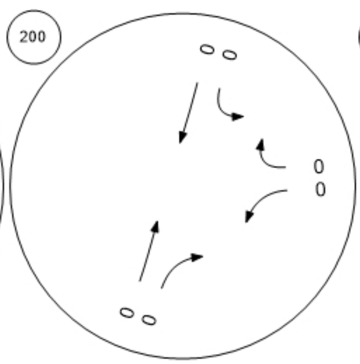
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

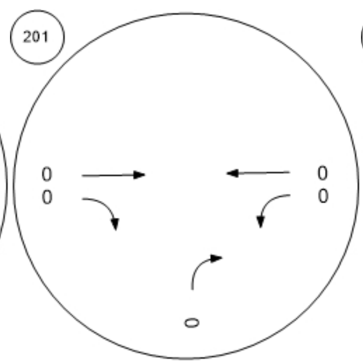

Bayfront Expwy/Bldg 21



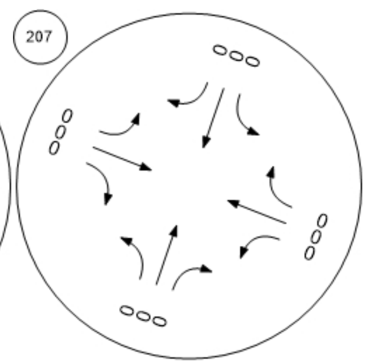

O'Brien Drive/Kavanaugh Dri



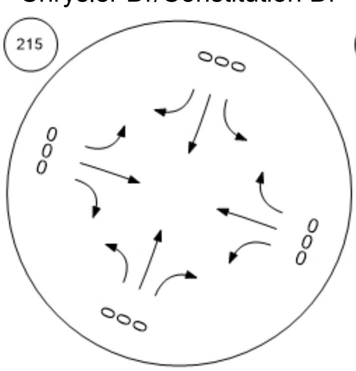

Bayfront Expwy/Bldg 20



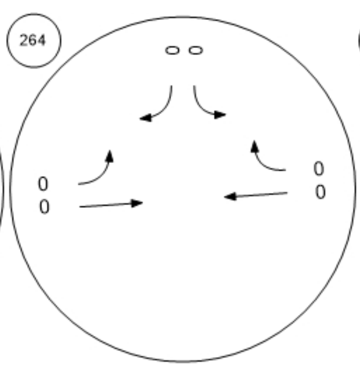

Chilco St/Constitution Dr



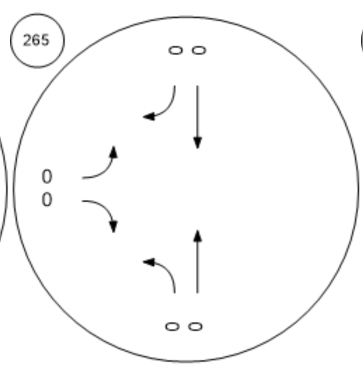

Chrysler Dr/Constitution Dr



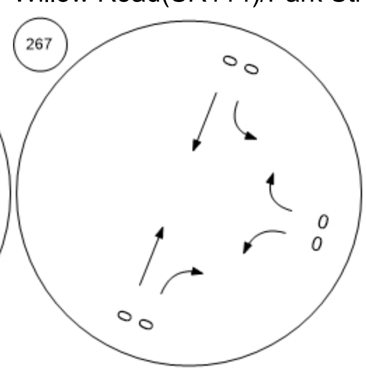

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

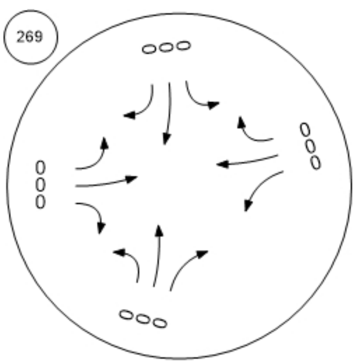


Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Volume - Other Volume


### O'Brien Drive/Loop Road

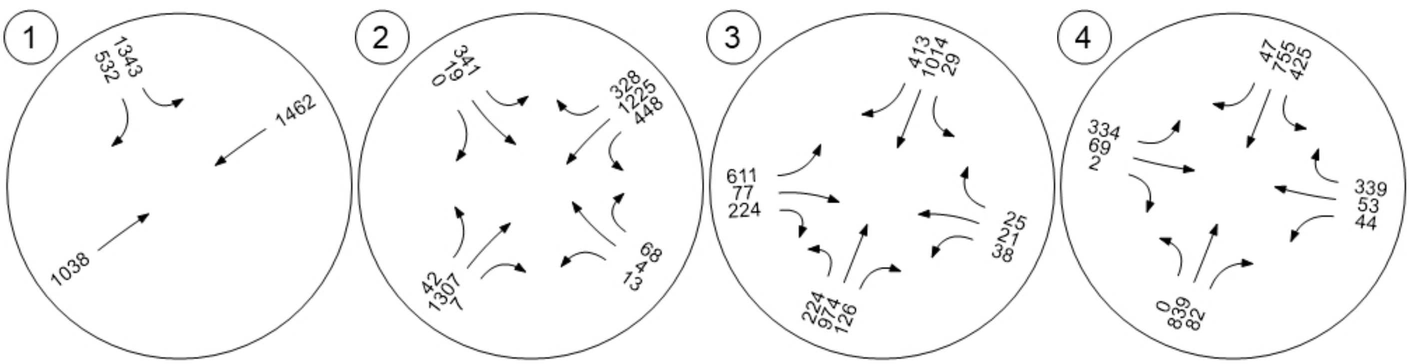


Generated with PTV VISTRO

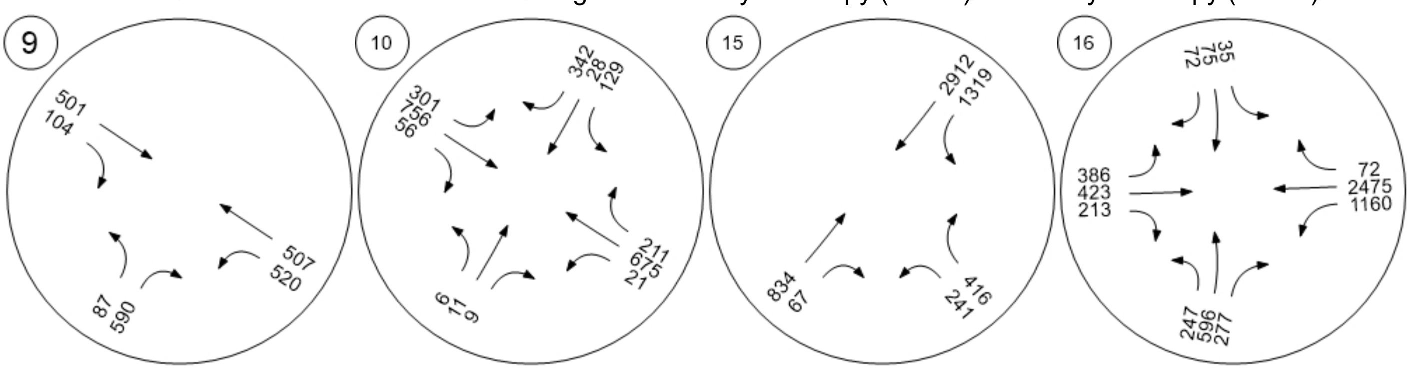
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume


Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd

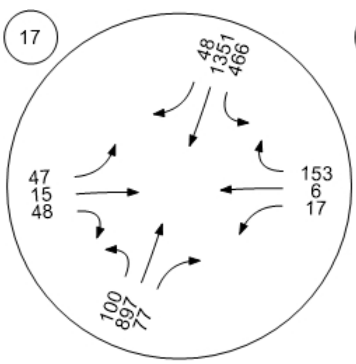



Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

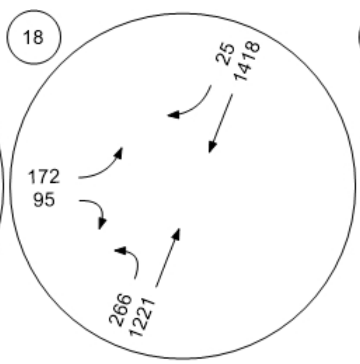


## Traffic Volume - Future Total Volume

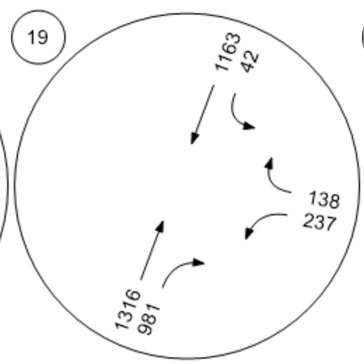

Willow Rd (SR 114)/Hamilton



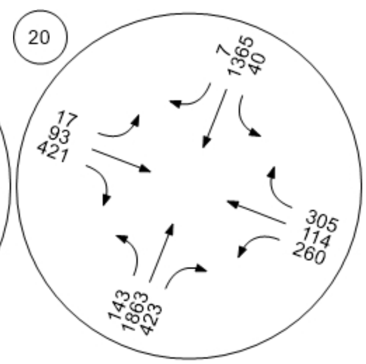

Willow Rd (SR 114)/Ivy Dr



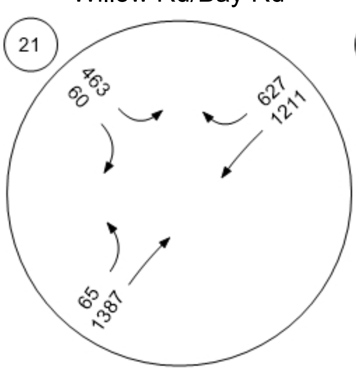

Willow Rd (SR 114)/O'Brien



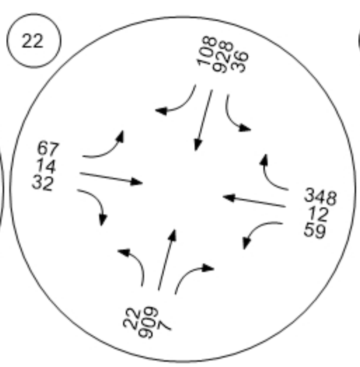

Willow Rd (SR 114)/Newbrid



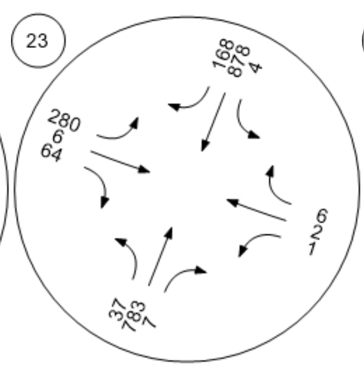

Willow Rd/Bay Rd



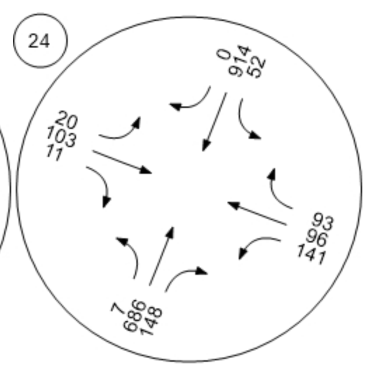

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

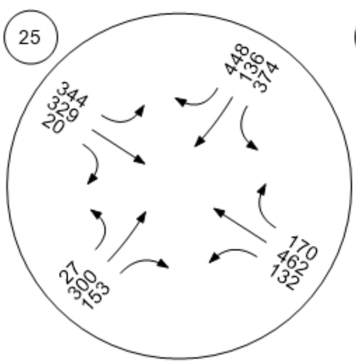


Generated with PTV VISTRO

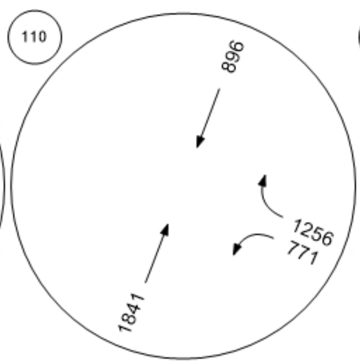
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

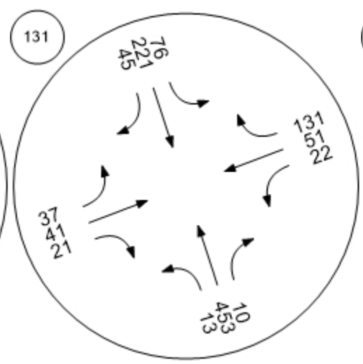

Middlefield Rd-Willow Rd



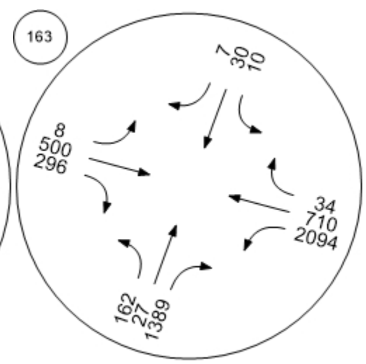

Marsh Road and US 101 NB



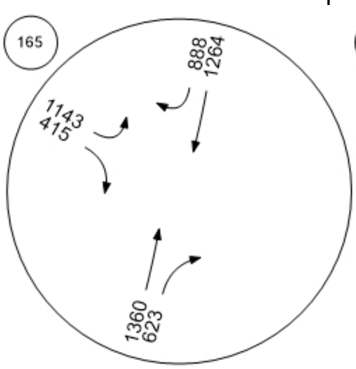

Chilco Street/Hamilton Avenu



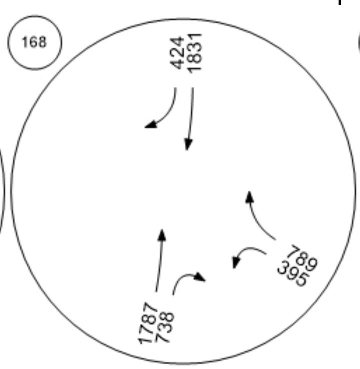

Bayfront Expy/Marsh Rd



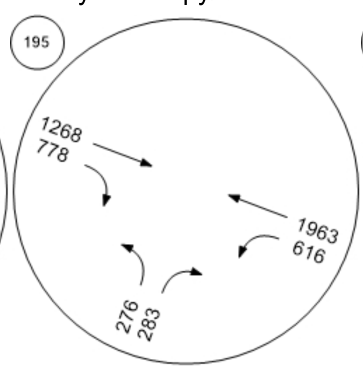

Willow Rd/US-101 SB Ramps



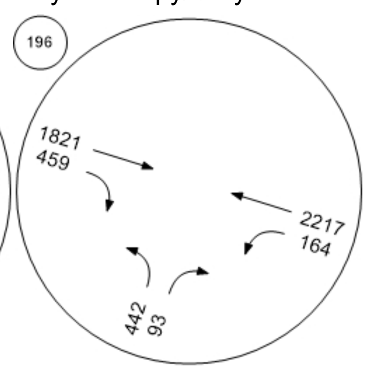

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

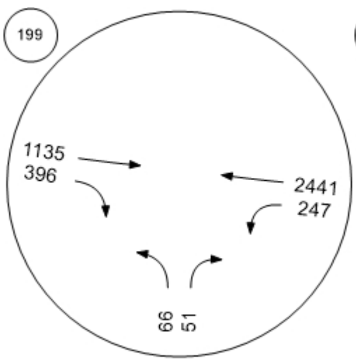


Generated with PTV VISTRO

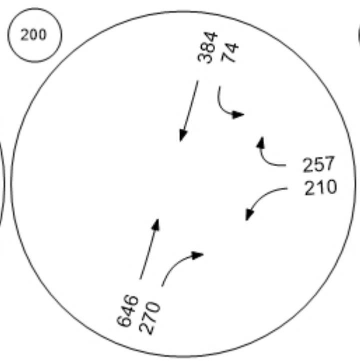
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

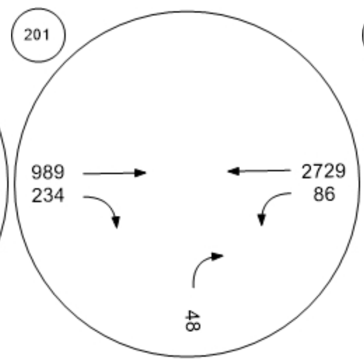

Bayfront Expwy/Bldg 21



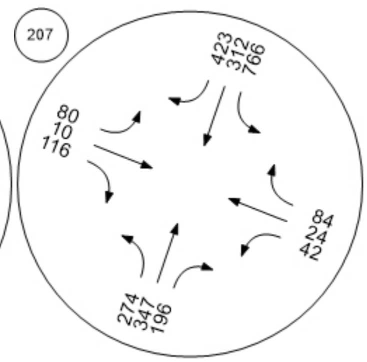

O'Brien Drive/Kavanaugh Dri



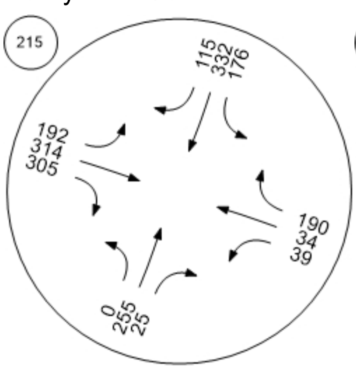

Bayfront Expwy/Bldg 20



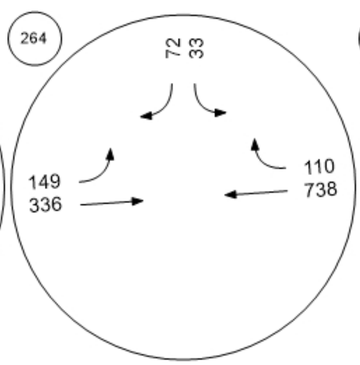

Chilco St/Constitution Dr



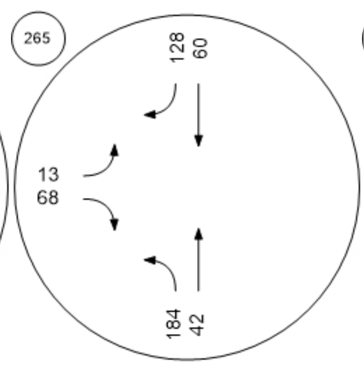

Chrysler Dr/Constitution Dr



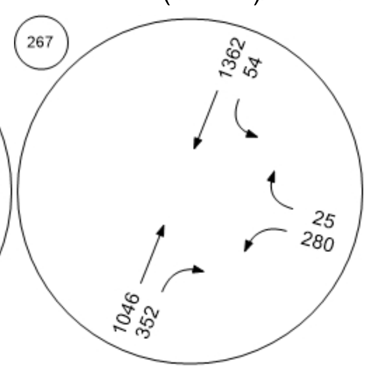

Adams Drive/O'Brien Drive




Adam Court/Adams Drive




Willow Road(SR114)/Park Str

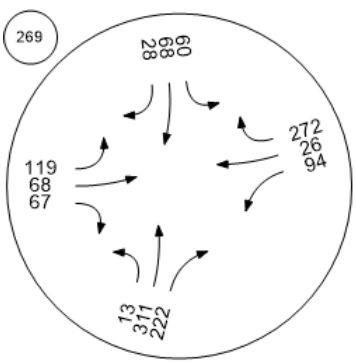


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume


O'Brien Drive/Loop Road

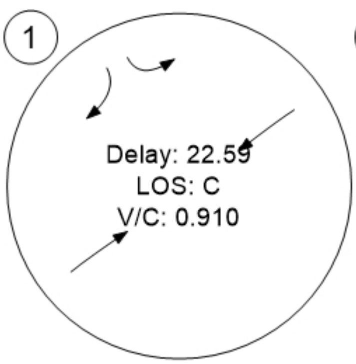


Generated with PTV VISTRO

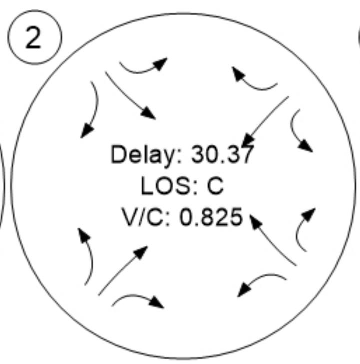
Version 2021 (SP 0-4)

Traffic Conditions

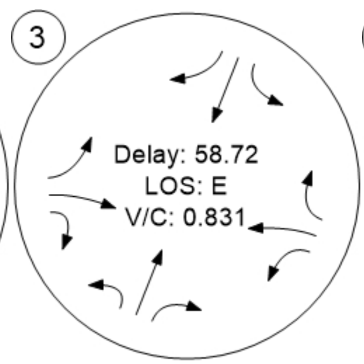

Marsh Rd (SR 84)/US 101 S



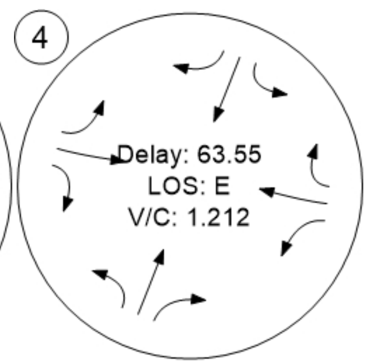

Marsh Rd/Rolison Rd-Scott D



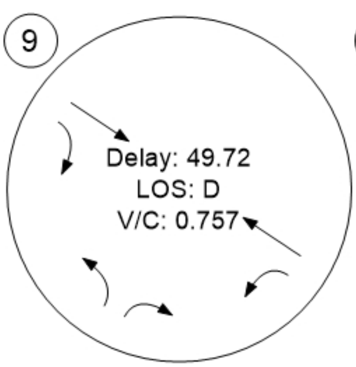

Marsh Rd/Florence St-Bohan



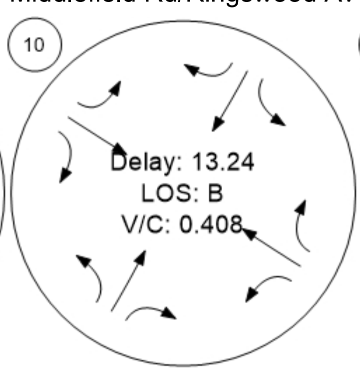

Marsh Rd/Bay Rd



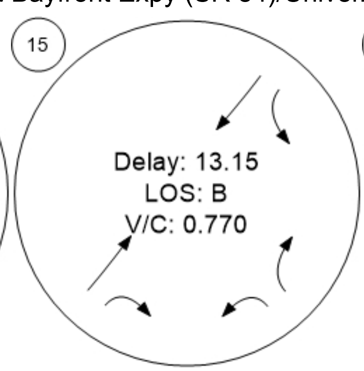

Middlefield Rd/Ravenswood



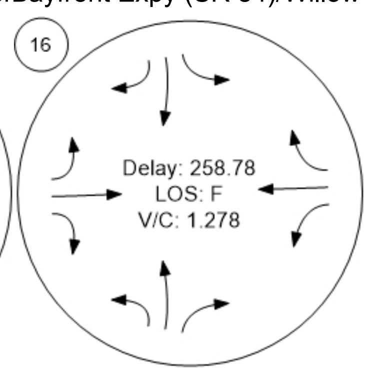

Middlefield Rd/Ringswood Av




Bayfront Expy (SR 84)/Univer

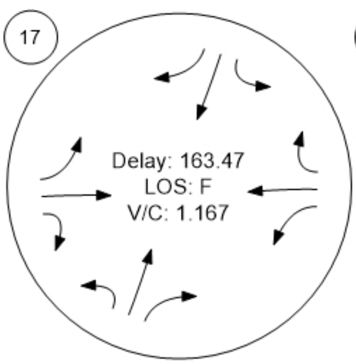



Bayfront Expy (SR 84)/Willow

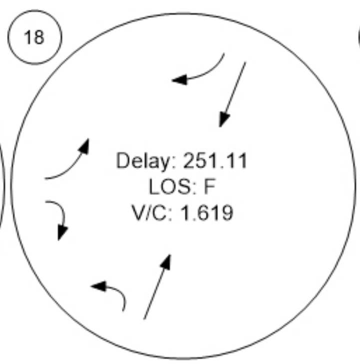


## Traffic Conditions

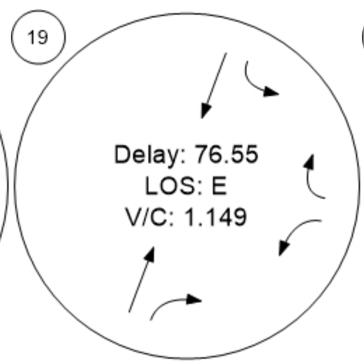

Willow Rd (SR 114)/Hamilton



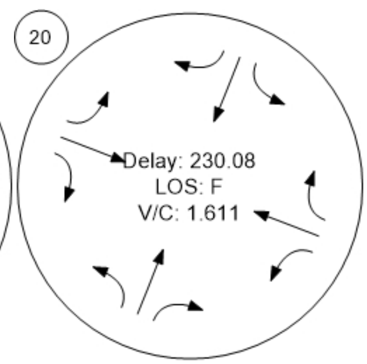

Willow Rd (SR 114)/Ivy Dr



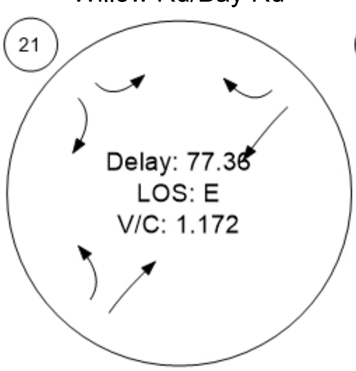

Willow Rd (SR 114)/O'Brien



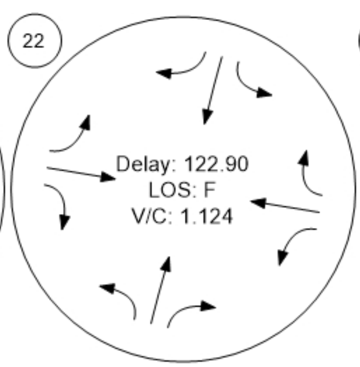

Willow Rd (SR 114)/Newbrid



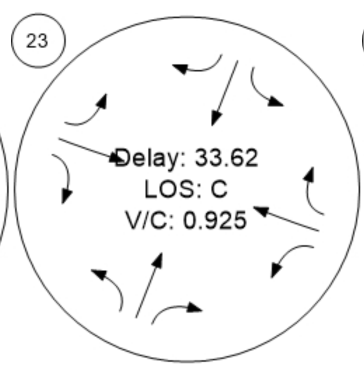

Willow Rd/Bay Rd



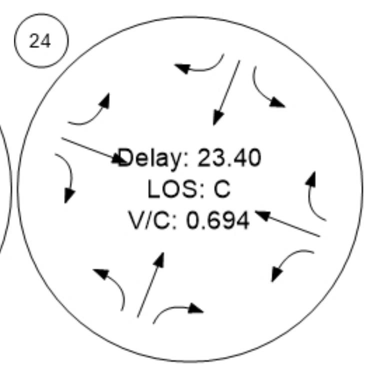

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave



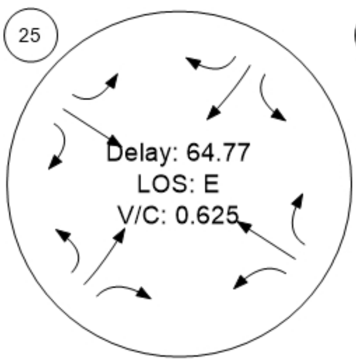
Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Conditions

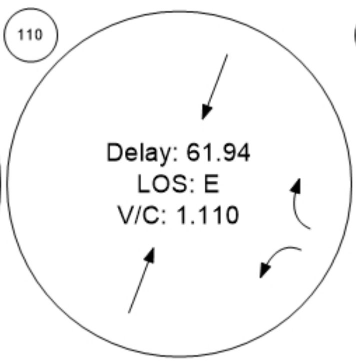

Middlefield Rd-Willow Rd

25



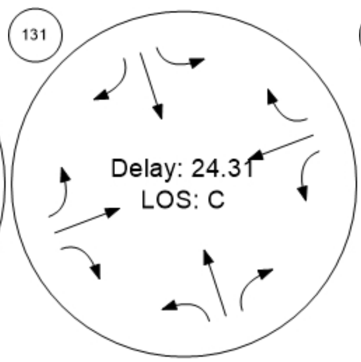

Marsh Road and US 101 NB

110



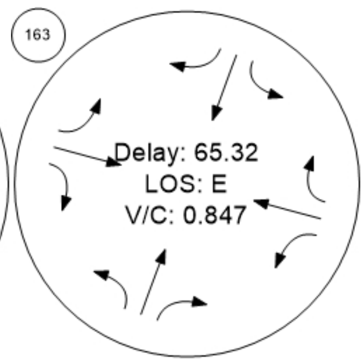

Chilco Street/Hamilton Avenu

131



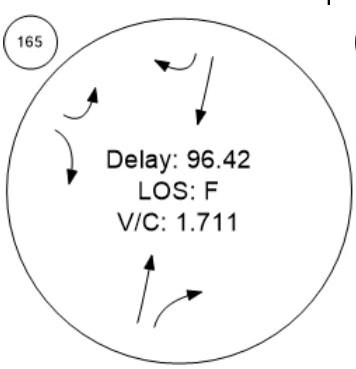

Bayfront Expy/Marsh Rd

163



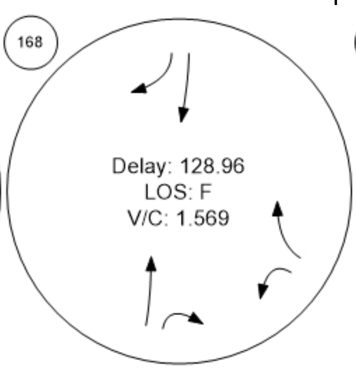

Willow Rd/US-101 SB Ramps

165



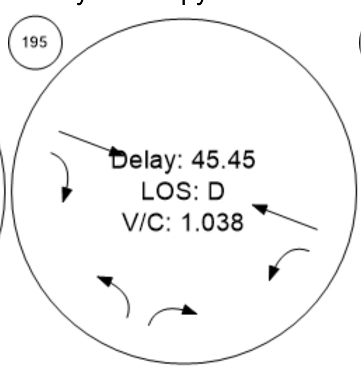

Willow Rd/US-101 NB Ramp

168



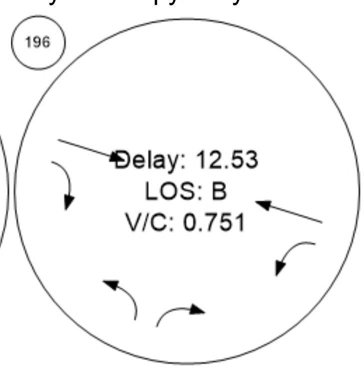

Bayfront Expy/Chilco St

195




Bayfront Expy/Chrysler Drive

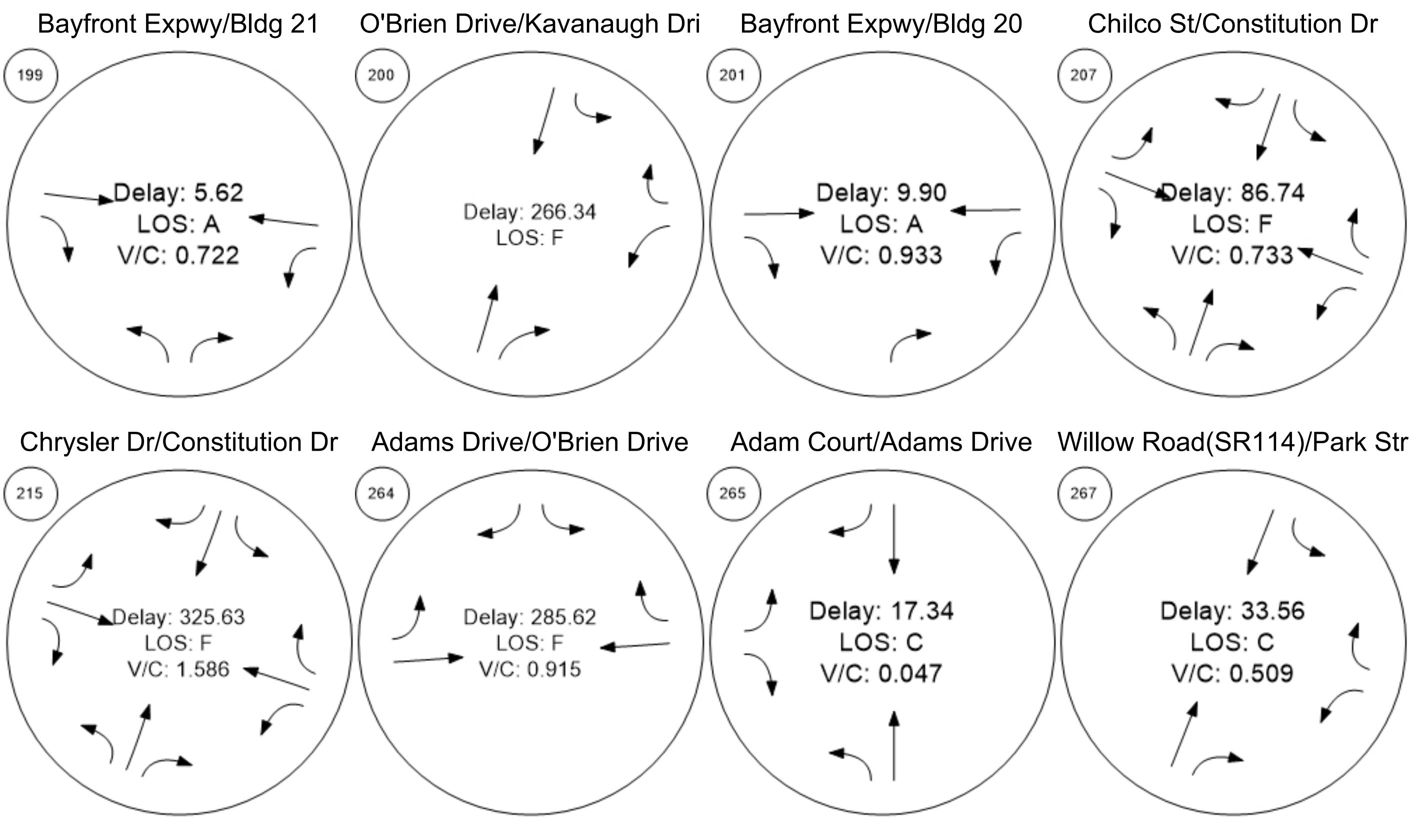
196



Generated with PTV VISTRO

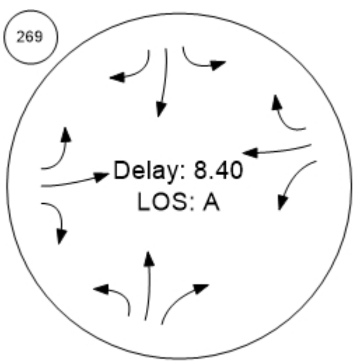
Version 2021 (SP 0-4)

Traffic Conditions

Traffic Conditions


O'Brien Drive/Loop Road

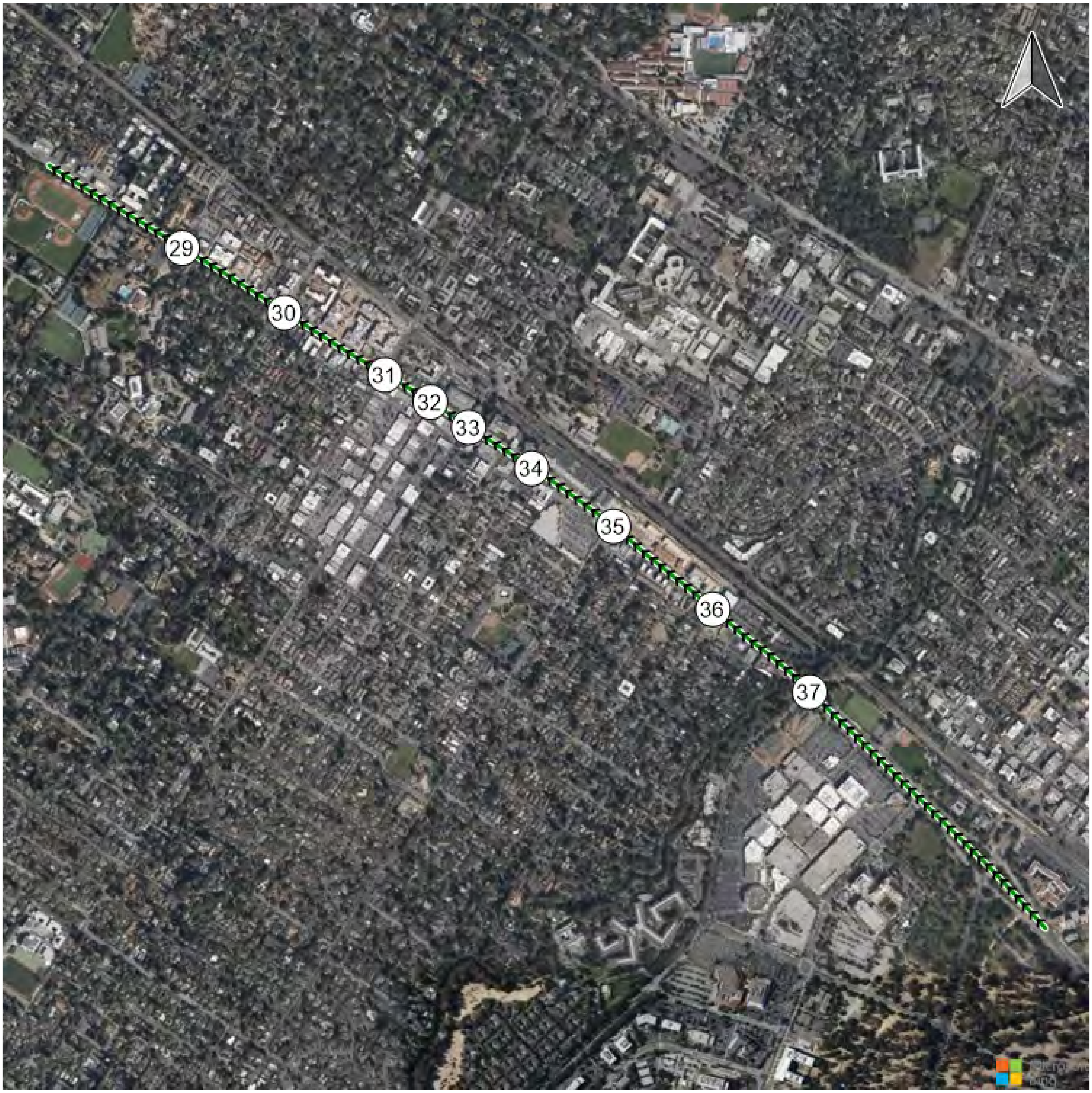


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



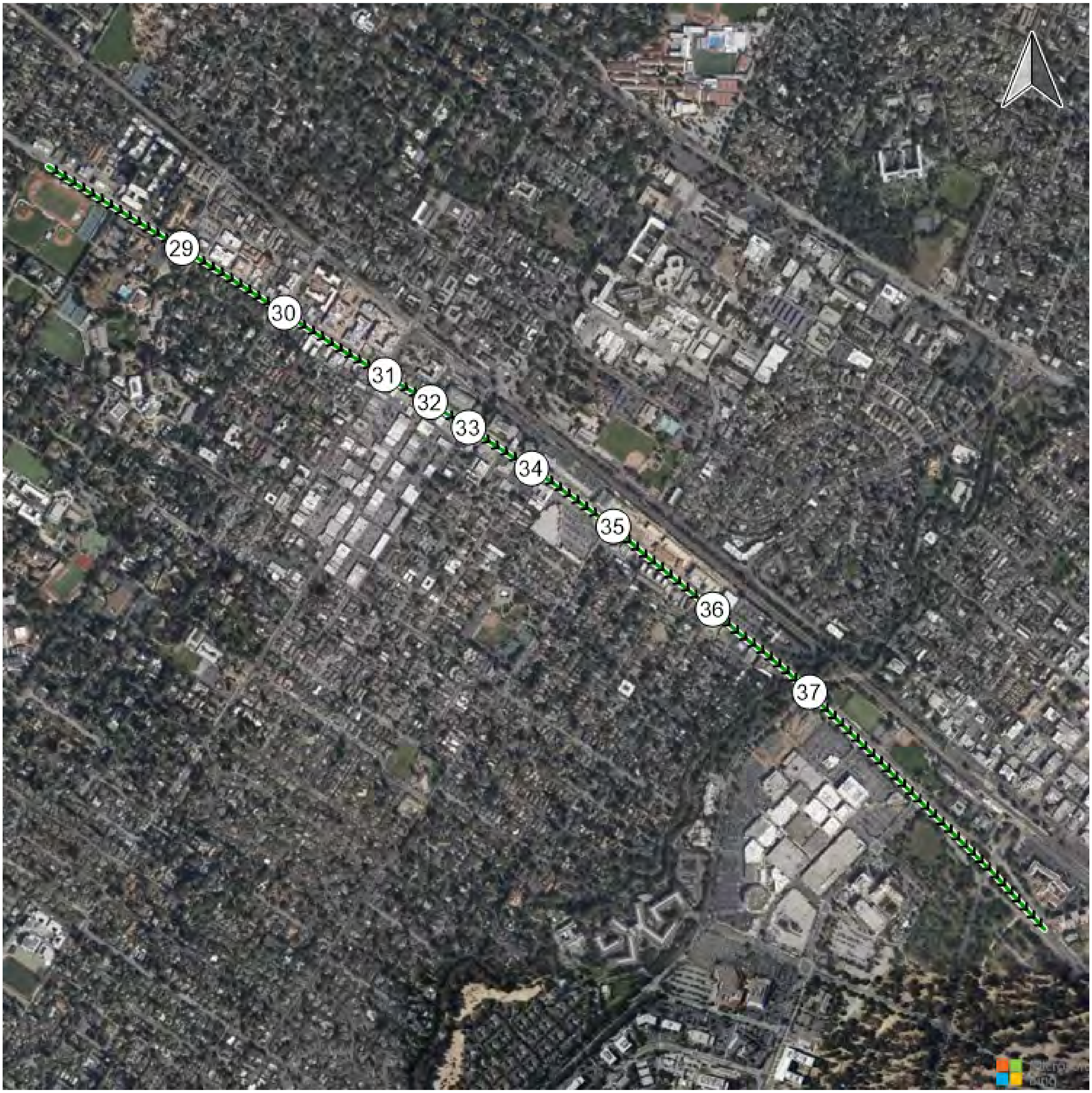
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2: ECR SB



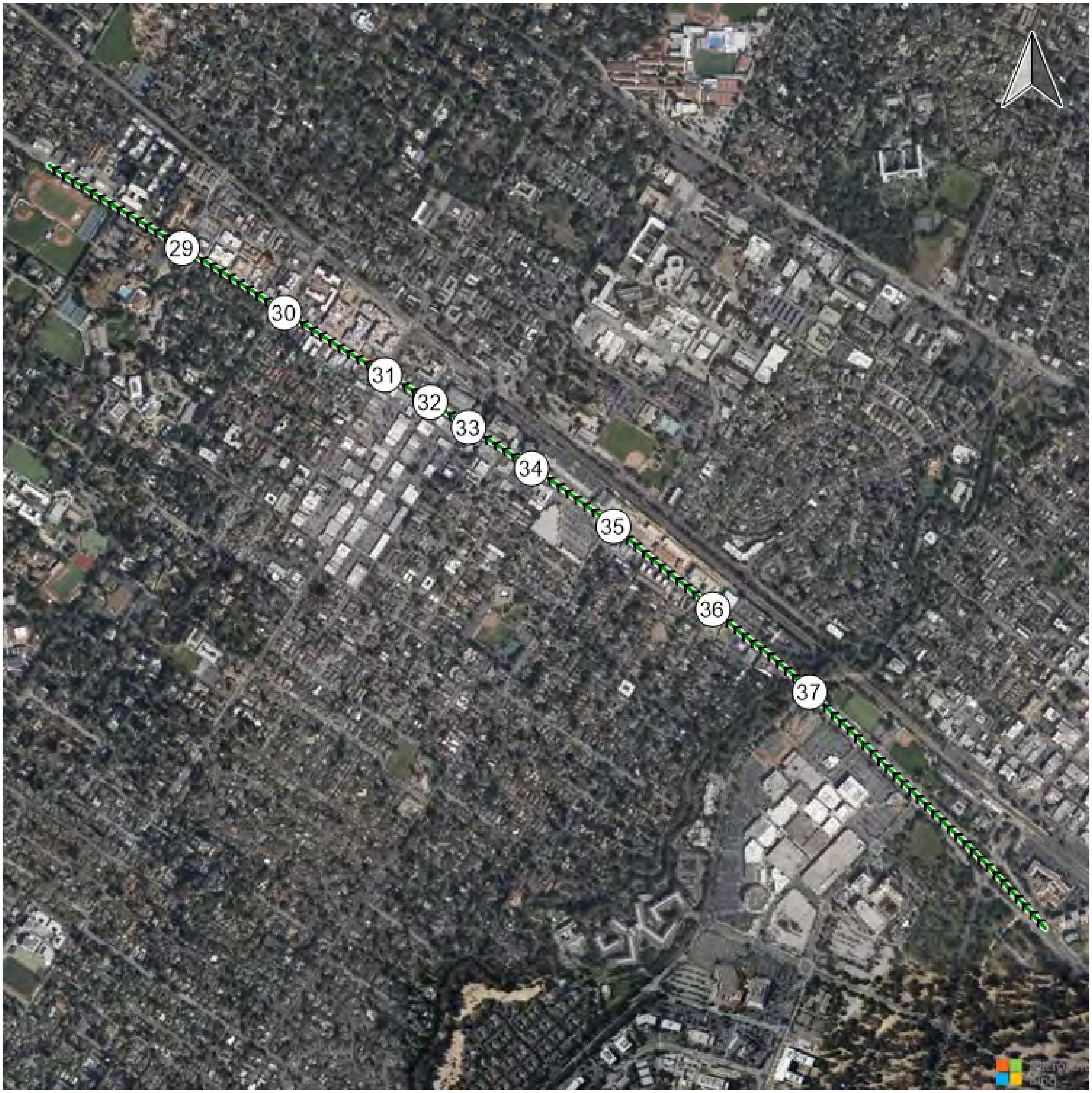
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



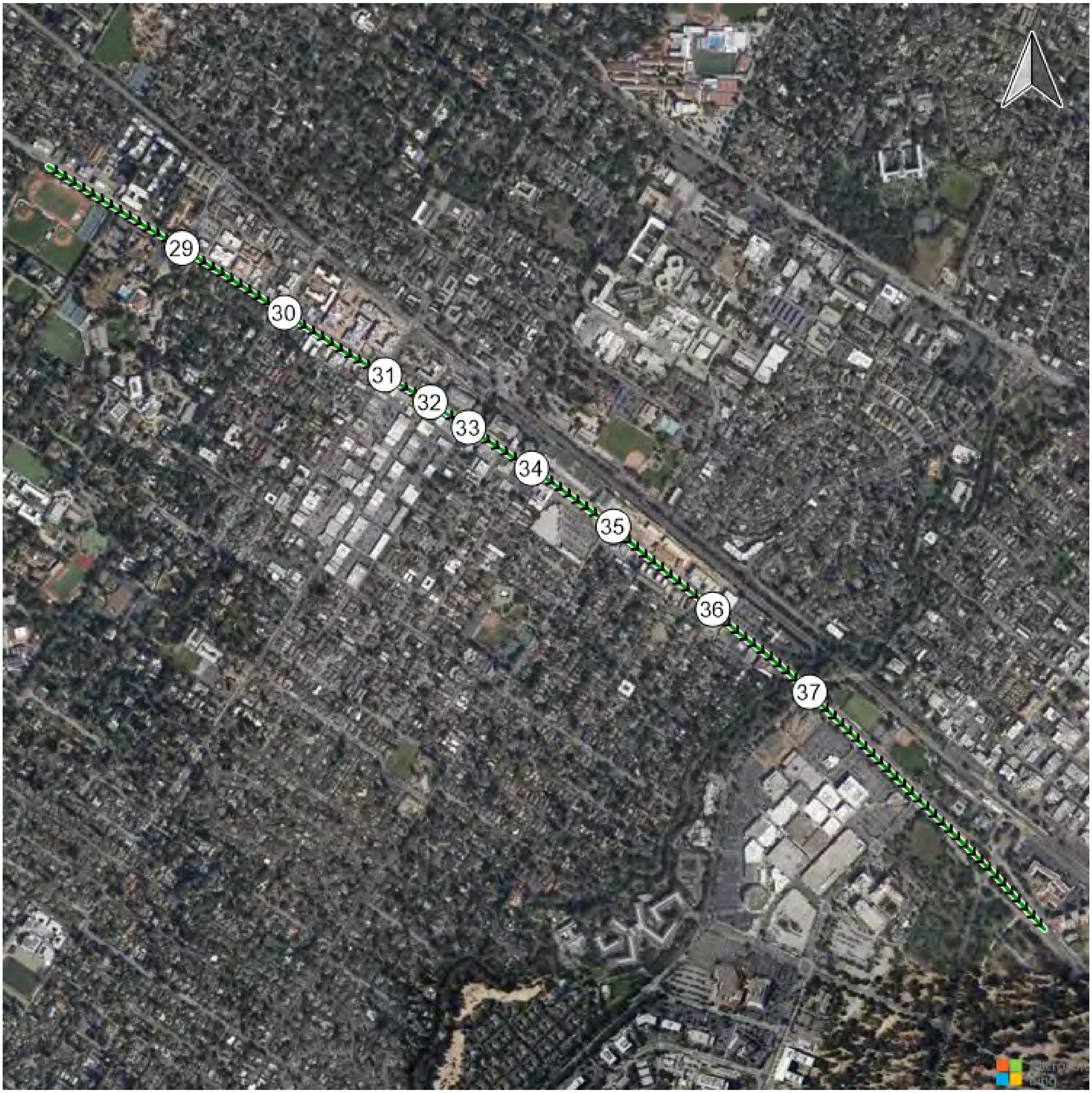
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project PM (RedTripCap).pdf

Scenario 22 Cumulative w/dumbarton PM (2040 vols)+ Project
12/9/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Signalized | HCM 6th Edition | SEB Left | 0.801 | 18.7 | B |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Signalized | HCM 6th Edition | NEB Left | 0.594 | 17.8 | B |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.852 | 53.1 | D |
| 4 | Marsh Rd/Bay Rd | Signalized | HCM 6th Edition | SB Left | 0.879 | 51.2 | D |
| 9 | Middlefield Rd/Ravenswood Ave | Signalized | HCM 6th Edition | NEB Left | 2.304 | 19.5 | B |
| 10 | Middlefield Rd/Ringwood Ave | Signalized | HCM 6th Edition | NEB Left | 0.543 | 21.1 | C |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Signalized | HCM 6th Edition | NEB Thru | 1.158 | 137.9 | F |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Signalized | HCM 6th Edition | SB Thru | 1.355 | 232.1 | F |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Signalized | HCM 6th Edition | EB Left | 1.636 | 438.0 | F |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | SB Right | 1.462 | 207.2 | F |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Signalized | HCM 6th Edition | WB Right | 1.612 | 255.6 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.466 | 206.7 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.410 | 224.3 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.277 | 222.0 | F |
| 23 | Willow Rd/Coleman Ave | Signalized | HCM 6th Edition | EB Left | 0.691 | 13.2 | B |
| 24 | Willow Rd/Gilbert Ave | Signalized | HCM 6th Edition | WB Left | 0.559 | 13.9 | B |
| 25 | Middlefield Rd-Willow Rd | Signalized | HCM 6th Edition | NEB Thru | 0.710 | 42.3 | D |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 110 | Marsh Road/101 NB Ramps | Signalized | HCM 6th Edition | NWB Right | 0.988 | 22.7 | C |
| 131 | Chilco Street/Hamilton Avenue | All-way stop | HCM 6th Edition | SB Thru | 1.552 | 163.8 | F |
| 163 | Bayfront Expy/Marsh Rd | Signalized | HCM 6th Edition | WB Left | 1.079 | 72.8 | E |
| 165 | Willow Rd/US-101 SB Ramps | Signalized | HCM 6th Edition | SB Right | 2.058 | 156.3 | F |
| 168 | Willow Rd/US-101 NB Ramps | Signalized | HCM 6th Edition | SB Thru | 1.237 | 230.9 | F |
| 195 | Bayfront Expy/Chilco St | Signalized | HCM 6th Edition | NB Right | 1.102 | 65.6 | E |
| 196 | Bayfront Expy/Chrysler Drive | Signalized | HCM 6th Edition | NB Left | 0.953 | 33.5 | C |
| 199 | Bafront Expwy/Bldg 21 | Signalized | HCM 6th Edition | NB Right | 0.941 | 36.1 | D |
| 200 | O'Brien Drive/Kavanaugh Drive | All-way stop | HCM 6th Edition | NB Thru | 1.614 | 168.7 | F |
| 201 | Bayfront Expwy/Bldg 20 | Signalized | HCM 6th Edition | NB Right | 0.888 | 18.8 | B |
| 207 | Chilco St/Constitution Dr | Signalized | HCM 6th Edition | EB Right | 1.147 | 170.9 | F |
| 215 | Chrysler Dr/Constitution Dr | Signalized | HCM 6th Edition | WB Right | 1.362 | 140.7 | F |
| 264 | Adams Drive/O'Brien Drive | Two-way stop | HCM 6th Edition | SB Left | 2.378 | 798.2 | F |
| 265 | Adam Court/ Adams Drive | Two-way stop | HCM 6th Edition | EB Left | 0.076 | 12.6 | B |
| 267 | Willow Road(SR114)/Park Street | Signalized | HCM 6th Edition | SB Left | 0.677 | 16.2 | B |
| 269 | O'Brien Drive/Loop Road | Roundabout | HCM 6th Edition | SB Thru | | 10.2 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.801 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 420.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road (SR 84) | | US 101 SB Offramp | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 969 | 1175 | 279 | 1311 | 427 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.70 | 2.15 | 3.60 | 0.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 969 | 1175 | 279 | 1311 | 427 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 247 | 300 | 70 | 334 | 109 |
| Total Analysis Volume [veh/h] | 0 | 989 | 1199 | 279 | 1338 | 436 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 5 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 6 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 52.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 2 | 0 | 4 | 5 |
| Auxiliary Signal Groups | | | | | | 1,4 |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 8 | 8 | 0 | 6 | 0 |
| Maximum Green [s] | 0 | 32 | 32 | 0 | 32 | 0 |
| Amber [s] | 0.0 | 4.1 | 4.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 45 | 45 | 0 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 16 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | | Yes | Yes | | No | |
| Maximum Recall | | No | No | | No | |
| Pedestrian Recall | | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 4.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 2.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 42 | 40 | 33 | 33 |
| g / C, Green / Cycle | 0.53 | 0.50 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.34 | 0.39 | 0.27 |
| s, saturation flow rate [veh/h] | 4000 | 3540 | 3414 | 1609 |
| c, Capacity [veh/h] | 2122 | 1785 | 1411 | 665 |
| d1, Uniform Delay [s] | 11.68 | 14.83 | 22.59 | 18.84 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.20 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.74 | 2.04 | 1.75 | 2.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.47 | 0.67 | 0.95 | 0.66 |
| d, Delay for Lane Group [s/veh] | 12.42 | 16.87 | 24.34 | 20.90 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.01 | 7.65 | 11.50 | 6.45 |
| 50th-Percentile Queue Length [ft/ln] | 125.33 | 191.27 | 287.61 | 161.19 |
| 95th-Percentile Queue Length [veh/ln] | 8.69 | 12.19 | 17.07 | 10.61 |
| 95th-Percentile Queue Length [ft/ln] | 217.13 | 304.68 | 426.68 | 265.30 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 12.42 | 16.87 | 0.00 | 24.34 | 20.90 |
| Movement LOS | | B | B | | C | C |
| d_A, Approach Delay [s/veh] | 12.42 | | 16.87 | | 23.49 | |
| Approach LOS | B | | B | | C | |
| d_I, Intersection Delay [s/veh] | 18.72 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.801 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.45 | 0.00 | 29.70 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.873 | 0.000 | 2.510 |
| Crosswalk LOS | C | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1011 | 1011 | 774 |
| d_b, Bicycle Delay [s] | 9.79 | 9.76 | 15.02 |
| I_b,int, Bicycle LOS Score for Intersection | 2.376 | 2.549 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 2: Marsh Rd/Rolison Rd-Scott Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.594 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 35.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Scott Drive | | | Rolison Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 50 | 1326 | 7 | 76 | 1038 | 263 | 15 | 6 | 414 | 299 | 6 | 4 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 2.40 | 0.00 | 4.50 | 1.50 | 2.50 | 3.70 | 0.00 | 1.70 | 1.30 | 7.70 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 50 | 1326 | 7 | 76 | 1038 | 263 | 15 | 6 | 88 | 299 | 6 | 4 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 345 | 2 | 20 | 270 | 68 | 4 | 2 | 23 | 78 | 2 | 1 |
| Total Analysis Volume [veh/h] | 52 | 1381 | 7 | 79 | 1081 | 274 | 16 | 6 | 92 | 311 | 6 | 4 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 0 | | | 0 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 0 | | | 0 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 1 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 77.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 14.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 0 | 1 | 6 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 4 | 10 | 0 | 4 | 10 | 0 | 0 | 6 | 0 | 0 | 4 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 10 | 40 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 3.2 | 0.0 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 51 | 0 | 12 | 48 | 0 | 0 | 41 | 0 | 0 | 36 | 0 |
| Vehicle Extension [s] | 2.5 | 3.5 | 0.0 | 2.0 | 3.5 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 8 | 0 | 0 | 8 | 0 |
| Pedestrian Clearance [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 28 | 0 | 0 | 24 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 0.0 | 20.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 7 | 99 | 99 | 98 | 98 | 98 | 9 | 9 | 18 | 18 |
| g / C, Green / Cycle | 0.05 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.06 | 0.06 | 0.13 | 0.13 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.26 | 0.26 | 0.09 | 0.37 | 0.38 | 0.01 | 0.03 | 0.09 | 0.09 |
| s, saturation flow rate [veh/h] | 1761 | 3549 | 1859 | 899 | 1877 | 1732 | 1833 | 2820 | 1791 | 1697 |
| c, Capacity [veh/h] | 91 | 2522 | 1321 | 650 | 1315 | 1213 | 115 | 178 | 228 | 216 |
| d1, Uniform Delay [s] | 64.78 | 7.88 | 7.88 | 8.28 | 9.98 | 10.13 | 62.16 | 63.48 | 58.65 | 58.65 |
| k, delay calibration | 0.08 | 0.50 | 0.50 | 0.15 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.08 | 0.40 | 0.77 | 0.11 | 1.53 | 1.75 | 0.59 | 1.73 | 3.20 | 3.38 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.57 | 0.36 | 0.36 | 0.12 | 0.53 | 0.54 | 0.19 | 0.52 | 0.72 | 0.72 |
| d, Delay for Lane Group [s/veh] | 68.86 | 8.28 | 8.65 | 8.39 | 11.50 | 11.88 | 62.74 | 65.21 | 61.85 | 62.03 |
| Lane Group LOS | E | A | A | A | B | B | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.91 | 5.12 | 5.50 | 0.39 | 10.00 | 9.66 | 0.77 | 1.65 | 5.88 | 5.58 |
| 50th-Percentile Queue Length [ft/ln] | 47.79 | 128.11 | 137.57 | 9.72 | 250.00 | 241.48 | 19.27 | 41.21 | 146.90 | 139.50 |
| 95th-Percentile Queue Length [veh/ln] | 3.44 | 8.84 | 9.35 | 0.70 | 15.19 | 14.76 | 1.39 | 2.97 | 9.85 | 9.45 |
| 95th-Percentile Queue Length [ft/ln] | 86.03 | 220.92 | 233.75 | 17.50 | 379.65 | 368.90 | 34.69 | 74.18 | 246.29 | 236.35 |

**Movement, Approach, & Intersection Results**

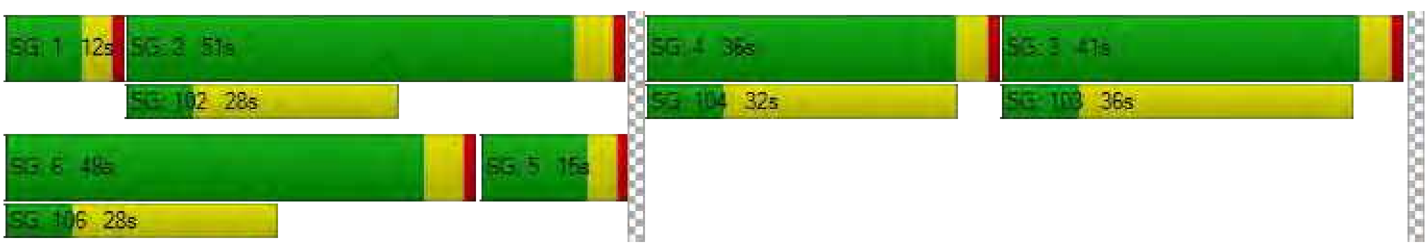
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 68.86 | 8.41 | 8.65 | 8.39 | 11.64 | 11.88 | 62.74 | 62.74 | 65.21 | 61.93 | 62.03 | 62.03 |
| Movement LOS | E | A | A | A | B | B | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 10.59 | | | 11.50 | | | 64.74 | | | 61.94 | | |
| Approach LOS | B | | | B | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 17.83 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.594 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 58.49 | 58.49 | 59.41 | 59.41 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.955 | 3.190 | 2.945 | 2.138 |
| Crosswalk LOS | C | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 615 | 526 | 454 |
| d_b, Bicycle Delay [s] | 31.53 | 33.60 | 38.01 | 41.79 |
| I_b,int, Bicycle LOS Score for Intersection | 2.352 | 2.743 | 2.286 | 2.089 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 53.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.852 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 56 | 125 | 87 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 80 | 181 | 15 | 3 | 272 | 95 | 124 | 9 | 15 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 318 | 726 | 58 | 14 | 1089 | 381 | 496 | 37 | 60 | 134 | 94 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 87 | 87 | 4 | 71 | 71 | 26 | 26 | 26 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.50 | 0.50 | 0.18 | 0.18 | 0.18 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.41 | 0.42 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 1867 | 1678 | 1774 | 1821 | 1572 | 1751 | 1788 |
| c, Capacity [veh/h] | 252 | 1151 | 1117 | 45 | 943 | 848 | 324 | 333 | 287 | 196 | 201 |
| d1, Uniform Delay [s] | 59.92 | 12.74 | 12.76 | 66.82 | 28.84 | 29.67 | 54.78 | 54.78 | 48.47 | 59.64 | 59.65 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 145.03 | 0.82 | 0.85 | 1.45 | 7.28 | 9.70 | 3.66 | 3.56 | 0.26 | 3.08 | 3.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.26 | 0.34 | 0.35 | 0.31 | 0.81 | 0.84 | 0.81 | 0.81 | 0.21 | 0.68 | 0.68 |
| d, Delay for Lane Group [s/veh] | 204.95 | 13.56 | 13.61 | 68.27 | 36.12 | 39.37 | 58.44 | 58.34 | 48.74 | 62.72 | 62.68 |
| Lane Group LOS | F | B | B | E | D | D | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 19.05 | 6.14 | 6.00 | 0.51 | 22.59 | 22.20 | 9.31 | 9.54 | 1.83 | 4.79 | 4.89 |
| 50th-Percentile Queue Length [ft/ln] | 476.29 | 153.52 | 150.01 | 12.71 | 564.65 | 554.92 | 232.66 | 238.60 | 45.83 | 119.65 | 122.26 |
| 95th-Percentile Queue Length [veh/ln] | 28.96 | 10.20 | 10.02 | 0.91 | 30.38 | 29.92 | 14.31 | 14.61 | 3.30 | 8.37 | 8.52 |
| 95th-Percentile Queue Length [ft/ln] | 723.93 | 255.12 | 250.44 | 22.87 | 759.50 | 748.08 | 357.73 | 365.26 | 82.49 | 209.34 | 212.93 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 204.95 | 13.59 | 13.61 | 68.27 | 37.10 | 39.37 | 58.39 | 58.34 | 48.74 | 62.72 | 62.68 | 62.68 |
| Movement LOS | F | B | B | E | D | D | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 68.81 | | | 37.98 | | | 57.41 | | | 62.70 | | |
| Approach LOS | E | | | D | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 53.11 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.852 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.959 | 3.062 | 2.717 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.469 | 2.784 | 2.825 | 2.007 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: Marsh Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 51.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.879 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Bay Road | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 2 | 745 | 61 | 434 | 723 | 56 | 95 | 25 | 2 | 65 | 90 | 310 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.30 | 0.90 | 1.00 | 1.00 | 0.00 | 2.20 | 6.90 | 0.00 | 1.20 | 0.00 | 2.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 2 | 745 | 61 | 434 | 723 | 56 | 95 | 25 | 2 | 65 | 90 | 310 |
| Peak Hour Factor | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 209 | 17 | 122 | 203 | 16 | 27 | 7 | 1 | 18 | 25 | 87 |
| Total Analysis Volume [veh/h] | 2 | 837 | 69 | 488 | 812 | 63 | 107 | 28 | 2 | 73 | 101 | 348 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 6 | | | 0 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 6 | | | 0 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 1 | | | 5 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 79 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Protecte | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 6 | 2 | 5 | 2 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 6 | 7 | 6 | 7 | 6 | 7 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 40 | 40 | 40 | 30 | 40 | 40 | 30 | 30 | 30 | 0 | 30 | 0 |
| Amber [s] | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 48 | 29 | 48 | 19 | 48 | 29 | 32 | 32 | 32 | 0 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 7 | 0 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 17 | 0 | 17 | 0 | 17 | 0 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 |
| Minimum Recall | | No | | No | No | | | No | | | No | |
| Maximum Recall | | No | | No | No | | | No | | | No | |
| Pedestrian Recall | | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | C | C | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 3.00 | 2.50 | 2.50 | 2.10 | 2.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 1.00 | 0.50 | 0.50 | 0.10 | 0.10 |
| g_i, Effective Green Time [s] | 27 | 27 | 16 | 46 | 46 | 29 | 29 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.20 | 0.58 | 0.58 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.26 | 0.26 | 0.27 | 0.23 | 0.24 | 0.22 | 0.30 |
| s, saturation flow rate [veh/h] | 1861 | 1644 | 1795 | 1885 | 1830 | 613 | 1723 |
| c, Capacity [veh/h] | 678 | 559 | 365 | 1095 | 1063 | 302 | 674 |
| d1, Uniform Delay [s] | 23.28 | 23.33 | 31.58 | 9.09 | 9.11 | 21.23 | 23.12 |
| k, delay calibration | 0.50 | 0.50 | 0.26 | 0.50 | 0.50 | 0.28 | 0.39 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.19 | 9.55 | 161.01 | 1.11 | 1.16 | 2.73 | 6.76 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.71 | 0.76 | 1.34 | 0.40 | 0.41 | 0.45 | 0.78 |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 29.47 | 32.88 | 192.58 | 10.19 | 10.27 | 23.96 | 29.87 |
| Lane Group LOS | C | C | F | B | B | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 8.55 | 8.05 | 22.94 | 3.86 | 3.80 | 2.32 | 9.55 |
| 50th-Percentile Queue Length [ft/ln] | 213.81 | 201.15 | 573.42 | 96.41 | 94.90 | 57.92 | 238.66 |
| 95th-Percentile Queue Length [veh/ln] | 13.35 | 12.70 | 35.28 | 6.94 | 6.83 | 4.17 | 14.61 |
| 95th-Percentile Queue Length [ft/ln] | 333.72 | 317.45 | 881.88 | 173.54 | 170.81 | 104.25 | 365.34 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.47 | 30.93 | 32.88 | 192.58 | 10.23 | 10.27 | 23.96 | 23.96 | 23.96 | 29.87 | 29.87 | 29.87 |
| Movement LOS | C | C | C | F | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 31.07 | | | 75.52 | | | 23.96 | | | 29.87 | | |
| Approach LOS | C | | | E | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 51.20 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.879 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 29.33 | 29.33 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.049 | 1.834 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 604 | 1084 | 690 | 690 |
| d_b, Bicycle Delay [s] | 19.29 | 8.30 | 17.02 | 16.99 |
| I_b,int, Bicycle LOS Score for Intersection | 2.309 | 2.684 | 1.786 | 2.421 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 9: Middlefield Rd/Ravenswood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.304 |

**Intersection Setup**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Northwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 120.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | No | |

**Volumes**

| Name | Ravenswood Avenue | | Middlefield Road | | Middlefield Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 137 | 541 | 468 | 638 | 465 | 104 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.10 | 1.30 | 0.60 | 1.40 | 6.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 1000 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 137 | 0 | 468 | 638 | 465 | 104 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 0 | 121 | 164 | 120 | 27 |
| Total Analysis Volume [veh/h] | 141 | 0 | 482 | 658 | 479 | 107 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | 12 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | 11 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 6 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 11 | | 27 | | 9 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 58.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 2 | 1 | 6 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | Lead | - | - | - |
| Minimum Green [s] | 4 | 10 | 4 | 5 | 10 | 0 |
| Maximum Green [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Amber [s] | 3.2 | 3.6 | 3.0 | 3.6 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 50 | 35 | 35 | 70 | 35 | 0 |
| Vehicle Extension [s] | 2.5 | 3.6 | 3.0 | 3.0 | 3.6 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 10 | 12 | 0 | 12 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | Yes | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | L | C | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 4.60 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.60 | 0.00 |
| g_i, Effective Green Time [s] | 12 | 12 | 26 | 63 | 38 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.32 | 0.77 | 0.46 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.00 | 0.27 | 0.35 | 0.32 |
| s, saturation flow rate [veh/h] | 1781 | 1588 | 1791 | 1891 | 1805 |
| c, Capacity [veh/h] | 269 | 240 | 569 | 1454 | 827 |
| d1, Uniform Delay [s] | 32.13 | 0.00 | 26.13 | 3.37 | 17.84 |
| k, delay calibration | 0.08 | 0.08 | 0.21 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.18 | 0.00 | 6.71 | 0.22 | 5.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.52 | 0.00 | 0.85 | 0.45 | 0.71 |
| d, Delay for Lane Group [s/veh] | 33.31 | 0.00 | 32.83 | 3.59 | 22.94 |
| Lane Group LOS | C | A | C | A | C |
| Critical Lane Group | Yes | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.61 | 0.00 | 9.26 | 2.26 | 9.16 |
| 50th-Percentile Queue Length [ft/ln] | 65.16 | 0.00 | 231.38 | 56.41 | 228.88 |
| 95th-Percentile Queue Length [veh/ln] | 4.69 | 0.00 | 14.24 | 4.06 | 14.12 |
| 95th-Percentile Queue Length [ft/ln] | 117.29 | 0.00 | 356.11 | 101.54 | 352.93 |

**Movement, Approach, & Intersection Results**

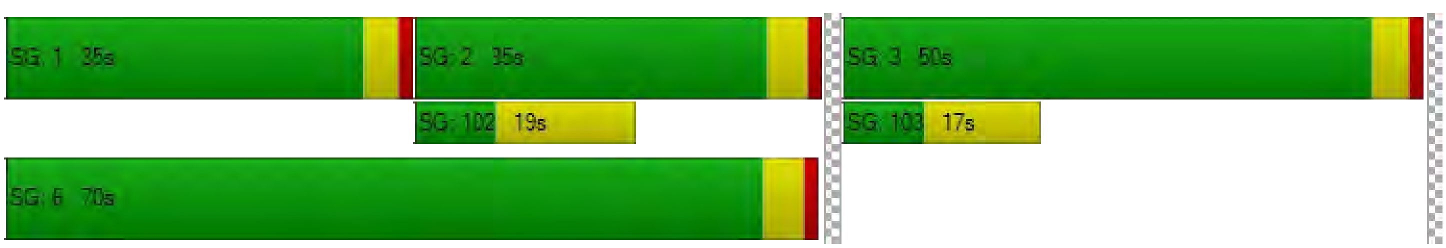
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.31 | 0.00 | 32.83 | 3.59 | 22.94 | 22.94 |
| Movement LOS | C | A | C | A | C | C |
| d_A, Approach Delay [s/veh] | 33.31 | | 15.95 | | 22.94 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 19.46 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 2.304 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 30.70 | 30.70 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.920 | 2.870 | 0.000 |
| Crosswalk LOS | D | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1118 | 1597 | 742 |
| d_b, Bicycle Delay [s] | 8.01 | 1.69 | 16.28 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.441 | 2.527 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 10: Middlefield Rd/Ringwood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.543 |

**Intersection Setup**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 30.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 20.00 | | | 30.00 | | | 35.00 | | | 35.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | D Street | | | Ringwood Avenue | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 772 | 137 | 323 | 706 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.70 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 0.00 | 1.70 | 0.00 | 2.10 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 57 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 32 | 32 | 224 | 0 | 263 | 2 | 772 | 80 | 323 | 706 | 2 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 8 | 8 | 59 | 0 | 69 | 1 | 203 | 21 | 85 | 186 | 1 |
| Total Analysis Volume [veh/h] | 36 | 34 | 34 | 236 | 0 | 277 | 2 | 813 | 84 | 340 | 743 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 6 | | | 0 | | | 6 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 6 | | | 1 | | | 6 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 2 | | | 1 | | | 7 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 1 | | | 2 | | | 8 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 5 | | | 21 | | | 18 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 120 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 58.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 8 | 2 | 6 | 8 | 6 | 1 | 6 | 8 | 5 | 2 | 4 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 10 | 10 | 6 | 10 | 4 | 10 | 6 | 4 | 10 | 0 |
| Maximum Green [s] | 35 | 35 | 35 | 50 | 35 | 50 | 10 | 50 | 35 | 10 | 35 | 0 |
| Amber [s] | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 | 3.6 | 3.0 | 3.6 | 3.2 | 3.5 | 3.6 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 35 | 35 | 35 | 50 | 35 | 50 | 50 | 50 | 35 | 35 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 2.9 | 3.0 | 3.6 | 2.9 | 3.6 | 3.0 | 3.6 | 2.9 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.6 | 0.0 |
| Minimum Recall | | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | | No | | No | Yes | | No | Yes | |
| Pedestrian Recall | | No | | | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 4.60 | 4.60 | 4.60 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.60 | 2.60 |
| g_i, Effective Green Time [s] | 34 | 34 | 34 | 34 | 82 | 65 | 65 | 79 | 75 | 75 |
| g / C, Green / Cycle | 0.29 | 0.29 | 0.29 | 0.29 | 0.68 | 0.54 | 0.54 | 0.66 | 0.62 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.04 | 0.21 | 0.18 | 0.00 | 0.23 | 0.05 | 0.39 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1421 | 1719 | 1136 | 1540 | 757 | 3569 | 1558 | 882 | 1873 | 1871 |
| c, Capacity [veh/h] | 156 | 493 | 386 | 442 | 535 | 1920 | 838 | 576 | 1166 | 1165 |
| d1, Uniform Delay [s] | 53.53 | 31.78 | 41.75 | 36.98 | 7.58 | 16.59 | 13.52 | 11.05 | 10.66 | 10.66 |
| k, delay calibration | 0.10 | 0.10 | 0.27 | 0.20 | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.71 | 0.12 | 3.90 | 2.64 | 0.00 | 0.69 | 0.24 | 4.39 | 0.72 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.14 | 0.61 | 0.63 | 0.00 | 0.42 | 0.10 | 0.59 | 0.32 | 0.32 |
| d, Delay for Lane Group [s/veh] | 54.25 | 31.90 | 45.66 | 39.62 | 7.58 | 17.28 | 13.75 | 15.43 | 11.38 | 11.38 |
| Lane Group LOS | D | C | D | D | A | B | B | B | B | B |
| Critical Lane Group | No | No | Yes | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.09 | 1.53 | 6.82 | 7.34 | 0.02 | 6.64 | 1.14 | 4.18 | 4.63 | 4.63 |
| 50th-Percentile Queue Length [ft/ln] | 27.24 | 38.21 | 170.60 | 183.45 | 0.42 | 166.02 | 28.57 | 104.46 | 115.80 | 115.70 |
| 95th-Percentile Queue Length [veh/ln] | 1.96 | 2.75 | 11.11 | 11.78 | 0.03 | 10.87 | 2.06 | 7.52 | 8.16 | 8.16 |
| 95th-Percentile Queue Length [ft/ln] | 49.03 | 68.78 | 277.70 | 294.52 | 0.76 | 271.68 | 51.42 | 188.02 | 204.04 | 203.91 |

**Movement, Approach, & Intersection Results**

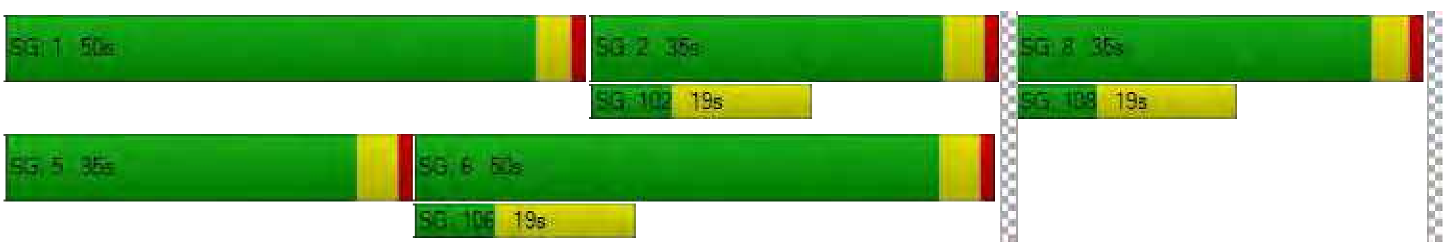
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.25 | 31.90 | 31.90 | 45.66 | 45.66 | 39.62 | 7.58 | 17.28 | 13.75 | 15.43 | 11.38 | 11.38 |
| Movement LOS | D | C | C | D | D | D | A | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 39.64 | | | 42.40 | | | 16.93 | | | 12.65 | | |
| Approach LOS | D | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 21.08 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.543 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 49.50 | 49.50 | 49.50 | 49.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.979 | 2.560 | 3.257 | 2.870 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 513 | 513 | 757 | 507 |
| d_b, Bicycle Delay [s] | 33.24 | 33.50 | 23.40 | 33.69 |
| I_b,int, Bicycle LOS Score for Intersection | 1.731 | 2.419 | 2.348 | 2.455 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 137.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.158 |

**Intersection Setup**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Northwestbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 2 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 830.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 55.00 | | 55.00 | | 35.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | Bayfront Expressway (SR84) | | Bayfront Expressway (SR84) | | University Avenue (SR109) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3762 | 20 | 359 | 970 | 68 | 1868 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.40 | 16.10 | 4.90 | 3.80 | 9.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3762 | 20 | 359 | 970 | 68 | 1868 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 960 | 5 | 92 | 247 | 17 | 477 |
| Total Analysis Volume [veh/h] | 3839 | 20 | 366 | 990 | 69 | 1906 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 7 | | 0 | | 8 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | 0 | | 7 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 1 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 10.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 6 | 2 | 5 | 2 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 4 | 10 | 4 | 4 |
| Maximum Green [s] | 90 | 140 | 50 | 140 | 15 | 15 |
| Amber [s] | 5.0 | 5.4 | 3.0 | 5.4 | 3.0 | 3.0 |
| All red [s] | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 |
| Split [s] | 30 | 0 | 0 | 0 | 30 | 30 |
| Vehicle Extension [s] | 3.5 | 3.5 | 2.0 | 3.5 | 2.0 | 2.0 |
| Walk [s] | 5 | 0 | 0 | 0 | 5 | 5 |
| Pedestrian Clearance [s] | 35 | 0 | 0 | 0 | 29 | 29 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 4.0 | 5.8 | 1.5 | 5.8 | 2.0 | 2.0 |
| Minimum Recall | Yes | | No | Yes | No | No |
| Maximum Recall | No | | No | No | No | No |
| Pedestrian Recall | No | | No | No | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 155 | 155 | 155 | 155 | 155 | 155 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 3.50 | 7.80 | 4.00 | 3.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 1.50 | 5.80 | 2.00 | 0.00 |
| g_i, Effective Green Time [s] | 90 | 90 | 36 | 128 | 15 | 55 |
| g / C, Green / Cycle | 0.58 | 0.58 | 0.24 | 0.83 | 0.10 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.76 | 0.01 | 0.11 | 0.20 | 0.02 | 0.45 |
| s, saturation flow rate [veh/h] | 5077 | 1399 | 3378 | 5020 | 3264 | 4237 |
| c, Capacity [veh/h] | 2948 | 812 | 796 | 4152 | 316 | 1518 |
| d1, Uniform Delay [s] | 32.52 | 13.84 | 50.79 | 2.89 | 64.61 | 49.75 |
| k, delay calibration | 0.13 | 0.13 | 0.04 | 0.13 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.78 | 0.01 | 0.15 | 0.04 | 0.13 | 115.59 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.30 | 0.02 | 0.46 | 0.24 | 0.22 | 1.26 |
| d, Delay for Lane Group [s/veh] | 169.29 | 13.85 | 50.95 | 2.92 | 64.74 | 165.34 |
| Lane Group LOS | F | B | D | A | E | F |
| Critical Lane Group | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 70.17 | 0.29 | 5.95 | 1.42 | 1.27 | 35.58 |
| 50th-Percentile Queue Length [ft/ln] | 1754.15 | 7.19 | 148.69 | 35.52 | 31.65 | 889.47 |
| 95th-Percentile Queue Length [veh/ln] | 101.89 | 0.52 | 9.95 | 2.56 | 2.28 | 52.22 |
| 95th-Percentile Queue Length [ft/ln] | 2547.19 | 12.95 | 248.68 | 63.94 | 56.97 | 1305.49 |

**Movement, Approach, & Intersection Results**

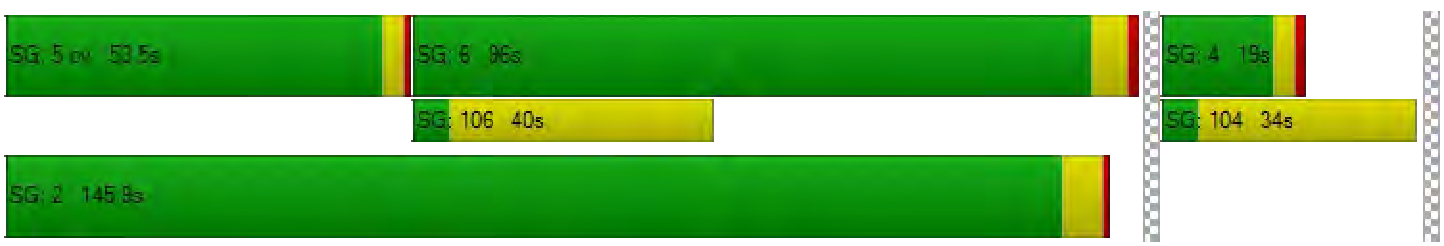
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 169.29 | 13.85 | 50.95 | 2.92 | 64.74 | 165.34 |
| Movement LOS | F | B | D | A | E | F |
| d_A, Approach Delay [s/veh] | 168.49 | | 15.88 | | 161.83 | |
| Approach LOS | F | | B | | F | |
| d_I, Intersection Delay [s/veh] | 137.88 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.158 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 68.73 | 0.00 | 68.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.877 | 0.000 | 3.088 |
| Crosswalk LOS | D | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 542 | 568 | 194 |
| d_b, Bicycle Delay [s] | 41.16 | 39.74 | 63.20 |
| I_b,int, Bicycle LOS Score for Intersection | 3.682 | 2.305 | 1.670 |
| Bicycle LOS | D | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 5 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 232.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.355 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 265.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 530.00 | 100.00 | 630.00 | 1500.00 | 100.00 | 600.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 20.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road | | | Ba Ex | | | Ba Ex | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 196 | 95 | 1142 | 159 | 332 | 146 | 76 | 2263 | 379 | 559 | 842 | 34 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.20 | 10.90 | 3.30 | 4.30 | 1.00 | 1.70 | 37.10 | 2.50 | 12.00 | 6.40 | 5.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 45 | 0 | 0 | 1 |
| Total Hourly Volume [veh/h] | 196 | 95 | 1142 | 159 | 332 | 76 | 76 | 2263 | 334 | 559 | 842 | 33 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 24 | 294 | 41 | 86 | 20 | 20 | 583 | 86 | 144 | 217 | 9 |
| Total Analysis Volume [veh/h] | 202 | 98 | 1177 | 164 | 342 | 78 | 78 | 2333 | 344 | 576 | 868 | 34 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 11 | | | 11 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 11 | | | 11 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 8 | | | 0 | | | 8 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 3 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 155 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Overlap | Protecte | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 7 | 4 | 4 | 3 | 8 | 4 | 1 | 6 | 2 | 5 | 2 | 6 |
| Auxiliary Signal Groups | | | 4,5 | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 |
| Maximum Green [s] | 22 | 15 | 15 | 9 | 9 | 15 | 26 | 40 | 50 | 25 | 50 | 40 |
| Amber [s] | 3.6 | 3.9 | 3.9 | 3.6 | 3.0 | 3.9 | 3.6 | 5.0 | 5.0 | 3.6 | 5.0 | 5.0 |
| All red [s] | 0.0 | 0.5 | 0.5 | 1.5 | 1.5 | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 25 | 47 | 47 | 20 | 42 | 47 | 21 | 38 | 64 | 47 | 64 | 38 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.6 | 2.4 | 2.4 | 3.1 | 2.5 | 2.4 | 2.6 | 4.0 | 4.0 | 2.6 | 4.0 | 4.0 |
| Minimum Recall | No | No | No | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | No | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | No | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| L, Total Lost Time per Cycle [s] | 3.60 | 4.40 | 4.60 | 5.10 | 4.50 | 4.50 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.60 | 2.40 | 0.00 | 3.10 | 2.50 | 2.50 | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 |
| g_i, Effective Green Time [s] | 14 | 13 | 40 | 9 | 10 | 10 | 67 | 40 | 40 | 67 | 58 | 58 |
| g / C, Green / Cycle | 0.13 | 0.13 | 0.38 | 0.09 | 0.09 | 0.09 | 0.64 | 0.38 | 0.38 | 0.64 | 0.55 | 0.55 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.07 | 0.28 | 0.09 | 0.21 | 0.05 | 0.08 | 0.76 | 0.39 | 0.41 | 0.18 | 0.02 |
| s, saturation flow rate [veh/h] | 1749 | 1479 | 4141 | 1748 | 1606 | 1453 | 956 | 3084 | 889 | 1421 | 4959 | 1615 |
| c, Capacity [veh/h] | 237 | 190 | 1582 | 150 | 149 | 134 | 620 | 1178 | 339 | 927 | 2728 | 888 |
| d1, Uniform Delay [s] | 44.31 | 42.63 | 27.84 | 47.92 | 47.57 | 45.39 | 7.80 | 32.40 | 32.40 | 24.04 | 12.86 | 10.84 |
| k, delay calibration | 0.12 | 0.11 | 0.16 | 0.35 | 0.48 | 0.11 | 0.11 | 0.19 | 0.44 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.20 | 2.15 | 1.07 | 88.74 | 605.96 | 3.92 | 0.09 | 442.36 | 49.20 | 0.68 | 0.07 | 0.02 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.85 | 0.52 | 0.74 | 1.09 | 2.30 | 0.58 | 0.13 | 1.98 | 1.01 | 0.62 | 0.32 | 0.04 |
| d, Delay for Lane Group [s/veh] | 53.52 | 44.79 | 28.91 | 136.65 | 653.52 | 49.31 | 7.89 | 474.75 | 81.60 | 24.72 | 12.92 | 10.85 |
| Lane Group LOS | D | D | C | F | F | D | A | F | F | C | B | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No | No | Yes | No | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 5.59 | 1.21 | 8.16 | 7.67 | 14.46 | 2.11 | 0.32 | 57.84 | 12.93 | 2.76 | 3.59 | 0.36 |
| 50th-Percentile Queue Length [ft/ln] | 139.78 | 30.30 | 203.88 | 191.64 | 361.51 | 52.77 | 8.07 | 1445.98 | 323.21 | 68.88 | 89.85 | 8.96 |
| 95th-Percentile Queue Length [veh/ln] | 9.47 | 2.18 | 12.84 | 12.60 | 24.83 | 3.80 | 0.58 | 94.76 | 18.99 | 4.96 | 6.47 | 0.65 |
| 95th-Percentile Queue Length [ft/ln] | 236.72 | 54.55 | 320.96 | 314.91 | 620.73 | 94.99 | 14.53 | 2368.92 | 474.84 | 123.99 | 161.73 | 16.13 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

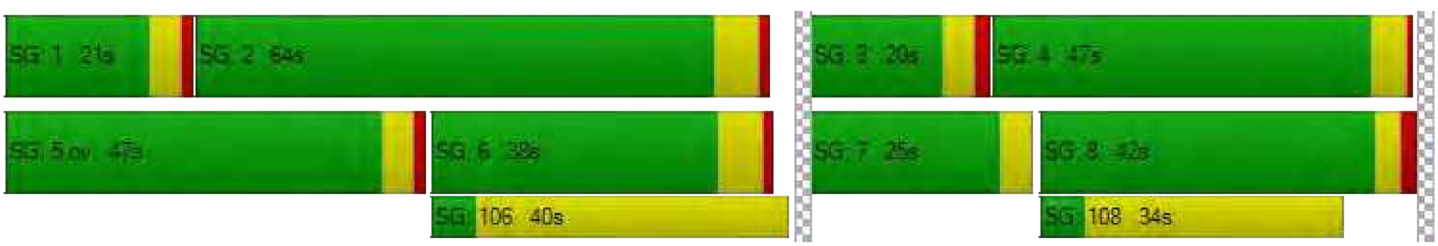
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 53.52 | 44.79 | 28.91 | 136.65 | 653.52 | 49.31 | 7.89 | 474.75 | 81.60 | 24.72 | 12.92 | 10.85 |
| Movement LOS | D | D | C | F | F | D | A | F | F | C | B | B |
| d_A, Approach Delay [s/veh] | 33.33 | | | 427.68 | | | 412.44 | | | 17.47 | | |
| Approach LOS | C | | | F | | | F | | | B | | |
| d_I, Intersection Delay [s/veh] | 232.14 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.355 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 43.76 | 0.00 | 43.76 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.475 | 0.000 | 3.251 | 0.000 |
| Crosswalk LOS | C | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 813 | 716 | 611 | 1108 |
| d_b, Bicycle Delay [s] | 18.44 | 21.61 | 25.26 | 10.43 |
| I_b,int, Bicycle LOS Score for Intersection | 2.778 | 2.099 | 3.100 | 2.373 |
| Bicycle LOS | C | B | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 17: Willow Rd (SR 114)/Hamilton Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 438.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.636 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 30.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 44 | 1281 | 22 | 271 | 1102 | 54 | 123 | 8 | 35 | 72 | 15 | 320 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 3.50 | 33.30 | 7.70 | 3.50 | 0.00 | 0.60 | 26.70 | 5.10 | 0.70 | 5.90 | 1.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 44 | 1281 | 22 | 271 | 1102 | 54 | 123 | 8 | 35 | 72 | 15 | 320 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 364 | 6 | 77 | 313 | 15 | 35 | 2 | 10 | 20 | 4 | 91 |
| Total Analysis Volume [veh/h] | 50 | 1456 | 25 | 308 | 1252 | 61 | 140 | 9 | 40 | 82 | 17 | 364 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 86 | | | 11 | | | 85 | | |
| v_di, Inbound Pedestrian Volume crossing m | 11 | | | 85 | | | 12 | | | 86 | | |
| v_co, Outbound Pedestrian Volume crossing | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 13 | | | 14 | | | 14 | | | 13 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 18 | | | 7 | | | 15 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 20.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 5 | 2 | 6 | 4 | 8 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 5 | 10 | 10 | 4 | 10 | 10 | 4 | 5 | 4 | 5 | 4 | 5 |
| Maximum Green [s] | 10 | 30 | 30 | 10 | 30 | 30 | 26 | 26 | 26 | 26 | 26 | 26 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.0 | 3.2 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 8 | 67 | 66 | 7 | 66 | 67 | 66 | 66 | 66 | 66 | 66 | 66 |
| Vehicle Extension [s] | 3.0 | 4.0 | 4.0 | 2.0 | 4.0 | 4.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 19 | 15 | 15 | 15 | 19 | 25 | 25 | 25 | 25 | 25 | 25 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 | 1.0 | 1.2 | 1.0 | 1.2 | 1.0 | 1.2 |
| Minimum Recall | Yes | Yes | | Yes | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 3.20 | 3.20 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 1.20 | 1.20 | 0.00 | 1.00 |
| g_i, Effective Green Time [s] | 70 | 63 | 63 | 70 | 63 | 63 | 63 | 63 | 63 | 63 |
| g / C, Green / Cycle | 0.50 | 0.45 | 0.45 | 0.50 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.90 | 0.90 | 0.43 | 0.80 | 0.81 | 0.14 | 0.09 | 0.06 | 0.58 |
| s, saturation flow rate [veh/h] | 521 | 826 | 821 | 718 | 826 | 807 | 1013 | 571 | 1353 | 656 |
| c, Capacity [veh/h] | 149 | 373 | 370 | 133 | 371 | 363 | 51 | 256 | 551 | 294 |
| d1, Uniform Delay [s] | 32.88 | 38.41 | 38.41 | 43.09 | 38.56 | 38.56 | 70.00 | 23.39 | 28.69 | 38.59 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.04 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.99 | 454.78 | 457.64 | 616.39 | 360.11 | 372.00 | 786.76 | 0.13 | 0.12 | 155.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.34 | 1.99 | 2.00 | 2.32 | 1.78 | 1.80 | 2.72 | 0.19 | 0.15 | 1.29 |
| d, Delay for Lane Group [s/veh] | 38.87 | 493.19 | 496.06 | 659.48 | 398.67 | 410.56 | 856.76 | 23.52 | 28.82 | 193.72 |
| Lane Group LOS | D | F | F | F | F | F | F | C | C | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.08 | 59.36 | 59.24 | 12.58 | 49.65 | 49.68 | 13.10 | 1.02 | 1.72 | 22.71 |
| 50th-Percentile Queue Length [ft/ln] | 26.88 | 1484.12 | 1480.92 | 314.46 | 1241.21 | 1241.95 | 327.57 | 25.44 | 42.91 | 567.74 |
| 95th-Percentile Queue Length [veh/ln] | 1.94 | 98.57 | 98.43 | 22.64 | 81.50 | 81.83 | 23.59 | 1.83 | 3.09 | 35.76 |
| 95th-Percentile Queue Length [ft/ln] | 48.38 | 2464.29 | 2460.63 | 566.02 | 2037.53 | 2045.63 | 589.63 | 45.80 | 77.24 | 894.02 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

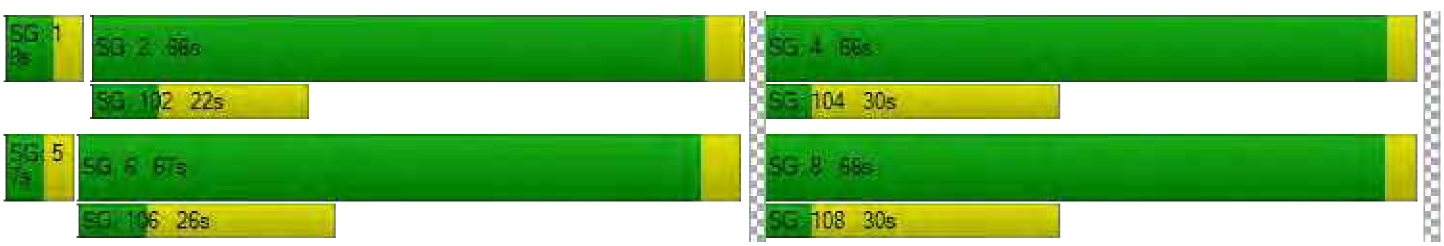
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 38.87 | 494.60 | 496.06 | 659.48 | 404.30 | 410.56 | 856.76 | 23.52 | 23.52 | 28.82 | 193.72 | 193.72 |
| Movement LOS | D | F | F | F | F | F | F | C | C | C | F | F |
| d_A, Approach Delay [s/veh] | 479.74 | | | 453.02 | | | 640.74 | | | 164.51 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 437.98 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.636 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 61.29 | 61.29 | 59.43 | 59.43 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.271 | 3.314 | 2.080 | 2.649 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 900 | 886 | 897 | 900 |
| d_b, Bicycle Delay [s] | 21.19 | 21.93 | 21.36 | 21.33 |
| I_b,int, Bicycle LOS Score for Intersection | 2.823 | 2.897 | 1.871 | 2.324 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 207.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.462 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 244 | 933 | 1447 | 52 | 163 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 244 | 933 | 1447 | 52 | 163 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 66 | 251 | 389 | 14 | 44 | 31 |
| Total Analysis Volume [veh/h] | 262 | 1003 | 1556 | 56 | 175 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 24 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 21 | 99 | 75 | 75 | 24 | 24 |
| g / C, Green / Cycle | 0.16 | 0.76 | 0.58 | 0.58 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.21 | 0.64 | 0.97 | 0.98 | 0.17 | 0.14 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 819 | 1026 | 899 |
| c, Capacity [veh/h] | 206 | 1199 | 479 | 472 | 190 | 167 |
| d1, Uniform Delay [s] | 54.41 | 10.23 | 27.54 | 27.54 | 51.92 | 49.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.26 | 0.12 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 155.88 | 7.02 | 316.93 | 327.98 | 30.53 | 7.14 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.27 | 0.84 | 1.68 | 1.71 | 0.92 | 0.74 |
| d, Delay for Lane Group [s/veh] | 210.28 | 17.25 | 344.47 | 355.52 | 82.45 | 56.85 |
| Lane Group LOS | F | B | F | F | F | E |
| Critical Lane Group | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 15.50 | 8.50 | 55.64 | 56.29 | 7.20 | 4.09 |
| 50th-Percentile Queue Length [ft/ln] | 387.46 | 212.42 | 1391.03 | 1407.15 | 180.09 | 102.31 |
| 95th-Percentile Queue Length [veh/ln] | 24.38 | 13.28 | 91.23 | 92.60 | 11.61 | 7.37 |
| 95th-Percentile Queue Length [ft/ln] | 609.52 | 331.93 | 2280.76 | 2315.12 | 290.13 | 184.16 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 210.28 | 17.25 | 349.80 | 355.52 | 82.45 | 56.85 |
| Movement LOS | F | B | F | F | F | E |
| d_A, Approach Delay [s/veh] | 57.23 | | 350.00 | | 71.88 | |
| Approach LOS | E | | F | | E | |
| d_I, Intersection Delay [s/veh] | 207.25 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.462 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.084 | 3.057 | 2.158 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.00 | 7.44 | 45.70 |
| I_b,int, Bicycle LOS Score for Intersection | 2.603 | 2.890 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 19: Willow Rd (SR 114)/O'Brien Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 255.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.612 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 60.00 | 100.00 | 100.00 | 50.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1000 | 492 | 57 | 1184 | 274 | 204 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.90 | 6.50 | 2.80 | 2.70 | 1.80 | 6.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1000 | 492 | 57 | 1184 | 274 | 204 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 269 | 132 | 15 | 318 | 74 | 55 |
| Total Analysis Volume [veh/h] | 1075 | 529 | 61 | 1273 | 295 | 219 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | 0 | | 5 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | 0 | | 5 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 3 | | 6 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 16.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 1 | 6 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 10 | 10 | 5 | 15 | 8 | 0 |
| Maximum Green [s] | 35 | 35 | 21 | 35 | 21 | 0 |
| Amber [s] | 4.0 | 4.0 | 3.0 | 4.0 | 3.2 | 0.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 88 | 88 | 16 | 104 | 26 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 10 | 10 | 0 |
| Pedestrian Clearance [s] | 17 | 17 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 1.0 | 2.0 | 1.2 | 0.0 |
| Minimum Recall | Yes | | No | Yes | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 6.0 | 6.0 | 20.0 | 6.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 3.00 | 4.00 | 3.20 | 3.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 1.00 | 2.00 | 1.20 | 1.20 |
| g_i, Effective Green Time [s] | 84 | 84 | 13 | 100 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.10 | 0.77 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.83 | 0.98 | 0.09 | 0.99 | 0.43 | 0.43 |
| s, saturation flow rate [veh/h] | 1293 | 540 | 643 | 1286 | 648 | 560 |
| c, Capacity [veh/h] | 838 | 350 | 63 | 989 | 114 | 98 |
| d1, Uniform Delay [s] | 22.83 | 21.66 | 58.46 | 15.00 | 53.56 | 53.56 |
| k, delay calibration | 0.50 | 0.50 | 0.10 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 136.04 | 243.96 | 43.45 | 136.99 | 667.24 | 671.46 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.28 | 1.51 | 0.97 | 1.29 | 2.43 | 2.43 |
| d, Delay for Lane Group [s/veh] | 158.87 | 265.62 | 101.91 | 151.99 | 720.80 | 725.02 |
| Lane Group LOS | F | F | F | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 27.00 | 32.58 | 2.73 | 29.51 | 24.77 | 21.53 |
| 50th-Percentile Queue Length [ft/ln] | 674.98 | 814.49 | 68.17 | 737.80 | 619.35 | 538.17 |
| 95th-Percentile Queue Length [veh/ln] | 42.34 | 54.14 | 4.91 | 46.41 | 41.82 | 36.85 |
| 95th-Percentile Queue Length [ft/ln] | 1058.46 | 1353.61 | 122.71 | 1160.34 | 1045.42 | 921.31 |

### Movement, Approach, & Intersection Results

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 158.87 | 265.62 | 101.91 | 151.99 | 721.28 | 725.02 |
| Movement LOS | F | F | F | F | F | F |
| d_A, Approach Delay [s/veh] | 194.08 | | 149.70 | | 722.76 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 255.65 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.612 | | | | | |

### Other Modes

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 54.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.317 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1293 | 1539 | 351 |
| d_b, Bicycle Delay [s] | 8.14 | 3.46 | 44.22 |
| I_b,int, Bicycle LOS Score for Intersection | 2.883 | 2.660 | 2.408 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 206.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.466 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 449 | 346 | 285 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 382 | 98 | 21 | 372 | 7 | 7 | 54 | 123 | 95 | 78 | 3 |
| Total Analysis Volume [veh/h] | 295 | 1526 | 390 | 86 | 1488 | 29 | 30 | 214 | 493 | 380 | 313 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 3 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 25 | 25 | 25 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 66 | 66 | 11 | 61 | 61 | 34 | 34 | 34 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 5 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 23 | 23 | 23 | 0 | 23 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| g_i, Effective Green Time [s] | 13 | 57 | 57 | 8 | 52 | 52 | 34 | 34 | 34 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.10 | 0.44 | 0.44 | 0.06 | 0.40 | 0.40 | 0.26 | 0.26 | 0.26 | 0.12 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.52 | 0.54 | 0.09 | 0.54 | 0.54 | 0.02 | 0.22 | 0.32 | 0.11 | 0.24 | 0.01 |
| s, saturation flow rate [veh/h] | 1273 | 2481 | 1171 | 952 | 1853 | 961 | 1810 | 965 | 1546 | 3409 | 1303 | 1416 |
| c, Capacity [veh/h] | 127 | 1082 | 511 | 59 | 737 | 382 | 478 | 255 | 408 | 420 | 160 | 174 |
| d1, Uniform Delay [s] | 58.50 | 36.66 | 36.66 | 61.00 | 39.16 | 39.16 | 35.81 | 45.25 | 47.19 | 56.26 | 57.00 | 50.36 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.07 | 0.50 | 0.50 | 0.04 | 0.23 | 0.50 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 617.13 | 95.62 | 118.65 | 223.20 | 168.40 | 177.57 | 0.02 | 14.07 | 114.48 | 3.08 | 450.13 | 0.06 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 2.32 | 1.19 | 1.23 | 1.47 | 1.35 | 1.36 | 0.06 | 0.84 | 1.21 | 0.91 | 1.95 | 0.07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 675.63 | 132.27 | 155.31 | 284.20 | 207.55 | 216.72 | 35.83 | 59.32 | 161.67 | 59.33 | 507.13 | 50.42 |
| Lane Group LOS | F | F | F | F | F | F | D | E | F | E | F | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 25.94 | 30.73 | 32.28 | 5.58 | 28.93 | 30.98 | 0.72 | 7.50 | 25.92 | 6.33 | 25.32 | 0.35 |
| 50th-Percentile Queue Length [ft/ln] | 648.43 | 768.35 | 806.92 | 139.60 | 723.22 | 774.45 | 18.11 | 187.55 | 648.02 | 158.35 | 632.93 | 8.77 |
| 95th-Percentile Queue Length [veh/ln] | 41.90 | 44.85 | 47.65 | 10.05 | 45.07 | 48.00 | 1.30 | 11.99 | 38.11 | 10.46 | 40.86 | 0.63 |
| 95th-Percentile Queue Length [ft/ln] | 1047.48 | 1121.30 | 1191.13 | 251.29 | 1126.66 | 1200.03 | 32.60 | 299.85 | 952.83 | 261.54 | 1021.50 | 15.79 |

**Movement, Approach, & Intersection Results**

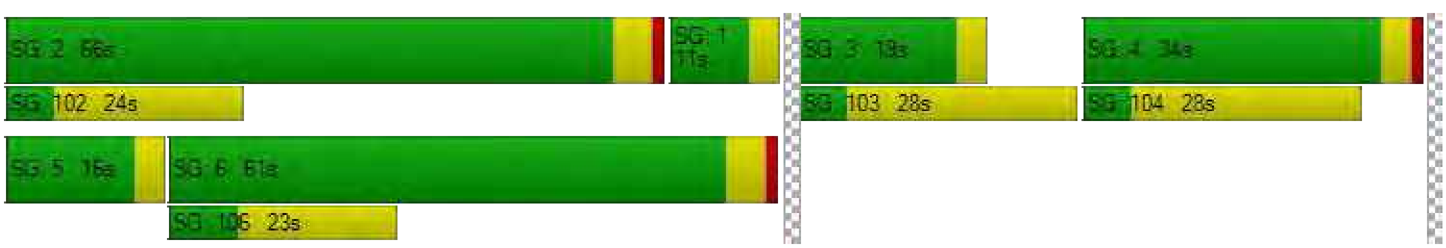
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 675.63 | 135.84 | 155.31 | 284.20 | 210.57 | 216.72 | 35.83 | 59.32 | 161.67 | 59.33 | 507.13 | 50.42 |
| Movement LOS | F | F | F | F | F | F | D | E | F | E | F | D |
| d_A, Approach Delay [s/veh] | | 211.30 | | | 214.63 | | | 126.83 | | | 257.99 | |
| Approach LOS | | F | | | F | | | F | | | F | |
| d_I, Intersection Delay [s/veh] | | | | | | 206.73 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.466 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.494 | 2.986 | 2.775 | 2.770 |
| Crosswalk LOS | C | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 938 | 862 | 462 | 246 |
| d_b, Bicycle Delay [s] | 18.31 | 21.11 | 38.54 | 50.14 |
| I_b,int, Bicycle LOS Score for Intersection | 2.776 | 2.441 | 3.064 | 2.797 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 224.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.410 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1319 | 809 | 283 | 349 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 40 | 1319 | 809 | 60 | 349 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 340 | 209 | 15 | 90 | 0 |
| Total Analysis Volume [veh/h] | 41 | 1360 | 834 | 62 | 360 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 88 | 88 | 88 | 88 | 88 | 88 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 3 | 42 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.03 | 0.48 | 0.41 | 0.41 | 0.41 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.81 | 0.50 | 0.04 | 0.42 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 1574 | 850 | 1596 |
| c, Capacity [veh/h] | 54 | 805 | 690 | 645 | 348 | 654 |
| d1, Uniform Delay [s] | 42.28 | 22.85 | 25.92 | 15.91 | 25.92 | 0.00 |
| k, delay calibration | 0.04 | 0.43 | 0.19 | 0.15 | 0.48 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.54 | 314.68 | 99.28 | 0.09 | 55.80 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.75 | 1.69 | 1.21 | 0.10 | 1.03 | 0.00 |
| d, Delay for Lane Group [s/veh] | 49.82 | 337.53 | 125.20 | 16.00 | 81.72 | 0.00 |
| Lane Group LOS | D | F | F | B | F | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.99 | 42.79 | 16.11 | 0.74 | 12.19 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 24.65 | 1069.64 | 402.65 | 18.58 | 304.81 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.77 | 70.48 | 25.45 | 1.34 | 18.31 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 44.37 | 1761.89 | 636.35 | 33.45 | 457.78 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 49.82 | 337.53 | 125.20 | 16.00 | 81.72 | 0.00 |
| Movement LOS | D | F | F | B | F | A |
| d_A, Approach Delay [s/veh] | 329.11 | | 117.65 | | 81.72 | |
| Approach LOS | F | | F | | F | |
| d_I, Intersection Delay [s/veh] | 224.28 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.410 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 33.58 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.244 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 820 | 820 | 820 |
| d_b, Bicycle Delay [s] | 15.35 | 15.32 | 15.30 |
| I_b,int, Bicycle LOS Score for Intersection | 2.715 | 2.483 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 222.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.277 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 50.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 20 | 21 | 8 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 292 | 1 | 8 | 150 | 5 | 39 | 9 | 6 | 6 | 2 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1169 | 4 | 32 | 601 | 20 | 158 | 34 | 22 | 23 | 9 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| g_i, Effective Green Time [s] | 1 | 100 | 100 | 4 | 102 | 13 | 13 | 13 | 19 | 19 |
| g / C, Green / Cycle | 0.01 | 0.65 | 0.65 | 0.02 | 0.67 | 0.08 | 0.08 | 0.08 | 0.12 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.92 | 0.92 | 0.02 | 1.05 | 0.05 | 0.05 | 0.05 | 0.01 | 0.11 |
| s, saturation flow rate [veh/h] | 1095 | 688 | 589 | 1810 | 593 | 1748 | 1840 | 444 | 1810 | 555 |
| c, Capacity [veh/h] | 10 | 449 | 384 | 43 | 395 | 144 | 151 | 37 | 225 | 69 |
| d1, Uniform Delay [s] | 75.91 | 26.66 | 26.66 | 74.41 | 25.58 | 68.22 | 68.20 | 67.65 | 59.52 | 66.02 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 119.64 | 196.32 | 198.58 | 22.85 | 268.65 | 4.91 | 4.61 | 14.84 | 0.20 | 30.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.96 | 1.41 | 1.41 | 0.75 | 1.57 | 0.65 | 0.65 | 0.60 | 0.10 | 0.88 |
| d, Delay for Lane Group [s/veh] | 195.55 | 222.98 | 225.23 | 97.25 | 294.23 | 73.13 | 72.80 | 82.49 | 59.71 | 96.54 |
| Lane Group LOS | F | F | F | F | F | E | E | F | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.74 | 40.12 | 34.58 | 1.54 | 43.15 | 3.87 | 4.04 | 1.01 | 0.82 | 2.96 |
| 50th-Percentile Queue Length [ft/ln] | 18.58 | 1003.06 | 864.39 | 38.44 | 1078.86 | 96.75 | 100.99 | 25.13 | 20.46 | 73.93 |
| 95th-Percentile Queue Length [veh/ln] | 1.34 | 63.64 | 55.54 | 2.77 | 71.28 | 6.97 | 7.27 | 1.81 | 1.47 | 5.32 |
| 95th-Percentile Queue Length [ft/ln] | 33.45 | 1590.92 | 1388.51 | 69.19 | 1782.12 | 174.15 | 181.79 | 45.24 | 36.83 | 133.07 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 195.55 | 224.01 | 225.23 | 97.25 | 294.23 | 294.23 | 73.00 | 72.80 | 82.49 | 59.71 | 96.54 | 96.54 |
| Movement LOS | F | F | F | F | F | F | E | E | F | E | F | F |
| d_A, Approach Delay [s/veh] | 223.78 | | | 284.58 | | | 73.94 | | | 86.45 | | |
| Approach LOS | F | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 221.95 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.277 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 65.98 | 65.98 | 65.98 | 65.98 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.532 | 2.753 | 2.204 | 2.007 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 261 | 261 | 392 | 392 |
| d_b, Bicycle Delay [s] | 57.98 | 58.15 | 49.55 | 49.55 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.637 | 1.942 | 1.698 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 23: Willow Rd/Coleman Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.691 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 30.00 | | | 30.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Coleman Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 693 | 5 | 2 | 687 | 109 | 147 | 2 | 49 | 15 | 4 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.10 | 0.00 | 0.00 | 3.70 | 2.40 | 3.90 | 0.00 | 3.20 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 693 | 5 | 2 | 687 | 109 | 147 | 2 | 49 | 15 | 4 | 6 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 190 | 1 | 1 | 189 | 30 | 40 | 1 | 13 | 4 | 1 | 2 |
| Total Analysis Volume [veh/h] | 23 | 762 | 5 | 2 | 755 | 120 | 162 | 2 | 54 | 16 | 4 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 19 | | | 15 | | | 19 | | | 15 | | |
| v_di, Inbound Pedestrian Volume crossing m | 19 | | | 15 | | | 19 | | | 15 | | |
| v_co, Outbound Pedestrian Volume crossing | 10 | | | 8 | | | 8 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 8 | | | 8 | | | 10 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 8 | | | 4 | | | 4 | | | 4 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 80.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 10 | 10 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 0 | 4 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 11 | 11 | 13 | 13 | 13 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 6.0 | 6.0 | 6.0 | 0.0 | 6.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 73 | 73 | 73 | 73 | 19 | 19 |
| g / C, Green / Cycle | 0.73 | 0.73 | 0.73 | 0.73 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.41 | 0.00 | 0.49 | 0.15 | 0.02 |
| s, saturation flow rate [veh/h] | 644 | 1851 | 712 | 1791 | 1413 | 1536 |
| c, Capacity [veh/h] | 360 | 1352 | 438 | 1309 | 327 | 345 |
| d1, Uniform Delay [s] | 15.83 | 6.19 | 11.83 | 7.09 | 38.60 | 33.49 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.18 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.34 | 1.73 | 0.02 | 2.73 | 3.82 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.57 | 0.00 | 0.67 | 0.67 | 0.08 |
| d, Delay for Lane Group [s/veh] | 16.17 | 7.92 | 11.85 | 9.81 | 42.42 | 33.59 |
| Lane Group LOS | B | A | B | A | D | C |
| Critical Lane Group | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.34 | 6.95 | 0.02 | 8.83 | 5.40 | 0.56 |
| 50th-Percentile Queue Length [ft/ln] | 8.41 | 173.80 | 0.59 | 220.87 | 135.06 | 13.88 |
| 95th-Percentile Queue Length [veh/ln] | 0.61 | 11.28 | 0.04 | 13.71 | 9.21 | 1.00 |
| 95th-Percentile Queue Length [ft/ln] | 15.14 | 281.90 | 1.06 | 342.73 | 230.36 | 24.98 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.17 | 7.92 | 7.92 | 11.85 | 9.81 | 9.81 | 42.42 | 42.42 | 42.42 | 33.59 | 33.59 | 33.59 |
| Movement LOS | B | A | A | B | A | A | D | D | D | C | C | C |
| d_A, Approach Delay [s/veh] | 8.16 | | | 9.82 | | | 42.42 | | | 33.59 | | |
| Approach LOS | A | | | A | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 13.19 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.691 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.57 | 39.57 | 39.57 | 39.57 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.405 | 2.763 | 1.930 | 1.737 |
| Crosswalk LOS | B | C | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1379 | 1379 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.84 | 4.83 | 29.75 | 29.75 |
| I_b,int, Bicycle LOS Score for Intersection | 2.863 | 3.007 | 1.919 | 1.604 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 24: Willow Rd/Gilbert Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.559 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ┐├ | | | ┐├ | | | ┐├ | | | ┐├ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 55.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Gilbert Avenue | | | Gilbert Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 120 | 5 | 81 | 52 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 3.00 | 0.00 | 0.00 | 2.70 | 0.00 | 3.30 | 2.00 | 10.10 | 0.00 | 2.30 | 3.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 120 | 5 | 81 | 52 | 58 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 171 | 31 | 14 | 183 | 3 | 11 | 31 | 1 | 21 | 14 | 15 |
| Total Analysis Volume [veh/h] | 3 | 683 | 124 | 56 | 732 | 10 | 46 | 125 | 5 | 84 | 54 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | | 1 | | | 2 | | | 4 | | |
| v_di, Inbound Pedestrian Volume crossing m | 4 | | | 2 | | | 1 | | | 3 | | |
| v_co, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 2 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 15 | | | 12 | | | 5 | | | 7 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 2 | 2 | 6 | 6 | 6 | 4 | 4 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 12 | 12 | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 0 | 5 | 0 |
| Maximum Green [s] | 60 | 60 | 60 | 60 | 60 | 60 | 24 | 24 | 24 | 0 | 24 | 0 |
| Amber [s] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 0.0 | 3.1 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 73 | 73 | 73 | 73 | 73 | 73 | 27 | 27 | 27 | 0 | 27 | 0 |
| Vehicle Extension [s] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 2.1 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | Yes | | | Yes | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 | 4.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 |
| g_i, Effective Green Time [s] | 74 | 74 | 74 | 74 | 18 | 18 | 18 | 18 |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.74 | 0.74 | 0.18 | 0.18 | 0.18 | 0.18 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.45 | 0.08 | 0.40 | 0.04 | 0.07 | 0.07 | 0.07 |
| s, saturation flow rate [veh/h] | 729 | 1796 | 686 | 1854 | 1259 | 1854 | 1276 | 1680 |
| c, Capacity [veh/h] | 475 | 1331 | 426 | 1375 | 191 | 327 | 189 | 297 |
| d1, Uniform Delay [s] | 10.00 | 6.07 | 12.77 | 5.57 | 42.58 | 36.46 | 44.12 | 36.37 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 2.06 | 0.64 | 1.52 | 0.65 | 0.78 | 1.63 | 0.82 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.01 | 0.61 | 0.13 | 0.54 | 0.24 | 0.40 | 0.44 | 0.38 |
|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 10.03 | 8.13 | 13.40 | 7.10 | 43.22 | 37.24 | 45.75 | 37.18 |
| Lane Group LOS | B | A | B | A | D | D | D | D |
| Critical Lane Group | No | Yes | No | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.03 | 7.41 | 0.73 | 6.19 | 1.11 | 2.90 | 2.11 | 2.54 |
| 50th-Percentile Queue Length [ft/ln] | 0.81 | 185.23 | 18.36 | 154.82 | 27.70 | 72.38 | 52.83 | 63.45 |
| 95th-Percentile Queue Length [veh/ln] | 0.06 | 11.87 | 1.32 | 10.27 | 1.99 | 5.21 | 3.80 | 4.57 |
| 95th-Percentile Queue Length [ft/ln] | 1.46 | 296.83 | 33.05 | 256.84 | 49.86 | 130.28 | 95.10 | 114.20 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.03 | 8.13 | 8.13 | 13.40 | 7.10 | 7.10 | 43.22 | 37.24 | 37.24 | 45.75 | 37.18 | 37.18 |
| Movement LOS | B | A | A | B | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 8.13 | | | 7.54 | | | 38.80 | | | 40.82 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 13.88 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.559 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.60 | 39.60 | 39.60 | 39.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.506 | 2.524 | 2.015 | 2.161 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 458 | 458 |
| d_b, Bicycle Delay [s] | 4.87 | 4.86 | 29.79 | 29.82 |
| I_b,int, Bicycle LOS Score for Intersection | 2.896 | 2.876 | 1.850 | 1.886 |
| Bicycle LOS | C | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 25: Middlefield Rd-Willow Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 42.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.710 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 75.00 | 100.00 | 215.00 | 155.00 | 100.00 | 160.00 | 125.00 | 100.00 | 70.00 | 270.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | Middlefield Road | | | Middlefield Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 281 | 269 | 372 | 126 | 299 | 134 | 478 | 184 | 277 | 684 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.20 | 1.10 | 0.00 | 1.70 | 0.00 | 2.40 | 1.10 | 0.50 | 2.30 | 6.40 | 0.00 | 3.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 120 | 0 | 0 | 1000 | 0 | 0 | 1000 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 281 | 149 | 372 | 126 | 0 | 134 | 478 | 184 | 277 | 684 | 22 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 74 | 39 | 98 | 33 | 0 | 35 | 126 | 48 | 73 | 180 | 6 |
| Total Analysis Volume [veh/h] | 32 | 296 | 157 | 392 | 133 | 0 | 141 | 503 | 194 | 292 | 720 | 23 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 12 | | | 6 | | | 12 | | | 6 | | |
| v_di, Inbound Pedestrian Volume crossing m | 12 | | | 6 | | | 12 | | | 6 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 5 | | | 4 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 50 | | | 19 | | | 4 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 150 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| Control Type | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 8 | 1 | 8 | 4 | 4 | 4 | 6 | 3 | 6 | 2 | 2 | 2 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | Lag | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 5 | 0 | 5 | 5 | 5 |
| Maximum Green [s] | 0 | 20 | 0 | 45 | 45 | 45 | 0 | 45 | 0 | 30 | 30 | 30 |
| Amber [s] | 0.0 | 3.3 | 0.0 | 3.7 | 3.7 | 3.7 | 0.0 | 3.7 | 0.0 | 3.7 | 3.7 | 3.7 |
| All red [s] | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 33 | 0 | 46 | 46 | 46 | 0 | 32 | 0 | 39 | 39 | 39 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 8 | 0 | 8 | 8 | 8 | 0 | 8 | 0 | 8 | 8 | 8 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 22 | 22 | 22 | 0 | 17 | 0 | 18 | 18 | 18 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.3 | 0.0 | 2.7 | 2.7 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 2.7 | 2.7 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | R | L | C | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| L, Total Lost Time per Cycle [s] | 4.30 | 4.30 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.30 | 2.30 | 2.30 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| g_i, Effective Green Time [s] | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 18 | 18 | 18 | 25 | 25 | 25 |
| g / C, Green / Cycle | 0.20 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.16 | 0.11 | 0.14 | 0.14 | 0.00 | 0.08 | 0.13 | 0.14 | 0.13 | 0.17 | 0.22 | 0.20 |
| s, saturation flow rate [veh/h] | 1778 | 1883 | 1452 | 1785 | 1853 | 1584 | 1794 | 1892 | 1892 | 1541 | 1718 | 1900 | 1699 |
| c, Capacity [veh/h] | 350 | 370 | 285 | 344 | 357 | 305 | 322 | 340 | 340 | 277 | 430 | 475 | 425 |
| d1, Uniform Delay [s] | 33.43 | 38.95 | 36.37 | 38.73 | 38.73 | 0.00 | 37.15 | 39.33 | 39.63 | 39.00 | 34.46 | 36.50 | 35.55 |
| k, delay calibration | 0.11 | 0.28 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.13 | 0.24 | 0.19 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.11 | 9.73 | 1.65 | 3.27 | 3.15 | 0.00 | 0.94 | 2.90 | 3.47 | 3.21 | 2.28 | 10.14 | 5.50 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.80 | 0.55 | 0.75 | 0.75 | 0.00 | 0.44 | 0.72 | 0.76 | 0.70 | 0.68 | 0.87 | 0.78 |
| d, Delay for Lane Group [s/veh] | 33.55 | 48.68 | 38.02 | 42.00 | 41.88 | 0.00 | 38.09 | 42.23 | 43.09 | 42.22 | 36.74 | 46.64 | 41.05 |
| Lane Group LOS | C | D | D | D | D | A | D | D | D | D | D | D | D |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.65 | 7.94 | 3.57 | 6.37 | 6.60 | 0.00 | 3.18 | 5.99 | 6.37 | 4.72 | 6.70 | 10.92 | 8.19 |
| 50th-Percentile Queue Length [ft/ln] | 16.37 | 198.50 | 89.18 | 159.18 | 164.94 | 0.00 | 79.59 | 149.6 | 159.1 | 118.1 | 167.49 | 273.06 | 204.63 |
| 95th-Percentile Queue Length [veh/ln] | 1.18 | 12.56 | 6.42 | 10.51 | 10.81 | 0.00 | 5.73 | 10.00 | 10.51 | 8.29 | 10.94 | 16.34 | 12.88 |
| 95th-Percentile Queue Length [ft/ln] | 29.47 | 314.03 | 160.53 | 262.64 | 270.26 | 0.00 | 143.2 | 249.9 | 262.6 | 207.2 | 273.61 | 408.56 | 321.93 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

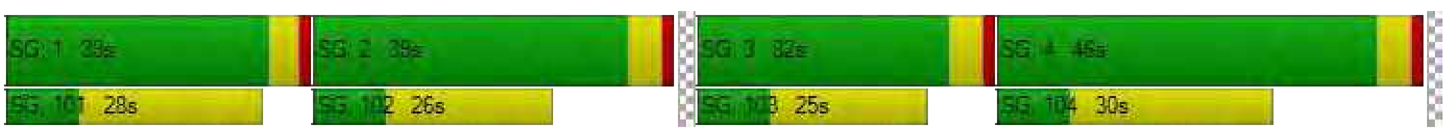
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.55 | 48.68 | 38.02 | 41.96 | 41.88 | 0.00 | 38.09 | 42.67 | 42.22 | 36.74 | 44.24 | 41.05 |
| Movement LOS | C | D | D | D | D | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 44.23 | | | 41.94 | | | 41.80 | | | 42.06 | | |
| Approach LOS | D | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 42.33 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.710 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 12.0 | 12.0 | 12.0 | 12.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.47 | 39.47 | 39.47 | 39.47 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.526 | 4.264 | 4.404 | 2.806 |
| Crosswalk LOS | B | E | E | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 565 | 814 | 538 | 676 |
| d_b, Bicycle Delay [s] | 26.79 | 18.03 | 27.18 | 22.41 |
| I_b,int, Bicycle LOS Score for Intersection | 2.558 | 4.076 | 3.076 | 2.413 |
| Bicycle LOS | B | D | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 110: Marsh Road/101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.988 |

**Intersection Setup**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Northwestbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 1 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 500.00 | 360.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | Yes | |

**Volumes**

| Name | Marsh Road | | Marsh Road | | 101 NB Ramps | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1912 | 0 | 0 | 1568 | 570 | 891 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.40 | 0.00 | 0.00 | 3.00 | 5.10 | 12.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1912 | 0 | 0 | 1568 | 570 | 891 |
| Peak Hour Factor | 0.9900 | 1.0000 | 1.0000 | 0.9900 | 0.9900 | 0.9900 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 483 | 0 | 0 | 396 | 144 | 225 |
| Total Analysis Volume [veh/h] | 1931 | 0 | 0 | 1584 | 576 | 900 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 1 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 7 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 40.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 8 | 1 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lag | - |
| Minimum Green [s] | 8 | 0 | 0 | 8 | 6 | 0 |
| Maximum Green [s] | 32 | 0 | 0 | 32 | 26 | 0 |
| Amber [s] | 4.1 | 0.0 | 0.0 | 4.1 | 3.2 | 0.0 |
| All red [s] | 0.5 | 0.0 | 0.0 | 0.5 | 1.0 | 0.0 |
| Split [s] | 50 | 0 | 0 | 50 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 12 | 0 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Minimum Recall | Yes | | | Yes | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | R |
|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 2.50 | 2.50 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.50 | 0.50 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 47 | 47 | 28 | 28 |
| g / C, Green / Cycle | 0.59 | 0.59 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.55 | 0.45 | 0.17 | 0.35 |
| s, saturation flow rate [veh/h] | 3492 | 3532 | 3373 | 2585 |
| c, Capacity [veh/h] | 2071 | 2095 | 1182 | 906 |
| d1, Uniform Delay [s] | 14.79 | 11.99 | 20.33 | 25.85 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.07 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.19 | 2.60 | 0.12 | 9.91 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.93 | 0.76 | 0.49 | 0.99 |
| d, Delay for Lane Group [s/veh] | 23.98 | 14.59 | 20.44 | 35.76 |
| Lane Group LOS | C | B | C | D |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 15.91 | 9.58 | 4.03 | 9.22 |
| 50th-Percentile Queue Length [ft/ln] | 397.83 | 239.49 | 100.73 | 230.42 |
| 95th-Percentile Queue Length [veh/ln] | 22.46 | 14.66 | 7.25 | 14.20 |
| 95th-Percentile Queue Length [ft/ln] | 561.38 | 366.39 | 181.31 | 354.89 |

**Movement, Approach, & Intersection Results**

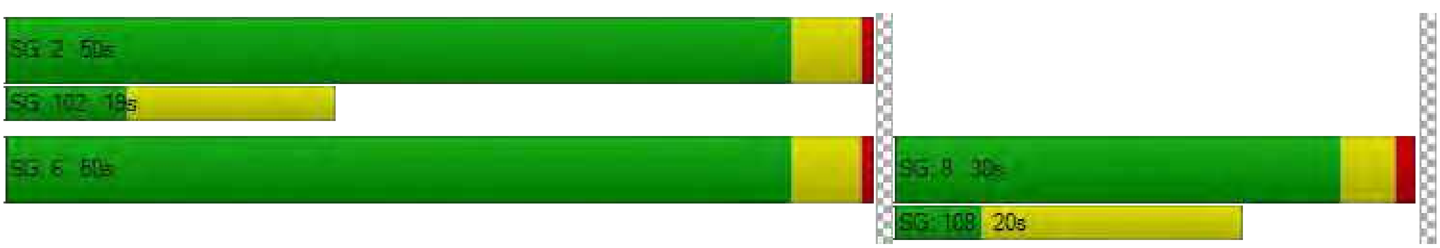
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 23.98 | 0.00 | 0.00 | 14.59 | 20.44 | 35.76 |
| Movement LOS | C | | | B | C | D |
| d_A, Approach Delay [s/veh] | 23.98 | | 14.59 | | 29.78 | |
| Approach LOS | C | | B | | C | |
| d_I, Intersection Delay [s/veh] | 22.71 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.988 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 29.73 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.203 | 2.484 |
| Crosswalk LOS | F | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1136 | 1136 | 645 |
| d_b, Bicycle Delay [s] | 7.46 | 7.49 | 18.34 |
| I_b,int, Bicycle LOS Score for Intersection | 3.153 | 2.866 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 163.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.552 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 103 | 5 | 21 | 211 | 10 | 6 | 35 | 7 | 2 | 4 | 15 |
| Total Analysis Volume [veh/h] | 24 | 413 | 19 | 82 | 845 | 39 | 24 | 140 | 26 | 8 | 17 | 61 |
| Pedestrian Volume [ped/h] | 3 | | | 4 | | | 2 | | | 5 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 603 | 966 | 512 | 504 |
| Degree of Utilization, x | 0.76 | 1.55 | 0.37 | 0.17 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 6.80 | 50.15 | 1.70 | 0.61 |
| 95th-Percentile Queue Length [ft] | 169.96 | 1253.69 | 42.55 | 15.26 |
| Approach Delay [s/veh] | 25.13 | 272.29 | 14.14 | 11.61 |
| Approach LOS | D | F | B | B |
| Intersection Delay [s/veh] | 163.83 | | | |
| Intersection LOS | F | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 163: Bayfront Expy/Marsh Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 72.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.079 |

**Intersection Setup**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | Marsh Road | | | Haven Avenue | | | Bayfront Expressway | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 194 | 40 | 1694 | 12 | 31 | 5 | 9 | 752 | 232 | 2657 | 802 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 19.20 | 0.00 | 2.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 2.20 | 2.90 | 14.30 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 194 | 40 | 1694 | 12 | 31 | 5 | 9 | 752 | 232 | 2657 | 802 | 14 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 10 | 441 | 3 | 8 | 1 | 2 | 196 | 60 | 692 | 209 | 4 |
| Total Analysis Volume [veh/h] | 202 | 42 | 1765 | 13 | 32 | 5 | 9 | 783 | 242 | 2768 | 835 | 15 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | | 0 | | | 4 | | | 4 | | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | | 0 | | | 4 | | | 4 | | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ci, Inbound Pedestrian Volume crossing mi | | 0 | | | 13 | | | 0 | | | 13 | |
| v_ab, Corner Pedestrian Volume [ped/h] | | 0 | | | 0 | | | 0 | | | 0 | |
| Bicycle Volume [bicycles/h] | | 0 | | | 13 | | | 8 | | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 125.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Split | Split | Overlap | Split | Split | Split | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 2 | 3 | 3 | 6 | 4 | 6 | 4 | 1 | 4 | 1 | 2 | 8 |
| Auxiliary Signal Groups | | | 2,3 | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lag | - | - | Lag | - | - | Lead | - | - |
| Minimum Green [s] | 10 | 6 | 6 | 10 | 4 | 10 | 4 | 12 | 4 | 12 | 10 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 4.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 4.7 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.0 | 0.5 | 0.0 | 1.0 | 0.0 |
| Split [s] | 58 | 11 | 11 | 25 | 32 | 25 | 32 | 59 | 32 | 59 | 58 | 0 |
| Vehicle Extension [s] | 4.5 | 2.0 | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 4.5 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 10 | 5 | 10 | 5 | 0 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 16 | 0 | 0 | 10 | 22 | 10 | 22 | 0 | 22 | 0 | 16 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.0 | 1.6 | 0.0 | 1.6 | 0.0 | 0.0 |
| Minimum Recall | | No | No | | No | | | No | | | Yes | |
| Maximum Recall | | No | No | | No | | | No | | | No | |
| Pedestrian Recall | | No | No | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | C | C | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 3.60 | 3.60 | 3.60 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.60 | 1.60 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 27 | 117 | 10 | 10 | 38 | 38 | 38 | 76 | 76 |
| g / C, Green / Cycle | 0.17 | 0.73 | 0.06 | 0.06 | 0.24 | 0.24 | 0.24 | 0.48 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.42 | 0.02 | 0.01 | 0.22 | 0.22 | 0.16 | 0.54 | 0.51 |
| s, saturation flow rate [veh/h] | 1824 | 4190 | 1707 | 1588 | 1892 | 1724 | 1556 | 5150 | 1678 |
| c, Capacity [veh/h] | 305 | 2956 | 137 | 97 | 447 | 407 | 368 | 2449 | 798 |
| d1, Uniform Delay [s] | 64.05 | 11.98 | 71.59 | 71.56 | 59.75 | 59.75 | 55.05 | 41.96 | 41.96 |
| k, delay calibration | 0.40 | 0.50 | 0.04 | 0.04 | 0.15 | 0.15 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 16.02 | 0.90 | 0.27 | 0.45 | 11.14 | 11.99 | 0.75 | 64.36 | 50.58 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.80 | 0.60 | 0.20 | 0.23 | 0.93 | 0.93 | 0.66 | 1.13 | 1.06 |
| d, Delay for Lane Group [s/veh] | 80.06 | 12.88 | 71.86 | 72.01 | 70.88 | 71.74 | 55.81 | 106.31 | 92.54 |
| Lane Group LOS | F | B | E | E | E | E | E | F | F |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.98 | 10.62 | 1.10 | 0.89 | 17.86 | 16.37 | 8.94 | 46.36 | 42.27 |
| 50th-Percentile Queue Length [ft/ln] | 274.42 | 265.44 | 27.52 | 22.30 | 446.62 | 409.28 | 223.62 | 1158.93 | 1056.65 |
| 95th-Percentile Queue Length [veh/ln] | 16.41 | 15.96 | 1.98 | 1.61 | 24.80 | 23.01 | 13.85 | 63.14 | 55.65 |
| 95th-Percentile Queue Length [ft/ln] | 410.26 | 399.04 | 49.54 | 40.15 | 619.91 | 575.17 | 346.25 | 1578.51 | 1391.25 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

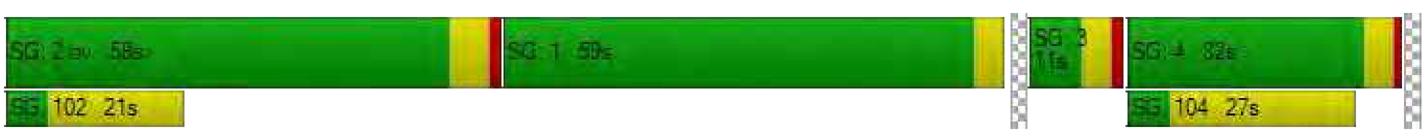
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 80.06 | 80.06 | 12.88 | 71.86 | 71.94 | 72.01 | 70.88 | 71.29 | 55.81 | 106.31 | 92.54 | 92.54 |
| Movement LOS | F | F | B | E | E | E | E | E | E | F | F | F |
| d_A, Approach Delay [s/veh] | 21.04 | | | 71.93 | | | 67.66 | | | 103.08 | | |
| Approach LOS | C | | | E | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 72.83 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 1.079 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 71.25 | 71.25 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.006 | 2.665 | 0.000 |
| Crosswalk LOS | F | B | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 80 | 349 | 693 | 654 |
| d_b, Bicycle Delay [s] | 73.73 | 54.89 | 34.33 | 36.27 |
| I_b,int, Bicycle LOS Score for Intersection | 4.874 | 1.601 | 2.413 | 7.529 |
| Bicycle LOS | E | A | B | F |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 165: Willow Rd/US-101 SB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 156.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.058 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Westbound | | | Southeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | Yes | | | No | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1036 | 199 | 0 | 1142 | 863 | 0 | 0 | 0 | 0 | 799 | 352 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 0.00 | 0.00 | 4.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1036 | 199 | 0 | 1142 | 863 | 0 | 0 | 0 | 0 | 799 | 352 |
| Peak Hour Factor | 1.0000 | 0.9300 | 1.0000 | 1.0000 | 0.9300 | 0.9300 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 278 | 50 | 0 | 307 | 232 | 0 | 0 | 0 | 0 | 200 | 98 |
| Total Analysis Volume [veh/h] | 0 | 1114 | 199 | 0 | 1228 | 928 | 0 | 0 | 0 | 0 | 799 | 391 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 10 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 16.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | Lead | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 59 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | Yes | | | Yes | | | | | | No | |
| Maximum Recall | | No | | | No | | | | | | No | |
| Pedestrian Recall | | No | | | No | | | | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 43 | 43 | 43 | | 29 | 29 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.54 | | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.25 | 1.34 | | 0.23 | 0.31 |
| s, saturation flow rate [veh/h] | 5094 | 5012 | 693 | | 3514 | 1271 |
| c, Capacity [veh/h] | 2749 | 2705 | 374 | | 1265 | 458 |
| d1, Uniform Delay [s] | 10.82 | 11.20 | 17.81 | | 21.14 | 23.59 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.45 | 0.55 | 673.93 | | 0.52 | 4.64 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.41 | 0.45 | 2.48 | | 0.63 | 0.85 |
| d, Delay for Lane Group [s/veh] | 11.27 | 11.75 | 691.74 | | 21.67 | 28.24 |
| Lane Group LOS | B | B | F | | C | C |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.61 | 4.12 | 75.84 | | 5.94 | 3.49 |
| 50th-Percentile Queue Length [ft/ln] | 90.14 | 103.05 | 1896.06 | | 148.38 | 87.14 |
| 95th-Percentile Queue Length [veh/ln] | 6.49 | 7.42 | 129.75 | | 9.93 | 6.27 |
| 95th-Percentile Queue Length [ft/ln] | 162.24 | 185.48 | 3243.66 | | 248.27 | 156.86 |

**Movement, Approach, & Intersection Results**

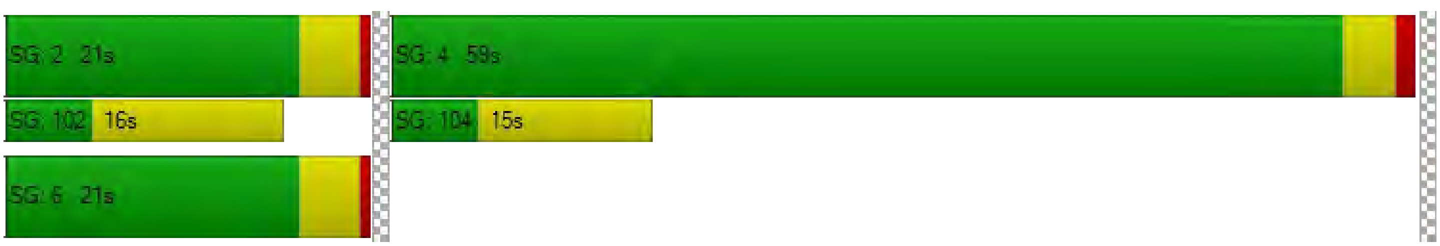
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 11.27 | 0.00 | 0.00 | 11.75 | 691.74 | 0.00 | 0.00 | 0.00 | 0.00 | 21.67 | 28.24 |
| Movement LOS | | B | | | B | F | | | | | C | C |
| d_A, Approach Delay [s/veh] | 11.27 | | | 304.43 | | | 0.00 | | | 23.83 | | |
| Approach LOS | B | | | F | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 156.34 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 2.058 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.46 | 0.00 | 31.46 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.970 | 0.000 | 1.419 | 0.000 |
| Crosswalk LOS | C | F | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 426 | 426 | 0 | 1377 |
| d_b, Bicycle Delay [s] | 24.77 | 24.88 | 39.95 | 3.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.172 | 2.745 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 168: Willow Rd/US-101 NB Ramps**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 230.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.237 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Northwestbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Right | Right | Left2 | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | | | | No | | |
| Crosswalk | No | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Willow Road | | | Willow Road (SR 114) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 1376 | 470 | 0 | 1637 | 784 | 0 | 0 | 0 | 345 | 0 | 859 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 1376 | 470 | 0 | 1637 | 784 | 0 | 0 | 0 | 345 | 0 | 859 |
| Peak Hour Factor | 1.0000 | 0.9800 | 0.9800 | 1.0000 | 0.9800 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 351 | 120 | 0 | 418 | 196 | 0 | 0 | 0 | 86 | 0 | 239 |
| Total Analysis Volume [veh/h] | 0 | 1404 | 480 | 0 | 1670 | 784 | 0 | 0 | 0 | 345 | 0 | 954 |
| Presence of On-Street Parking | No | | No | No | | No | | | | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 4 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 8.00 |

**Phasing & Timing**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Unsigna | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 30 | 0 | 0 |
| Amber [s] | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 60 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 11 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | | No | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| Minimum Recall | | No | | | No | | | | | No | | |
| Maximum Recall | | No | | | No | | | | | No | | |
| Pedestrian Recall | | No | | | No | | | | | No | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | R | C | | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 80 | 80 | 80 | | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 24 | 24 | 24 | | 48 | 48 |
| g / C, Green / Cycle | 0.30 | 0.30 | 0.30 | | 0.60 | 0.60 |
| (v / s)_i Volume / Saturation Flow Rate | 0.46 | 0.30 | 0.55 | | 0.10 | 0.57 |
| s, saturation flow rate [veh/h] | 3051 | 1579 | 3051 | | 3514 | 1685 |
| c, Capacity [veh/h] | 913 | 472 | 913 | | 2111 | 1012 |
| d1, Uniform Delay [s] | 28.00 | 27.73 | 28.00 | | 7.06 | 14.68 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 247.61 | 45.53 | 377.52 | | 0.04 | 5.24 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.54 | 1.02 | 1.83 | | 0.16 | 0.94 |
| d, Delay for Lane Group [s/veh] | 275.61 | 73.26 | 405.52 | | 7.10 | 19.93 |
| Lane Group LOS | F | F | F | | A | B |
| Critical Lane Group | No | No | Yes | | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 26.44 | 14.44 | 37.42 | | 1.15 | 7.31 |
| 50th-Percentile Queue Length [ft/ln] | 660.92 | 361.06 | 935.44 | | 28.85 | 182.77 |
| 95th-Percentile Queue Length [veh/ln] | 42.77 | 20.88 | 61.19 | | 2.08 | 11.74 |
| 95th-Percentile Queue Length [ft/ln] | 1069.31 | 522.08 | 1529.79 | | 51.94 | 293.62 |

**Movement, Approach, & Intersection Results**

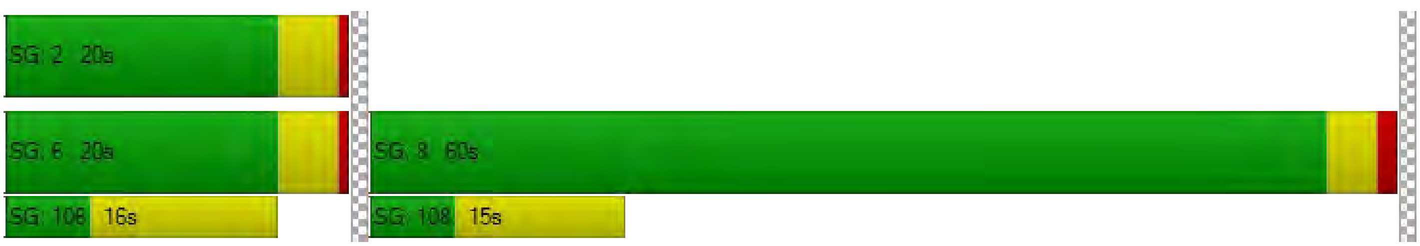
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 275.61 | 73.26 | 0.00 | 405.52 | 0.00 | 0.00 | 0.00 | 0.00 | 7.10 | 0.00 | 19.93 |
| Movement LOS | | F | F | | F | | | | | A | | B |
| d_A, Approach Delay [s/veh] | 224.05 | | | 405.52 | | | 0.00 | | | 16.52 | | |
| Approach LOS | F | | | F | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 230.95 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.237 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 31.48 | 31.48 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 3.151 | 1.419 | 0.000 |
| Crosswalk LOS | F | C | A | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 400 | 0 | 1401 |
| d_b, Bicycle Delay [s] | 25.60 | 25.63 | 39.97 | 3.59 |
| I_b,int, Bicycle LOS Score for Intersection | 2.596 | 2.478 | 4.132 | 1.560 |
| Bicycle LOS | B | B | D | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 195: Bayfront Expy/Chilco St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.102 |

**Intersection Setup**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 50.00 | 100.00 | 660.00 | 520.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chilco Street | | Bayfront Expy | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 768 | 555 | 2535 | 280 | 219 | 1966 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.50 | 3.10 | 3.10 | 1.30 | 21.10 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 768 | 555 | 2535 | 280 | 219 | 1966 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 206 | 149 | 681 | 75 | 59 | 528 |
| Total Analysis Volume [veh/h] | 826 | 597 | 2726 | 301 | 235 | 2114 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Permissive | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 3 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 10 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 8.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 9.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 94 | 94 | 94 | 94 | 94 | 94 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 64 | 64 |
| g / C, Green / Cycle | 0.21 | 0.21 | 0.53 | 0.53 | 0.68 | 0.68 |
| (v / s)_i Volume / Saturation Flow Rate | 0.25 | 0.39 | 0.54 | 0.19 | 0.68 | 0.42 |
| s, saturation flow rate [veh/h] | 3361 | 1543 | 5049 | 1579 | 347 | 4979 |
| c, Capacity [veh/h] | 719 | 330 | 2700 | 844 | 298 | 3387 |
| d1, Uniform Delay [s] | 36.75 | 36.55 | 21.75 | 12.47 | 28.34 | 8.31 |
| k, delay calibration | 0.07 | 0.50 | 0.04 | 0.04 | 0.50 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 69.45 | 375.54 | 7.55 | 0.09 | 18.75 | 0.07 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.15 | 1.81 | 1.01 | 0.36 | 0.79 | 0.62 |
| d, Delay for Lane Group [s/veh] | 106.20 | 412.08 | 29.30 | 12.56 | 47.10 | 8.38 |
| Lane Group LOS | F | F | F | B | D | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 14.95 | 41.76 | 19.68 | 3.43 | 3.06 | 6.66 |
| 50th-Percentile Queue Length [ft/ln] | 373.85 | 1044.07 | 492.09 | 85.84 | 76.56 | 166.52 |
| 95th-Percentile Queue Length [veh/ln] | 22.86 | 65.95 | 27.17 | 6.18 | 5.51 | 10.89 |
| 95th-Percentile Queue Length [ft/ln] | 571.48 | 1648.86 | 679.17 | 154.51 | 137.82 | 272.34 |

**Movement, Approach, & Intersection Results**

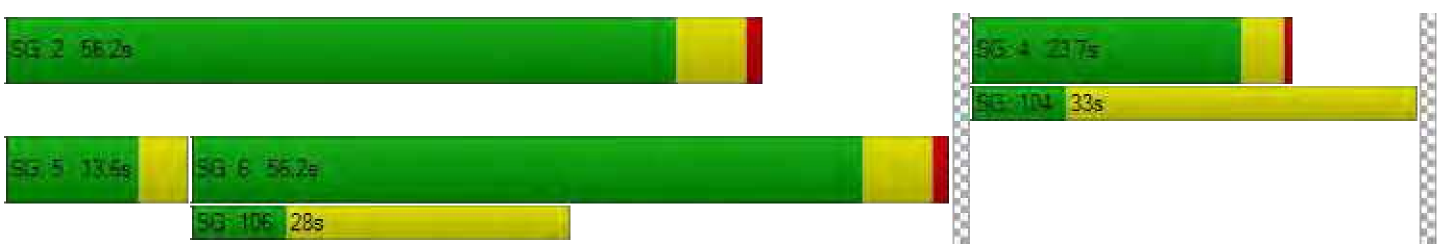
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 106.20 | 412.08 | 29.30 | 12.56 | 47.10 | 8.38 |
| Movement LOS | F | F | F | B | D | A |
| d_A, Approach Delay [s/veh] | 234.53 | | 27.64 | | 12.25 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 65.62 | | | | | |
| Intersection LOS | E | | | | | |
| Intersection V/C | 1.102 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.40 | 36.40 | 36.40 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.959 | 3.426 | 3.385 |
| Crosswalk LOS | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 428 | 1070 | 1070 |
| d_b, Bicycle Delay [s] | 29.01 | 10.12 | 10.12 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.224 | 2.852 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 196: Bayfront Expy/Chrysler Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.953 |

**Intersection Setup**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 280.00 | 100.00 | 290.00 | 345.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | 45.00 | | 45.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Chrysler Drive | | Bayfront Expy | | Bayfront Expy | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1029 | 89 | 2580 | 93 | 69 | 2347 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.80 | 0.00 | 2.80 | 0.90 | 0.00 | 4.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1029 | 89 | 2580 | 93 | 69 | 2347 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 263 | 23 | 658 | 24 | 18 | 599 |
| Total Analysis Volume [veh/h] | 1050 | 91 | 2633 | 95 | 70 | 2395 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Protected | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 25 | 0 | 50 | 0 | 20 | 50 |
| Amber [s] | 4.1 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 10 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 10 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.6 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 20.0 | 0.0 | 0.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | R | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 95 | 95 | 95 | 95 | 95 | 95 |
| L, Total Lost Time per Cycle [s] | 4.60 | 4.60 | 6.20 | 6.20 | 4.10 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.60 | 2.60 | 4.20 | 4.20 | 2.10 | 4.20 |
| g_i, Effective Green Time [s] | 25 | 25 | 50 | 50 | 5 | 59 |
| g / C, Green / Cycle | 0.26 | 0.26 | 0.53 | 0.53 | 0.05 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.06 | 0.52 | 0.06 | 0.04 | 0.48 |
| s, saturation flow rate [veh/h] | 3464 | 1615 | 5061 | 1604 | 1810 | 4975 |
| c, Capacity [veh/h] | 914 | 426 | 2670 | 846 | 93 | 3096 |
| d1, Uniform Delay [s] | 34.88 | 27.21 | 22.04 | 11.24 | 44.36 | 13.04 |
| k, delay calibration | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 68.75 | 0.09 | 2.66 | 0.02 | 4.57 | 0.16 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.15 | 0.21 | 0.99 | 0.11 | 0.75 | 0.77 |
| d, Delay for Lane Group [s/veh] | 103.63 | 27.30 | 24.70 | 11.26 | 48.93 | 13.20 |
| Lane Group LOS | F | C | C | B | D | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 19.09 | 1.62 | 16.85 | 0.90 | 1.68 | 9.87 |
| 50th-Percentile Queue Length [ft/ln] | 477.33 | 40.54 | 421.23 | 22.47 | 41.92 | 246.64 |
| 95th-Percentile Queue Length [veh/ln] | 28.40 | 2.92 | 23.58 | 1.62 | 3.02 | 15.02 |
| 95th-Percentile Queue Length [ft/ln] | 710.00 | 72.96 | 589.52 | 40.44 | 75.45 | 375.42 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

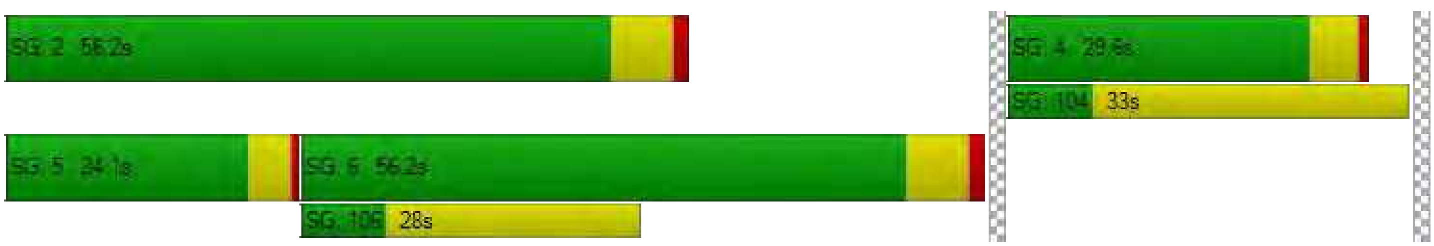
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 103.63 | 27.30 | 24.70 | 11.26 | 48.93 | 13.20 |
| Movement LOS | F | C | C | B | D | B |
| d_A, Approach Delay [s/veh] | 97.54 | | 24.23 | | 14.21 | |
| Approach LOS | F | | C | | B | |
| d_I, Intersection Delay [s/veh] | 33.54 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.953 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.99 | 36.99 | 36.99 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.398 | 3.856 | 3.680 |
| Crosswalk LOS | B | D | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 528 | 1056 | 1056 |
| d_b, Bicycle Delay [s] | 25.65 | 10.55 | 10.55 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.060 | 2.915 |
| Bicycle LOS | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 199: Bafront Expwy/Bldg 21**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 36.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.941 |

**Intersection Setup**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 21 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 581 | 164 | 2490 | 60 | 48 | 1306 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 14.80 | 14.80 | 4.10 | 4.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 581 | 164 | 2490 | 60 | 48 | 1306 |
| Peak Hour Factor | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 148 | 42 | 635 | 15 | 12 | 333 |
| Total Analysis Volume [veh/h] | 593 | 167 | 2541 | 61 | 49 | 1333 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 0 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 0 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 0.0 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 7 |
| Pedestrian Clearance [s] | 26 | 0 | 21 | 0 | 0 | 21 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 0.0 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | No | | Yes | | No | Yes |
| Maximum Recall | No | | No | | No | No |
| Pedestrian Recall | No | | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 87 | 87 | 87 | 87 | 87 | 87 |
| L, Total Lost Time per Cycle [s] | 3.70 | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 20 | 20 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.23 | 0.23 | 0.57 | 0.57 | 0.66 | 0.66 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.27 | 0.56 | 0.04 | 0.10 | 0.30 |
| s, saturation flow rate [veh/h] | 1438 | 1365 | 4507 | 1406 | 471 | 4470 |
| c, Capacity [veh/h] | 330 | 313 | 2588 | 807 | 342 | 2936 |
| d1, Uniform Delay [s] | 33.54 | 33.54 | 18.10 | 8.26 | 20.44 | 7.31 |
| k, delay calibration | 0.50 | 0.50 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 104.70 | 112.89 | 2.35 | 0.01 | 0.07 | 0.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.17 | 1.19 | 0.98 | 0.08 | 0.14 | 0.45 |
| d, Delay for Lane Group [s/veh] | 138.25 | 146.43 | 20.45 | 8.27 | 20.51 | 7.35 |
| Lane Group LOS | F | F | C | A | C | A |
| Critical Lane Group | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 16.35 | 16.23 | 14.93 | 0.48 | 0.14 | 3.44 |
| 50th-Percentile Queue Length [ft/ln] | 408.81 | 405.70 | 373.36 | 11.88 | 3.46 | 86.09 |
| 95th-Percentile Queue Length [veh/ln] | 24.96 | 24.97 | 21.27 | 0.86 | 0.25 | 6.20 |
| 95th-Percentile Queue Length [ft/ln] | 624.01 | 624.28 | 531.80 | 21.39 | 6.23 | 154.96 |

**Movement, Approach, & Intersection Results**

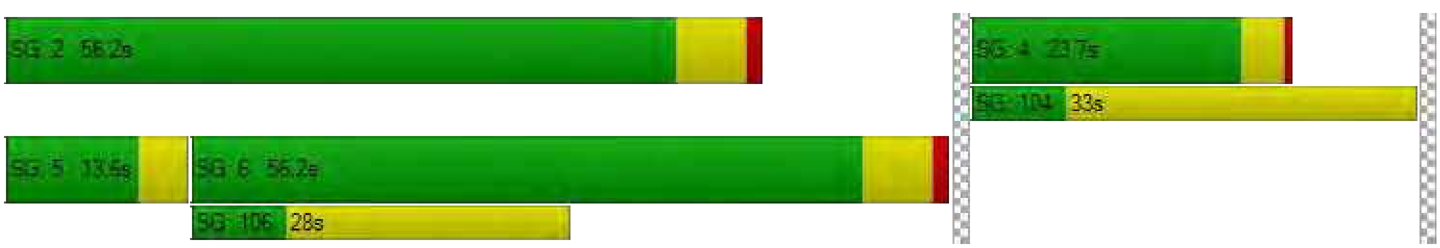
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 141.12 | 146.43 | 20.45 | 8.27 | 20.51 | 7.35 |
| Movement LOS | F | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 142.26 | | 20.17 | | 7.82 | |
| Approach LOS | F | | C | | A | |
| d_I, Intersection Delay [s/veh] | 36.13 | | | | | |
| Intersection LOS | D | | | | | |
| Intersection V/C | 0.941 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.21 | 33.21 | 33.21 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.383 | 3.222 | 3.222 |
| Crosswalk LOS | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 460 | 1149 | 1149 |
| d_b, Bicycle Delay [s] | 25.81 | 7.88 | 7.88 |
| I_b,int, Bicycle LOS Score for Intersection | 2.814 | 2.991 | 2.320 |
| Bicycle LOS | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 168.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.614 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 388 | 372 | 167 | 261 | 101 | 336 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 388 | 372 | 167 | 261 | 101 | 336 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 111 | 107 | 48 | 75 | 29 | 97 |
| Total Analysis Volume [veh/h] | 446 | 428 | 192 | 300 | 116 | 386 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 874 | 517 | 546 |
| Degree of Utilization, x | 1.61 | 0.95 | 0.92 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 48.35 | 12.16 | 11.25 |
| 95th-Percentile Queue Length [ft] | 1208.81 | 304.08 | 281.27 |
| Approach Delay [s/veh] | 302.58 | 55.19 | 46.80 |
| Approach LOS | F | F | E |
| Intersection Delay [s/veh] | 168.68 | | |
| Intersection LOS | F | | |

**Intersection Level Of Service Report**
**Intersection 201: Bayfront Expwy/Bldg 20**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.888 |

**Intersection Setup**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Bldg 20 | | Bayfront Expressway (SR 84) | | Bayfront Expressway (SR 84) | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 179 | 2541 | 24 | 49 | 1374 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 19.20 | 3.80 | 3.80 | 8.60 | 8.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 179 | 2541 | 24 | 49 | 1374 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 49 | 698 | 7 | 13 | 377 |
| Total Analysis Volume [veh/h] | 0 | 197 | 2792 | 26 | 54 | 1510 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

### Phasing & Timing

| Control Type | Split | Split | Permissive | Permissive | ProtPerm | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 4 | 4 | 6 | 0 | 5 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lag | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 5 | 10 | 0 | 5 | 10 |
| Maximum Green [s] | 20 | 20 | 50 | 0 | 10 | 50 |
| Amber [s] | 3.2 | 3.2 | 5.2 | 0.0 | 3.6 | 5.2 |
| All red [s] | 0.5 | 0.5 | 1.0 | 0.0 | 0.0 | 1.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 7 | 7 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 26 | 26 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.7 | 1.7 | 4.2 | 0.0 | 2.1 | 4.2 |
| Minimum Recall | | No | Yes | | No | Yes |
| Maximum Recall | | No | No | | No | No |
| Pedestrian Recall | | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | R | C | R | L | C |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 82 | 82 | 82 | 82 | 82 |
| L, Total Lost Time per Cycle [s] | 3.70 | 6.20 | 6.20 | 6.20 | 6.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.70 | 4.20 | 4.20 | 0.00 | 4.20 |
| g_i, Effective Green Time [s] | 15 | 50 | 50 | 57 | 57 |
| g / C, Green / Cycle | 0.18 | 0.61 | 0.61 | 0.70 | 0.70 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.62 | 0.02 | 0.25 | 0.35 |
| s, saturation flow rate [veh/h] | 1233 | 4518 | 1410 | 214 | 4342 |
| c, Capacity [veh/h] | 222 | 2761 | 862 | 224 | 3035 |
| d1, Uniform Delay [s] | 32.75 | 15.91 | 6.31 | 20.33 | 5.68 |
| k, delay calibration | 0.13 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.61 | 8.03 | 0.01 | 0.20 | 0.05 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.89 | 1.01 | 0.03 | 0.24 | 0.50 |
| d, Delay for Lane Group [s/veh] | 46.36 | 23.94 | 6.31 | 20.53 | 5.73 |
| Lane Group LOS | D | F | A | C | A |
| Critical Lane Group | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.53 | 16.08 | 0.16 | 0.23 | 3.05 |
| 50th-Percentile Queue Length [ft/ln] | 113.26 | 402.00 | 3.96 | 5.83 | 76.29 |
| 95th-Percentile Queue Length [veh/ln] | 8.02 | 22.86 | 0.28 | 0.42 | 5.49 |
| 95th-Percentile Queue Length [ft/ln] | 200.53 | 571.56 | 7.12 | 10.49 | 137.32 |

**Movement, Approach, & Intersection Results**

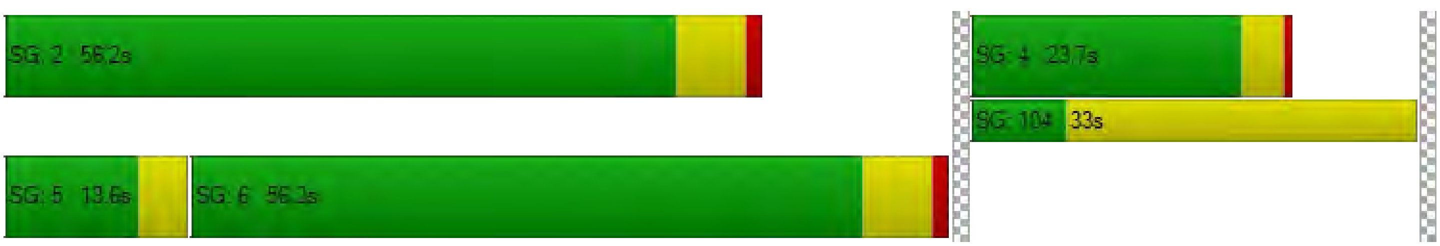
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 46.36 | 23.94 | 6.31 | 20.53 | 5.73 |
| Movement LOS | | D | F | A | C | A |
| d_A, Approach Delay [s/veh] | 46.36 | | 23.78 | | 6.24 | |
| Approach LOS | D | | C | | A | |
| d_I, Intersection Delay [s/veh] | 18.76 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.888 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | -6.2 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 47.30 | 30.60 | 30.60 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.911 | 3.191 | 3.223 |
| Crosswalk LOS | A | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 489 | 1224 | 1224 |
| d_b, Bicycle Delay [s] | 23.31 | 6.16 | 6.16 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 3.110 | 2.420 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 207: Chilco St/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 170.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.147 |

**Intersection Setup**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 80.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 75.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Terminal Avenue | | | Chilco Street | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 95 | 458 | 27 | 131 | 346 | 51 | 325 | 21 | 597 | 270 | 18 | 678 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 95 | 458 | 27 | 131 | 346 | 51 | 325 | 21 | 597 | 270 | 18 | 678 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 130 | 8 | 37 | 98 | 14 | 92 | 6 | 170 | 77 | 5 | 193 |
| Total Analysis Volume [veh/h] | 108 | 520 | 31 | 149 | 393 | 58 | 369 | 24 | 678 | 307 | 20 | 770 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 40 | | | 40 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 40 | | | 40 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 19 | | | 0 | | | 19 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 11 | 46 | 0 | 11 | 46 | 0 | 0 | 36 | 0 | 0 | 21 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 11 | 34 | 0 | 9 | 32 | 0 | 0 | 48 | 0 | 0 | 39 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 7 | 30 | 5 | 28 | 44 | 44 | 35 | 35 |
| g / C, Green / Cycle | 0.05 | 0.23 | 0.04 | 0.22 | 0.34 | 0.34 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.30 | 0.04 | 0.26 | 0.22 | 0.46 | 0.33 | 0.35 |
| s, saturation flow rate [veh/h] | 1767 | 1837 | 3431 | 1755 | 1772 | 1488 | 1687 | 1577 |
| c, Capacity [veh/h] | 95 | 424 | 132 | 378 | 600 | 504 | 454 | 425 |
| d1, Uniform Delay [s] | 61.50 | 50.00 | 62.50 | 51.00 | 36.55 | 41.80 | 47.50 | 47.50 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 133.38 | 151.39 | 117.25 | 110.23 | 5.51 | 168.56 | 112.43 | 148.09 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.14 | 1.30 | 1.13 | 1.19 | 0.66 | 1.35 | 1.21 | 1.29 |
| d, Delay for Lane Group [s/veh] | 194.88 | 201.39 | 179.75 | 161.23 | 42.07 | 210.36 | 159.93 | 195.59 |
| Lane Group LOS | F | F | F | F | D | F | F | F |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.67 | 31.54 | 4.33 | 23.83 | 11.53 | 39.13 | 28.80 | 31.12 |
| 50th-Percentile Queue Length [ft/ln] | 166.74 | 788.53 | 108.34 | 595.73 | 288.15 | 978.27 | 720.03 | 777.92 |
| 95th-Percentile Queue Length [veh/ln] | 11.31 | 46.68 | 7.80 | 34.95 | 17.09 | 58.63 | 41.89 | 46.30 |
| 95th-Percentile Queue Length [ft/ln] | 282.81 | 1166.94 | 195.00 | 873.66 | 427.34 | 1465.63 | 1047.14 | 1157.44 |

### Movement, Approach, & Intersection Results

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 194.88 | 201.39 | 201.39 | 179.75 | 161.23 | 161.23 | 42.07 | 42.07 | 210.36 | 159.93 | 159.93 | 185.33 |
| Movement LOS | F | F | F | F | F | F | D | D | F | F | F | F |
| d_A, Approach Delay [s/veh] | 200.32 | | | 165.83 | | | 148.60 | | | 177.76 | | |
| Approach LOS | F | | | F | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 170.90 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.147 | | | | | | | | | | | |

### Other Modes

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 56.31 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.621 | 2.759 | 2.368 | 2.467 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 462 | 431 | 677 | 538 |
| d_b, Bicycle Delay [s] | 38.46 | 40.02 | 28.45 | 34.71 |
| I_b,int, Bicycle LOS Score for Intersection | 2.647 | 2.550 | 3.327 | 3.370 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 215: Chrysler Dr/Constitution Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 140.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.362 |

**Intersection Setup**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chrysler Drive | | | | | | Constitution Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 349 | 49 | 39 | 340 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.60 | 0.00 | 100.00 | 1.50 | 1.80 | 11.10 | 50.00 | 50.00 | 5.10 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 349 | 49 | 39 | 340 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 87 | 12 | 10 | 85 | 38 | 1 | 15 | 2 | 60 | 0 | 123 | 20 |
| Total Analysis Volume [veh/h] | 349 | 49 | 39 | 340 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 8 | | | 7 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 7 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Split | Split | Split | Split | Split | Split | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 41 | 0 | 0 | 27 | 0 | 0 | 22 | 0 | 0 | 41 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 38 | 22 | 22 | 18 | 38 | 38 |
| g / C, Green / Cycle | 0.43 | 0.24 | 0.24 | 0.20 | 0.43 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.81 | 0.21 | 0.09 | 0.34 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 540 | 1609 | 1680 | 902 | 1629 | 1472 |
| c, Capacity [veh/h] | 301 | 387 | 404 | 182 | 732 | 625 |
| d1, Uniform Delay [s] | 35.92 | 33.00 | 28.64 | 36.00 | 18.04 | 18.29 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.47 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 220.80 | 6.54 | 0.59 | 330.50 | 1.67 | 2.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 1.45 | 0.88 | 0.38 | 1.69 | 0.41 | 0.44 |
| d, Delay for Lane Group [s/veh] | 256.72 | 39.54 | 29.22 | 366.50 | 19.71 | 20.49 |
| Lane Group LOS | F | D | C | F | B | C |
| Critical Lane Group | Yes | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 25.13 | 7.66 | 2.78 | 20.61 | 4.46 | 4.21 |
| 50th-Percentile Queue Length [ft/ln] | 628.35 | 191.57 | 69.59 | 515.15 | 111.50 | 105.27 |
| 95th-Percentile Queue Length [veh/ln] | 40.98 | 12.20 | 5.01 | 34.17 | 7.92 | 7.58 |
| 95th-Percentile Queue Length [ft/ln] | 1024.42 | 305.06 | 125.27 | 854.33 | 198.09 | 189.41 |

**Movement, Approach, & Intersection Results**

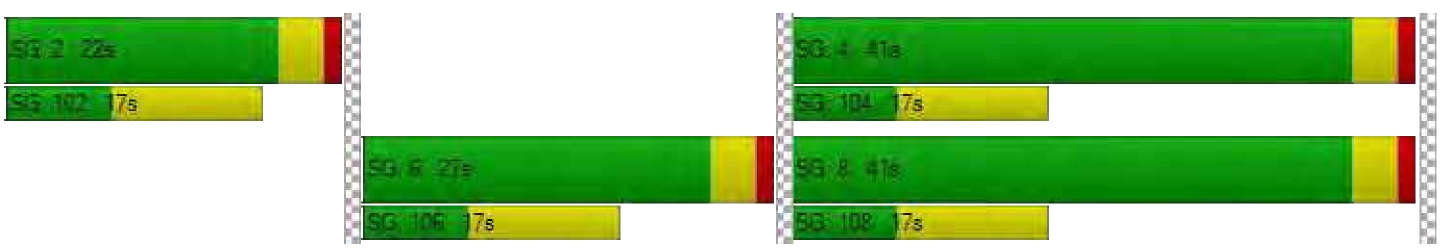
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 256.72 | 256.72 | 256.72 | 39.54 | 29.22 | 29.22 | 366.50 | 366.50 | 366.50 | 19.71 | 20.01 | 20.49 |
| Movement LOS | F | F | F | D | C | C | F | F | F | B | C | C |
| d_A, Approach Delay [s/veh] | 256.72 | | | 36.34 | | | 366.50 | | | 20.08 | | |
| Approach LOS | F | | | D | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 140.67 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.362 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.72 | 34.72 | 34.72 | 34.72 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.429 | 2.116 | 2.642 | 2.161 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 821 | 511 | 400 | 821 |
| d_b, Bicycle Delay [s] | 15.64 | 24.98 | 28.85 | 15.64 |
| I_b,int, Bicycle LOS Score for Intersection | 2.281 | 2.373 | 2.066 | 2.029 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | - | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 798.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 2.378 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 118 | 63 | 230 | 644 | 280 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 118 | 63 | 230 | 644 | 280 | 22 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 19 | 69 | 194 | 84 | 7 |
| Total Analysis Volume [veh/h] | 142 | 76 | 277 | 776 | 337 | 27 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 2.38 | 0.11 | 0.24 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 798.19 | 743.16 | 9.01 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 20.32 | 20.32 | 0.92 | 0.92 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 508.11 | 508.11 | 22.95 | 22.95 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 779.01 | | 2.37 | | 0.00 | |
| Approach LOS | F | | A | | A | |
| d_I, Intersection Delay [s/veh] | 105.39 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 265: Adam Court/ Adams Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.076 |

**Intersection Setup**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | Adams Drive | | Adams Court | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 42 | 209 | 35 | 15 | 34 | 90 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 7.90 | 7.90 | 14.00 | 14.00 | 12.70 | 17.70 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 209 | 35 | 15 | 34 | 90 |
| Peak Hour Factor | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 | 0.8100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 65 | 11 | 5 | 10 | 28 |
| Total Analysis Volume [veh/h] | 52 | 258 | 43 | 19 | 42 | 111 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.00 | 0.08 | 0.11 |
| d_M, Delay for Movement [s/veh] | 7.48 | 0.00 | 0.00 | 0.00 | 12.58 | 9.75 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.00 | 0.00 | 0.70 | 0.70 |
| 95th-Percentile Queue Length [ft/ln] | 2.68 | 2.68 | 0.00 | 0.00 | 17.48 | 17.48 |
| d_A, Approach Delay [s/veh] | 1.25 | | 0.00 | | 10.53 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 3.81 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 267: Willow Road(SR114)/Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.677 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1182 | 324 | 147 | 1062 | 498 | 192 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1182 | 324 | 147 | 1062 | 498 | 192 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 296 | 81 | 37 | 266 | 125 | 48 |
| Total Analysis Volume [veh/h] | 1182 | 324 | 147 | 1062 | 498 | 192 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Protected | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 1 | 6 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | Lead | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 5 | 5 | 5 | 0 |
| Maximum Green [s] | 57 | 0 | 16 | 73 | 67 | 0 |
| Amber [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 74 | 0 | 13 | 87 | 53 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 7 | 0 | 0 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 11 | 0 | 0 | 11 | 11 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | No | No | No | |
| Maximum Recall | No | | No | No | No | |
| Pedestrian Recall | No | | No | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | L | C | L | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 65 | 65 | 65 | 65 | 65 | 65 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 32 | 32 | 5 | 41 | 16 | 16 |
| g / C, Green / Cycle | 0.49 | 0.49 | 0.07 | 0.63 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.40 | 0.43 | 0.04 | 0.30 | 0.20 | 0.20 |
| s, saturation flow rate [veh/h] | 1870 | 1738 | 3459 | 3560 | 1781 | 1666 |
| c, Capacity [veh/h] | 923 | 858 | 248 | 2232 | 444 | 416 |
| d1, Uniform Delay [s] | 13.92 | 14.67 | 29.16 | 6.42 | 22.79 | 22.85 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.83 | 3.09 | 2.24 | 0.16 | 3.33 | 3.74 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.88 | 0.59 | 0.48 | 0.80 | 0.81 |
| d, Delay for Lane Group [s/veh] | 15.75 | 17.76 | 31.40 | 6.58 | 26.12 | 26.59 |
| Lane Group LOS | B | B | C | A | C | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 7.74 | 8.40 | 1.10 | 2.59 | 5.11 | 4.88 |
| 50th-Percentile Queue Length [ft/ln] | 193.48 | 209.96 | 27.53 | 64.87 | 127.65 | 122.10 |
| 95th-Percentile Queue Length [veh/ln] | 12.30 | 13.15 | 1.98 | 4.67 | 8.81 | 8.51 |
| 95th-Percentile Queue Length [ft/ln] | 307.54 | 328.78 | 49.55 | 116.76 | 220.29 | 212.71 |

**Movement, Approach, & Intersection Results**

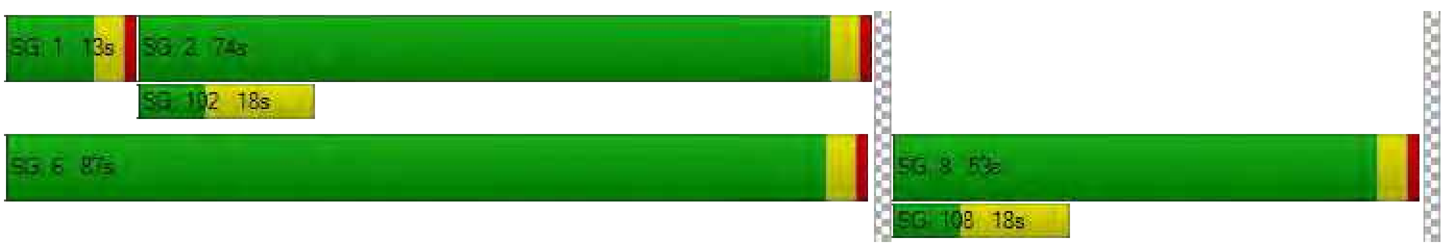
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.48 | 17.76 | 31.40 | 6.58 | 26.26 | 26.59 |
| Movement LOS | B | B | C | A | C | C |
| d_A, Approach Delay [s/veh] | 16.76 | | 9.60 | | 26.35 | |
| Approach LOS | B | | A | | C | |
| d_I, Intersection Delay [s/veh] | 16.16 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.677 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 22.27 | 22.27 | 22.27 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.109 | 2.994 | 2.396 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 2165 | 2567 | 1515 |
| d_b, Bicycle Delay [s] | 0.22 | 2.60 | 1.90 |
| I_b,int, Bicycle LOS Score for Intersection | 2.802 | 2.557 | 2.698 |
| Bicycle LOS | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 269: O'Brien Drive/Loop Road**

| | | | |
|---|---|---|---|
| Control Type: | Roundabout | Delay (sec / veh): | 10.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | O'Brien Drive | | | East Loop Road | | | Main Street | | | O'Brien Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 22 | 14 | 64 | 73 | 29 | 9 | 14 | 26 | 41 | 22 | 19 |
| Total Analysis Volume [veh/h] | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Conflicting Circulating Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Circulating Flow Rate [veh/h] | 356 | | | 303 | | | 724 | | | 177 | | |
| Exiting Flow Rate [veh/h] | 567 | | | 206 | | | 254 | | | 376 | | |
| Demand Flow Rate [veh/h] | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 |
| Adjusted Demand Flow Rate [veh/h] | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 |

**Lanes**

| | | | | |
|---|---|---|---|---|
| Overwrite Calculated Critical Headway | No | No | No | No |
| User-Defined Critical Headway [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| Overwrite Calculated Follow-Up Time | No | No | No | No |
| User-Defined Follow-Up Time [s] | 3.00 | 3.00 | 3.00 | 3.00 |
| A (intercept) | 1380.00 | 1380.00 | 1380.00 | 1380.00 |
| B (coefficient) | 0.00102 | 0.00102 | 0.00102 | 0.00102 |
| HV Adjustment Factor | 0.98 | 0.98 | 0.98 | 0.98 |
| Entry Flow Rate [veh/h] | 198 | 676 | 199 | 332 |
| Capacity of Entry and Bypass Lanes [veh/h] | 960 | 1014 | 660 | 1152 |
| Pedestrian Impedance | 1.00 | 1.00 | 1.00 | 1.00 |
| Capacity per Entry Lane [veh/h] | 941 | 994 | 647 | 1129 |
| X, volume / capacity | 0.21 | 0.67 | 0.30 | 0.29 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| Lane LOS | A | B | A | A |
| 95th-Percentile Queue Length [veh] | 0.77 | 5.31 | 1.27 | 1.20 |
| 95th-Percentile Queue Length [ft] | 19.32 | 132.82 | 31.69 | 29.96 |
| Approach Delay [s/veh] | 5.85 | 13.88 | 9.47 | 5.91 |
| Approach LOS | A | B | A | A |
| Intersection Delay [s/veh] | 10.24 | | | |
| Intersection LOS | B | | | |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project PM (RedTripCap).pdf

Scenario 22 Cumulative w/dumbarton PM (2040 vols)+ Project
12/9/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | 969 | 1175 | 1311 | 427 | 3882 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | 50 | 1326 | 7 | 76 | 1038 | 263 | 15 | 6 | 414 | 299 | 6 | 4 | 3504 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 | 3382 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | 2 | 745 | 61 | 434 | 723 | 56 | 95 | 25 | 2 | 65 | 90 | 310 | 2608 |

| ID | Intersection Name | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | 137 | 541 | 468 | 638 | 465 | 104 | 2353 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 772 | 137 | 323 | 706 | 2 | 2535 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | 3762 | 20 | 359 | 970 | 68 | 1868 | 7047 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | 196 | 95 | 1142 | 159 | 332 | 146 | 76 | 2263 | 379 | 559 | 842 | 34 | 6223 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | 44 | 1281 | 22 | 271 | 1102 | 54 | 123 | 8 | 35 | 72 | 15 | 320 | 3347 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 244 | 933 | 1447 | 52 | 163 | 114 | 2953 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | 1000 | 492 | 57 | 1184 | 274 | 204 | 3211 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 | 5003 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 40 | 1319 | 809 | 283 | 349 | 40 | 2840 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 | 1940 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | 21 | 693 | 5 | 2 | 687 | 109 | 147 | 2 | 49 | 15 | 4 | 6 | 1740 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 120 | 5 | 81 | 52 | 58 | 1905 |

| ID | Intersection Name | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | 30 | 281 | 269 | 372 | 126 | 299 | 134 | 478 | 184 | 277 | 684 | 22 | 3156 |

| ID | Intersection Name | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | 1912 | 1568 | 570 | 891 | 4941 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 | 1562 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | 194 | 40 | 1694 | 12 | 31 | 5 | 9 | 752 | 232 | 2657 | 802 | 14 | 6442 |

| ID | Intersection Name | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | 1036 | 199 | 1142 | 863 | 799 | 352 | 4391 |

| ID | Intersection Name | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | 1376 | 470 | 1637 | 784 | 345 | 859 | 5471 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | 768 | 555 | 2535 | 280 | 219 | 1966 | 6323 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | 1029 | 89 | 2580 | 93 | 69 | 2347 | 6207 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | 581 | 164 | 2490 | 60 | 48 | 1306 | 4649 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 388 | 372 | 167 | 261 | 101 | 336 | 1625 |

| ID | Intersection Name | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | 179 | 2541 | 24 | 49 | 1374 | 4167 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | 95 | 458 | 27 | 131 | 346 | 51 | 325 | 21 | 597 | 270 | 18 | 678 | 3017 |

| ID | Intersection Name | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | 349 | 49 | 39 | 340 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 | 1806 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 118 | 63 | 230 | 644 | 280 | 22 | 1357 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | 42 | 209 | 35 | 15 | 34 | 90 | 425 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road(SR114)/Park Street | 1182 | 324 | 147 | 1062 | 498 | 192 | 3405 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 | 1376 |

Vistro File: \...\Vistro_AllScenarios_PM - 12.1.2021.vistro

Report File: \...\Cumulative w Dumbarton + Project PM (RedTripCap).pdf

Scenario 22 Cumulative w/dumbarton PM (2040 vols)+ Project

12/9/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northeastbound | Southwestbound | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 1 | Marsh Rd (SR 84)/US 101 SB Offramp | Final Base | 969 | 1175 | 1311 | 427 | 3882 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **969** | **1175** | **1311** | **427** | **3882** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 2 | Marsh Rd/Rolison Rd-Scott Dr | Final Base | 50 | 1326 | 7 | 76 | 1038 | 263 | 15 | 6 | 414 | 299 | 6 | 4 | 3504 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **50** | **1326** | **7** | **76** | **1038** | **263** | **15** | **6** | **414** | **299** | **6** | **4** | **3504** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 | 3382 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **296** | **675** | **54** | **13** | **1013** | **354** | **461** | **34** | **230** | **125** | **87** | **40** | **3382** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4 | Marsh Rd/Bay Rd | Final Base | 2 | 745 | 61 | 434 | 723 | 56 | 95 | 25 | 2 | 65 | 90 | 310 | 2608 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **2** | **745** | **61** | **434** | **723** | **56** | **95** | **25** | **2** | **65** | **90** | **310** | **2608** |

| ID | Intersection Name | Volume Type | Northeastbound | | Northwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 9 | Middlefield Rd/Ravenswood Ave | Final Base | 137 | 541 | 468 | 638 | 465 | 104 | 2353 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **137** | **541** | **468** | **638** | **465** | **104** | **2353** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10 | Middlefield Rd/Ringwood Ave | Final Base | 34 | 32 | 32 | 224 | 0 | 271 | 2 | 772 | 137 | 323 | 706 | 2 | 2535 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **32** | **32** | **224** | **0** | **271** | **2** | **772** | **137** | **323** | **706** | **2** | **2535** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 15 | Bayfront Expy (SR 84) /University Ave (SR 109) | Final Base | 3762 | 20 | 359 | 970 | 68 | 1868 | 7047 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3762** | **20** | **359** | **970** | **68** | **1868** | **7047** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 16 | Bayfront Expy (SR 84)/Willow Rd (SR 114) | Final Base | 196 | 95 | 1142 | 159 | 332 | 146 | 76 | 2263 | 379 | 559 | 842 | 34 | 6223 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **196** | **95** | **1142** | **159** | **332** | **146** | **76** | **2263** | **379** | **559** | **842** | **34** | **6223** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Willow Rd (SR 114)/Hamilton Ave | Final Base | 44 | 1281 | 22 | 271 | 1102 | 54 | 123 | 8 | 35 | 72 | 15 | 320 | 3347 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **44** | **1281** | **22** | **271** | **1102** | **54** | **123** | **8** | **35** | **72** | **15** | **320** | **3347** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 244 | 933 | 1447 | 52 | 163 | 114 | 2953 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **244** | **933** | **1447** | **52** | **163** | **114** | **2953** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 19 | Willow Rd (SR 114)/O'Brien Dr | Final Base | 1000 | 492 | 57 | 1184 | 274 | 204 | 3211 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1000** | **492** | **57** | **1184** | **274** | **204** | **3211** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 | 5003 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1389** | **355** | **78** | **1354** | **26** | **27** | **195** | **624** | **346** | **285** | **56** | **5003** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 40 | 1319 | 809 | 283 | 349 | 40 | 2840 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1319** | **809** | **283** | **349** | **40** | **2840** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 | 1940 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1052** | **4** | **29** | **541** | **18** | **142** | **31** | **38** | **21** | **8** | **47** | **1940** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 23 | Willow Rd/Coleman Ave | Final Base | 21 | 693 | 5 | 2 | 687 | 109 | 147 | 2 | 49 | 15 | 4 | 6 | 1740 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **21** | **693** | **5** | **2** | **687** | **109** | **147** | **2** | **49** | **15** | **4** | **6** | **1740** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 24 | Willow Rd/Gilbert Ave | Final Base | 3 | 656 | 119 | 54 | 703 | 10 | 44 | 120 | 5 | 81 | 52 | 58 | 1905 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **3** | **656** | **119** | **54** | **703** | **10** | **44** | **120** | **5** | **81** | **52** | **58** | **1905** |

| ID | Intersection Name | Volume Type | Northeastbound | | | Southwestbound | | | Northwestbound | | | Southeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 25 | Middlefield Rd-Willow Rd | Final Base | 30 | 281 | 269 | 372 | 126 | 299 | 134 | 478 | 184 | 277 | 684 | 22 | 3156 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **30** | **281** | **269** | **372** | **126** | **299** | **134** | **478** | **184** | **277** | **684** | **22** | **3156** |

| ID | Intersection Name | Volume Type | Northbound | Southbound | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Thru | Left | Right | |
| 110 | Marsh Road/101 NB Ramps | Final Base | 1912 | 1568 | 570 | 891 | 4941 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1912** | **1568** | **570** | **891** | **4941** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 | 1562 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **382** | **18** | **76** | **781** | **36** | **21** | **124** | **23** | **7** | **16** | **56** | **1562** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 163 | Bayfront Expy/Marsh Rd | Final Base | 194 | 40 | 1694 | 12 | 31 | 5 | 9 | 752 | 232 | 2657 | 802 | 14 | 6442 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **194** | **40** | **1694** | **12** | **31** | **5** | **9** | **752** | **232** | **2657** | **802** | **14** | **6442** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 165 | Willow Rd/US-101 SB Ramps | Final Base | 1036 | 199 | 1142 | 863 | 799 | 352 | 4391 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1036** | **199** | **1142** | **863** | **799** | **352** | **4391** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Northwestbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | 2 | Right | |
| 168 | Willow Rd/US-101 NB Ramps | Final Base | 1376 | 470 | 1637 | 784 | 345 | 859 | 5471 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1376** | **470** | **1637** | **784** | **345** | **859** | **5471** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 195 | Bayfront Expy/Chilco St | Final Base | 768 | 555 | 2535 | 280 | 219 | 1966 | 6323 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **768** | **555** | **2535** | **280** | **219** | **1966** | **6323** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 196 | Bayfront Expy/Chrysler Drive | Final Base | 1029 | 89 | 2580 | 93 | 69 | 2347 | 6207 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1029** | **89** | **2580** | **93** | **69** | **2347** | **6207** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 199 | Bafront Expwy/Bldg 21 | Final Base | 581 | 164 | 2490 | 60 | 48 | 1306 | 4649 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **581** | **164** | **2490** | **60** | **48** | **1306** | **4649** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 388 | 372 | 167 | 261 | 101 | 336 | 1625 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **388** | **372** | **167** | **261** | **101** | **336** | **1625** |

| ID | Intersection Name | Volume Type | Northbound | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | | Right | Thru | Right | Left | Thru | |
| 201 | Bayfront Expwy/Bldg 20 | Final Base | 179 | 2541 | 24 | 49 | 1374 | 4167 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **179** | **2541** | **24** | **49** | **1374** | **4167** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 207 | Chilco St/Constitution Dr | Final Base | 95 | 458 | 27 | 131 | 346 | 51 | 325 | 21 | 597 | 270 | 18 | 678 | 3017 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **95** | **458** | **27** | **131** | **346** | **51** | **325** | **21** | **597** | **270** | **18** | **678** | **3017** |

| ID | Intersection Name | Volume Type | Southbound | | | Eastbound | | | Westbound | | | Northeastbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 215 | Chrysler Dr/Constitution Dr | Final Base | 349 | 49 | 39 | 340 | 150 | 3 | 60 | 9 | 238 | 0 | 490 | 79 | 1806 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **349** | **49** | **39** | **340** | **150** | **3** | **60** | **9** | **238** | **0** | **490** | **79** | **1806** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 118 | 63 | 230 | 644 | 280 | 22 | 1357 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **118** | **63** | **230** | **644** | **280** | **22** | **1357** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 265 | Adam Court/ Adams Drive | Final Base | 42 | 209 | 35 | 15 | 34 | 90 | 425 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **42** | **209** | **35** | **15** | **34** | **90** | **425** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 267 | Willow Road (SR114)/Park Street | Final Base | 1182 | 324 | 147 | 1062 | 498 | 192 | 3405 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1182** | **324** | **147** | **1062** | **498** | **192** | **3405** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 269 | O'Brien Drive/Loop Road | Final Base | 49 | 88 | 57 | 256 | 292 | 114 | 37 | 56 | 102 | 162 | 86 | 77 | 1376 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **49** | **88** | **57** | **256** | **292** | **114** | **37** | **56** | **102** | **162** | **86** | **77** | **1376** |

# Signal Warrants Report For Intersection 131: Chilco Street/Hamilton Avenue

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | S | N | E | W |
| 1 | 422 | 893 | 79 | 168 |
| 2 | 409 | 866 | 77 | 163 |
| 3 | 401 | 848 | 75 | 160 |
| 4 | 376 | 795 | 70 | 150 |
| 5 | 333 | 705 | 62 | 133 |
| 6 | 329 | 697 | 62 | 131 |
| 7 | 325 | 688 | 61 | 129 |
| 8 | 295 | 625 | 55 | 118 |
| 9 | 291 | 616 | 55 | 116 |
| 10 | 287 | 607 | 54 | 114 |
| 11 | 249 | 527 | 47 | 99 |
| 12 | 232 | 491 | 43 | 92 |
| 13 | 228 | 482 | 43 | 91 |
| 14 | 169 | 357 | 32 | 67 |
| 15 | 169 | 357 | 32 | 67 |
| 16 | 118 | 250 | 22 | 47 |
| 17 | 68 | 143 | 13 | 27 |
| 18 | 68 | 143 | 13 | 27 |
| 19 | 38 | 80 | 7 | 15 |
| 20 | 21 | 45 | 4 | 8 |
| 21 | 13 | 27 | 2 | 5 |
| 22 | 4 | 9 | 1 | 2 |
| 23 | 4 | 9 | 1 | 2 |
| 24 | 4 | 9 | 1 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1315 | 1 | 168 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1275 | 1 | 163 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1249 | 1 | 160 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1171 | 1 | 150 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 1038 | 1 | 133 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 1026 | 1 | 131 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 1013 | 1 | 129 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 920 | 1 | 118 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 907 | 1 | 116 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 894 | 1 | 114 | No | No | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 776 | 1 | 99 | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 12 | 1 | 723 | 1 | 92 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 710 | 1 | 91 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 526 | 1 | 67 | No | No | No | No | No | No | Yes | Yes | No | No |
| 15 | 1 | 526 | 1 | 67 | No | No | No | No | No | No | Yes | Yes | No | No |
| 16 | 1 | 368 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 211 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 211 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 118 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 66 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 40 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 13 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 7 | 10 | 13 | 11 | 13 | 15 | 15 | 8 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.6 | 14.1 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:15 | 0:39 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 79 | 168 |
| High Minor Volume Condition Met | No | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1562 | 1562 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | Yes | Yes |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 200: O'Brien Drive/Kavanaugh Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 428 | 760 | 437 |
| 2 | 415 | 737 | 424 |
| 3 | 407 | 722 | 415 |
| 4 | 381 | 676 | 389 |
| 5 | 338 | 600 | 345 |
| 6 | 334 | 593 | 341 |
| 7 | 330 | 585 | 336 |
| 8 | 300 | 532 | 306 |
| 9 | 295 | 524 | 302 |
| 10 | 291 | 517 | 297 |
| 11 | 253 | 448 | 258 |
| 12 | 235 | 418 | 240 |
| 13 | 231 | 410 | 236 |
| 14 | 171 | 304 | 175 |
| 15 | 171 | 304 | 175 |
| 16 | 120 | 213 | 122 |
| 17 | 68 | 122 | 70 |
| 18 | 68 | 122 | 70 |
| 19 | 39 | 68 | 39 |
| 20 | 21 | 38 | 22 |
| 21 | 13 | 23 | 13 |
| 22 | 4 | 8 | 4 |
| 23 | 4 | 8 | 4 |
| 24 | 4 | 8 | 4 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1188 | 1 | 437 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 | 1 | 1152 | 1 | 424 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 3 | 1 | 1129 | 1 | 415 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 1 | 1057 | 1 | 389 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5 | 1 | 938 | 1 | 345 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 6 | 1 | 927 | 1 | 341 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 7 | 1 | 915 | 1 | 336 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 8 | 1 | 832 | 1 | 306 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 9 | 1 | 819 | 1 | 302 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 10 | 1 | 808 | 1 | 297 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 11 | 1 | 701 | 1 | 258 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 12 | 1 | 653 | 1 | 240 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 13 | 1 | 641 | 1 | 236 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| 14 | 1 | 475 | 1 | 175 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 15 | 1 | 475 | 1 | 175 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 16 | 1 | 333 | 1 | 122 | No | No | No | Yes | No | No | No | No | No | No |
| 17 | 1 | 190 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 190 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 107 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 59 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 36 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 13 | 15 | 15 | 16 | 10 | 13 | 13 | 15 | 13 | 7 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 46.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 5:40 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 437 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1625 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 264: Adams Drive/O'Brien Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | Yes |
| #2 | Four Hour Vehicular Volume | Yes |
| #3 | Peak Hour | Yes |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 302 | 874 | 181 |
| 2 | 293 | 848 | 176 |
| 3 | 287 | 830 | 172 |
| 4 | 269 | 778 | 161 |
| 5 | 239 | 690 | 143 |
| 6 | 236 | 682 | 141 |
| 7 | 233 | 673 | 139 |
| 8 | 211 | 612 | 127 |
| 9 | 208 | 603 | 125 |
| 10 | 205 | 594 | 123 |
| 11 | 178 | 516 | 107 |
| 12 | 166 | 481 | 100 |
| 13 | 163 | 472 | 98 |
| 14 | 121 | 350 | 72 |
| 15 | 121 | 350 | 72 |
| 16 | 85 | 245 | 51 |
| 17 | 48 | 140 | 29 |
| 18 | 48 | 140 | 29 |
| 19 | 27 | 79 | 16 |
| 20 | 15 | 44 | 9 |
| 21 | 9 | 26 | 5 |
| 22 | 3 | 9 | 2 |
| 23 | 3 | 9 | 2 |
| 24 | 3 | 9 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 1176 | 1 | 181 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 2 | 1 | 1141 | 1 | 176 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 3 | 1 | 1117 | 1 | 172 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 4 | 1 | 1047 | 1 | 161 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 5 | 1 | 929 | 1 | 143 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 6 | 1 | 918 | 1 | 141 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 7 | 1 | 906 | 1 | 139 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| 8 | 1 | 823 | 1 | 127 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 9 | 1 | 811 | 1 | 125 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 10 | 1 | 799 | 1 | 123 | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 11 | 1 | 694 | 1 | 107 | No | No | Yes | Yes | No | Yes | Yes | Yes | No | No |
| 12 | 1 | 647 | 1 | 100 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 13 | 1 | 635 | 1 | 98 | No | No | No | Yes | No | Yes | Yes | Yes | No | No |
| 14 | 1 | 471 | 1 | 72 | No | No | No | No | No | No | No | Yes | No | No |
| 15 | 1 | 471 | 1 | 72 | No | No | No | No | No | No | No | Yes | No | No |
| 16 | 1 | 330 | 1 | 51 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 188 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 188 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 106 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 59 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 35 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 12 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 10 | 11 | 13 | 10 | 13 | 13 | 15 | 7 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 779 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 39:10 |
| Delay Condition Met | Yes |
| Volume on Minor Street Approach During Same Hour | 181 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 1357 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | Yes |
| **Warrant Met for Intersection** | **Yes** |

# Signal Warrants Report For Intersection 265: Adam Court/ Adams Drive

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | S, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | S | N | W |
| 1 | 251 | 50 | 124 |
| 2 | 243 | 49 | 120 |
| 3 | 238 | 48 | 118 |
| 4 | 223 | 45 | 110 |
| 5 | 198 | 40 | 98 |
| 6 | 196 | 39 | 97 |
| 7 | 193 | 39 | 95 |
| 8 | 176 | 35 | 87 |
| 9 | 173 | 35 | 86 |
| 10 | 171 | 34 | 84 |
| 11 | 148 | 30 | 73 |
| 12 | 138 | 28 | 68 |
| 13 | 136 | 27 | 67 |
| 14 | 100 | 20 | 50 |
| 15 | 100 | 20 | 50 |
| 16 | 70 | 14 | 35 |
| 17 | 40 | 8 | 20 |
| 18 | 40 | 8 | 20 |
| 19 | 23 | 5 | 11 |
| 20 | 13 | 3 | 6 |
| 21 | 8 | 2 | 4 |
| 22 | 3 | 1 | 1 |
| 23 | 3 | 1 | 1 |
| 24 | 3 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 301 | 1 | 124 | No | No | No | Yes | No | No | No | No | No | No |
| 2 | 1 | 292 | 1 | 120 | No | No | No | Yes | No | No | No | No | No | No |
| 3 | 1 | 286 | 1 | 118 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 268 | 1 | 110 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 238 | 1 | 98 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 235 | 1 | 97 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 232 | 1 | 95 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 211 | 1 | 87 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 208 | 1 | 86 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 205 | 1 | 84 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 178 | 1 | 73 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 166 | 1 | 68 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 163 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 120 | 1 | 50 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 120 | 1 | 50 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 84 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 48 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 48 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 28 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 16 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 10 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.5 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:21 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 124 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 425 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

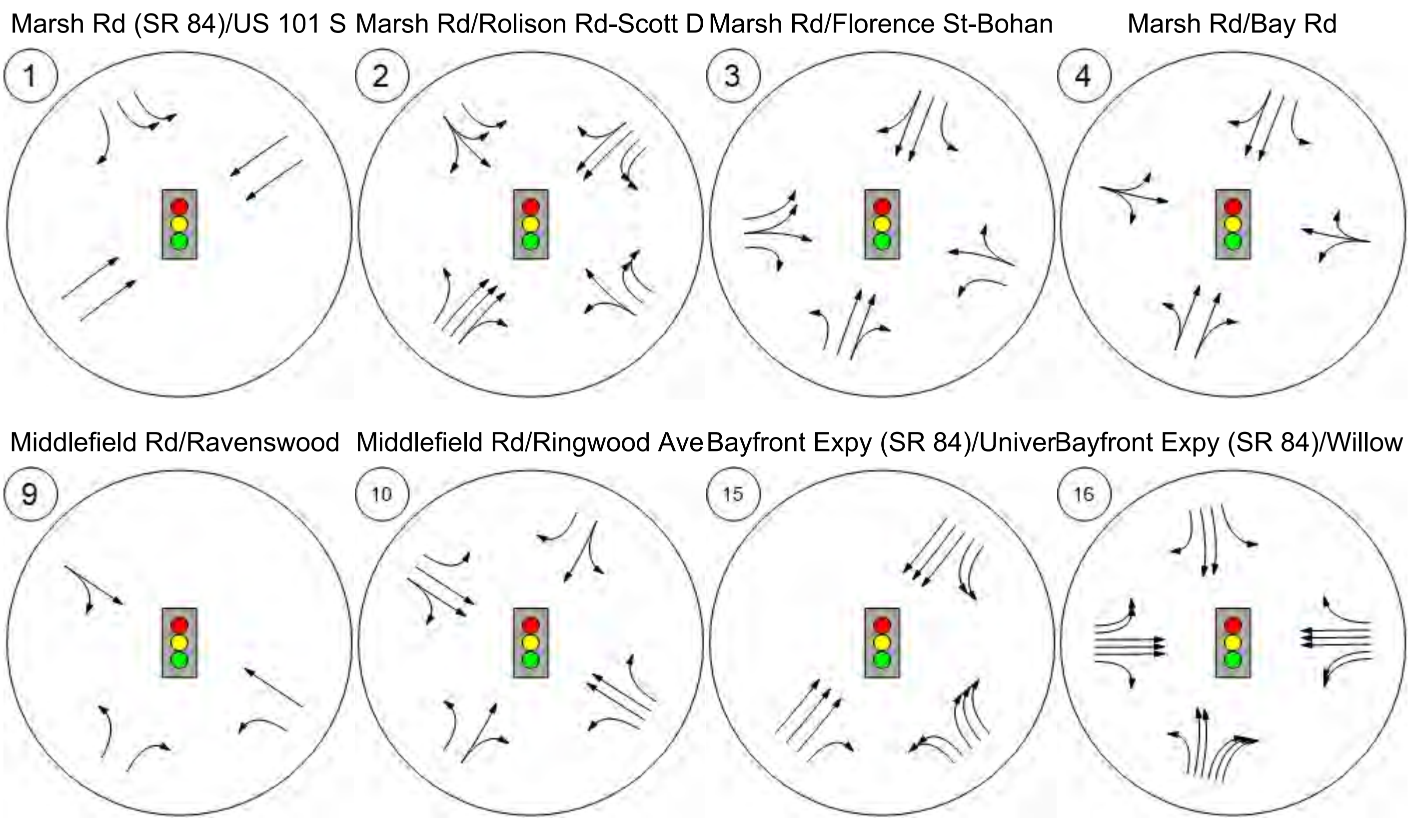
Version 2021 (SP 0-4)

Study Intersections

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

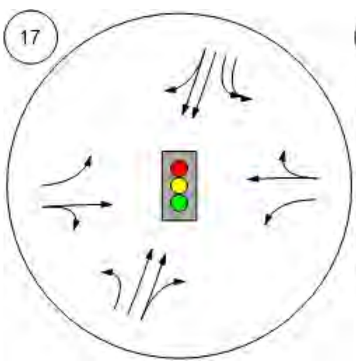



Generated with PTV VISTRO

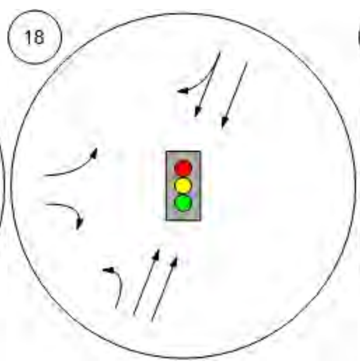
Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control

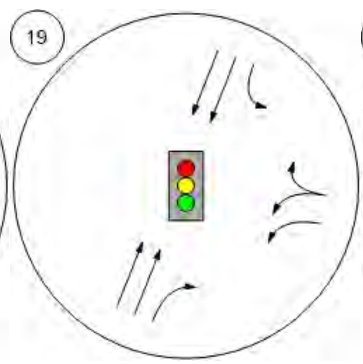

Willow Rd (SR 114)/Hamilton



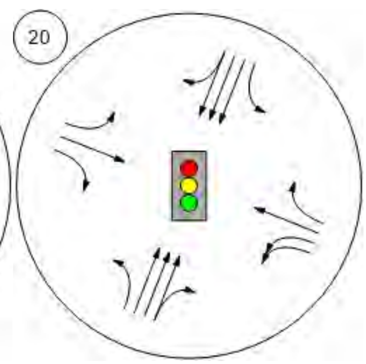

Willow Rd (SR 114)/Ivy Dr



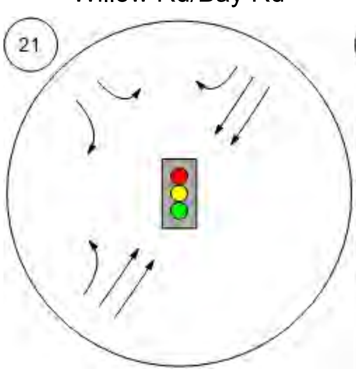

Willow Rd (SR 114)/O'Brien



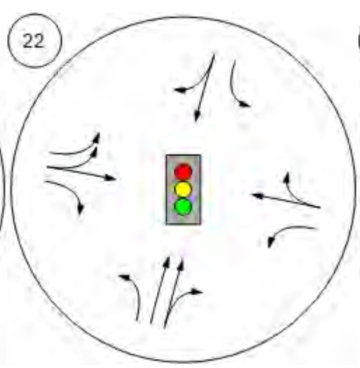

Willow Rd (SR 114)/Newbrid



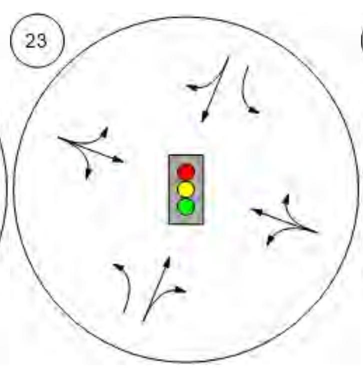

Willow Rd/Bay Rd



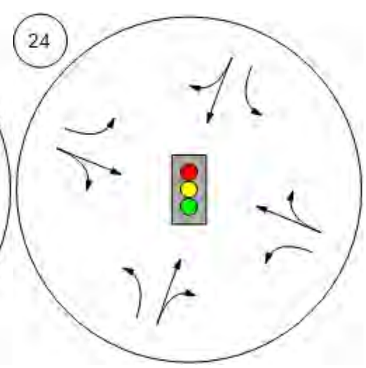

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

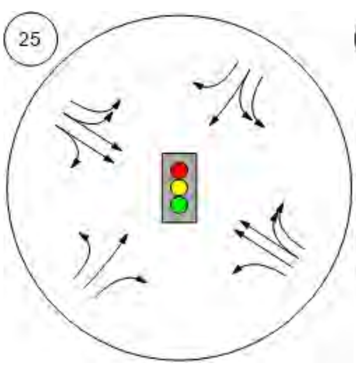


Generated with PTV VISTRO

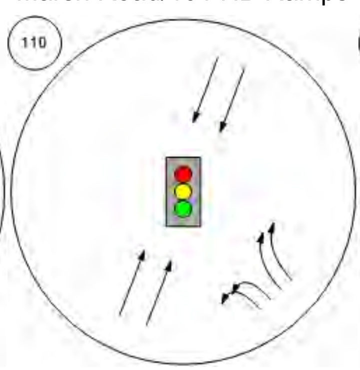
Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control

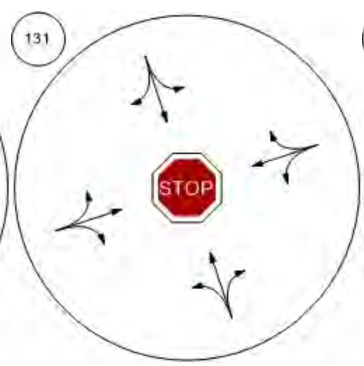

Middlefield Rd-Willow Rd



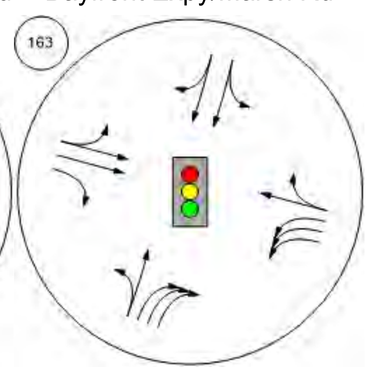

Marsh Road/101 NB Ramps



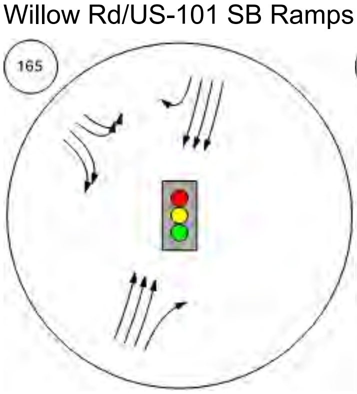

Chilco Street/Hamilton Avenu



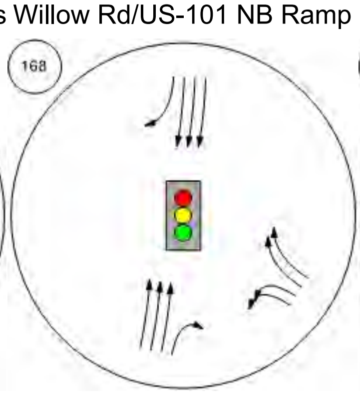

Bayfront Expy/Marsh Rd



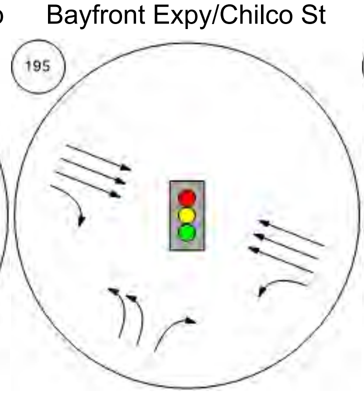

Willow Rd/US-101 SB Ramps



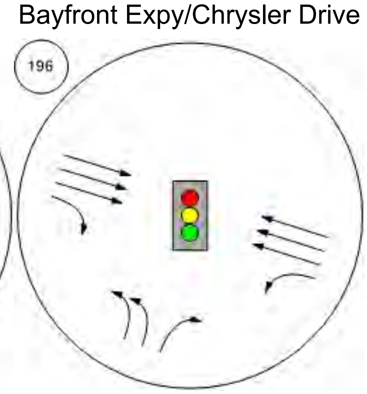

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

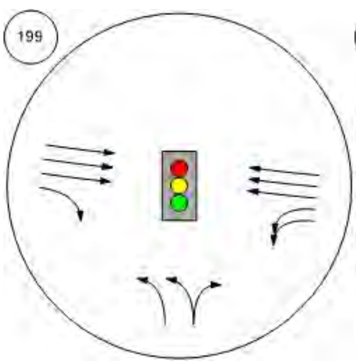


Generated with PTV VISTRO

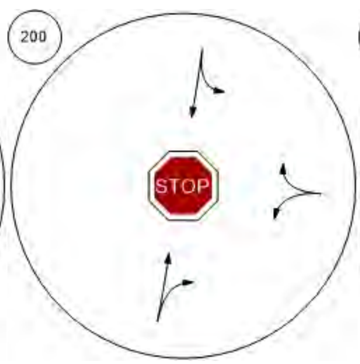
Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

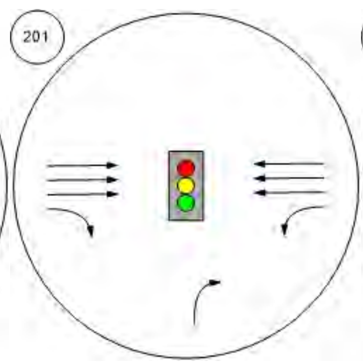

Bafront Expwy/Bldg 21



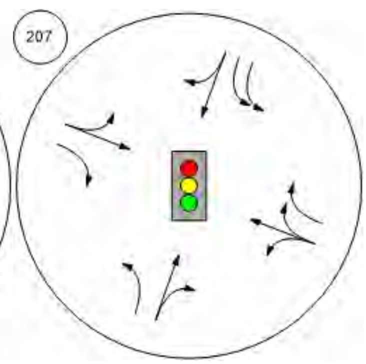

O'Brien Drive/Kavanaugh Dri



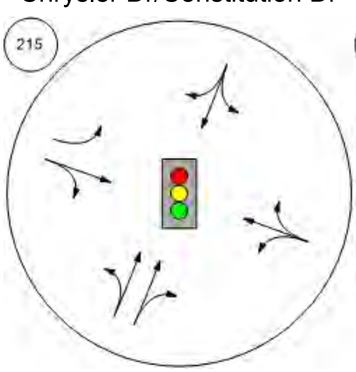

Bayfront Expwy/Bldg 20



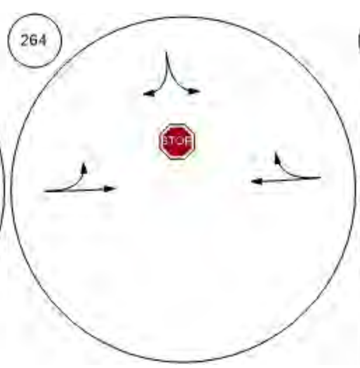

Chilco St/Constitution Dr



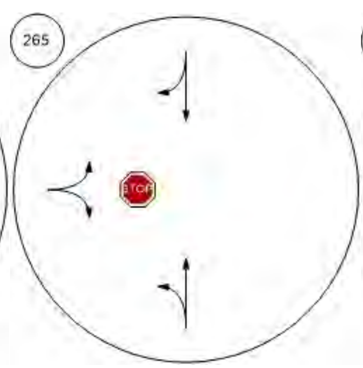

Chrysler Dr/Constitution Dr



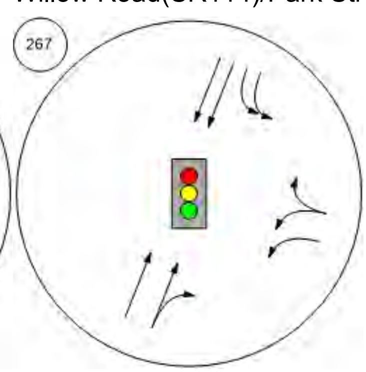

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



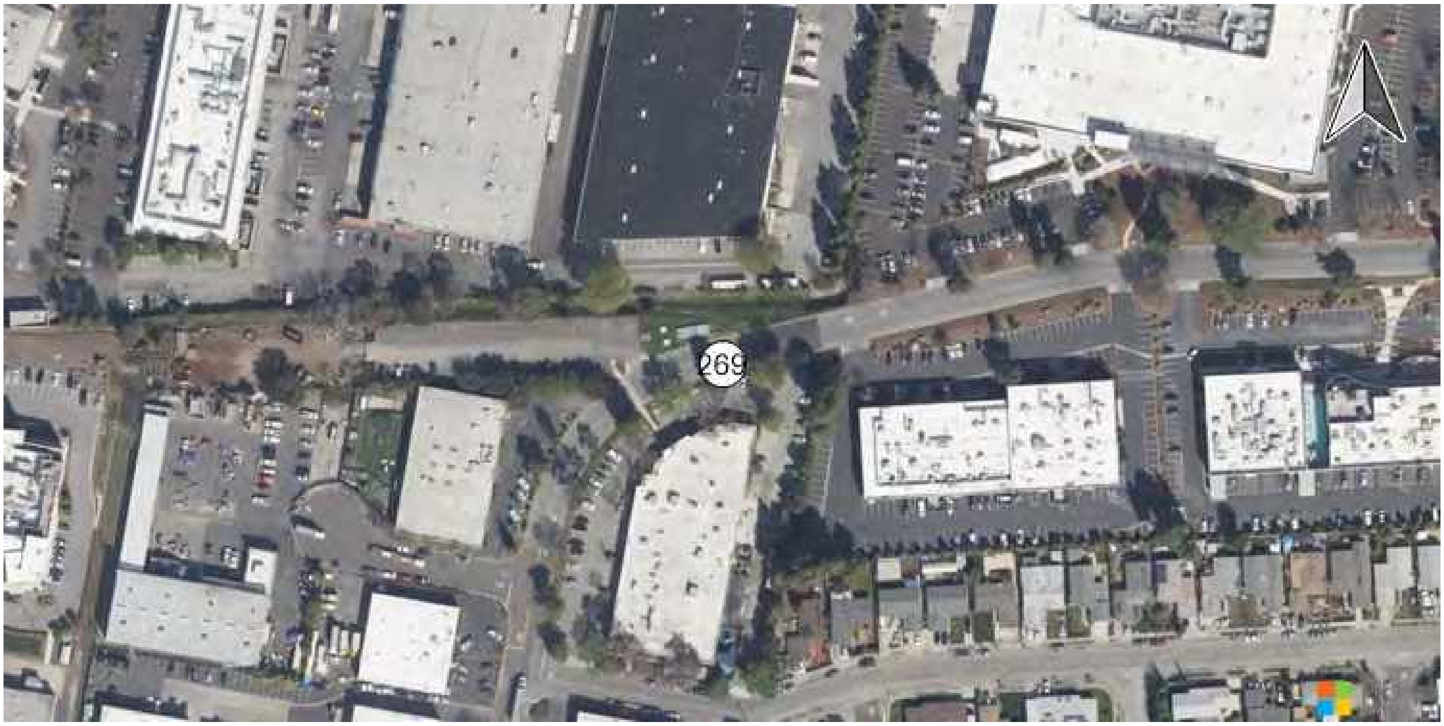

Willow Road(SR114)/Park Str



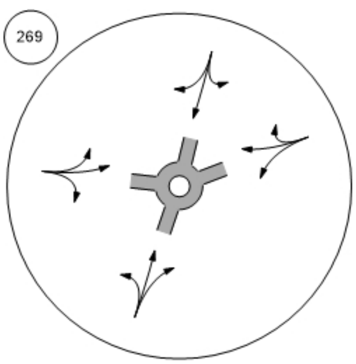
Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Lane Configuration and Traffic Control




### O'Brien Drive/Loop Road

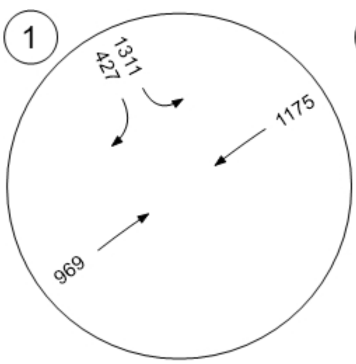


Generated with PTV VISTRO

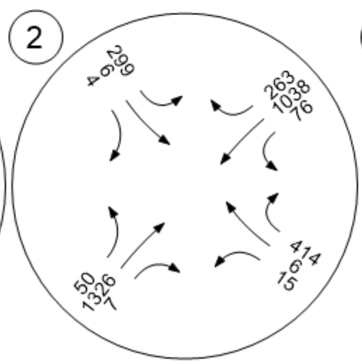
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

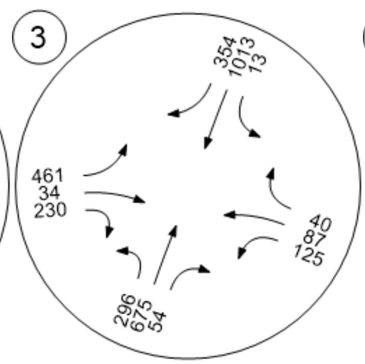

Marsh Rd (SR 84)/US 101 S



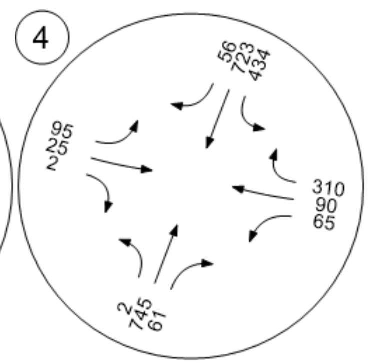

Marsh Rd/Rolison Rd-Scott D



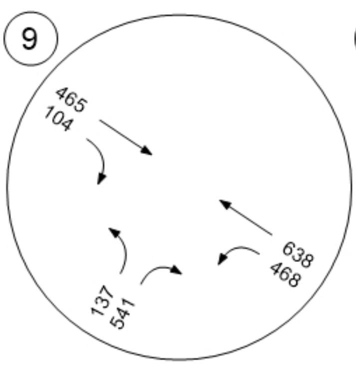

Marsh Rd/Florence St-Bohan



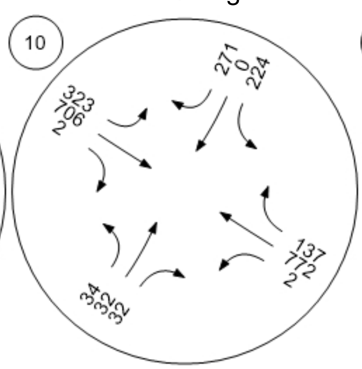

Marsh Rd/Bay Rd



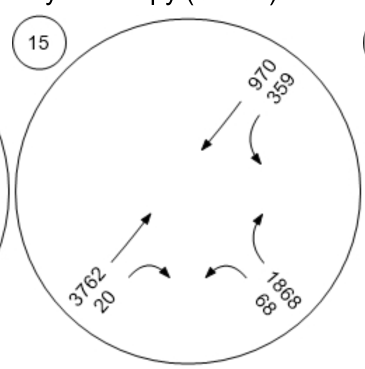

Middlefield Rd/Ravenswood



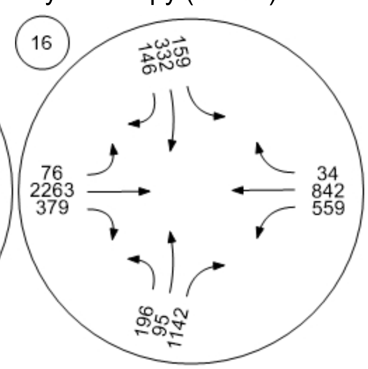

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

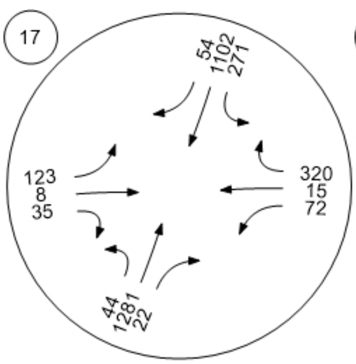


Generated with PTV VISTRO

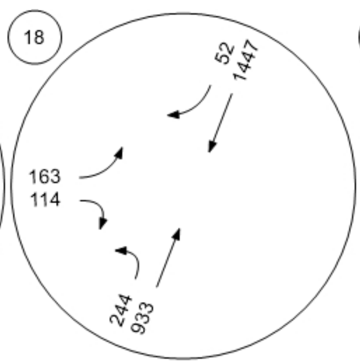
Version 2021 (SP 0-4)

Traffic Volume - Base Volume

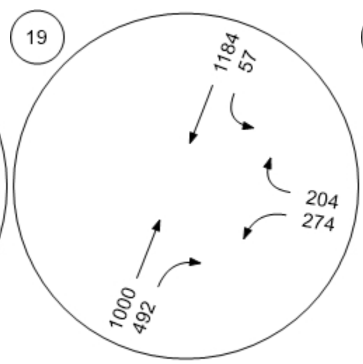

Willow Rd (SR 114)/Hamilton



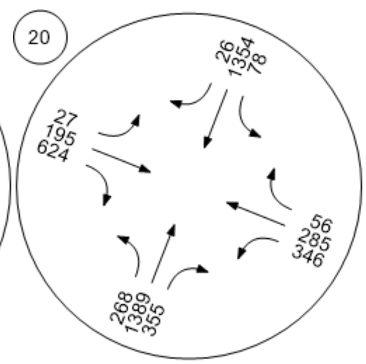

Willow Rd (SR 114)/Ivy Dr



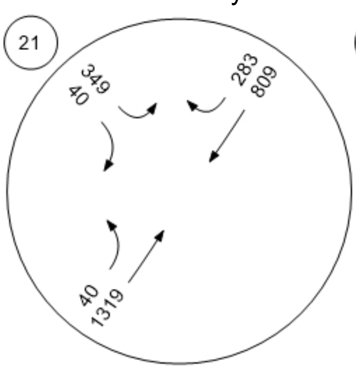

Willow Rd (SR 114)/O'Brien



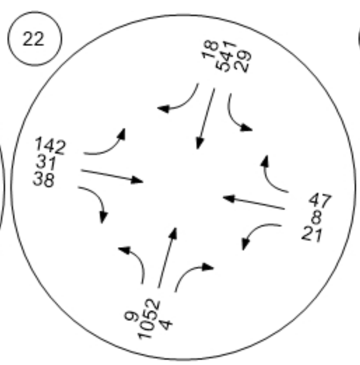

Willow Rd (SR 114)/Newbrid



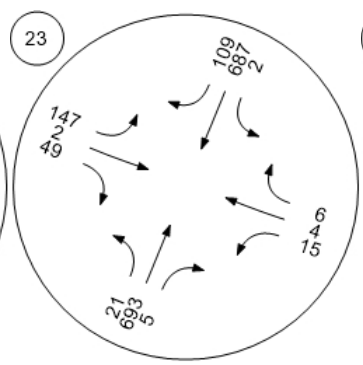

Willow Rd/Bay Rd



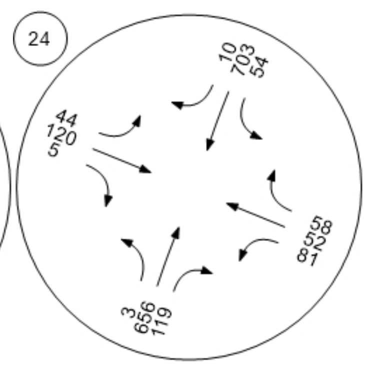

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

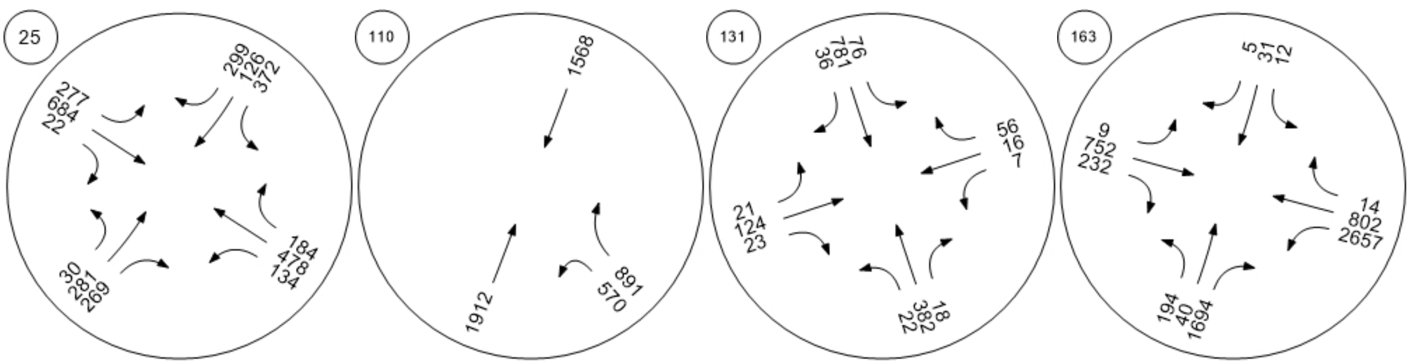


Generated with PTV VISTRO

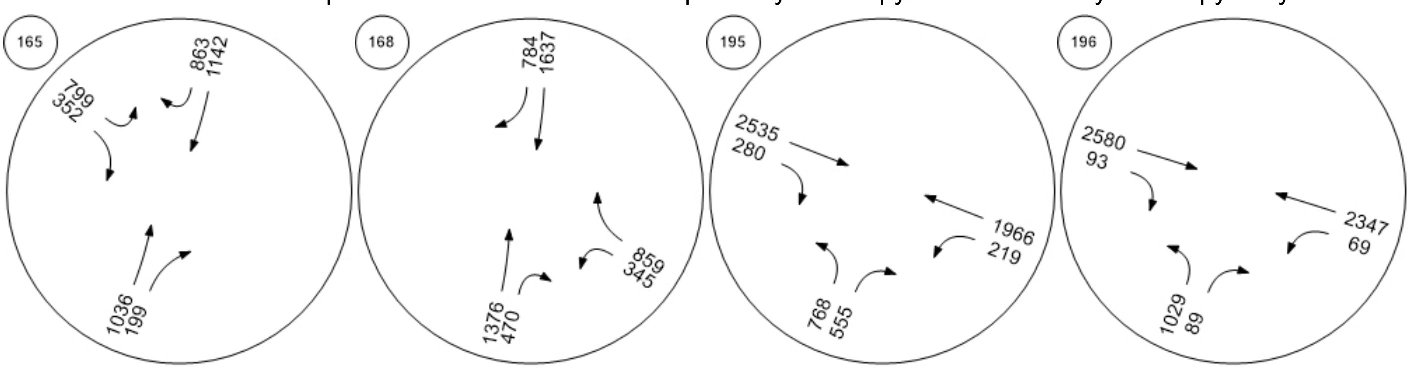
Version 2021 (SP 0-4)

Traffic Volume - Base Volume


Middlefield Rd-Willow Rd | Marsh Road/101 NB Ramps | Chilco Street/Hamilton Avenu | Bayfront Expy/Marsh Rd




Willow Rd/US-101 SB Ramps | Willow Rd/US-101 NB Ramp | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive

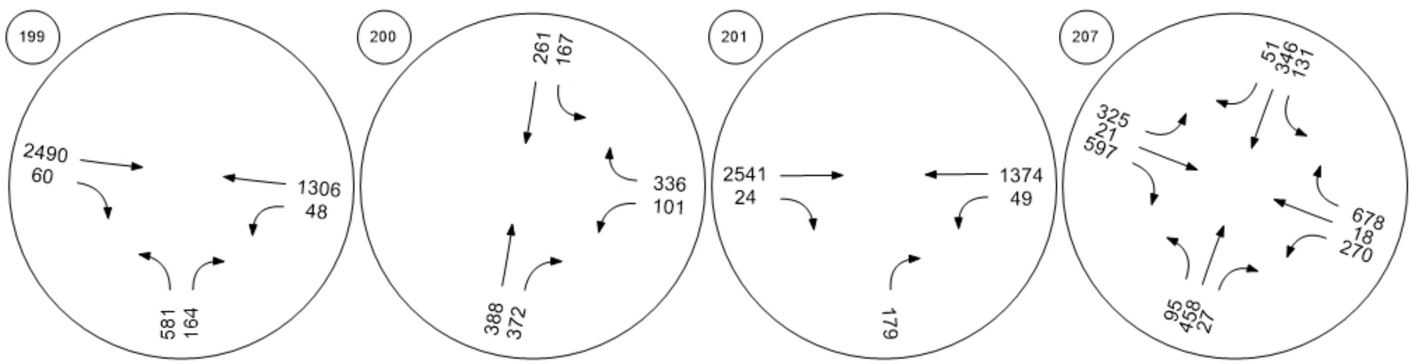


Generated with PTV VISTRO

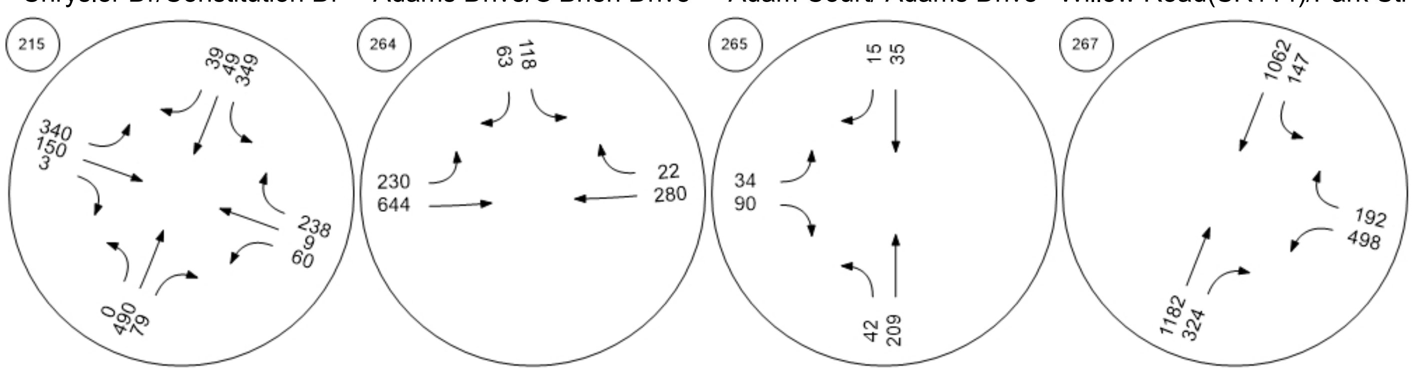
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume


Bafront Expwy/Bldg 21 | O'Brien Drive/Kavanaugh Dri | Bayfront Expwy/Bldg 20 | Chilco St/Constitution Dr



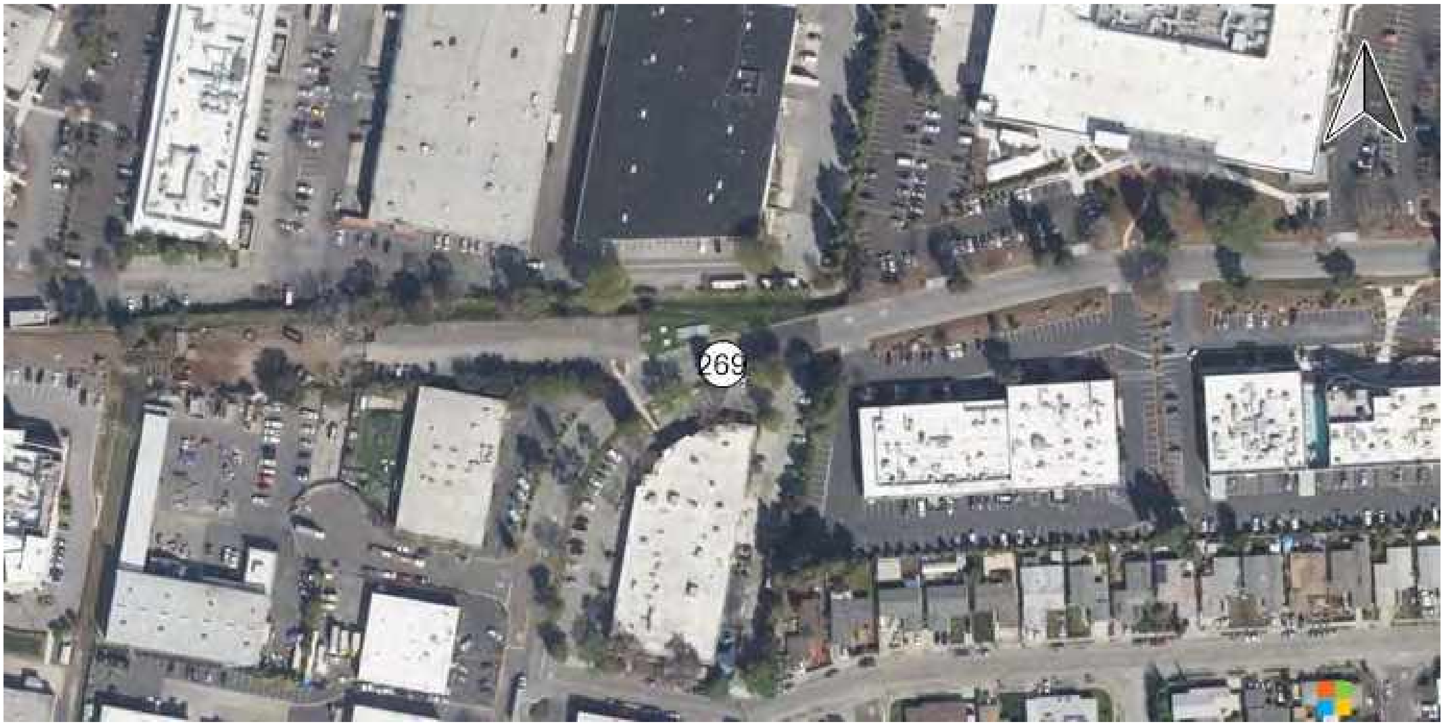

Chrysler Dr/Constitution Dr | Adams Drive/O'Brien Drive | Adam Court/ Adams Drive | Willow Road(SR114)/Park Str



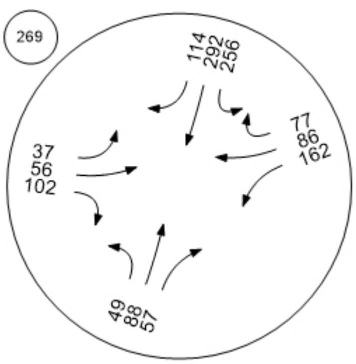
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Base Volume




O'Brien Drive/Loop Road

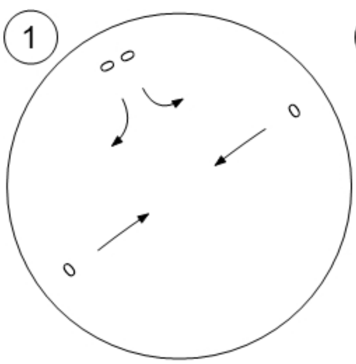


Generated with PTV VISTRO

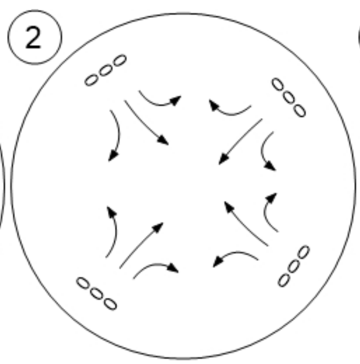
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

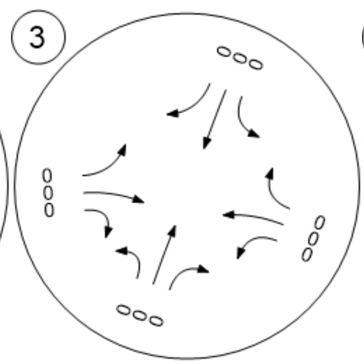

Marsh Rd (SR 84)/US 101 S



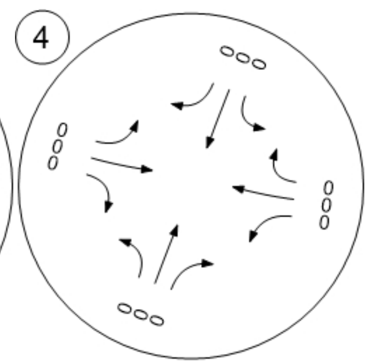

Marsh Rd/Rolison Rd-Scott D



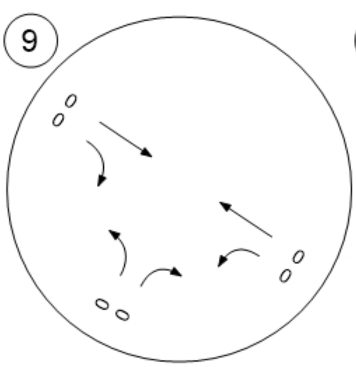

Marsh Rd/Florence St-Bohan



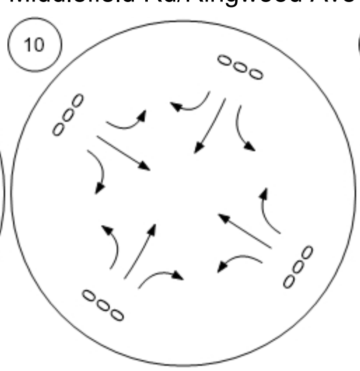

Marsh Rd/Bay Rd



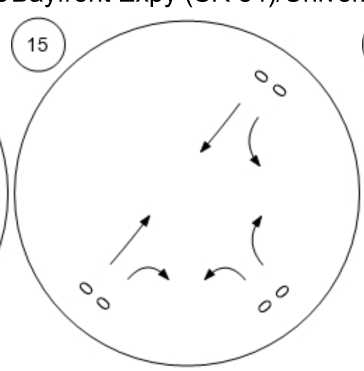

Middlefield Rd/Ravenswood



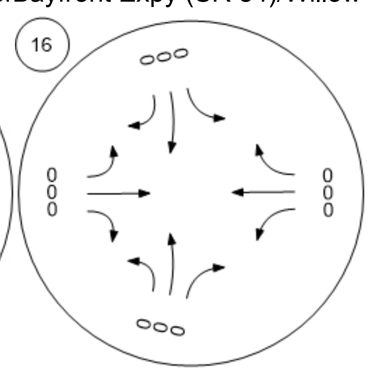

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

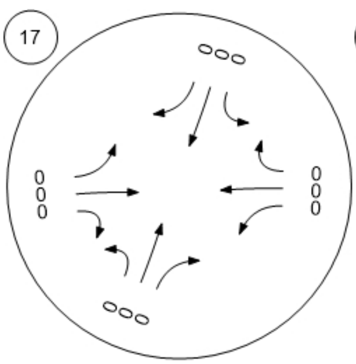


Generated with PTV VISTRO

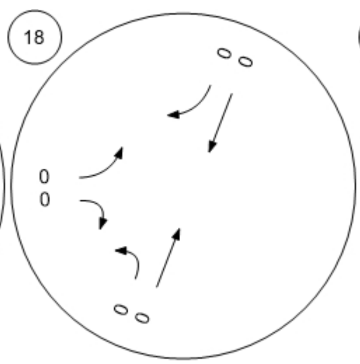
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

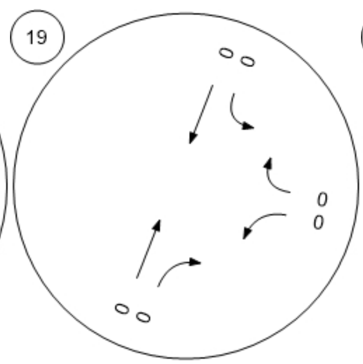

Willow Rd (SR 114)/Hamilton



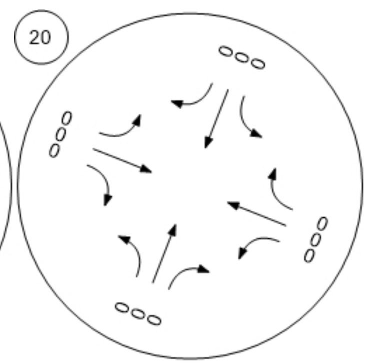

Willow Rd (SR 114)/Ivy Dr



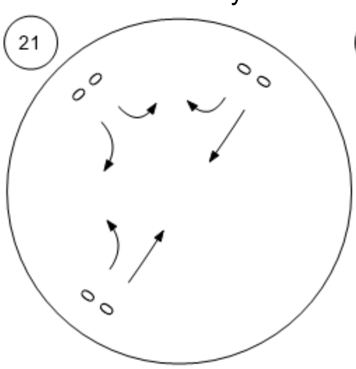

Willow Rd (SR 114)/O'Brien



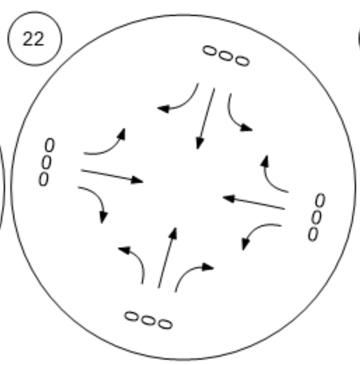

Willow Rd (SR 114)/Newbrid



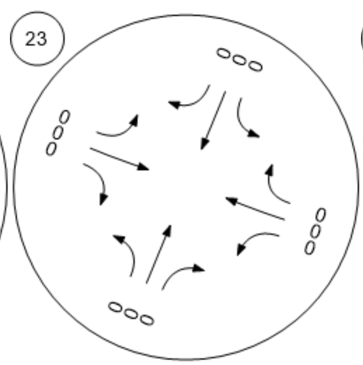

Willow Rd/Bay Rd



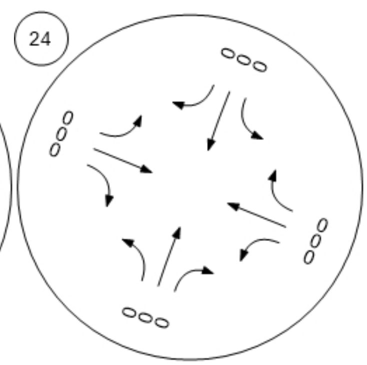

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

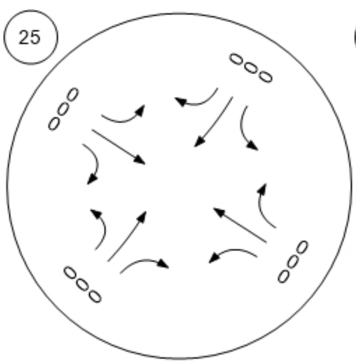



Willow Rd/Gilbert Ave

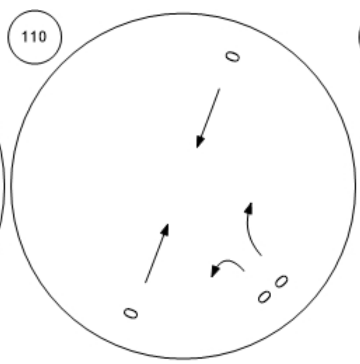


Traffic Volume - In-Process Volume

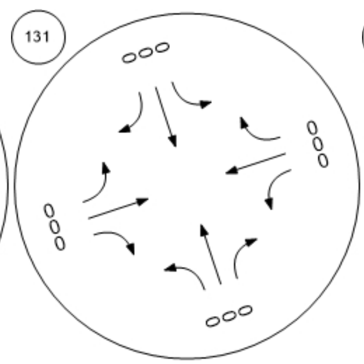

Middlefield Rd-Willow Rd



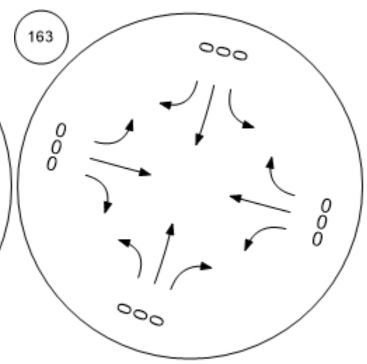

Marsh Road/101 NB Ramps



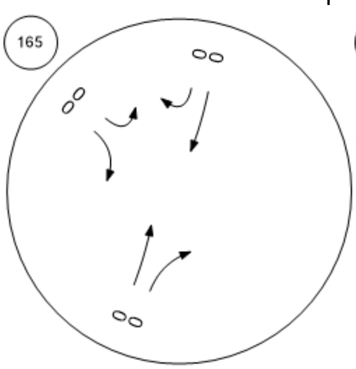

Chilco Street/Hamilton Avenu



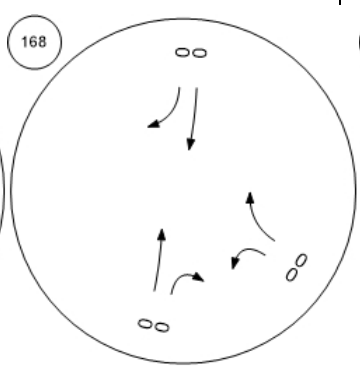

Bayfront Expy/Marsh Rd



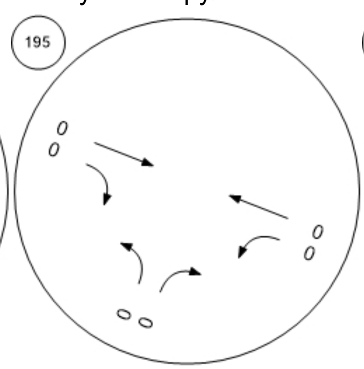

Willow Rd/US-101 SB Ramps



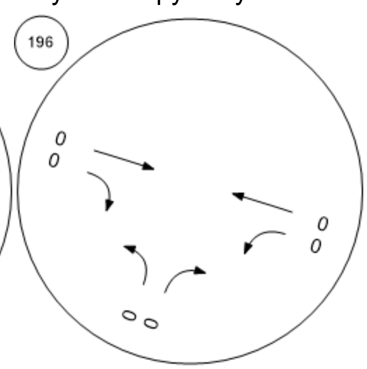

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

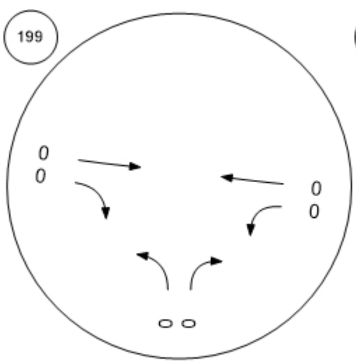


Generated with PTV VISTRO

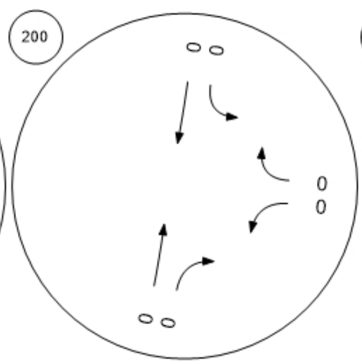
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

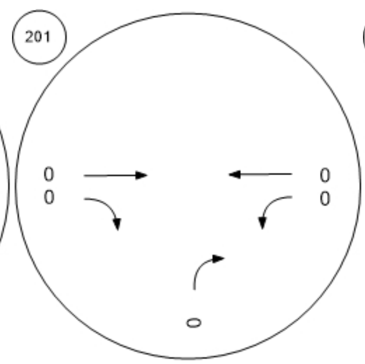

Bafront Expwy/Bldg 21



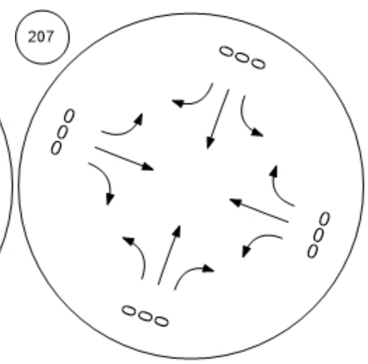

O'Brien Drive/Kavanaugh Dri



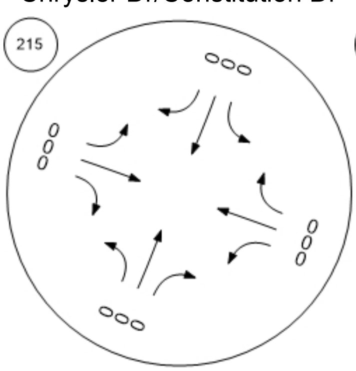

Bayfront Expwy/Bldg 20



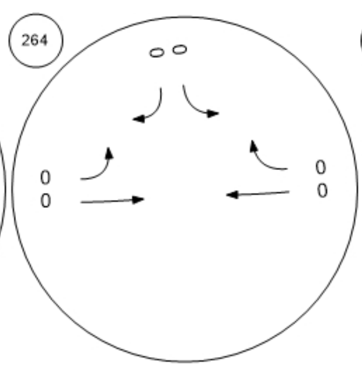

Chilco St/Constitution Dr



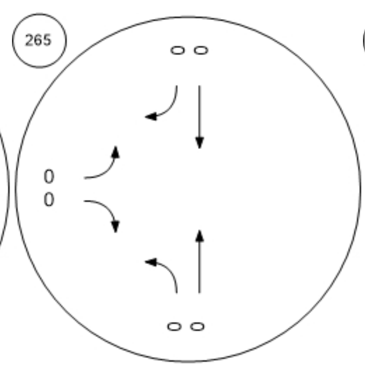

Chrysler Dr/Constitution Dr



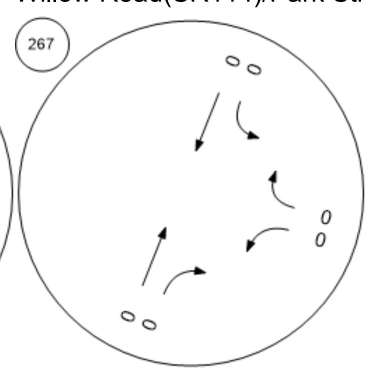

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



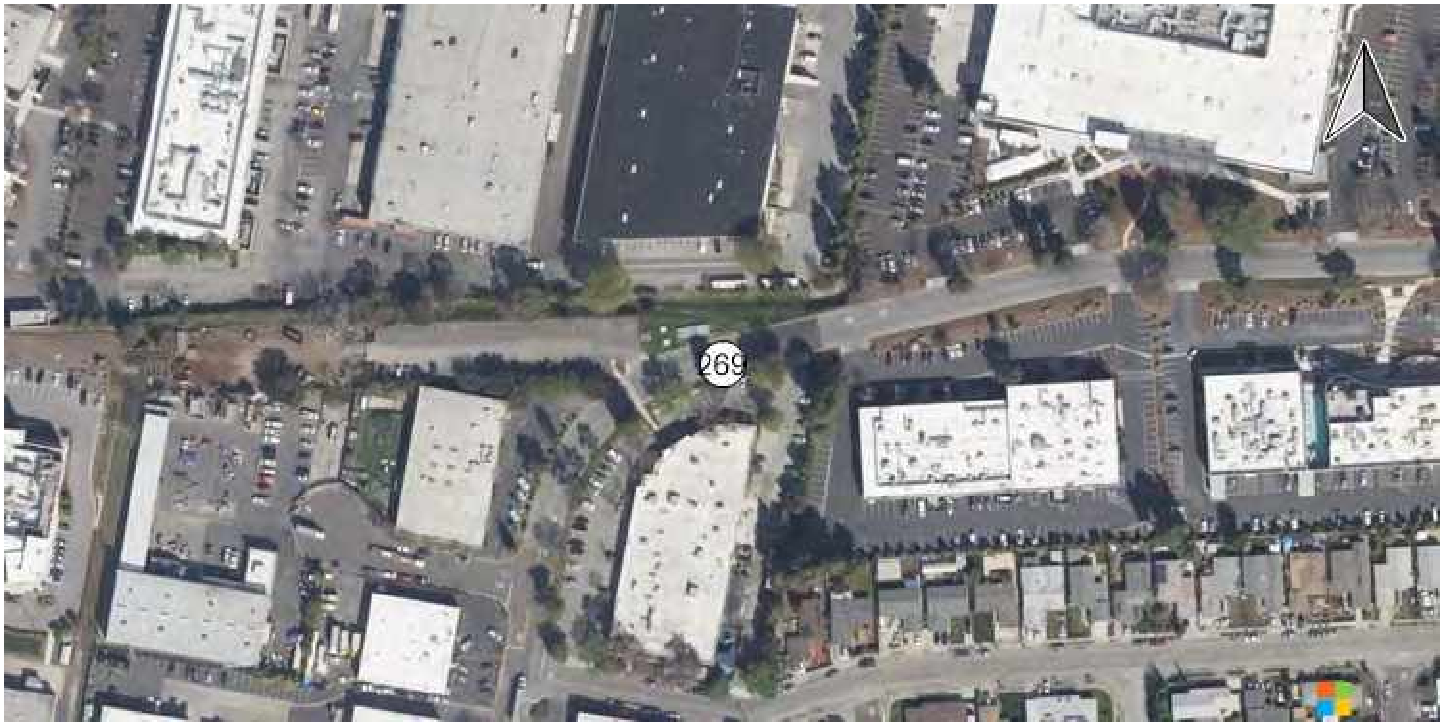

Willow Road(SR114)/Park Str



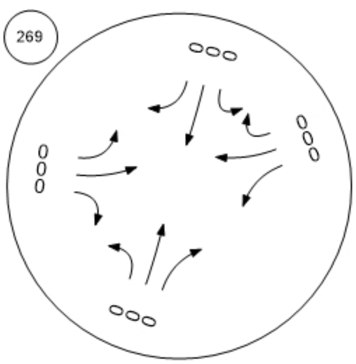
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume




O'Brien Drive/Loop Road

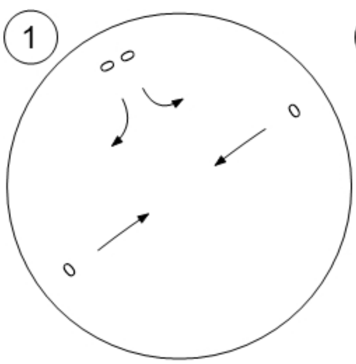


Generated with PTV VISTRO

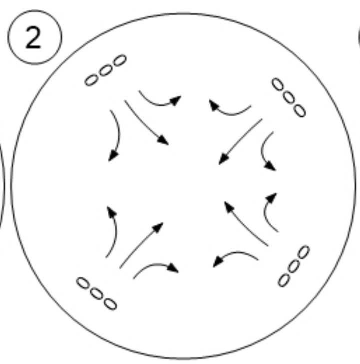
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

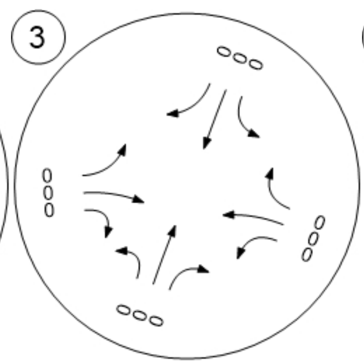

Marsh Rd (SR 84)/US 101 S



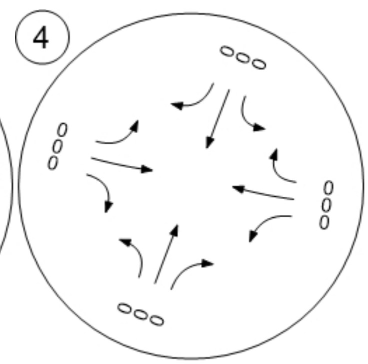

Marsh Rd/Rolison Rd-Scott D



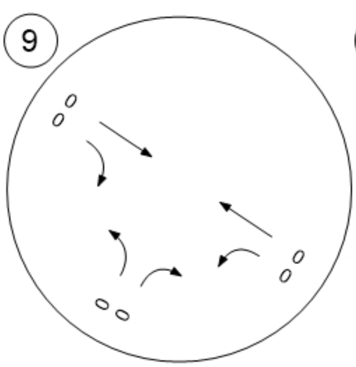

Marsh Rd/Florence St-Bohan



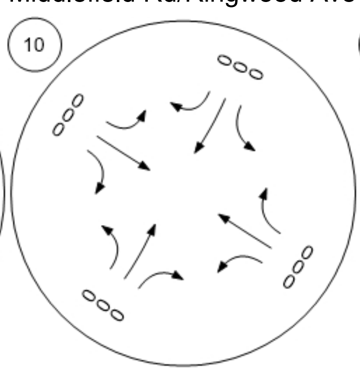

Marsh Rd/Bay Rd



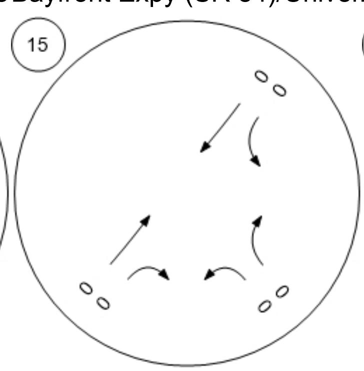

Middlefield Rd/Ravenswood



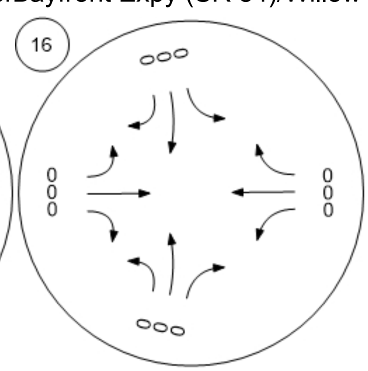

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer

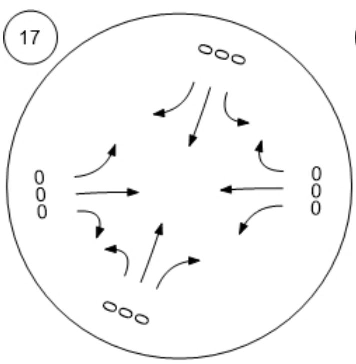



Bayfront Expy (SR 84)/Willow

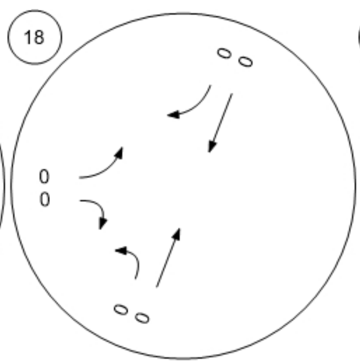


Traffic Volume - Net New Site Trips

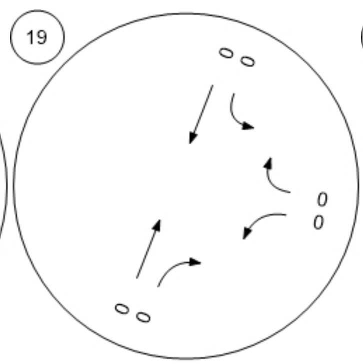

Willow Rd (SR 114)/Hamilton



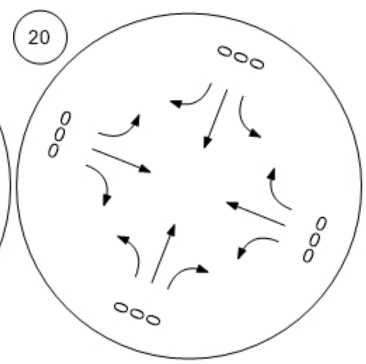

Willow Rd (SR 114)/Ivy Dr



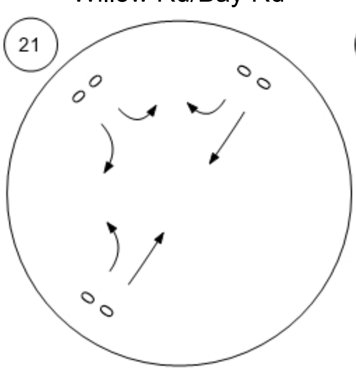

Willow Rd (SR 114)/O'Brien



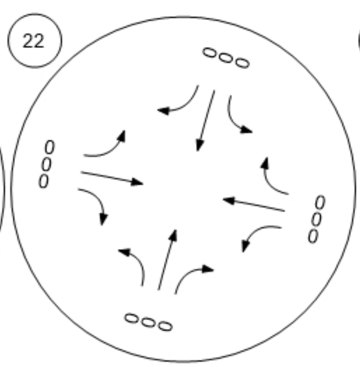

Willow Rd (SR 114)/Newbrid



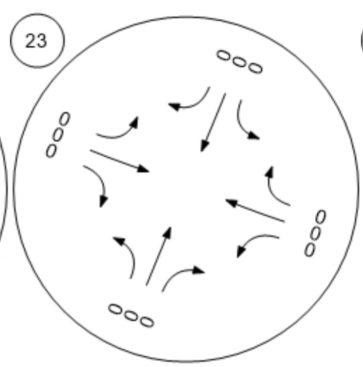

Willow Rd/Bay Rd



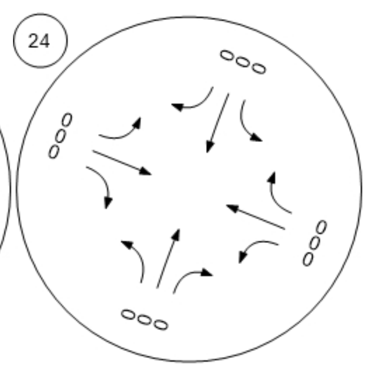

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

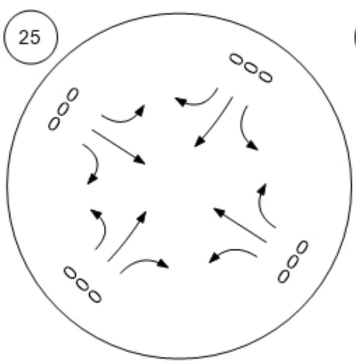


Generated with PTV VISTRO

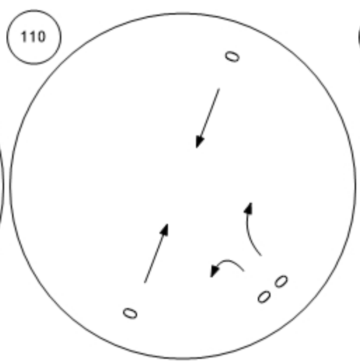
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

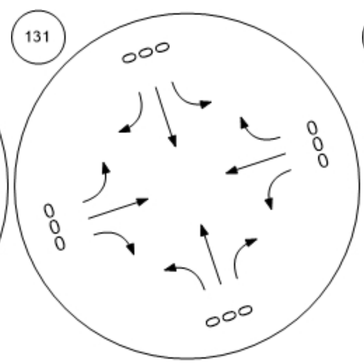

Middlefield Rd-Willow Rd



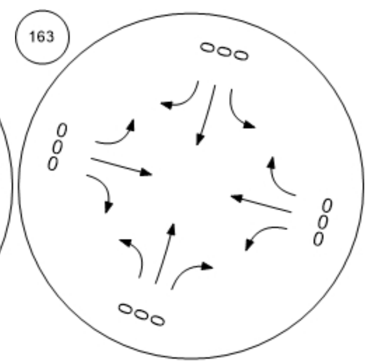

Marsh Road/101 NB Ramps



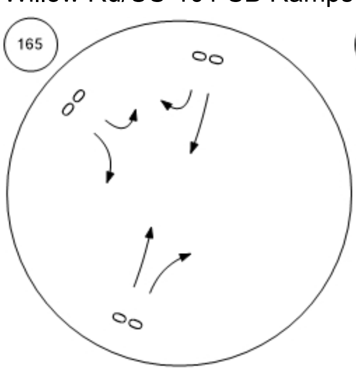

Chilco Street/Hamilton Avenu



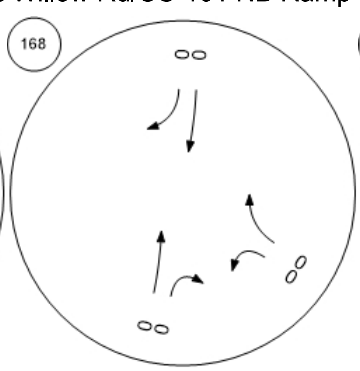

Bayfront Expy/Marsh Rd



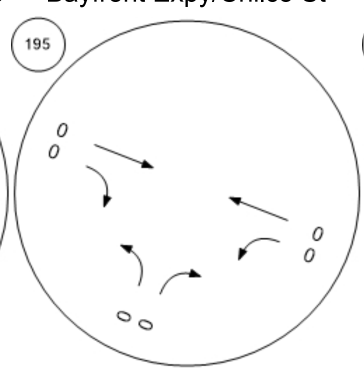

Willow Rd/US-101 SB Ramps



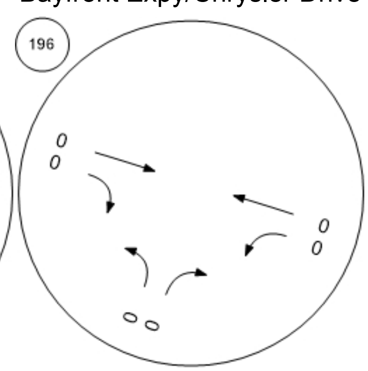

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

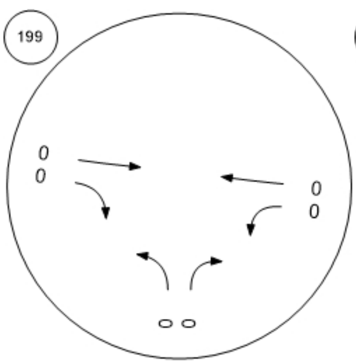


Generated with PTV VISTRO

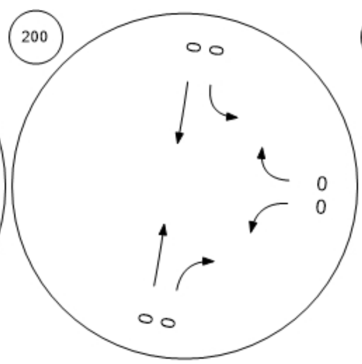
Version 2021 (SP 0-4)

## Traffic Volume - Net New Site Trips

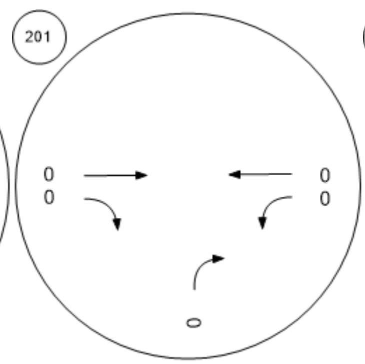

Bafront Expwy/Bldg 21



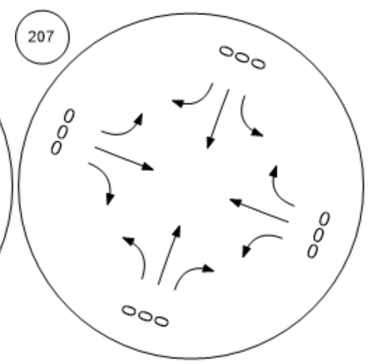

O'Brien Drive/Kavanaugh Dri



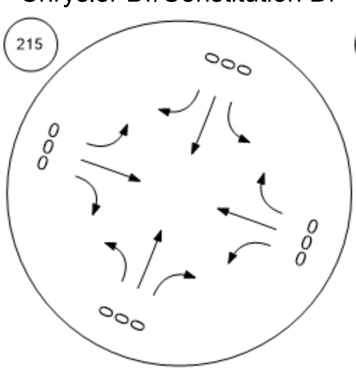

Bayfront Expwy/Bldg 20



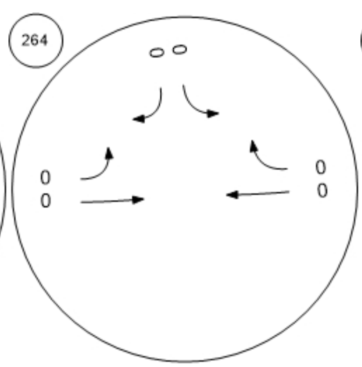

Chilco St/Constitution Dr



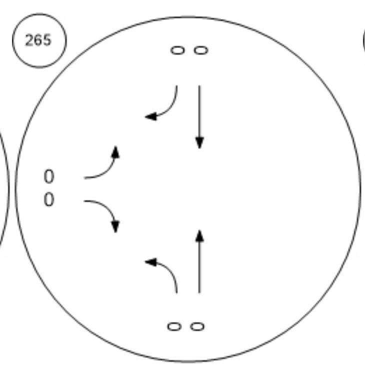

Chrysler Dr/Constitution Dr



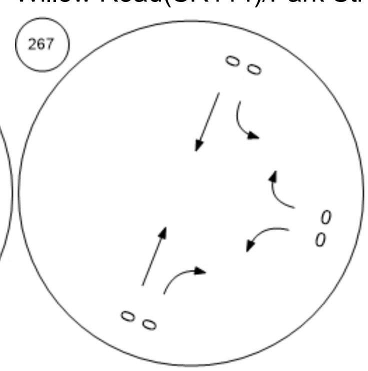

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



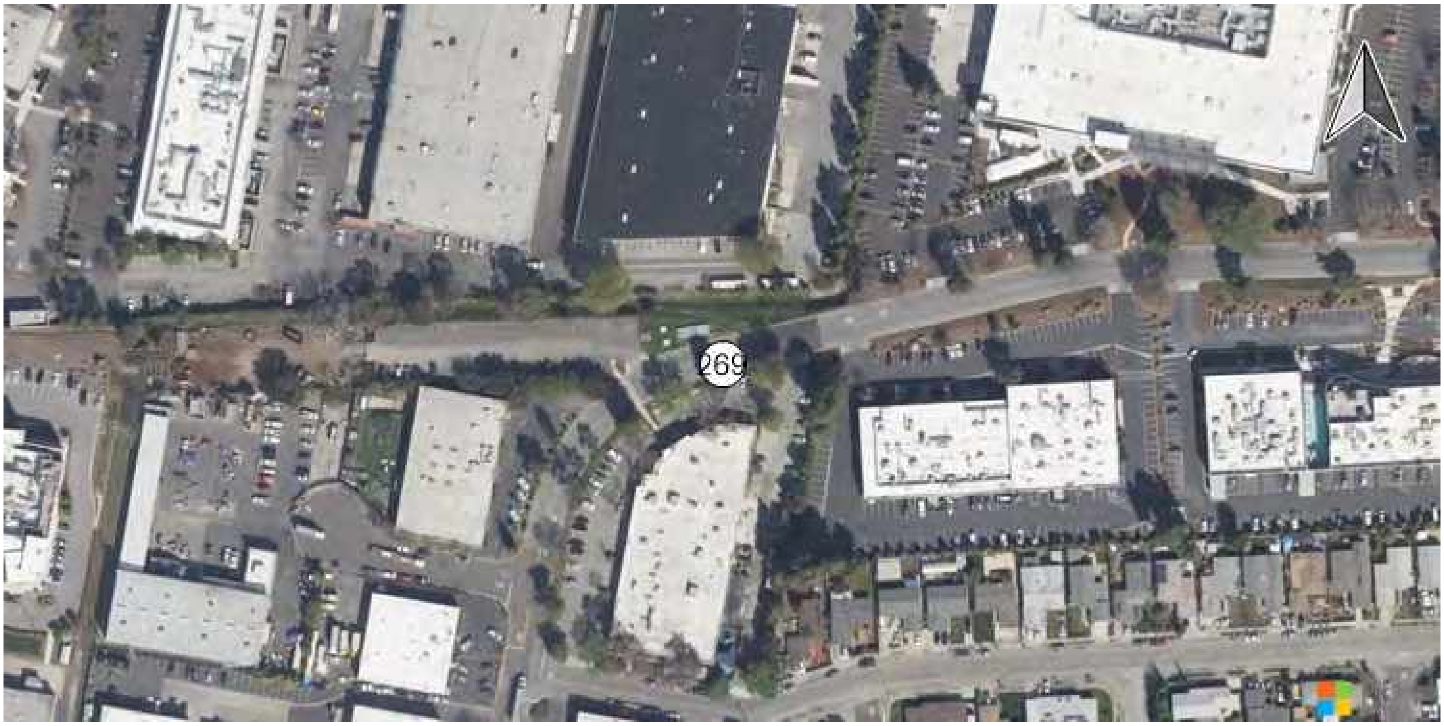

Willow Road(SR114)/Park Str



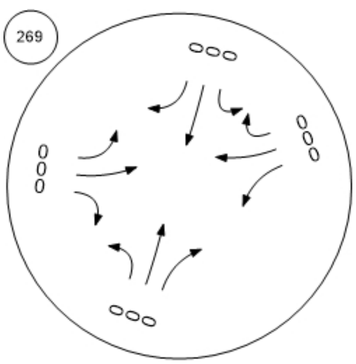
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

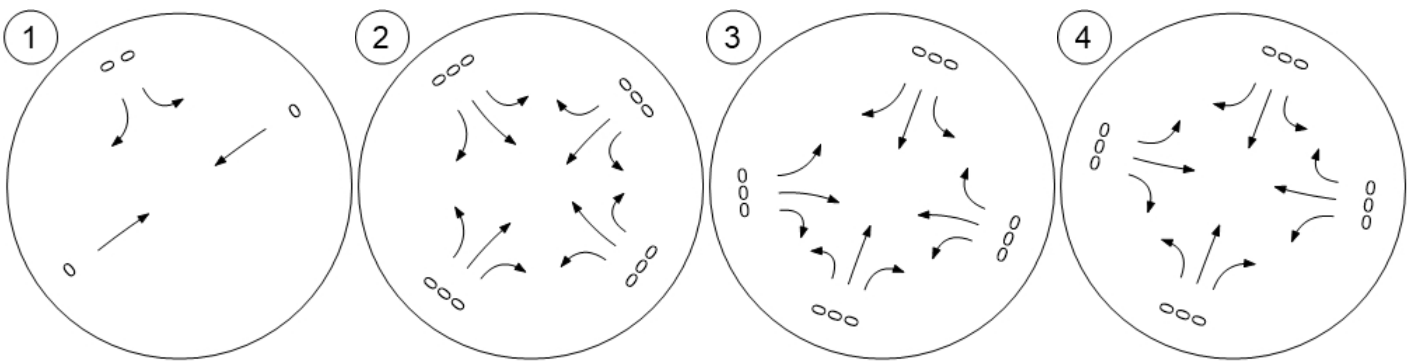



O'Brien Drive/Loop Road

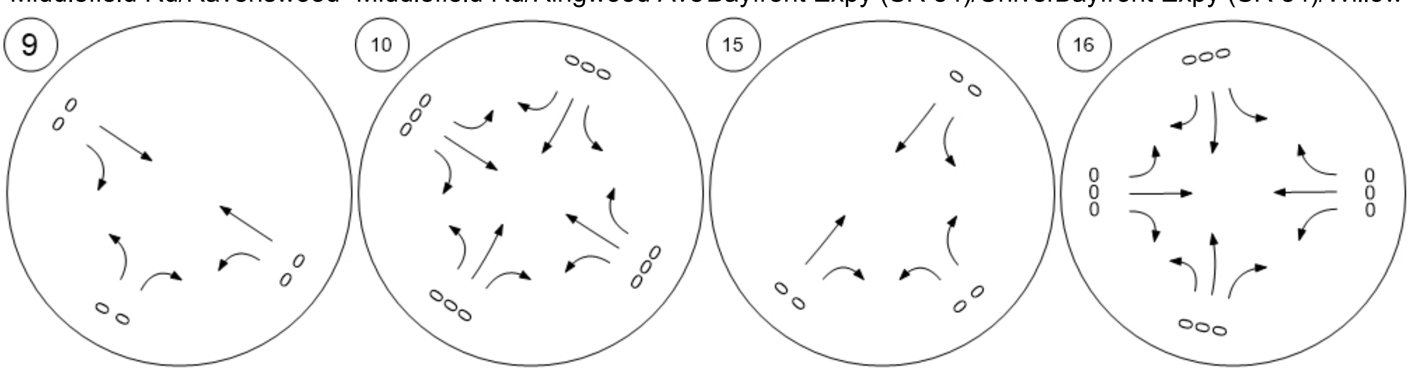


## Traffic Volume - Other Volume


Marsh Rd (SR 84)/US 101 S Marsh Rd/Rolison Rd-Scott D Marsh Rd/Florence St-Bohan Marsh Rd/Bay Rd




Middlefield Rd/Ravenswood Middlefield Rd/Ringwood Ave Bayfront Expy (SR 84)/Univer Bayfront Expy (SR 84)/Willow

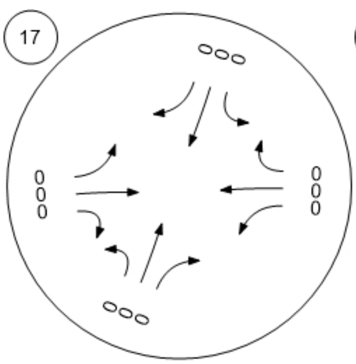


Generated with PTV VISTRO

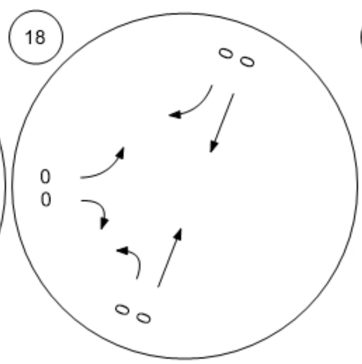
Version 2021 (SP 0-4)

Traffic Volume - Other Volume

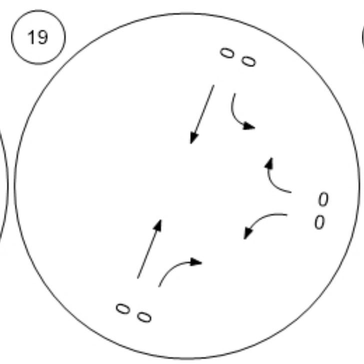

Willow Rd (SR 114)/Hamilton



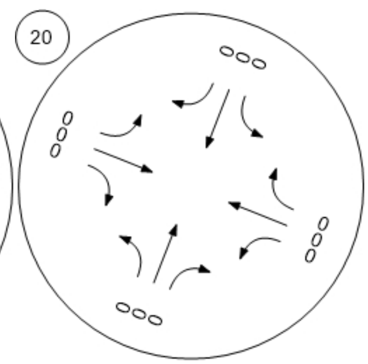

Willow Rd (SR 114)/Ivy Dr



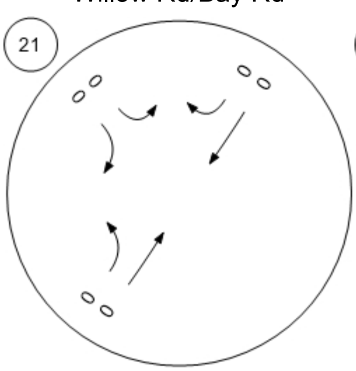

Willow Rd (SR 114)/O'Brien



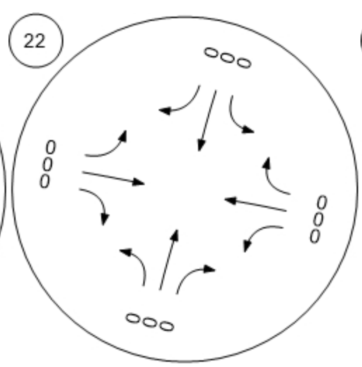

Willow Rd (SR 114)/Newbrid



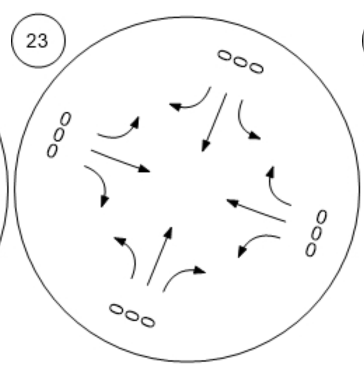

Willow Rd/Bay Rd



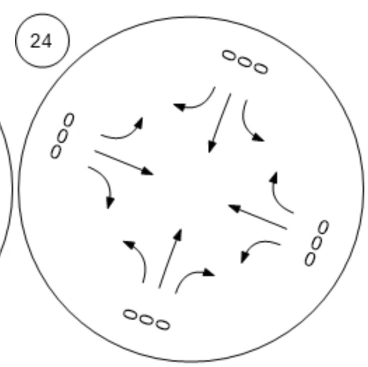

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave

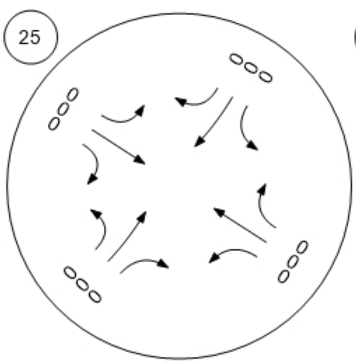



Willow Rd/Gilbert Ave

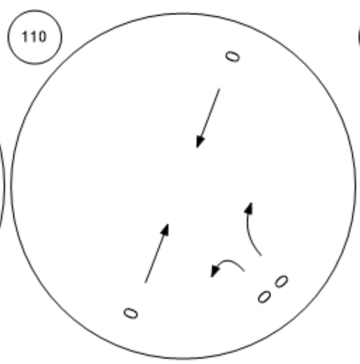


Traffic Volume - Other Volume

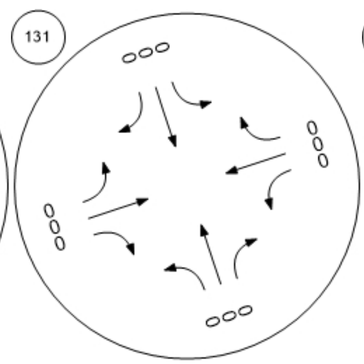

Middlefield Rd-Willow Rd



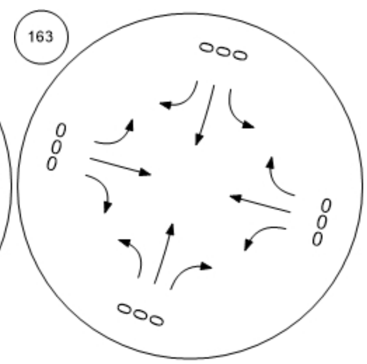

Marsh Road/101 NB Ramps



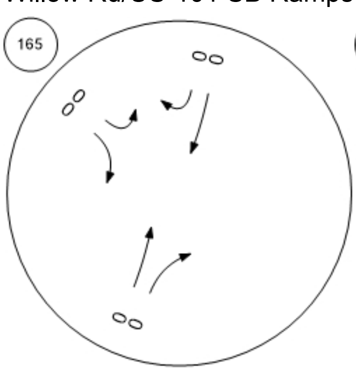

Chilco Street/Hamilton Avenu



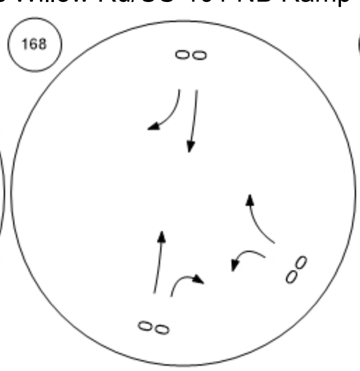

Bayfront Expy/Marsh Rd



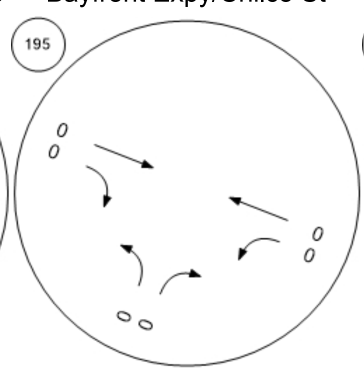

Willow Rd/US-101 SB Ramps



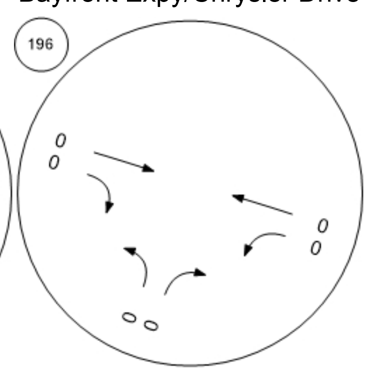

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

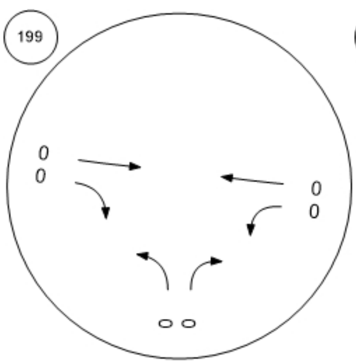


Generated with PTV VISTRO

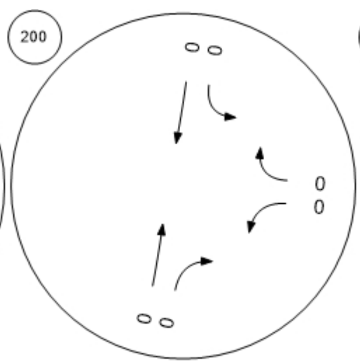
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

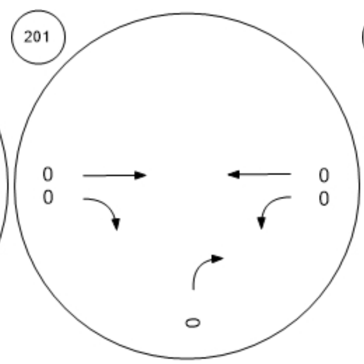

Bafront Expwy/Bldg 21



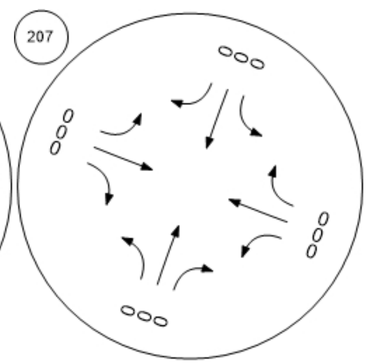

O'Brien Drive/Kavanaugh Dri



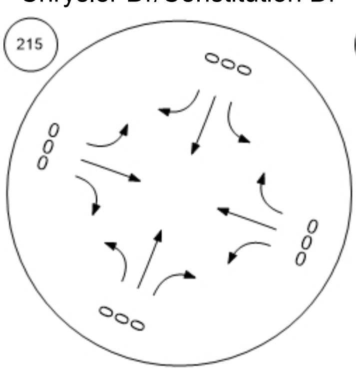

Bayfront Expwy/Bldg 20



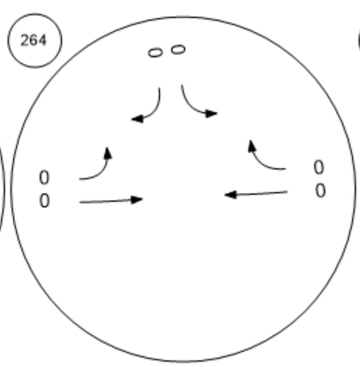

Chilco St/Constitution Dr



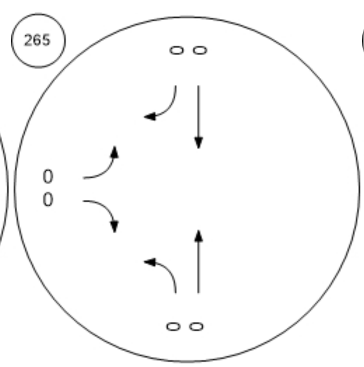

Chrysler Dr/Constitution Dr



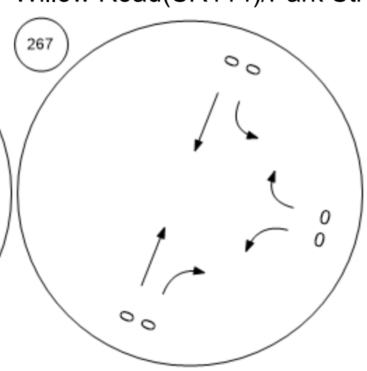

Adams Drive/O'Brien Drive




Adam Court/ Adams Drive



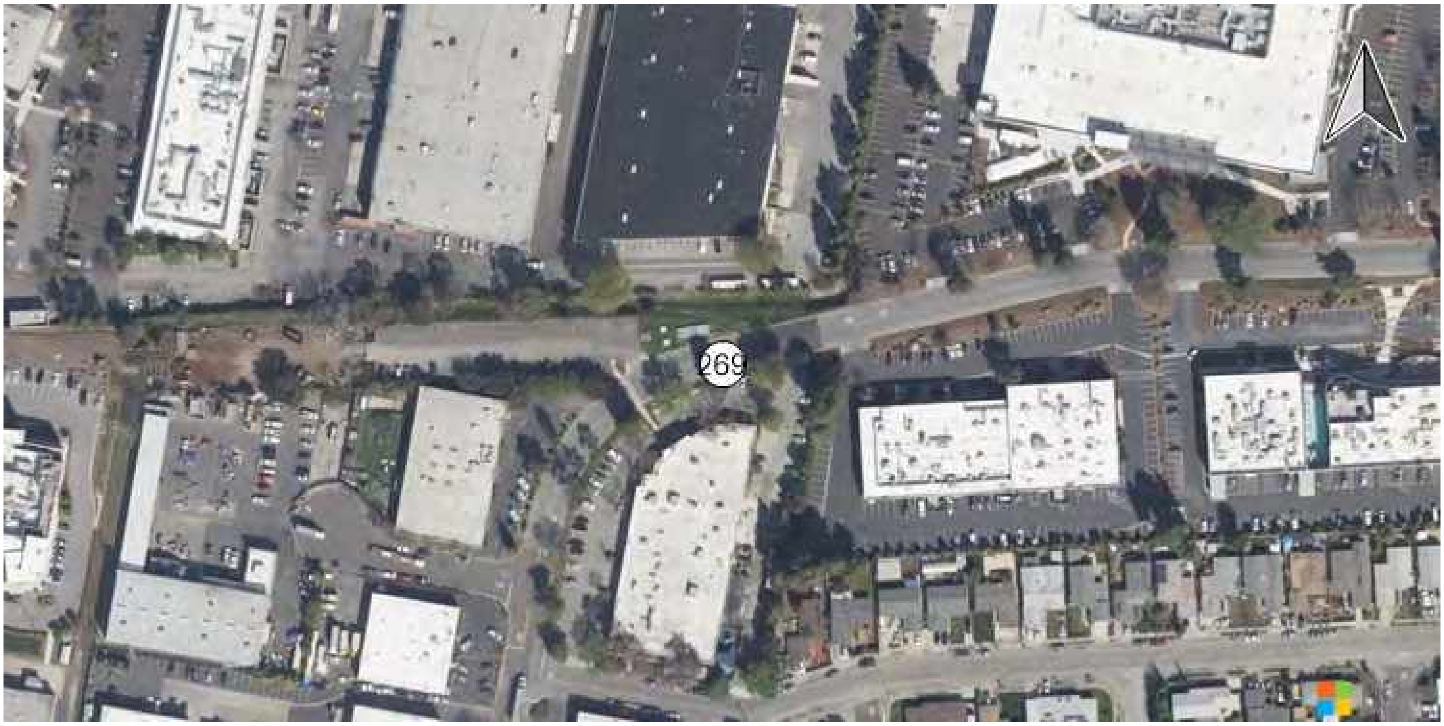

Willow Road(SR114)/Park Str



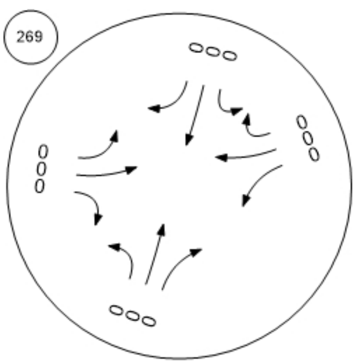
Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume




O'Brien Drive/Loop Road

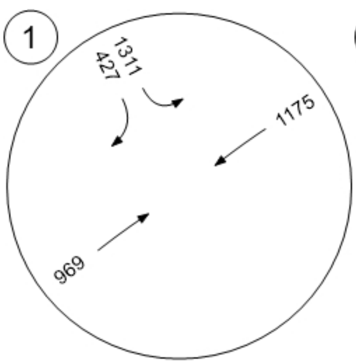


Generated with PTV VISTRO

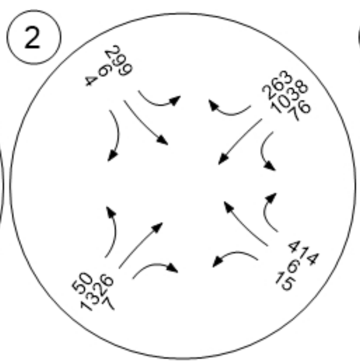
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

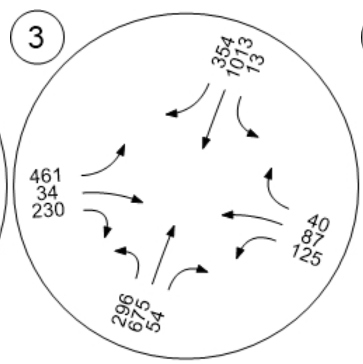

Marsh Rd (SR 84)/US 101 S



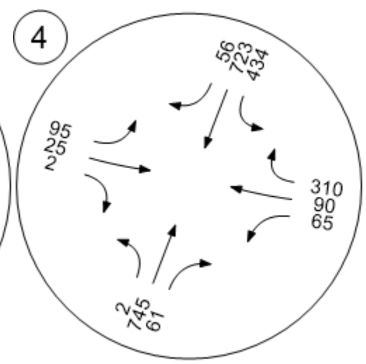

Marsh Rd/Rolison Rd-Scott D



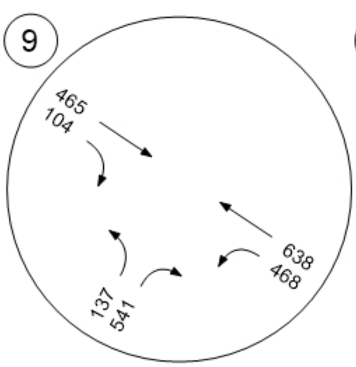

Marsh Rd/Florence St-Bohan



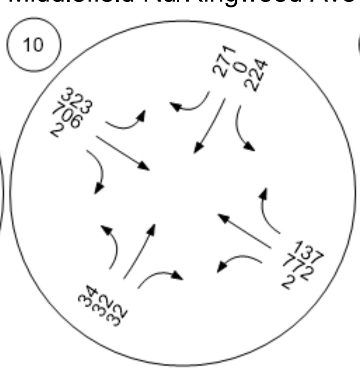

Marsh Rd/Bay Rd



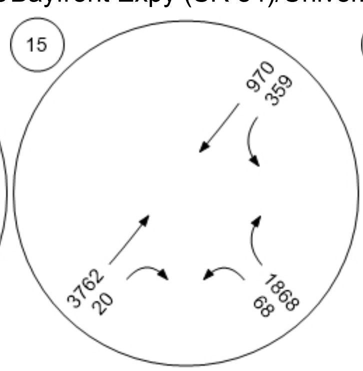

Middlefield Rd/Ravenswood



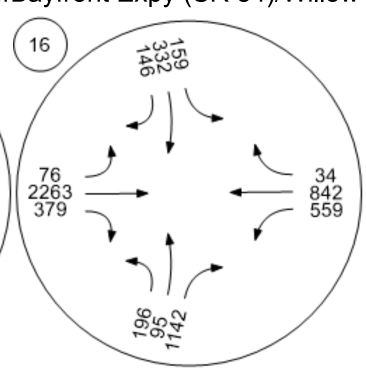

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

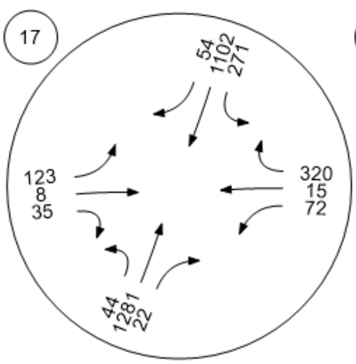


Generated with PTV VISTRO

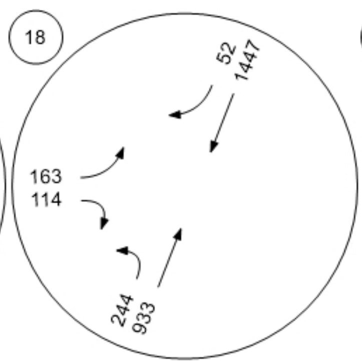
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

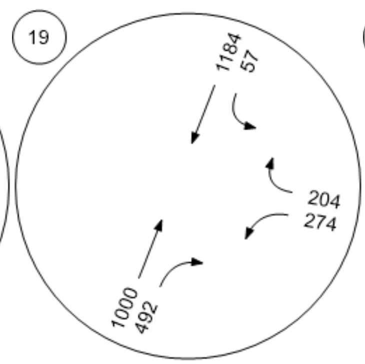

Willow Rd (SR 114)/Hamilton



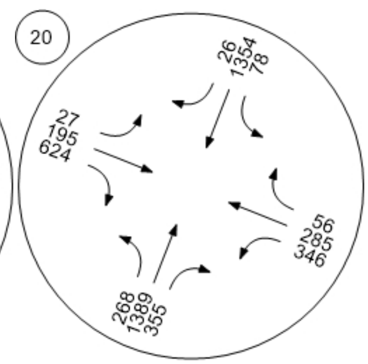

Willow Rd (SR 114)/Ivy Dr



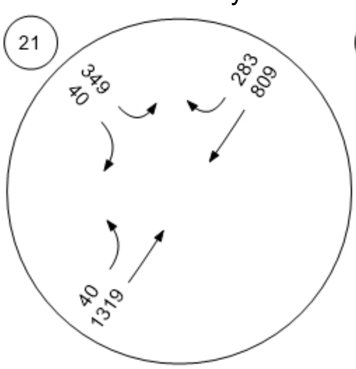

Willow Rd (SR 114)/O'Brien



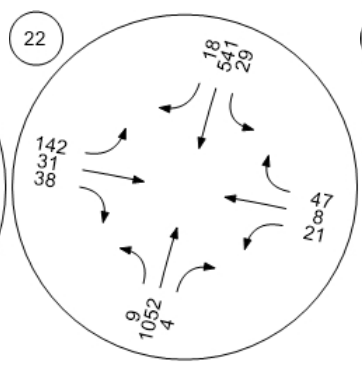

Willow Rd (SR 114)/Newbrid



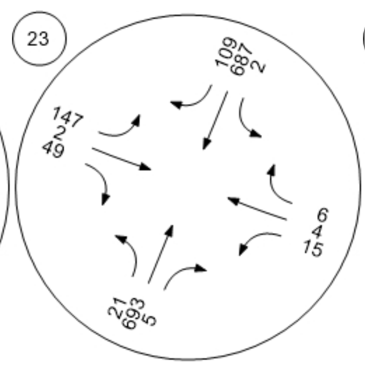

Willow Rd/Bay Rd



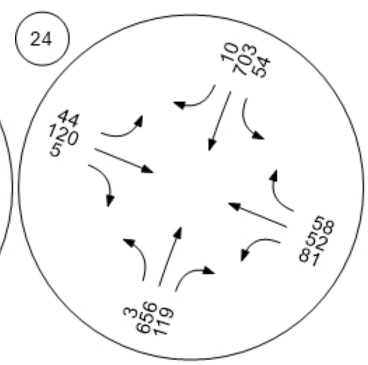

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave




Willow Rd/Gilbert Ave

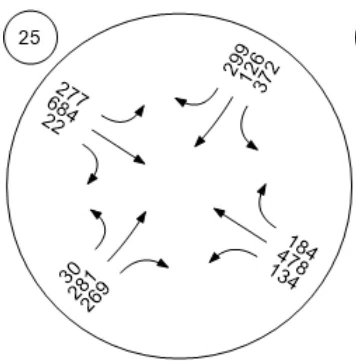


Generated with PTV VISTRO

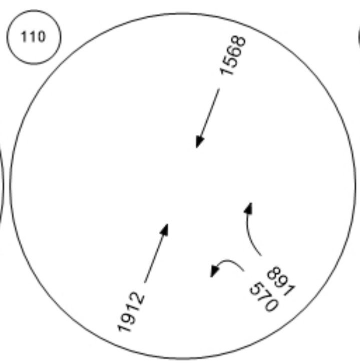
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

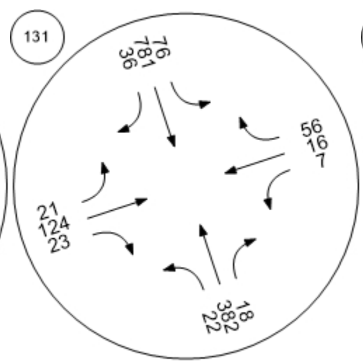

Middlefield Rd-Willow Rd



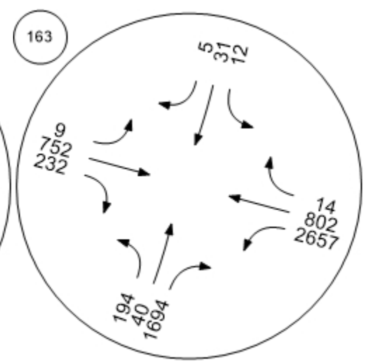

Marsh Road/101 NB Ramps



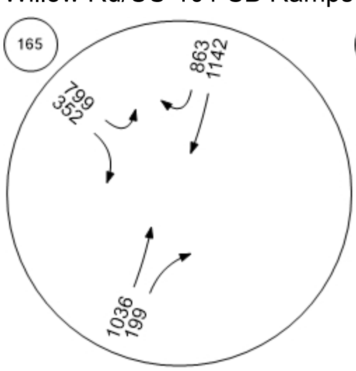

Chilco Street/Hamilton Avenu



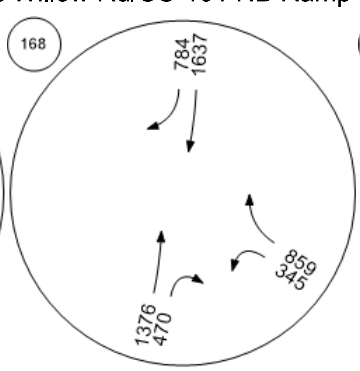

Bayfront Expy/Marsh Rd



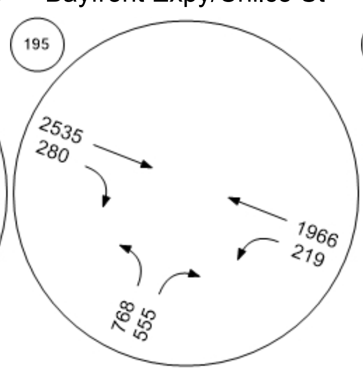

Willow Rd/US-101 SB Ramps



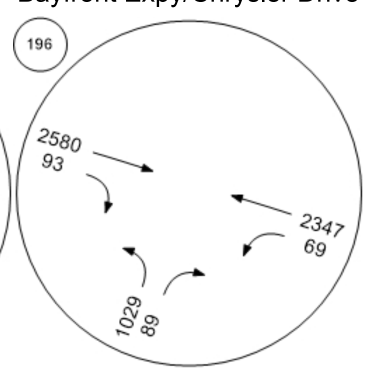

Willow Rd/US-101 NB Ramp




Bayfront Expy/Chilco St




Bayfront Expy/Chrysler Drive

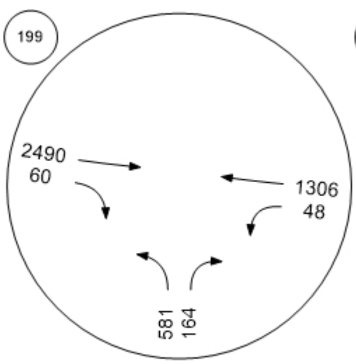


Generated with PTV VISTRO

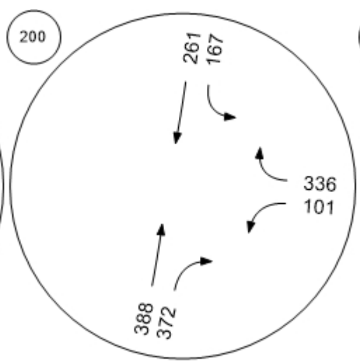
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

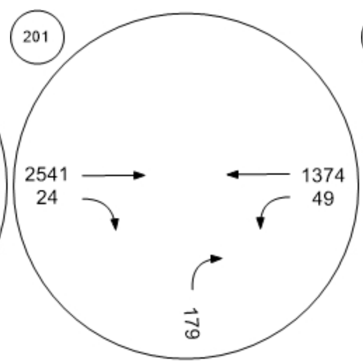

Bafront Expwy/Bldg 21



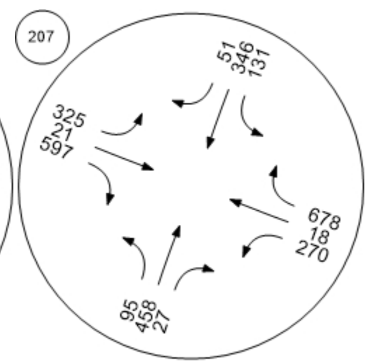

O'Brien Drive/Kavanaugh Dri



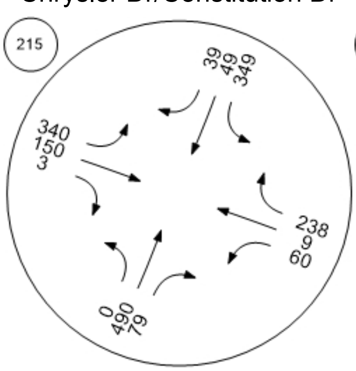

Bayfront Expwy/Bldg 20



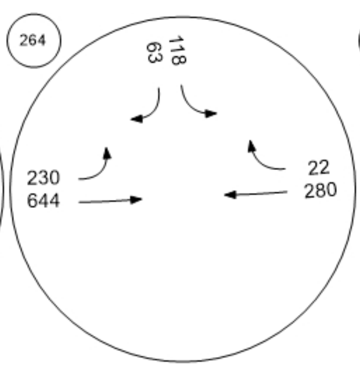

Chilco St/Constitution Dr



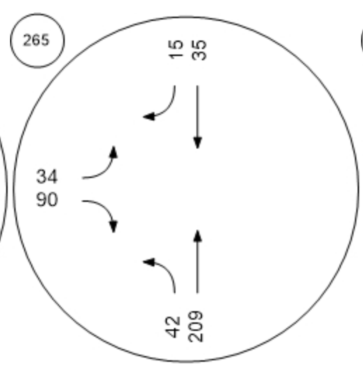

Chrysler Dr/Constitution Dr



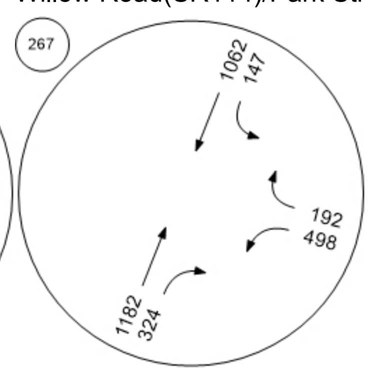

Adams Drive/O'Brien Drive



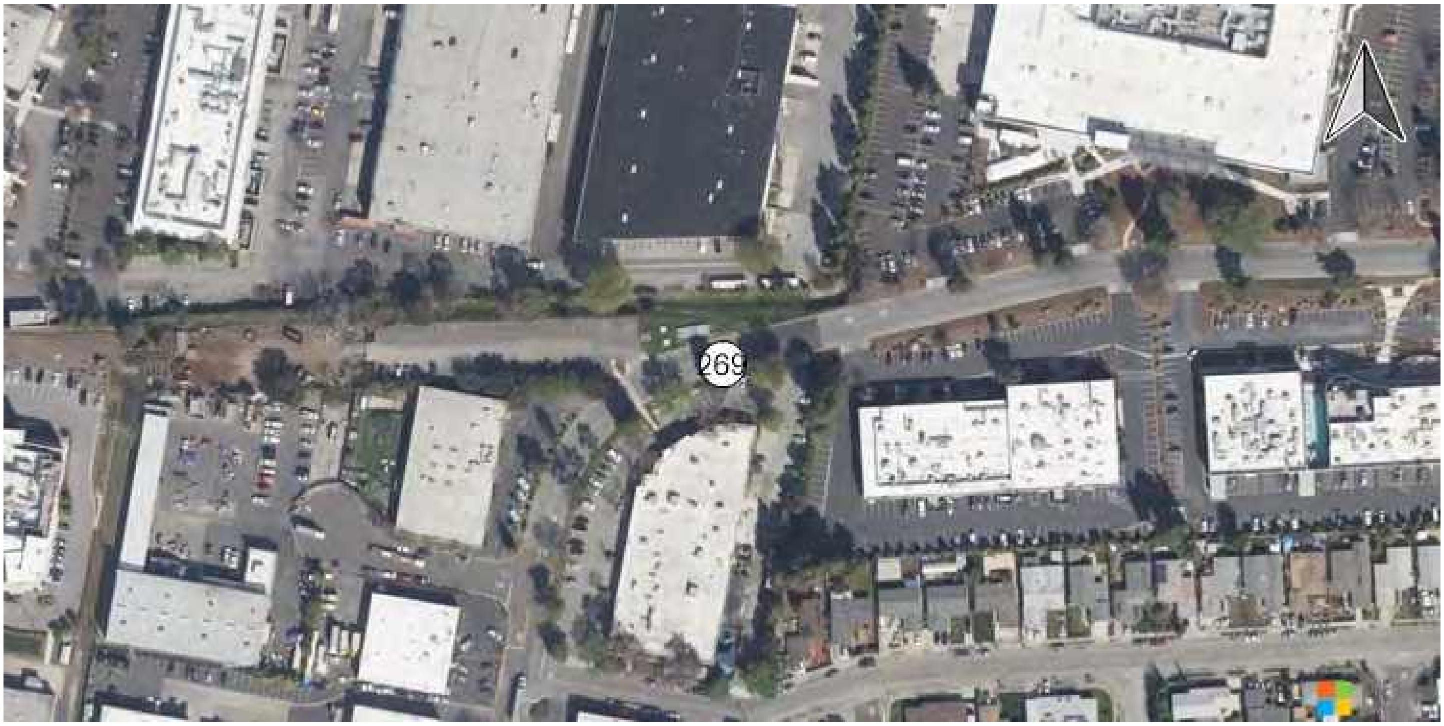

Adam Court/ Adams Drive



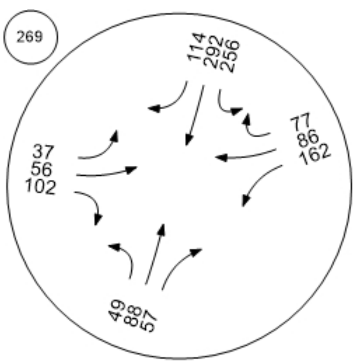

Willow Road(SR114)/Park Str



Traffic Volume - Future Total Volume




O'Brien Drive/Loop Road

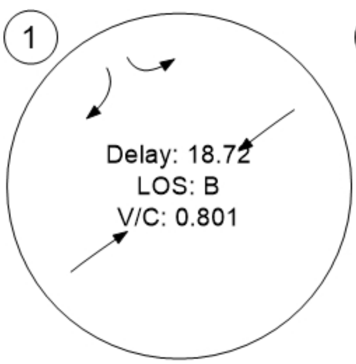


Generated with PTV VISTRO

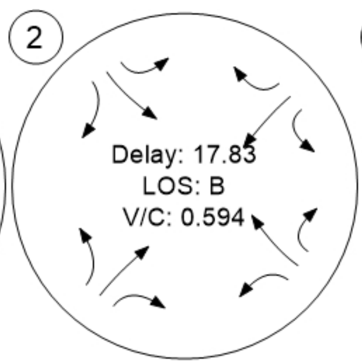
Version 2021 (SP 0-4)

## Traffic Conditions

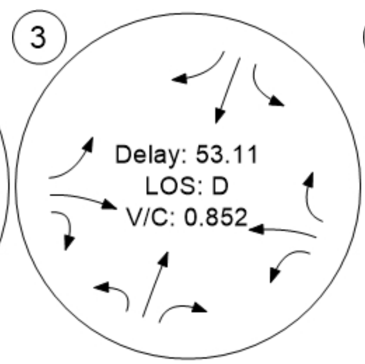

Marsh Rd (SR 84)/US 101 S



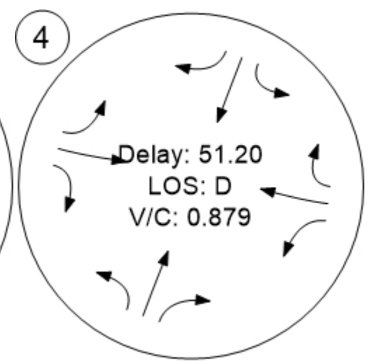

Marsh Rd/Rolison Rd-Scott D



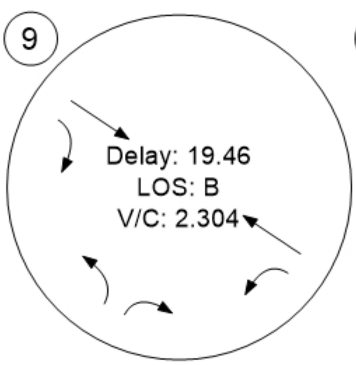

Marsh Rd/Florence St-Bohan



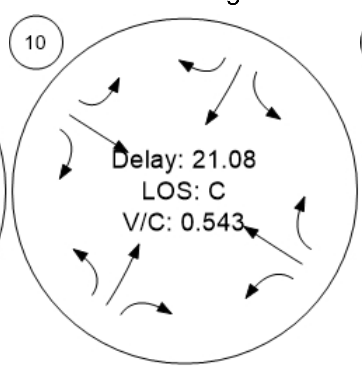

Marsh Rd/Bay Rd



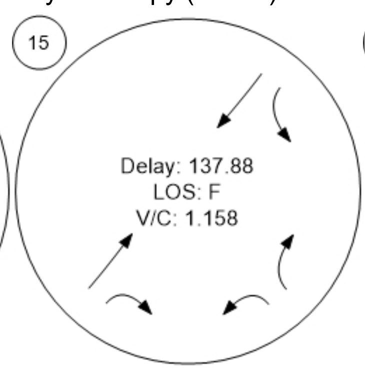

Middlefield Rd/Ravenswood



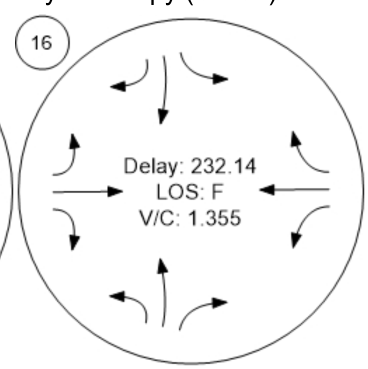

Middlefield Rd/Ringwood Ave




Bayfront Expy (SR 84)/Univer




Bayfront Expy (SR 84)/Willow

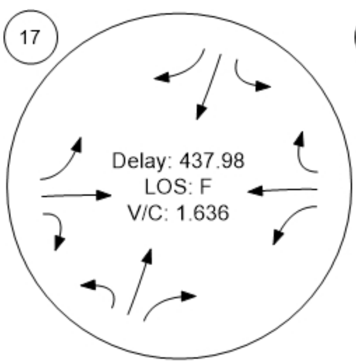


Generated with PTV VISTRO

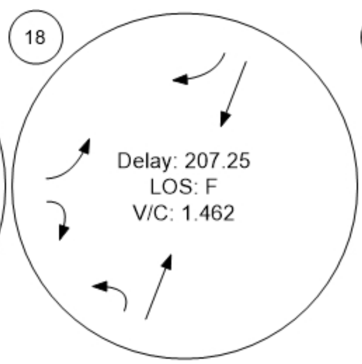
Version 2021 (SP 0-4)

## Traffic Conditions

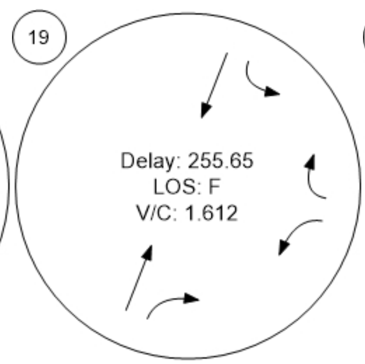

Willow Rd (SR 114)/Hamilton



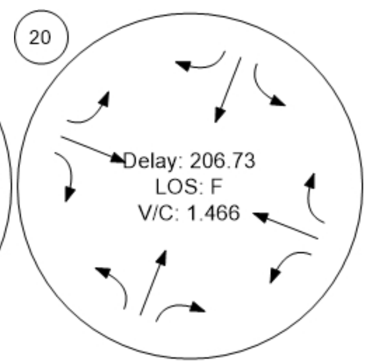

Willow Rd (SR 114)/Ivy Dr



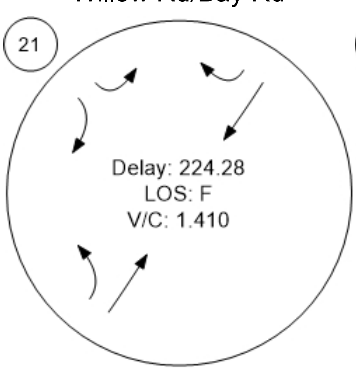

Willow Rd (SR 114)/O'Brien



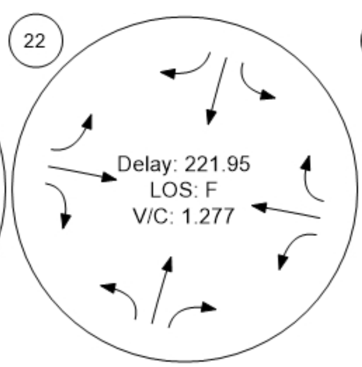

Willow Rd (SR 114)/Newbrid



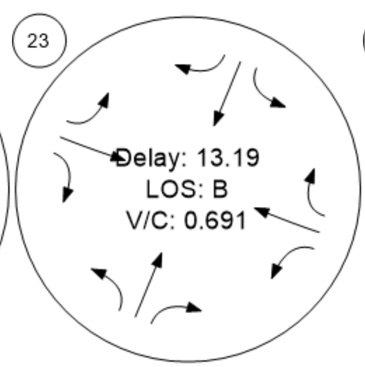

Willow Rd/Bay Rd



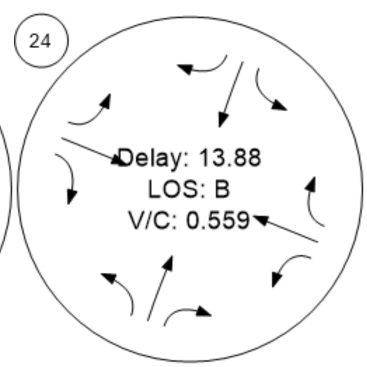

Willow Rd/Durham St-VA Me




Willow Rd/Coleman Ave



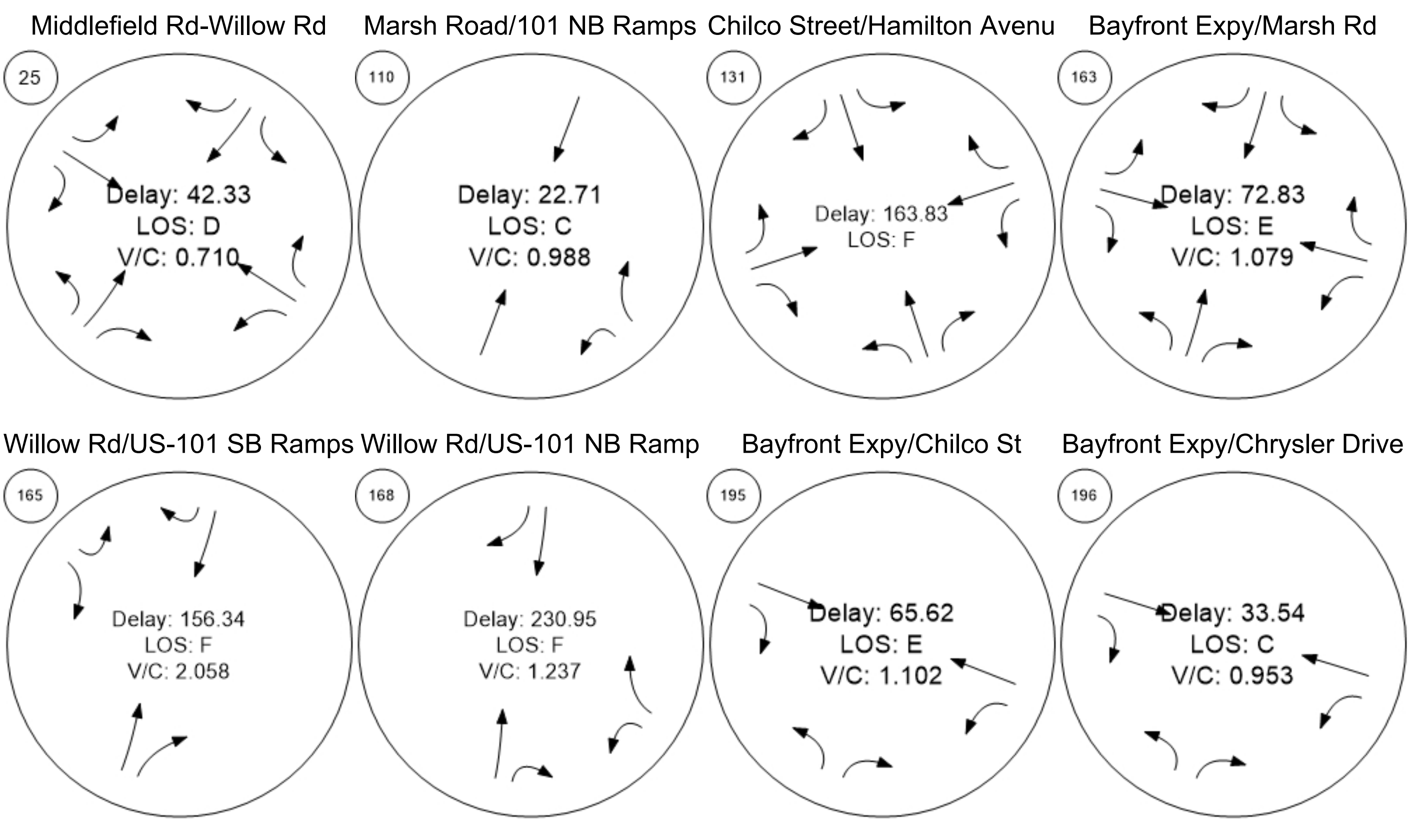

Willow Rd/Gilbert Ave



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions

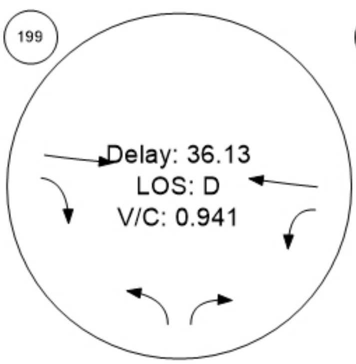



Generated with PTV VISTRO

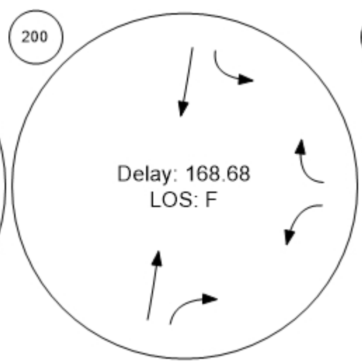
Version 2021 (SP 0-4)

## Traffic Conditions

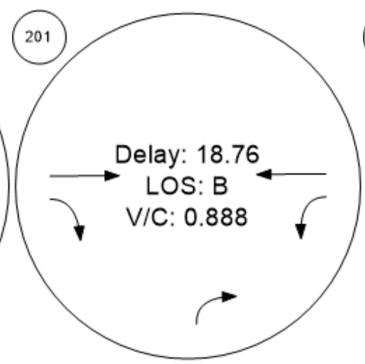

Bafront Expwy/Bldg 21



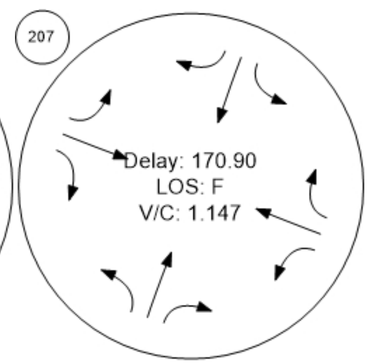

O'Brien Drive/Kavanaugh Dri



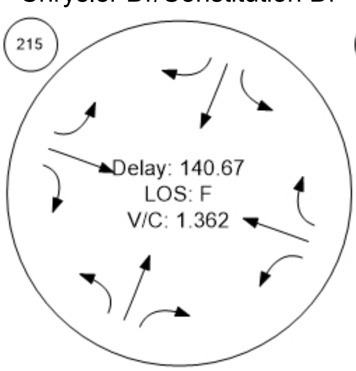

Bayfront Expwy/Bldg 20



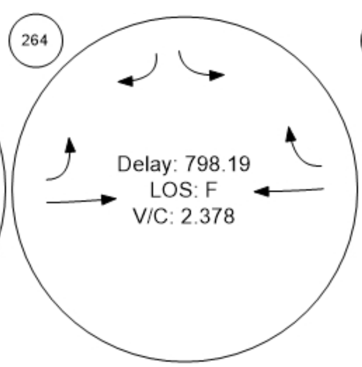

Chilco St/Constitution Dr



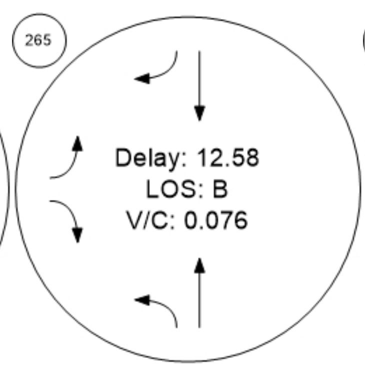

Chrysler Dr/Constitution Dr



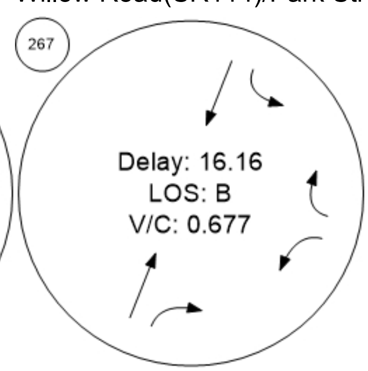

Adams Drive/O'Brien Drive



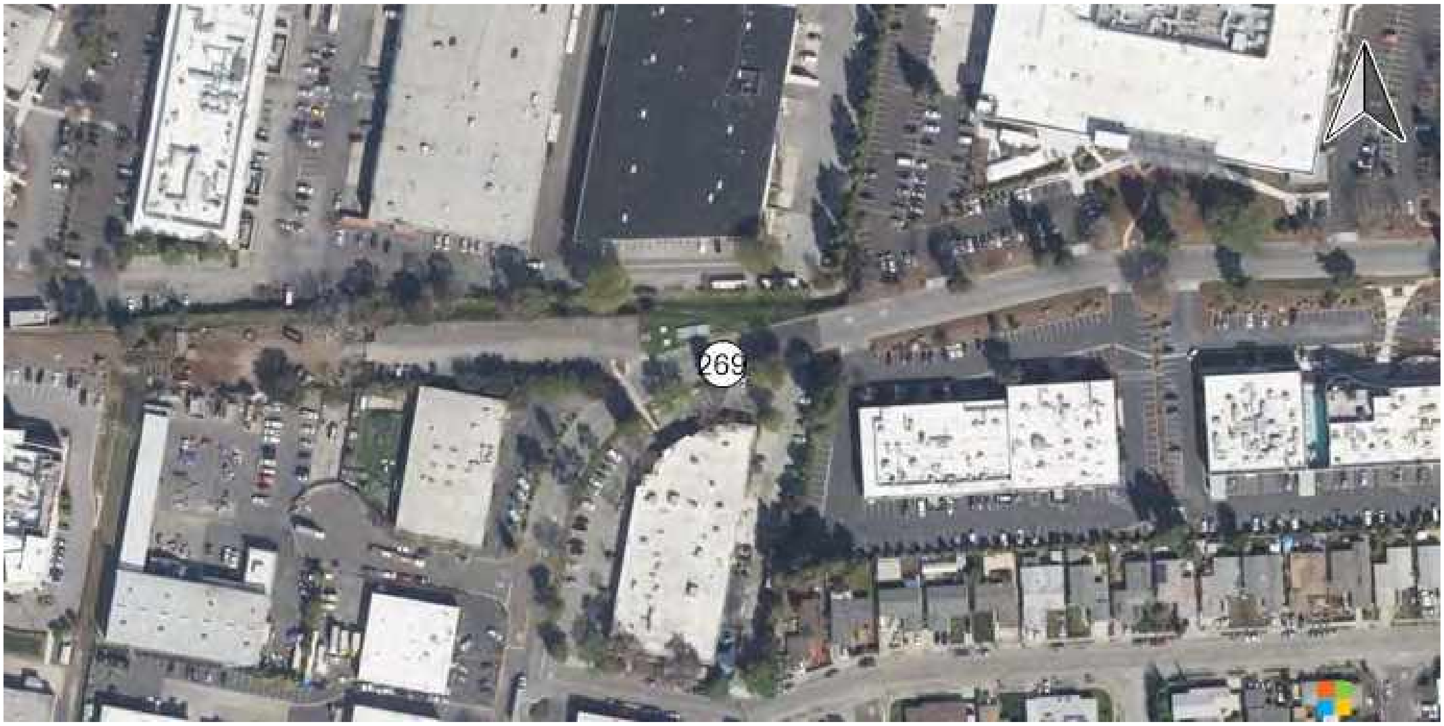

Adam Court/ Adams Drive



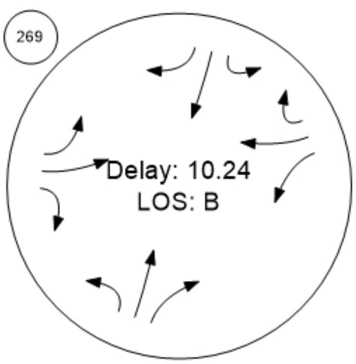

Willow Road(SR114)/Park Str



Traffic Conditions




O'Brien Drive/Loop Road

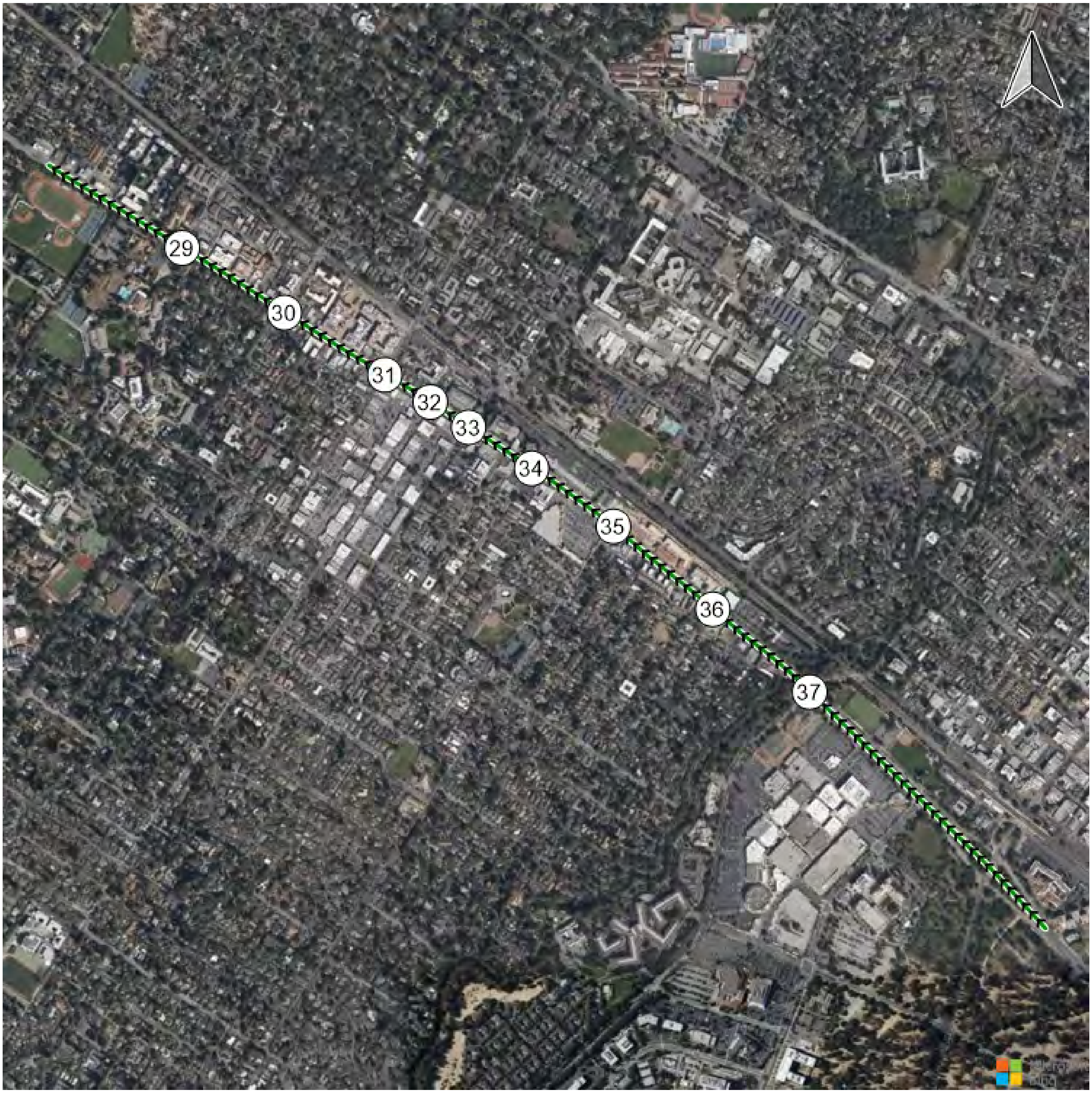


Generated with PTV VISTRO

Version 2021 (SP 0-4)

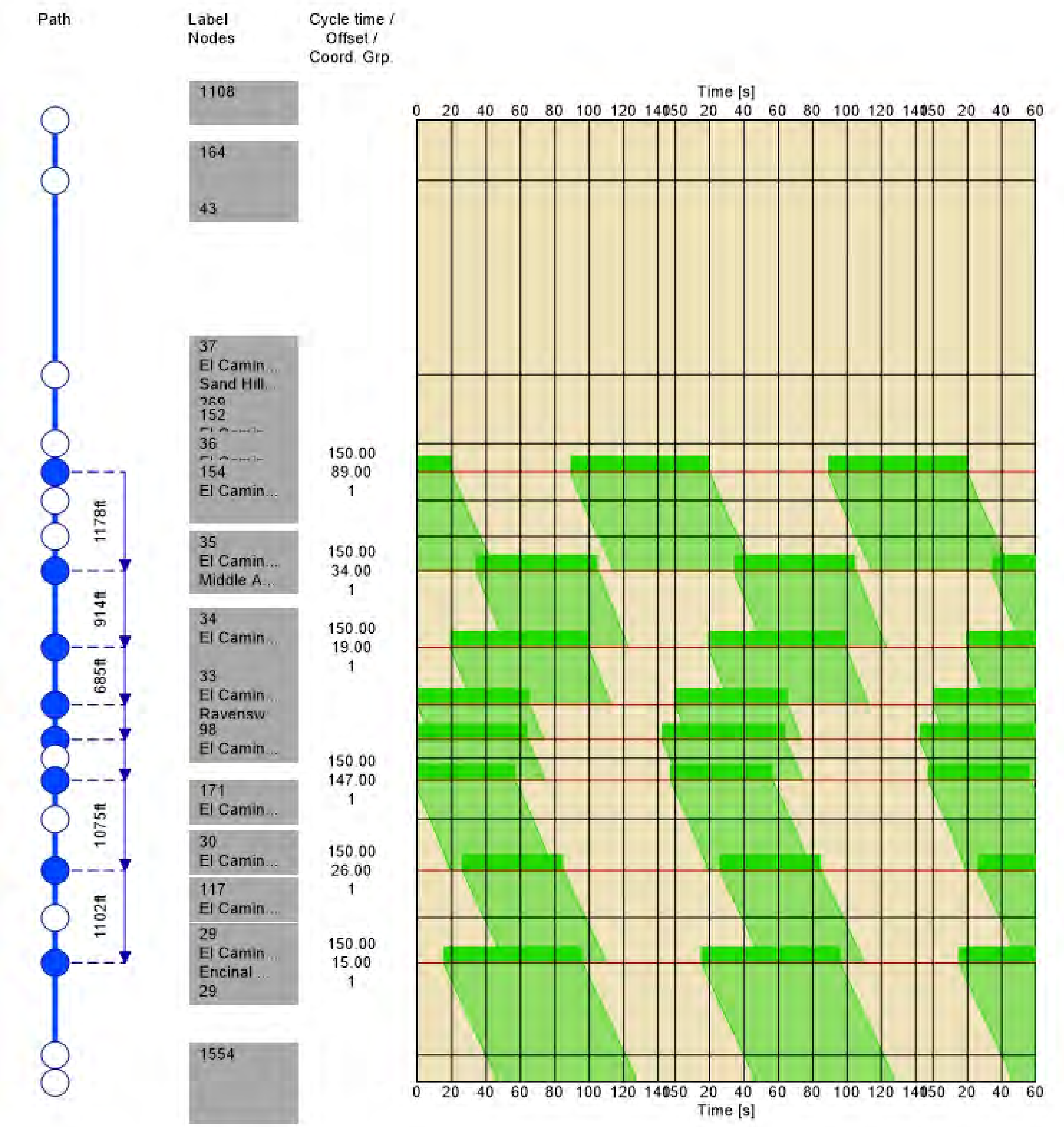
Time Space Diagram - Flowing Off

Route 1: ECR NB



Generated with PTV VISTRO
Version 2021 (SP 0-4)

Route 1: ECR NB

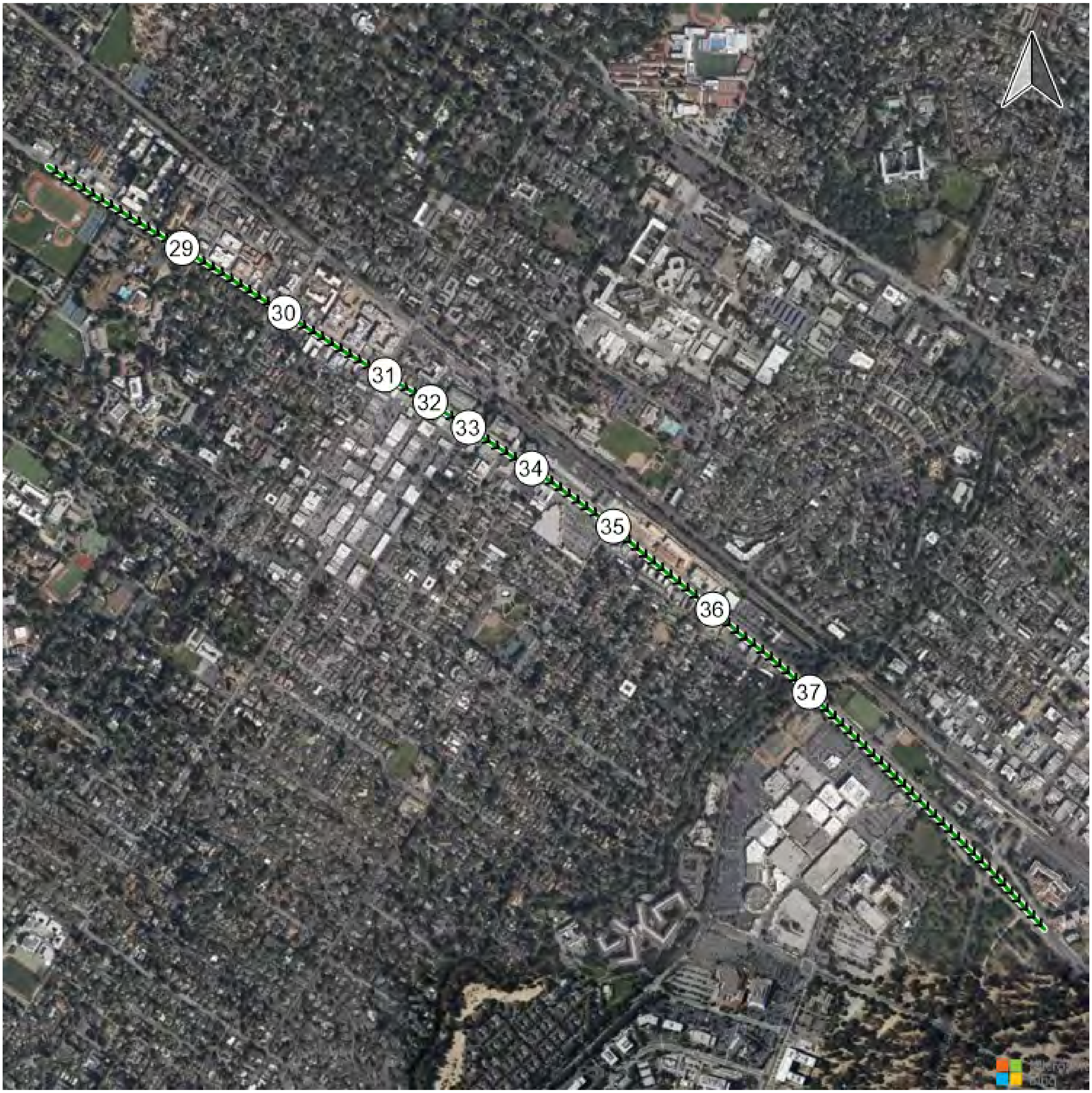


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

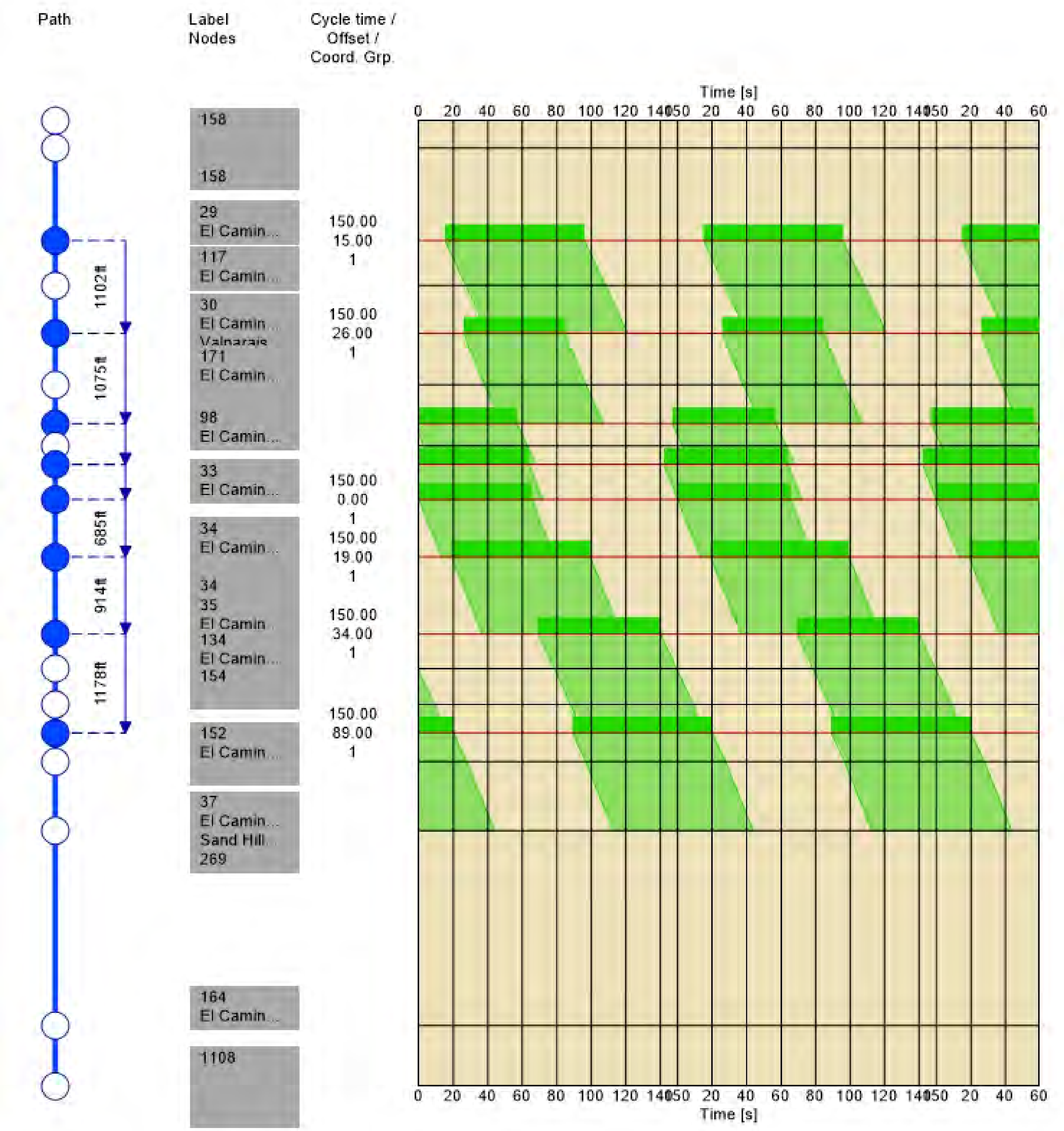
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Route 2: ECR SB

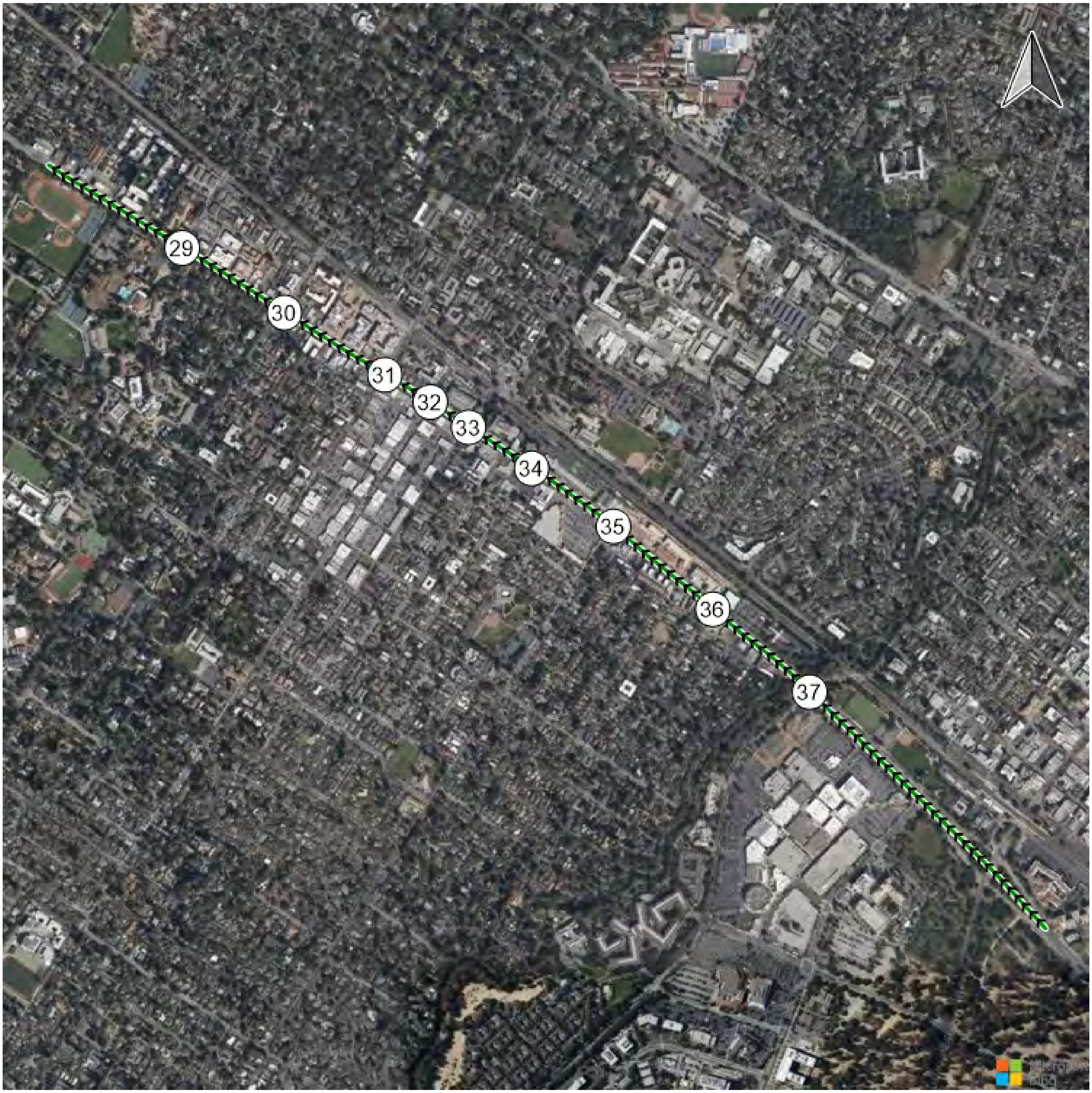


Generated with PTV VISTRO

Version 2021 (SP 0-4)

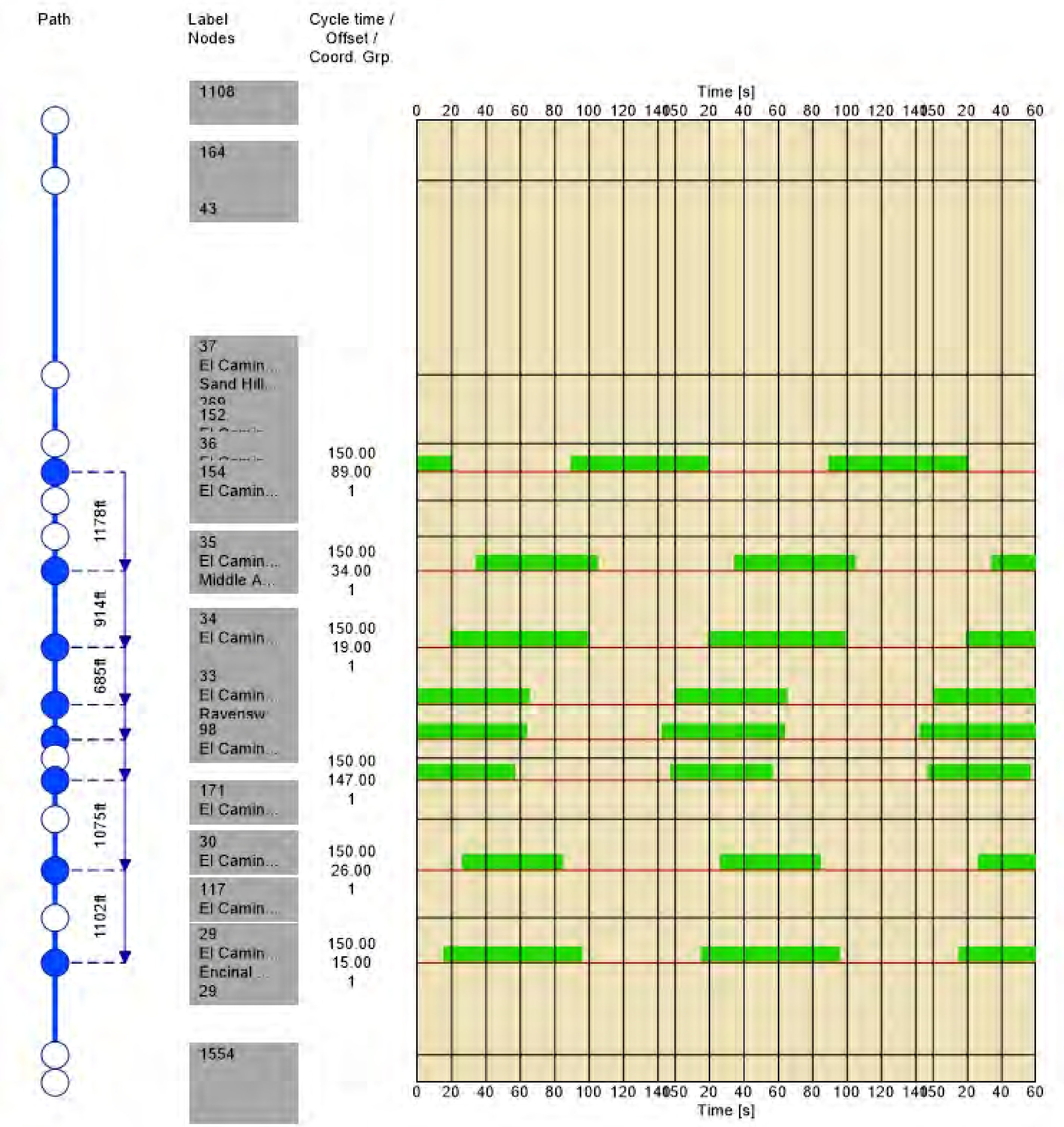
Time Space Diagram - Arterial Band

Route 1: ECR NB



Generated with PTV VISTRO
Version 2021 (SP 0-4)

## Route 1: ECR NB

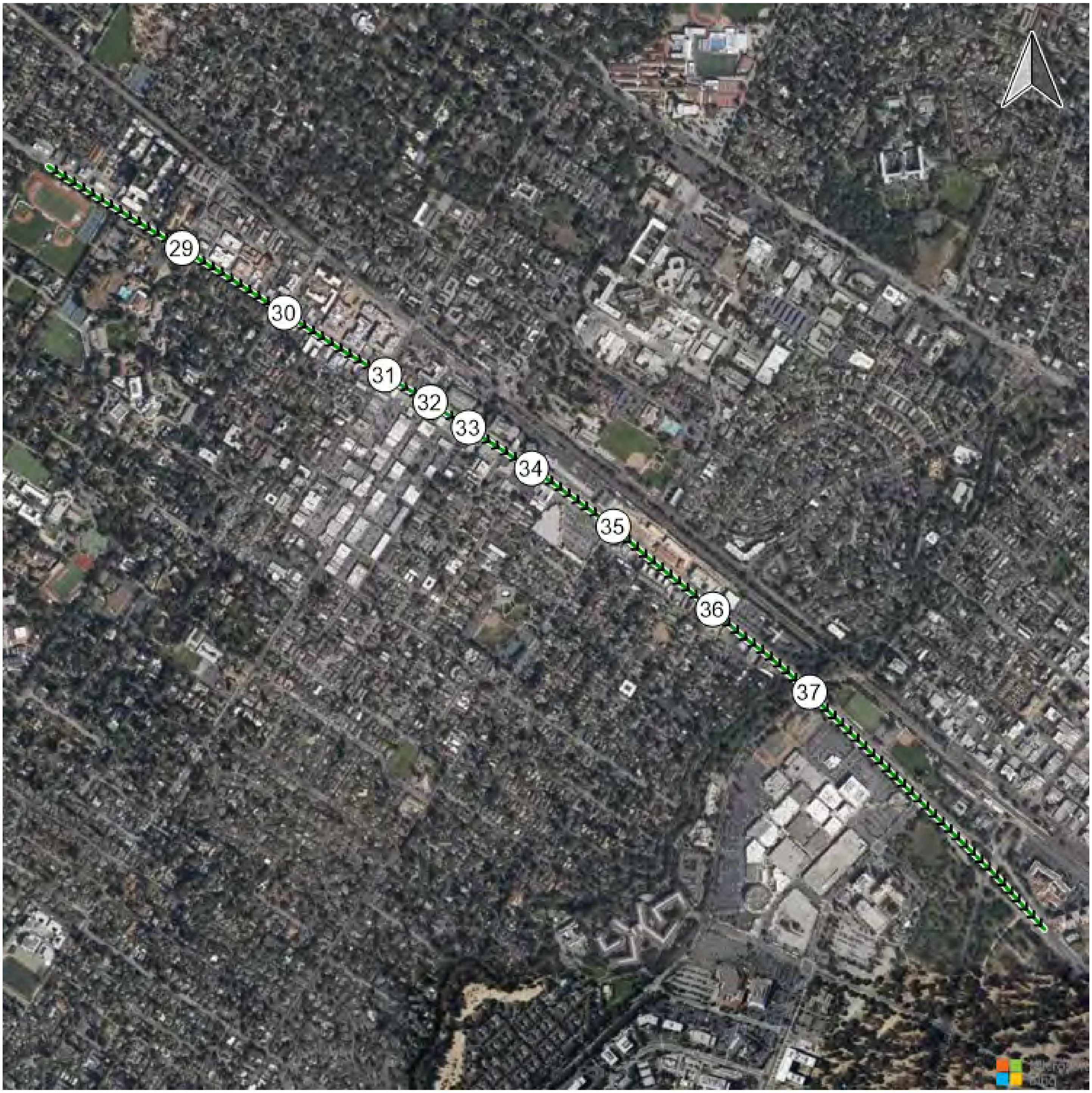


Generated with PTV VISTRO

Version 2021 (SP 0-4)

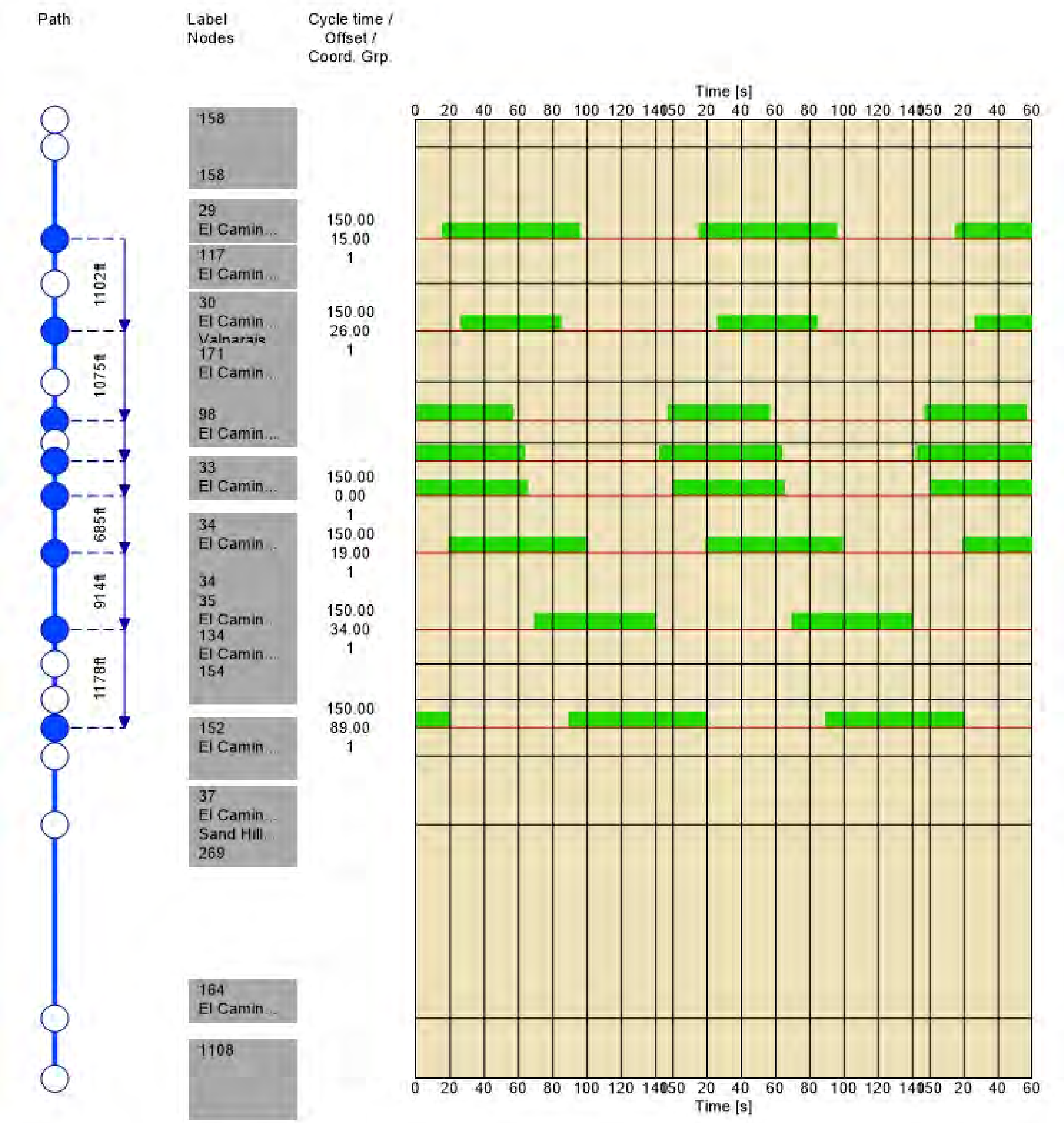
Time Space Diagram - Arterial Band

Route 2: ECR SB



Generated with PTV VISTRO
Version 2021 (SP 0-4)

Route 2: ECR SB



Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project AM_Imp.pdf

Scenario 25 Imp-Cumulative w/Dumbarton AM (2040 vols)+ Project
10/14/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.698 | 55.1 | E |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.602 | 234.3 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.375 | 147.6 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Left | 0.927 | 20.5 | C |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.064 | 101.6 | F |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | WB Right | 0.466 | 15.6 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | WB Right | 0.776 | 24.0 | C |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | EB Left | 0.703 | 18.5 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 55.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.698 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.00 | 1.60 | 5.60 | 7.40 | 5.10 | 3.00 | 6.50 | 8.50 | 4.50 | 25.90 | 37.50 | 28.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 209 | 38 | 21 | 25 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 58 | 251 | 32 | 7 | 261 | 106 | 157 | 20 | 54 | 10 | 5 | 6 |
| Total Analysis Volume [veh/h] | 231 | 1004 | 130 | 30 | 1045 | 426 | 630 | 79 | 215 | 39 | 22 | 26 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 1 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 1 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 1 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 1 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 0 | | | 6 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 160 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 50.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lag | - | - | Lead | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 15 | 76 | 76 | 12 | 72 | 72 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | R | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 96 | 96 | 5 | 89 | 89 | 38 | 38 | 38 | 12 | 12 |
| g / C, Green / Cycle | 0.08 | 0.60 | 0.60 | 0.03 | 0.56 | 0.56 | 0.24 | 0.24 | 0.24 | 0.07 | 0.07 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.31 | 0.31 | 0.02 | 0.30 | 0.27 | 0.21 | 0.21 | 0.14 | 0.03 | 0.04 |
| s, saturation flow rate [veh/h] | 1752 | 1876 | 1792 | 1704 | 3472 | 1575 | 1717 | 1706 | 1526 | 1439 | 1212 |
| c, Capacity [veh/h] | 142 | 1132 | 1081 | 58 | 1932 | 877 | 409 | 407 | 364 | 106 | 90 |
| d1, Uniform Delay [s] | 73.44 | 18.16 | 18.25 | 75.88 | 22.50 | 21.55 | 58.55 | 58.41 | 53.79 | 70.46 | 71.37 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.17 | 0.16 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 310.01 | 1.64 | 1.76 | 2.58 | 1.09 | 1.93 | 8.69 | 8.10 | 1.14 | 1.56 | 3.65 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 1.62 | 0.51 | 0.52 | 0.51 | 0.54 | 0.49 | 0.87 | 0.87 | 0.59 | 0.37 | 0.54 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 383.45 | 19.80 | 20.01 | 78.45 | 23.59 | 23.48 | 67.24 | 66.52 | 54.93 | 72.02 | 75.03 |
| Lane Group LOS | F | B | C | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 18.10 | 12.62 | 12.29 | 1.26 | 12.71 | 10.17 | 15.04 | 14.73 | 7.89 | 1.59 | 2.01 |
| 50th-Percentile Queue Length [ft/ln] | 452.52 | 315.39 | 307.21 | 31.42 | 317.85 | 254.21 | 375.96 | 368.25 | 197.19 | 39.71 | 50.35 |
| 95th-Percentile Queue Length [veh/ln] | 28.88 | 18.44 | 18.04 | 2.26 | 18.56 | 15.40 | 21.40 | 21.02 | 12.49 | 2.86 | 3.63 |
| 95th-Percentile Queue Length [ft/ln] | 722.05 | 461.01 | 450.94 | 56.56 | 464.05 | 384.95 | 534.95 | 525.61 | 312.33 | 71.48 | 90.63 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

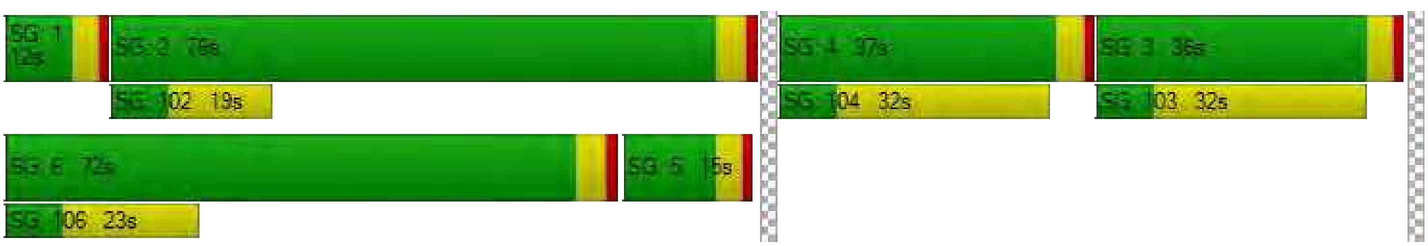
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 383.45 | 19.89 | 20.01 | 78.45 | 23.59 | 23.48 | 66.93 | 66.52 | 54.93 | 72.02 | 75.03 | 75.03 |
| Movement LOS | F | B | C | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 81.43 | | | 24.66 | | | 64.10 | | | 73.68 | | |
| Approach LOS | F | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 55.14 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.698 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 69.34 | 69.34 | 69.34 | 69.34 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.988 | 3.135 | 2.508 | 2.056 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 893 | 843 | 400 | 410 |
| d_b, Bicycle Delay [s] | 24.53 | 26.77 | 51.32 | 50.53 |
| I_b,int, Bicycle LOS Score for Intersection | 2.686 | 2.798 | 3.109 | 1.703 |
| Bicycle LOS | B | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 234.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.602 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 135.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 266 | 1221 | 1418 | 25 | 172 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.30 | 5.70 | 10.30 | 22.20 | 0.00 | 6.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 266 | 1221 | 1418 | 25 | 172 | 95 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 332 | 385 | 7 | 47 | 26 |
| Total Analysis Volume [veh/h] | 289 | 1327 | 1541 | 27 | 187 | 103 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 4 | | 9 | | 3 | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | 9 | | 4 | |
| v_co, Outbound Pedestrian Volume crossing | 9 | | 2 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 9 | | 2 | | 2 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 8 | | 1 | | 1 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 16 | 106 | 90 | 90 | 24 | 24 |
| Vehicle Extension [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | No |
| Maximum Recall | No | No | No | | No | No |
| Pedestrian Recall | No | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 |
| g_i, Effective Green Time [s] | 13 | 106 | 90 | 90 | 16 | 32 |
| g / C, Green / Cycle | 0.10 | 0.82 | 0.70 | 0.70 | 0.13 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.86 | 1.00 | 1.01 | 0.11 | 0.13 |
| s, saturation flow rate [veh/h] | 795 | 1546 | 781 | 775 | 1732 | 792 |
| c, Capacity [veh/h] | 80 | 1267 | 544 | 540 | 219 | 198 |
| d1, Uniform Delay [s] | 58.39 | 11.71 | 19.72 | 19.72 | 55.52 | 41.90 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.17 | 0.29 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1210.33 | 38.72 | 209.34 | 213.84 | 13.25 | 5.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 3.62 | 1.05 | 1.44 | 1.45 | 0.85 | 0.52 |
| d, Delay for Lane Group [s/veh] | 1268.72 | 50.43 | 229.06 | 233.56 | 68.77 | 47.43 |
| Lane Group LOS | F | F | F | F | E | D |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 29.41 | 17.99 | 45.26 | 45.62 | 6.81 | 3.16 |
| 50th-Percentile Queue Length [ft/ln] | 735.22 | 449.83 | 1131.52 | 1140.46 | 170.16 | 79.02 |
| 95th-Percentile Queue Length [veh/ln] | 47.55 | 25.98 | 72.23 | 72.98 | 11.08 | 5.69 |
| 95th-Percentile Queue Length [ft/ln] | 1188.82 | 649.59 | 1805.64 | 1824.51 | 277.12 | 142.24 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 1268.72 | 50.43 | 231.27 | 233.56 | 68.77 | 47.43 |
| Movement LOS | F | F | F | F | E | D |
| d_A, Approach Delay [s/veh] | 268.30 | | 231.31 | | 61.19 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 234.32 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.602 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.166 | 3.152 | 2.155 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1570 | 1324 | 323 |
| d_b, Bicycle Delay [s] | 3.01 | 7.42 | 45.67 |
| I_b,int, Bicycle LOS Score for Intersection | 2.893 | 2.853 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 147.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.375 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | BayRoad | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 5.70 | 6.60 | 2.00 | 10.00 | 30.00 | 10.80 | 4.10 | 1.80 | 2.90 | 7.50 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 34 |
| Total Hourly Volume [veh/h] | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 377 | 260 | 114 | 271 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 495 | 113 | 11 | 363 | 2 | 5 | 25 | 100 | 69 | 30 | 72 |
| Total Analysis Volume [veh/h] | 152 | 1982 | 450 | 43 | 1452 | 7 | 18 | 99 | 401 | 277 | 121 | 288 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 3 | | | 3 | | |
| v_di, Inbound Pedestrian Volume crossing m | 3 | | | 3 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 8 | | | 12 | | | 7 | | | 11 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | | 11 | | | 8 | | | 12 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 5 | | | 14 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 9 | 60 | 60 | 7 | 58 | 58 | 63 | 32 | 32 | 31 | 37 | 37 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 6 | 58 | 58 | 4 | 56 | 56 | 56 | 28 | 28 | 25 | 0 | 0 |
| g / C, Green / Cycle | 0.05 | 0.45 | 0.45 | 0.03 | 0.43 | 0.43 | 0.43 | 0.21 | 0.21 | 0.19 | 0.00 | 0.00 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.47 | 0.50 | 0.03 | 0.64 | 0.64 | 0.02 | 0.06 | 0.31 | 0.18 | 0.15 | 0.40 |
| s, saturation flow rate [veh/h] | 1270 | 3455 | 1627 | 1270 | 1491 | 781 | 1180 | 1577 | 1315 | 1536 | 800 | 723 |
| c, Capacity [veh/h] | 95 | 1541 | 726 | 75 | 642 | 336 | 544 | 338 | 282 | 297 | 0 | 0 |
| d1, Uniform Delay [s] | 64.17 | 36.00 | 36.00 | 64.54 | 37.00 | 37.00 | 22.70 | 42.78 | 50.53 | 51.64 | 0.00 | 0.00 |
| k, delay calibration | 0.23 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.11 | 0.04 | 0.50 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 295.33 | 36.68 | 73.22 | 2.55 | 229.13 | 236.42 | 0.02 | 0.18 | 209.19 | 5.77 | 0.00 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.61 | 1.05 | 1.12 | 0.57 | 1.49 | 1.49 | 0.03 | 0.29 | 1.42 | 0.93 | 10000.0 | 10000.0 |
| d, Delay for Lane Group [s/veh] | 359.50 | 72.68 | 109.22 | 67.09 | 266.13 | 273.42 | 22.72 | 42.96 | 259.72 | 57.40 | 0.00 | 0.00 |
| Lane Group LOS | F | F | F | E | F | F | C | D | F | E | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 10.98 | 31.06 | 36.62 | 1.52 | 30.54 | 32.67 | 0.34 | 2.71 | 25.44 | 4.67 | 0.00 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 274.62 | 776.49 | 915.45 | 37.93 | 763.45 | 816.64 | 8.44 | 67.66 | 636.12 | 116.85 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 18.31 | 41.68 | 50.72 | 2.73 | 49.37 | 52.50 | 0.61 | 4.87 | 39.61 | 8.22 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 457.84 | 1041.88 | 1268.08 | 68.27 | 1234.27 | 1312.45 | 15.20 | 121.78 | 990.35 | 205.49 | 0.00 | 0.00 |

**Movement, Approach, & Intersection Results**

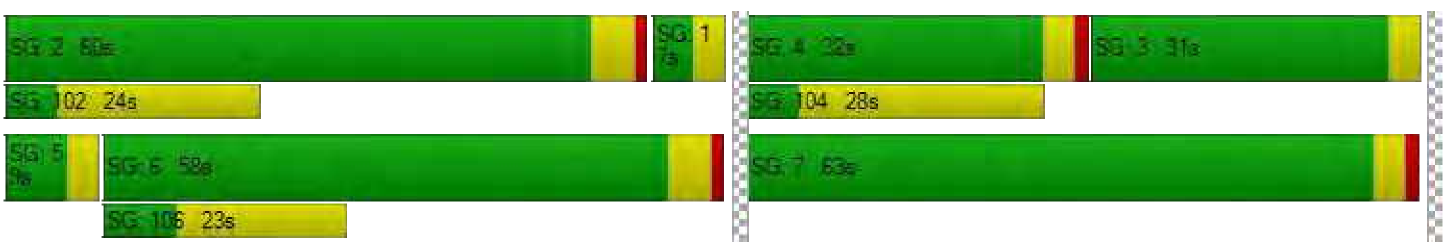
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 359.50 | 79.43 | 109.22 | 67.09 | 268.61 | 273.42 | 22.72 | 42.96 | 259.72 | 57.40 | 0.00 | 0.00 |
| Movement LOS | F | E | F | E | F | F | C | D | F | E | A | A |
| d_A, Approach Delay [s/veh] | 101.09 | | | 262.86 | | | 210.06 | | | 23.18 | | |
| Approach LOS | F | | | F | | | F | | | C | | |
| d_I, Intersection Delay [s/veh] | 147.59 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.375 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 33.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 36.19 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.496 | 3.065 | 2.633 | 2.684 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 846 | 815 | 431 | 0 |
| d_b, Bicycle Delay [s] | 21.66 | 22.82 | 40.12 | 65.00 |
| I_b,int, Bicycle LOS Score for Intersection | 2.981 | 2.386 | 2.487 | 2.748 |
| Bicycle LOS | C | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 1 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 20.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.927 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | ┑‖ | | ‖┍ | | ┑┑┍ | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 65 | 1387 | 1211 | 627 | 463 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.40 | 3.00 | 1.80 | 3.30 | 1.40 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 299 | 0 | 77 |
| Total Hourly Volume [veh/h] | 65 | 1387 | 1211 | 328 | 463 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 347 | 303 | 82 | 116 | 0 |
| Total Analysis Volume [veh/h] | 65 | 1387 | 1211 | 328 | 463 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 4 | | 4 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 4 | | 4 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 1 | | 2 | | 1 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 73 | 73 | 73 | 73 | 73 | 73 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 4 | 43 | 35 | 35 | 21 | 21 |
| g / C, Green / Cycle | 0.06 | 0.58 | 0.48 | 0.48 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.05 | 0.53 | 0.44 | 0.27 | 0.26 | 0.00 |
| s, saturation flow rate [veh/h] | 1318 | 2615 | 2770 | 1232 | 1801 | 841 |
| c, Capacity [veh/h] | 75 | 1523 | 1323 | 588 | 515 | 240 |
| d1, Uniform Delay [s] | 34.33 | 13.64 | 17.81 | 13.59 | 25.21 | 0.00 |
| k, delay calibration | 0.04 | 0.15 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.48 | 3.43 | 4.11 | 1.18 | 2.40 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.91 | 0.92 | 0.56 | 0.90 | 0.00 |
| d, Delay for Lane Group [s/veh] | 44.81 | 17.07 | 21.91 | 14.77 | 27.61 | 0.00 |
| Lane Group LOS | D | B | C | B | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.33 | 9.01 | 8.84 | 3.53 | 3.80 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 33.34 | 225.32 | 220.93 | 88.37 | 95.07 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 2.40 | 13.94 | 13.71 | 6.36 | 6.84 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 60.00 | 348.41 | 342.81 | 159.07 | 171.12 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.81 | 17.07 | 21.91 | 14.77 | 27.61 | 0.00 |
| Movement LOS | D | B | C | B | C | A |
| d_A, Approach Delay [s/veh] | 18.31 | | 20.39 | | 27.61 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 20.48 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.927 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 26.44 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.638 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 983 | 983 | 983 |
| d_b, Bicycle Delay [s] | 9.47 | 9.47 | 9.47 |
| I_b,int, Bicycle LOS Score for Intersection | 2.758 | 3.076 | 1.560 |
| Bicycle LOS | C | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 101.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.064 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 26 | 59 | 12 | 348 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 237 | 2 | 9 | 242 | 28 | 17 | 4 | 7 | 15 | 3 | 91 |
| Total Analysis Volume [veh/h] | 23 | 947 | 7 | 38 | 967 | 113 | 70 | 15 | 27 | 61 | 13 | 363 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 8 | | | 3 | | | 3 | | | 9 | | |
| v_di, Inbound Pedestrian Volume crossing m | 9 | | | 3 | | | 3 | | | 8 | | |
| v_co, Outbound Pedestrian Volume crossing | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 11 | | | 4 | | | 11 | | | 4 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 2 | | | 1 | | | 6 | | | 2 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Overlap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | 1,8 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | No |
| Maximum Recall | No | No | | No | No | | | No | | | No | No |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 | 164 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.50 | 2.50 | 0.00 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0.00 |
| g_i, Effective Green Time [s] | 107 | 74 | 74 | 107 | 100 | 14 | 14 | 14 | 30 | 63 |
| g / C, Green / Cycle | 0.65 | 0.45 | 0.45 | 0.65 | 0.61 | 0.08 | 0.08 | 0.08 | 0.18 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.29 | 0.29 | 0.05 | 0.76 | 0.04 | 0.04 | 0.02 | 0.08 | 0.43 |
| s, saturation flow rate [veh/h] | 551 | 1445 | 1894 | 700 | 1414 | 952 | 1396 | 1336 | 960 | 842 |
| c, Capacity [veh/h] | 92 | 652 | 855 | 380 | 860 | 79 | 116 | 111 | 175 | 322 |
| d1, Uniform Delay [s] | 41.55 | 34.61 | 34.62 | 14.61 | 32.19 | 71.70 | 71.68 | 70.27 | 59.51 | 50.36 |
| k, delay calibration | 0.23 | 0.23 | 0.23 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.99 | 2.17 | 1.66 | 0.11 | 124.36 | 3.77 | 2.54 | 1.12 | 1.61 | 88.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.25 | 0.63 | 0.63 | 0.10 | 1.26 | 0.44 | 0.43 | 0.24 | 0.42 | 1.13 |
|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 44.54 | 36.78 | 36.28 | 14.73 | 156.55 | 75.47 | 74.23 | 71.39 | 61.13 | 139.04 |
| Lane Group LOS | D | D | D | B | F | E | E | E | E | F |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.39 | 13.31 | 17.34 | 0.53 | 63.10 | 1.52 | 2.16 | 1.13 | 2.86 | 21.17 |
| 50th-Percentile Queue Length [ft/ln] | 9.69 | 332.69 | 433.54 | 13.36 | 1577.43 | 37.90 | 54.12 | 28.23 | 71.39 | 529.29 |
| 95th-Percentile Queue Length [veh/ln] | 0.70 | 19.29 | 24.17 | 0.96 | 90.59 | 2.73 | 3.90 | 2.03 | 5.14 | 31.04 |
| 95th-Percentile Queue Length [ft/ln] | 17.44 | 482.25 | 604.27 | 24.06 | 2264.81 | 68.22 | 97.41 | 50.82 | 128.50 | 776.06 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.54 | 36.50 | 36.28 | 14.73 | 156.55 | 156.55 | 74.87 | 74.23 | 71.39 | 61.13 | 61.13 | 139.04 |
| Movement LOS | D | D | D | B | F | F | E | E | E | E | E | F |
| d_A, Approach Delay [s/veh] | 36.69 | | | 151.73 | | | 73.93 | | | 125.85 | | |
| Approach LOS | D | | | F | | | E | | | F | | |
| d_I, Intersection Delay [s/veh] | 101.65 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.064 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 71.50 | 71.50 | 71.50 | 71.50 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.574 | 2.820 | 2.210 | 2.128 |
| Crosswalk LOS | B | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 244 | 244 | 365 | 365 |
| d_b, Bicycle Delay [s] | 63.41 | 63.38 | 55.04 | 54.93 |
| I_b,int, Bicycle LOS Score for Intersection | 2.366 | 3.404 | 1.754 | 2.281 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.466 |

**Intersection Setup**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Chilco Streeet | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 |
| Peak Hour Factor | 0.9570 | 0.9570 | 0.9570 | 0.8000 | 0.8000 | 0.8000 | 0.7830 | 0.7830 | 0.7830 | 0.9110 | 0.9110 | 0.9110 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 118 | 3 | 24 | 69 | 14 | 12 | 13 | 7 | 6 | 14 | 36 |
| Total Analysis Volume [veh/h] | 14 | 473 | 10 | 95 | 276 | 56 | 47 | 52 | 27 | 24 | 56 | 144 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 4 | | | 5 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 5 | | | 4 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 60 | 0 | 0 | 60 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 56 | 56 | 26 | 26 |
| g / C, Green / Cycle | 0.62 | 0.62 | 0.29 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.30 | 0.31 | 0.10 | 0.15 |
| s, saturation flow rate [veh/h] | 1663 | 1361 | 1278 | 1475 |
| c, Capacity [veh/h] | 1076 | 896 | 424 | 470 |
| d1, Uniform Delay [s] | 9.13 | 8.86 | 24.83 | 26.73 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.43 | 1.82 | 1.78 | 3.43 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.46 | 0.48 | 0.30 | 0.48 |
| d, Delay for Lane Group [s/veh] | 10.56 | 10.68 | 26.62 | 30.16 |
| Lane Group LOS | B | B | C | C |
| Critical Lane Group | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.06 | 4.31 | 2.27 | 4.37 |
| 50th-Percentile Queue Length [ft/ln] | 126.52 | 107.75 | 56.70 | 109.18 |
| 95th-Percentile Queue Length [veh/ln] | 8.75 | 7.71 | 4.08 | 7.79 |
| 95th-Percentile Queue Length [ft/ln] | 218.76 | 192.87 | 102.07 | 194.86 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.56 | 10.56 | 10.56 | 10.68 | 10.68 | 10.68 | 26.62 | 26.62 | 26.62 | 30.16 | 30.16 | 30.16 |
| Movement LOS | B | B | B | B | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 10.56 | | | 10.68 | | | 26.62 | | | 30.16 | | |
| Approach LOS | B | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 15.63 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.466 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.152 | 2.315 | 1.859 | 2.037 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1244 | 1244 | 578 | 578 |
| d_b, Bicycle Delay [s] | 6.42 | 6.42 | 22.76 | 22.76 |
| I_b,int, Bicycle LOS Score for Intersection | 2.380 | 2.264 | 1.768 | 1.929 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.776 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 646 | 270 | 74 | 384 | 210 | 257 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 646 | 270 | 74 | 384 | 210 | 257 |
| Peak Hour Factor | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 | 0.8800 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 184 | 77 | 21 | 109 | 60 | 73 |
| Total Analysis Volume [veh/h] | 734 | 307 | 84 | 436 | 239 | 292 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 66 | 0 | 0 | 66 | 24 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 62 | 62 | 62 | 20 | 20 |
| g / C, Green / Cycle | 0.69 | 0.69 | 0.69 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.59 | 0.16 | 0.24 | 0.14 | 0.19 |
| s, saturation flow rate [veh/h] | 1763 | 538 | 1855 | 1767 | 1577 |
| c, Capacity [veh/h] | 1215 | 197 | 1278 | 393 | 350 |
| d1, Uniform Delay [s] | 10.63 | 32.60 | 5.69 | 31.48 | 33.41 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.91 | 6.60 | 0.73 | 6.87 | 20.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.86 | 0.43 | 0.34 | 0.61 | 0.83 |
| d, Delay for Lane Group [s/veh] | 18.54 | 39.19 | 6.42 | 38.35 | 53.64 |
| Lane Group LOS | B | D | A | D | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 15.11 | 2.02 | 3.05 | 5.33 | 7.90 |
| 50th-Percentile Queue Length [ft/ln] | 377.66 | 50.50 | 76.19 | 133.15 | 197.60 |
| 95th-Percentile Queue Length [veh/ln] | 21.48 | 3.64 | 5.49 | 9.11 | 12.51 |
| 95th-Percentile Queue Length [ft/ln] | 537.01 | 90.91 | 137.14 | 227.77 | 312.87 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 18.54 | 18.54 | 39.19 | 6.42 | 38.35 | 53.64 |
| Movement LOS | B | B | D | A | D | D |
| d_A, Approach Delay [s/veh] | 18.54 | | 11.72 | | 46.76 | |
| Approach LOS | B | | B | | D | |
| d_I, Intersection Delay [s/veh] | 24.01 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.776 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1378 | 1378 | 444 |
| d_b, Bicycle Delay [s] | 4.36 | 4.36 | 27.22 |
| I_b,int, Bicycle LOS Score for Intersection | 3.277 | 2.418 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.703 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 72 | 149 | 336 | 738 | 110 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 72 | 149 | 336 | 738 | 110 |
| Peak Hour Factor | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 | 0.7700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 23 | 48 | 109 | 240 | 36 |
| Total Analysis Volume [veh/h] | 43 | 94 | 194 | 436 | 958 | 143 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 19 | 0 | 0 | 71 | 71 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 15 | 67 | 67 | 67 |
| g / C, Green / Cycle | 0.17 | 0.74 | 0.74 | 0.74 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.39 | 0.24 | 0.62 |
| s, saturation flow rate [veh/h] | 1604 | 499 | 1823 | 1783 |
| c, Capacity [veh/h] | 267 | 234 | 1357 | 1327 |
| d1, Uniform Delay [s] | 34.17 | 33.91 | 3.86 | 7.69 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.86 | 27.24 | 0.63 | 6.12 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.83 | 0.32 | 0.83 |
| d, Delay for Lane Group [s/veh] | 41.03 | 61.16 | 4.49 | 13.80 |
| Lane Group LOS | D | E | A | B |
| Critical Lane Group | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.20 | 6.06 | 2.24 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 79.96 | 151.62 | 56.11 | 308.68 |
| 95th-Percentile Queue Length [veh/ln] | 5.76 | 10.10 | 4.04 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 143.92 | 252.59 | 100.99 | 452.75 |

**Movement, Approach, & Intersection Results**

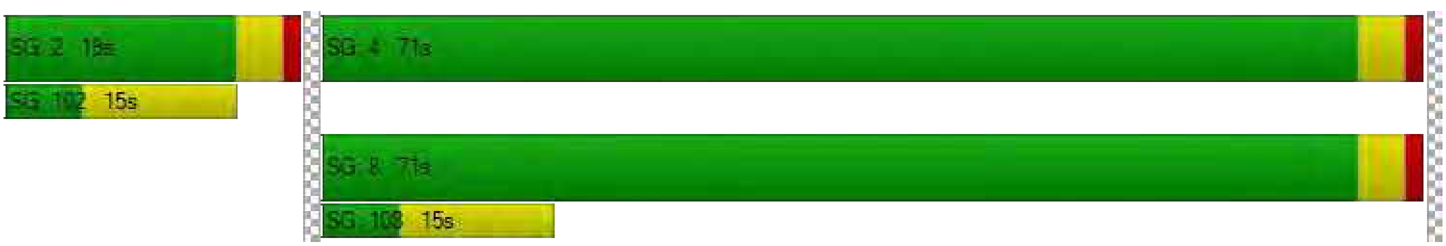
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 41.03 | 41.03 | 61.16 | 4.49 | 13.80 | 13.80 |
| Movement LOS | D | D | E | A | B | B |
| d_A, Approach Delay [s/veh] | 41.03 | | 21.94 | | 13.80 | |
| Approach LOS | D | | C | | B | |
| d_I, Intersection Delay [s/veh] | 18.54 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.703 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.223 | 2.488 | 2.487 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 333 | 1489 | 1489 |
| d_b, Bicycle Delay [s] | 31.25 | 2.94 | 2.94 |
| I_b,int, Bicycle LOS Score for Intersection | 1.786 | 2.599 | 3.376 |
| Bicycle LOS | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project AM_Imp.pdf

Scenario 25 Imp-Cumulative w/Dumbarton AM (2040 vols)+ Project
10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 | 3776 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 266 | 1221 | 1418 | 25 | 172 | 95 | 3197 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 | 5051 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 65 | 1387 | 1211 | 627 | 463 | 60 | 3813 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 | 2542 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 | 1121 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 646 | 270 | 74 | 384 | 210 | 257 | 1841 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 33 | 72 | 149 | 336 | 738 | 110 | 1438 |

Vistro File: \...\Vistro_AllScenarios_AM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project AM_Imp.pdf

Scenario 25 Imp-Cumulative w/Dumbarton AM (2040 vols)+ Project
10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 224 | 974 | 126 | 29 | 1014 | 413 | 611 | 77 | 224 | 38 | 21 | 25 | 3776 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **224** | **974** | **126** | **29** | **1014** | **413** | **611** | **77** | **224** | **38** | **21** | **25** | **3776** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 266 | 1221 | 1418 | 25 | 172 | 95 | 3197 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **266** | **1221** | **1418** | **25** | **172** | **95** | **3197** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 143 | 1863 | 423 | 40 | 1365 | 7 | 17 | 93 | 421 | 260 | 114 | 305 | 5051 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **143** | **1863** | **423** | **40** | **1365** | **7** | **17** | **93** | **421** | **260** | **114** | **305** | **5051** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 65 | 1387 | 1211 | 627 | 463 | 60 | 3813 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **65** | **1387** | **1211** | **627** | **463** | **60** | **3813** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 22 | 909 | 7 | 36 | 928 | 108 | 67 | 14 | 32 | 59 | 12 | 348 | 2542 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **909** | **7** | **36** | **928** | **108** | **67** | **14** | **32** | **59** | **12** | **348** | **2542** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 13 | 453 | 10 | 76 | 221 | 45 | 37 | 41 | 21 | 22 | 51 | 131 | 1121 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **453** | **10** | **76** | **221** | **45** | **37** | **41** | **21** | **22** | **51** | **131** | **1121** |

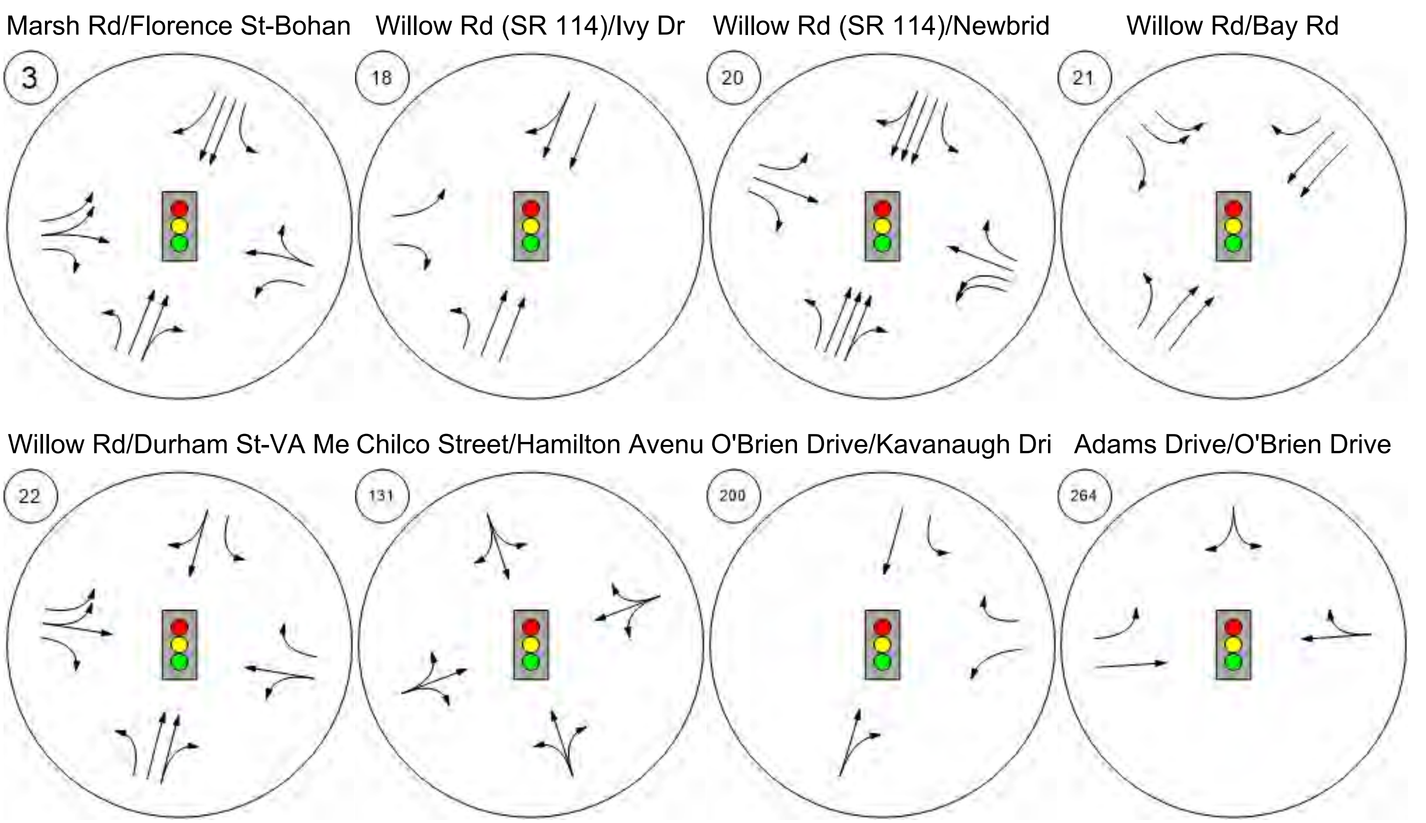
| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 646 | 270 | 74 | 384 | 210 | 257 | 1841 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **646** | **270** | **74** | **384** | **210** | **257** | **1841** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 33 | 72 | 149 | 336 | 738 | 110 | 1438 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **33** | **72** | **149** | **336** | **738** | **110** | **1438** |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

Study Intersections

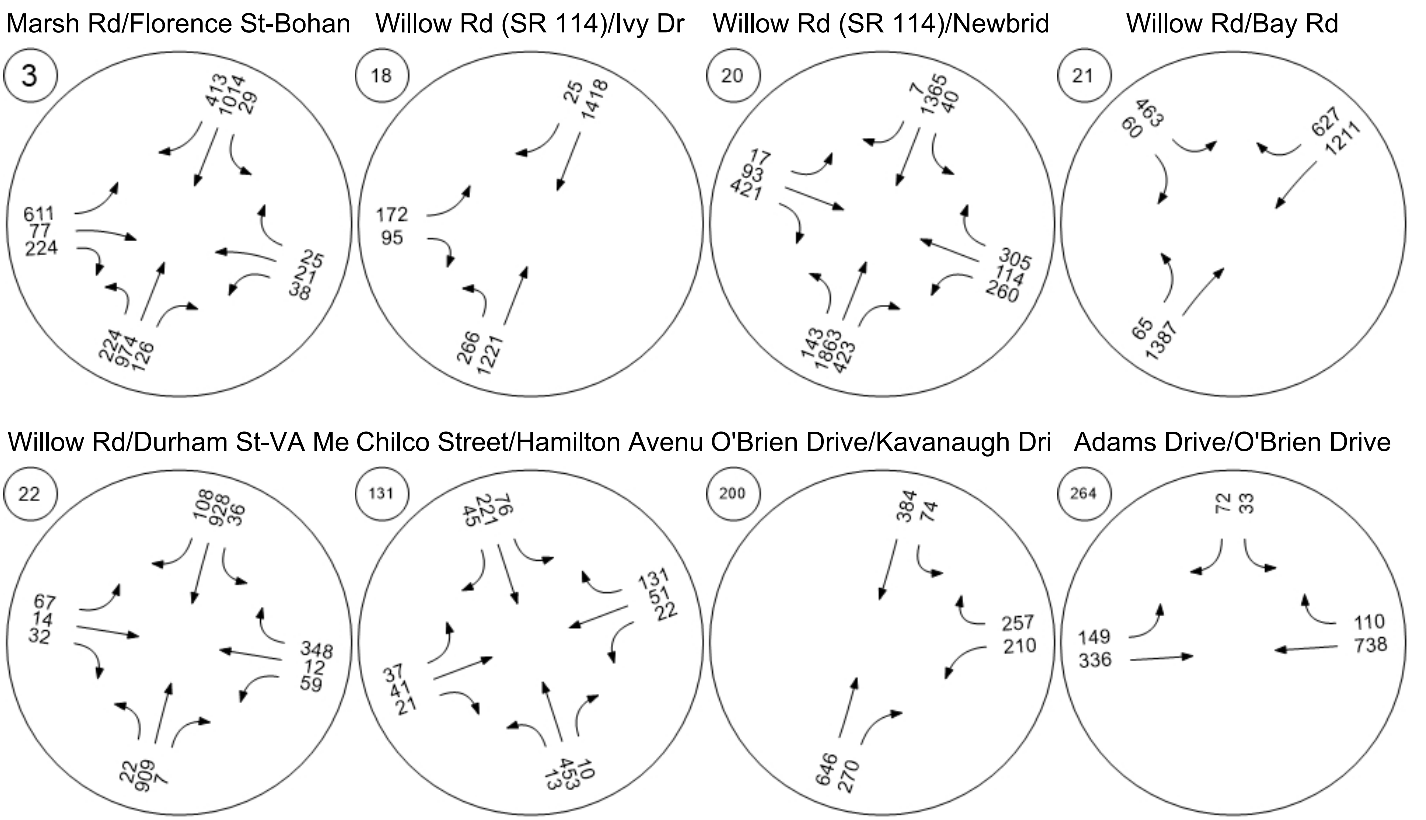
Lane Configuration and Traffic Control

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Base Volume

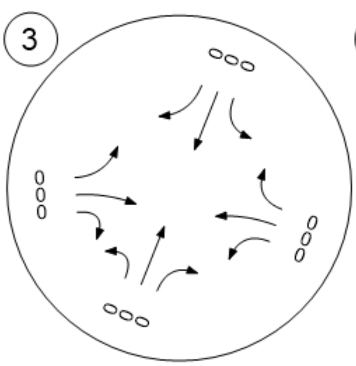



Generated with PTV VISTRO

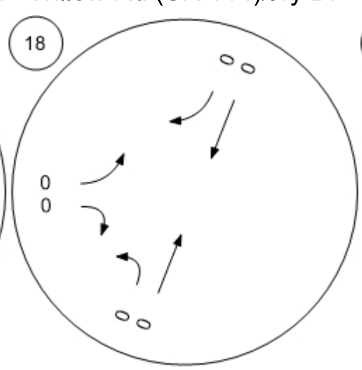
Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

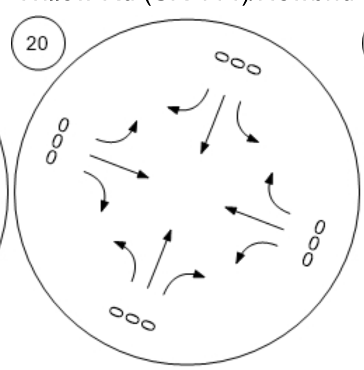

Marsh Rd/Florence St-Bohan



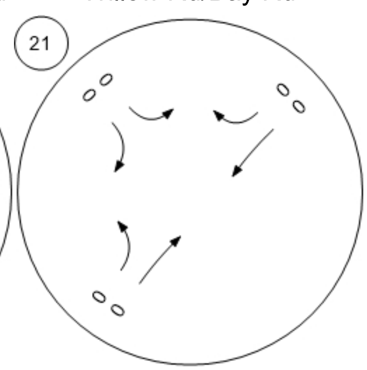

Willow Rd (SR 114)/Ivy Dr



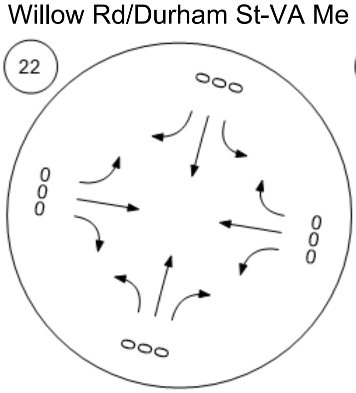

Willow Rd (SR 114)/Newbrid



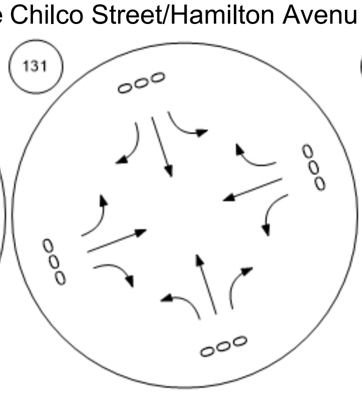

Willow Rd/Bay Rd



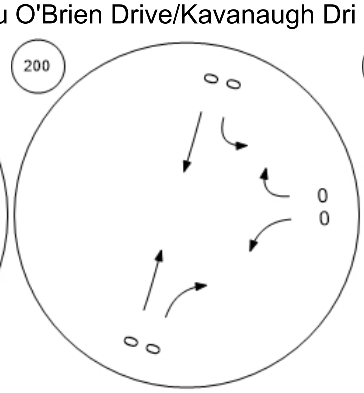

Willow Rd/Durham St-VA Me



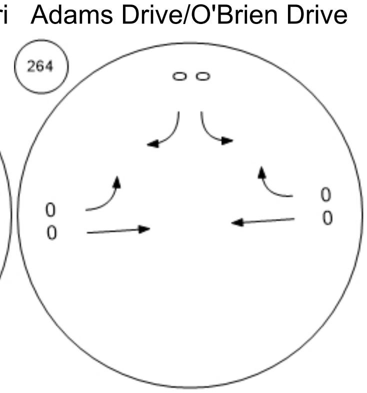

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

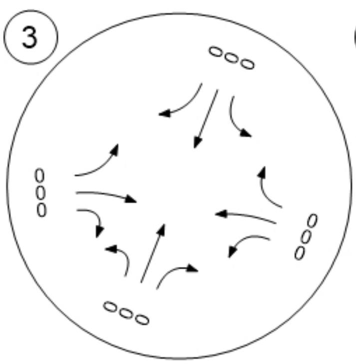


Generated with PTV VISTRO

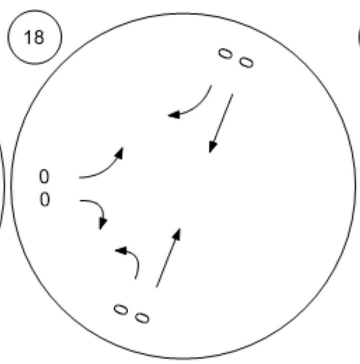
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

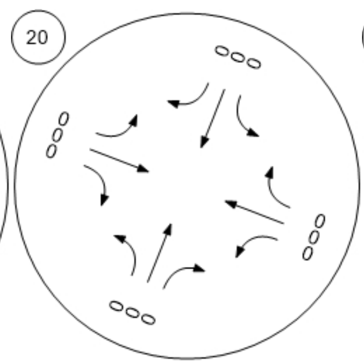

Marsh Rd/Florence St-Bohan



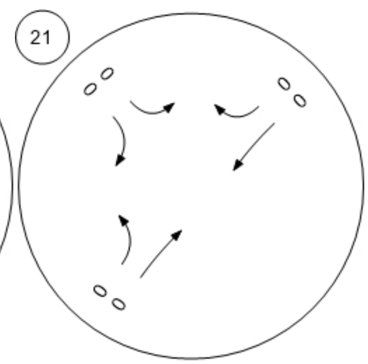

Willow Rd (SR 114)/Ivy Dr



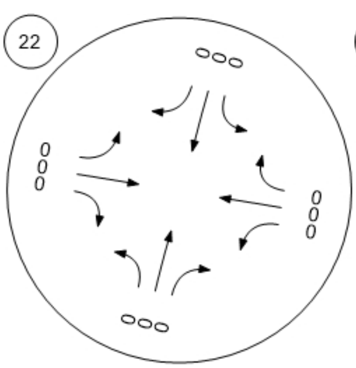

Willow Rd (SR 114)/Newbrid



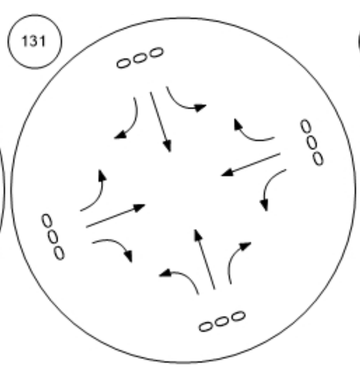

Willow Rd/Bay Rd



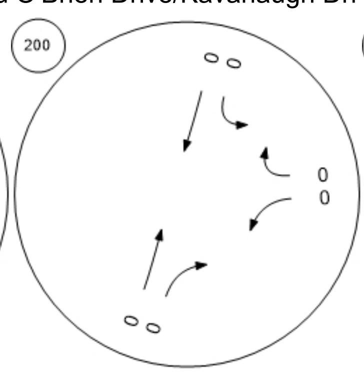

Willow Rd/Durham St-VA Me



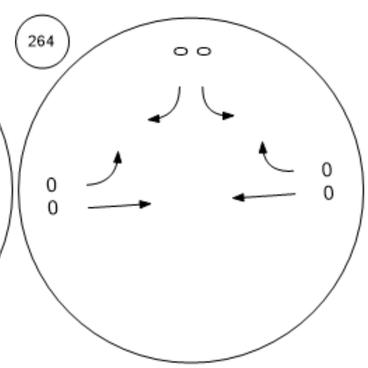

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

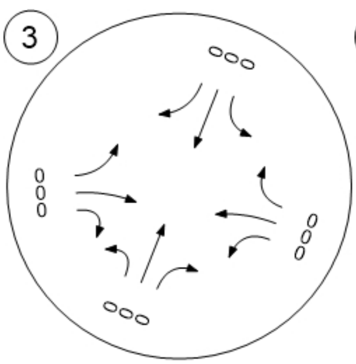


Generated with PTV VISTRO

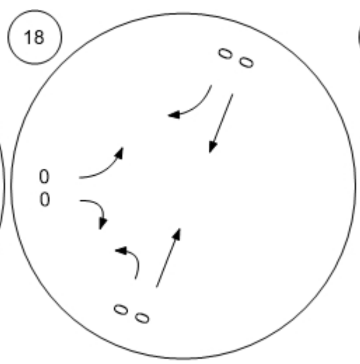
Version 2021 (SP 0-4)

# Traffic Volume - Other Volume

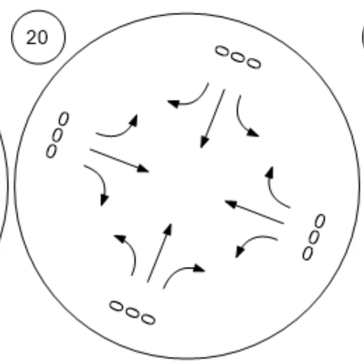

Marsh Rd/Florence St-Bohan



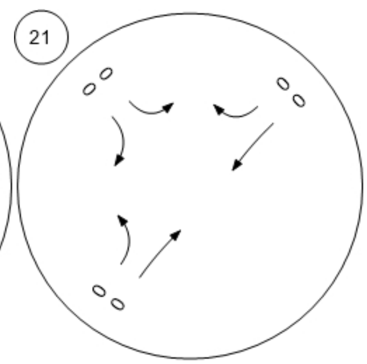

Willow Rd (SR 114)/Ivy Dr



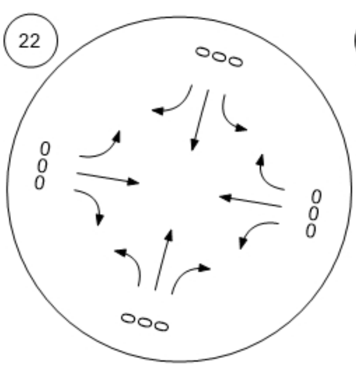

Willow Rd (SR 114)/Newbrid



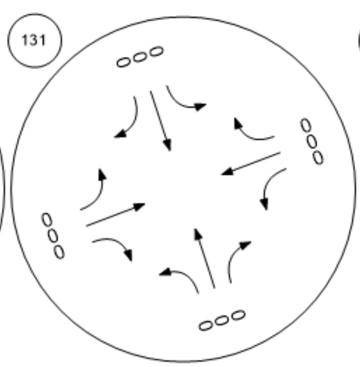

Willow Rd/Bay Rd



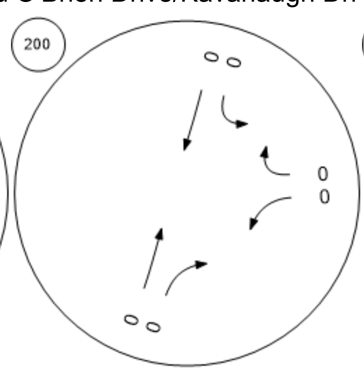

Willow Rd/Durham St-VA Me



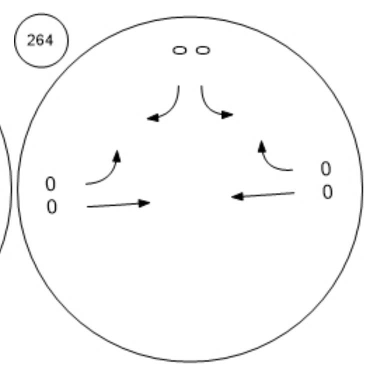

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri

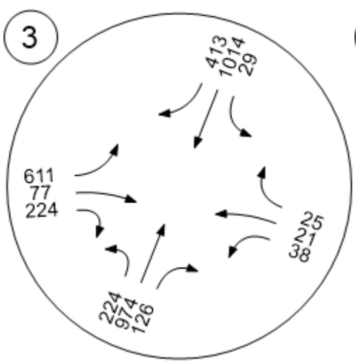



Adams Drive/O'Brien Drive

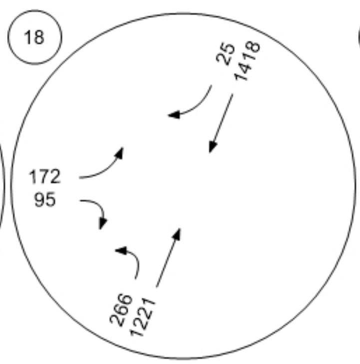


Traffic Volume - Future Total Volume

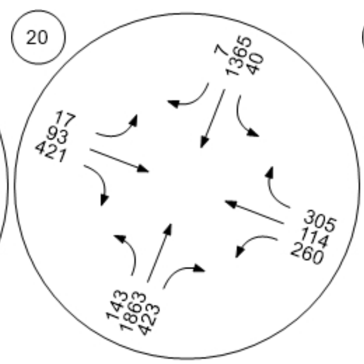

Marsh Rd/Florence St-Bohan



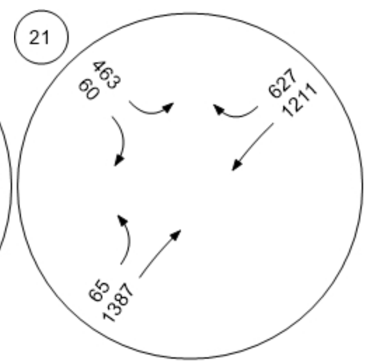

Willow Rd (SR 114)/Ivy Dr



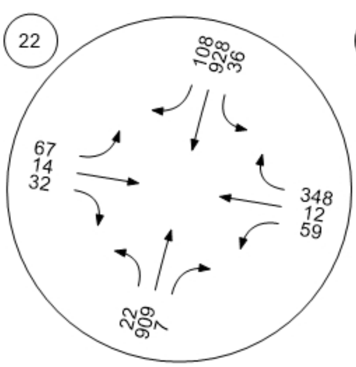

Willow Rd (SR 114)/Newbrid



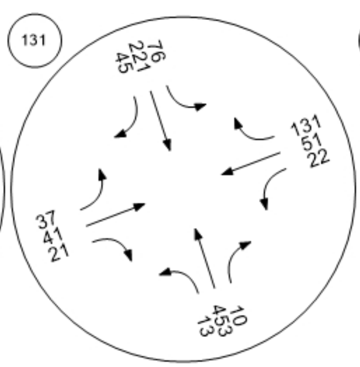

Willow Rd/Bay Rd



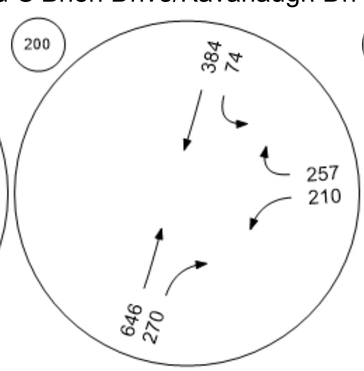

Willow Rd/Durham St-VA Me



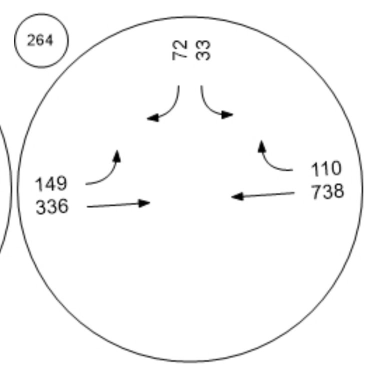

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

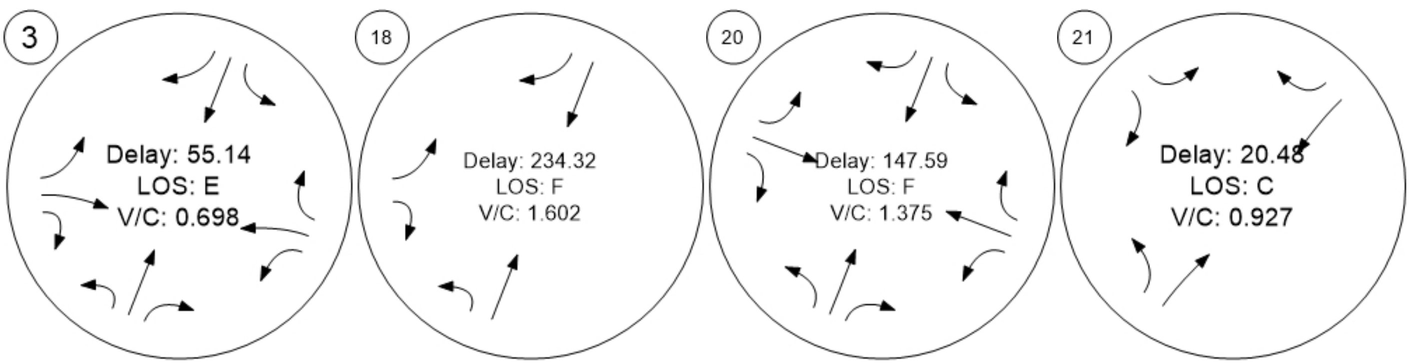


Generated with PTV VISTRO

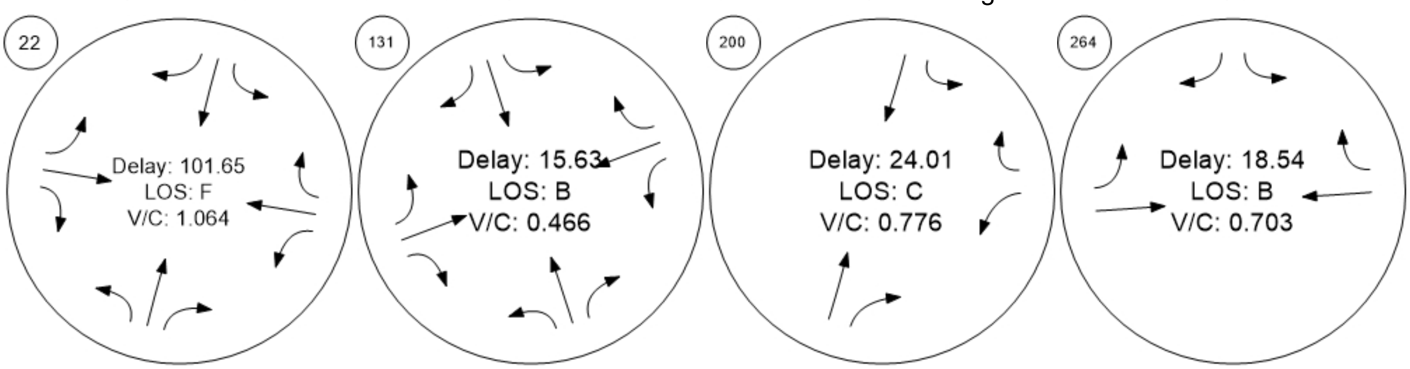
Version 2021 (SP 0-4)

Traffic Conditions


Marsh Rd/Florence St-Bohan | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/Newbrid | Willow Rd/Bay Rd




Willow Rd/Durham St-VA Me | Chilco Street/Hamilton Avenu | O'Brien Drive/Kavanaugh Dri | Adams Drive/O'Brien Drive

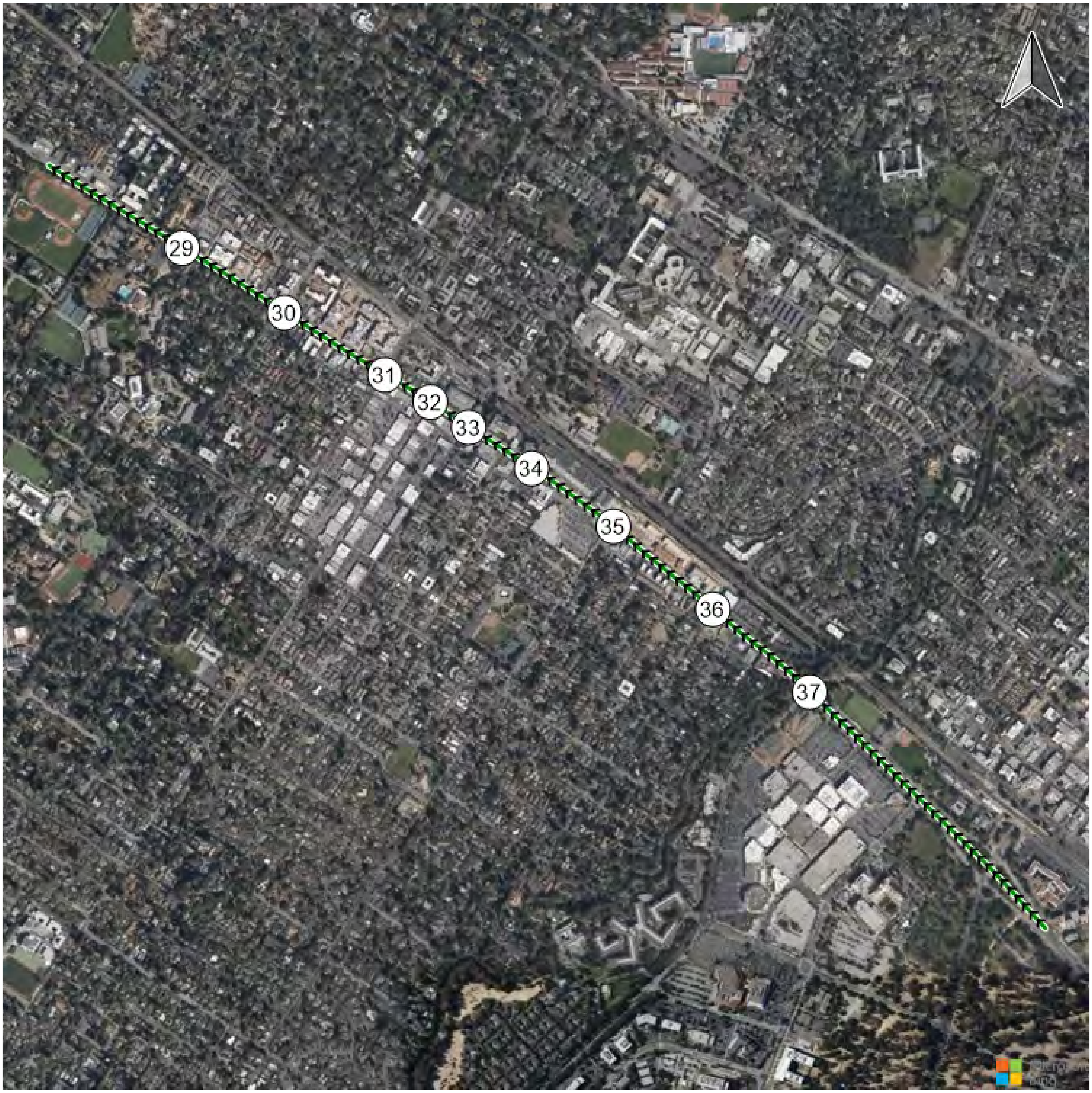


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

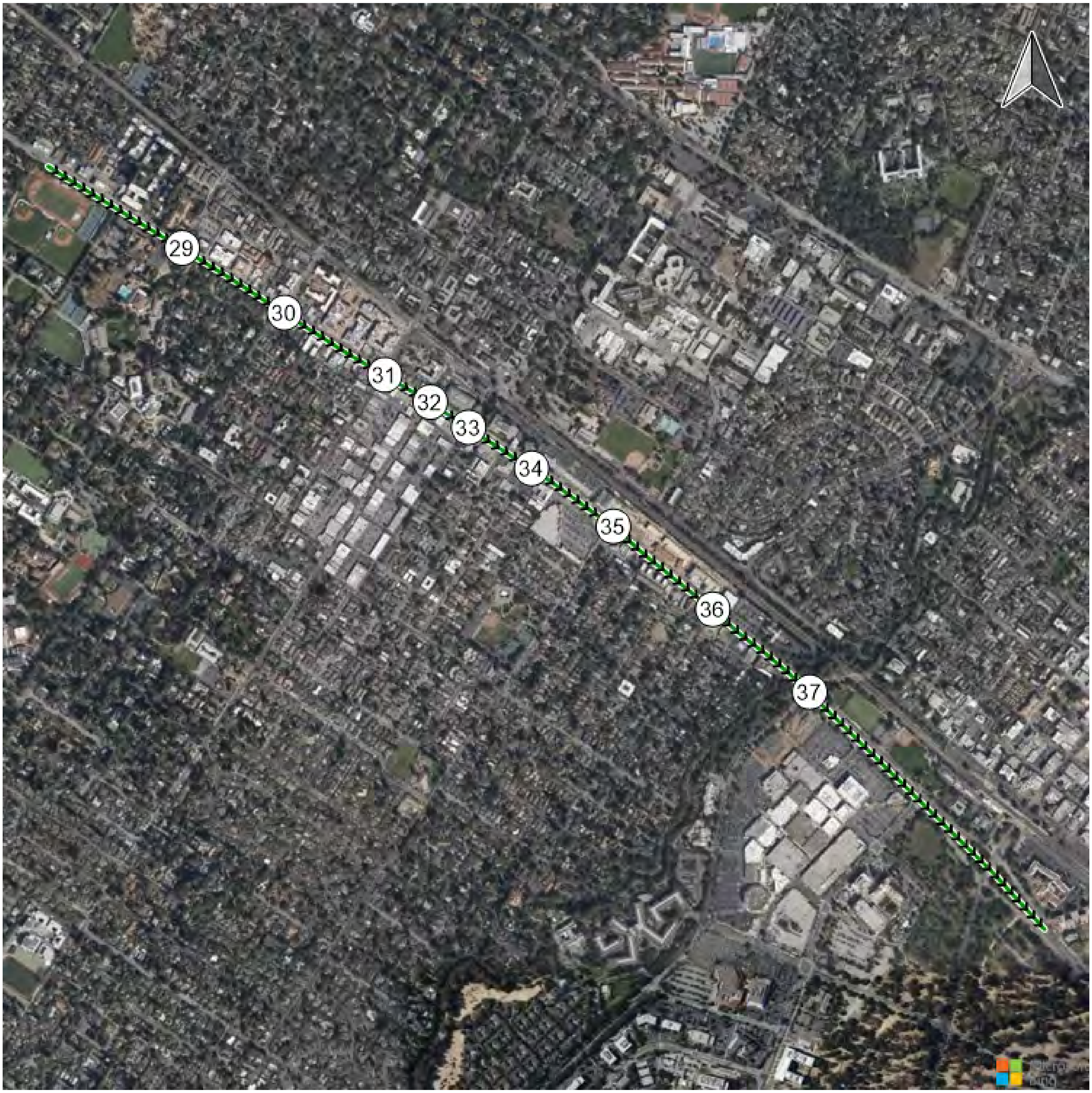
Route 1: ECR NB



Route 1: ECR NB

Time Space Diagram - Flowing Off

Route 2: ECR SB



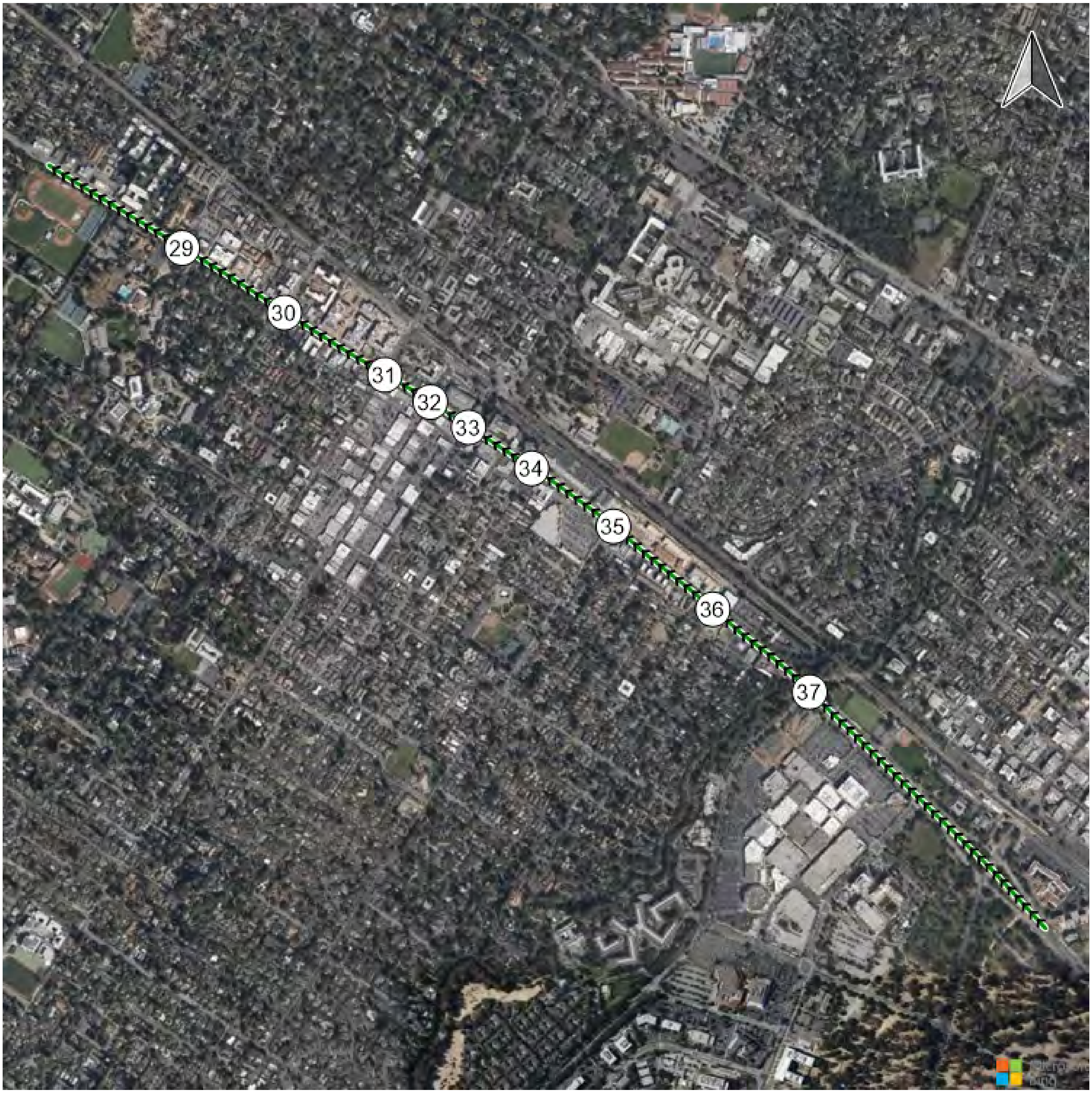
Route 2: ECR SB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



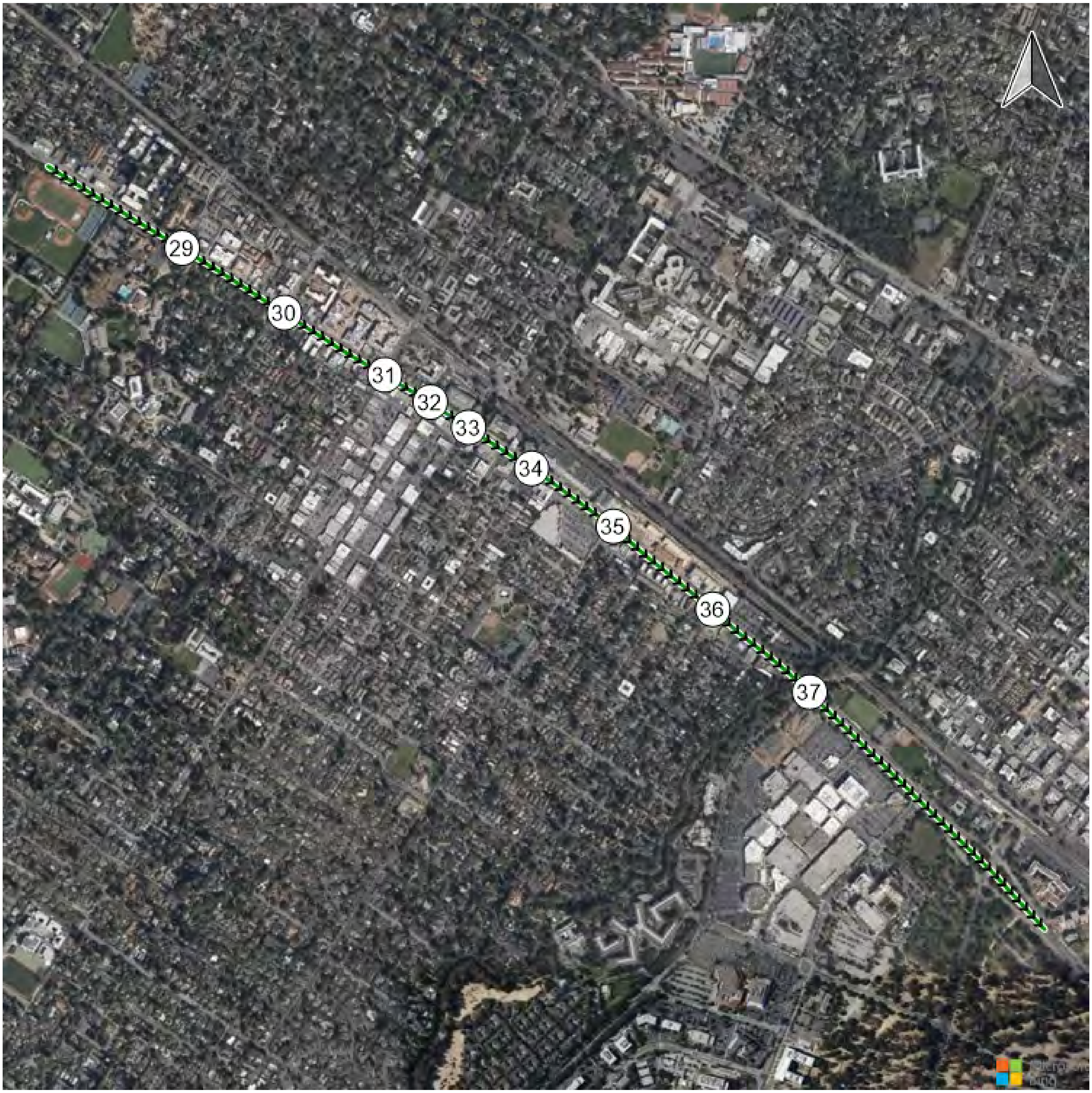
Route 1: ECR NB

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2: ECR SB



Route 2: ECR SB

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project PM_Imp.pdf

Scenario 25 Imp-Cumulative w/dumbarton PM (2040 vols)+ Project
10/14/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 3 | Marsh Rd/Florence St-Bohannon Dr | Signalized | HCM 6th Edition | NB Left | 0.732 | 48.1 | D |
| 18 | Willow Rd (SR 114)/Ivy Dr | Signalized | HCM 6th Edition | NB Left | 1.429 | 194.9 | F |
| 20 | Willow Rd (SR 114) /Newbridge St | Signalized | HCM 6th Edition | NB Left | 1.373 | 186.5 | F |
| 21 | Willow Rd/Bay Rd | Signalized | HCM 6th Edition | NEB Thru | 1.232 | 98.3 | F |
| 22 | Willow Rd/Durham St-VA Med Entrance | Signalized | HCM 6th Edition | SB Thru | 1.213 | 204.1 | F |
| 131 | Chilco Street/Hamilton Avenue | Signalized | HCM 6th Edition | EB Thru | 0.732 | 15.2 | B |
| 200 | O'Brien Drive/Kavanaugh Drive | Signalized | HCM 6th Edition | WB Right | 0.768 | 31.6 | C |
| 264 | Adams Drive/O'Brien Drive | Signalized | HCM 6th Edition | SB Left | 0.559 | 12.9 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 3: Marsh Rd/Florence St-Bohannon Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 48.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.732 |

**Intersection Setup**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 155.00 | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | | 35.00 | | | 25.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Marsh Road | | | Marsh Road | | | Florence Street | | | Bohannon Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.70 | 3.20 | 6.00 | 6.70 | 2.20 | 4.00 | 2.50 | 0.00 | 0.80 | 4.10 | 0.00 | 6.90 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 56 | 125 | 87 | 40 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 80 | 181 | 15 | 3 | 272 | 95 | 124 | 9 | 15 | 34 | 23 | 11 |
| Total Analysis Volume [veh/h] | 318 | 726 | 58 | 14 | 1089 | 381 | 496 | 37 | 60 | 134 | 94 | 43 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 1 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 1 | | | 2 | | | 1 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 3 | | | 3 | | | 1 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 1 | | | 3 | | | 3 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 1 | | | 2 | | | 3 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 140 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 31.0 |
| Offset Reference | LagCoordGreen |
| Permissive Mode | SingleBand |
| Lost time [s] | 4.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Split | Split | Split | Split | Split | Split |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 3 | 4 | 8 | 4 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lag | - | - | - | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 8 | 8 | 8 | 0 | 8 | 0 |
| Maximum Green [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amber [s] | 3.0 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 3.2 | 3.0 | 3.2 | 0.0 | 3.2 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 22 | 55 | 55 | 12 | 45 | 45 | 37 | 36 | 37 | 0 | 37 | 0 |
| Vehicle Extension [s] | 2.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 2.5 | 2.5 | 2.5 | 0.0 | 2.5 | 0.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 12 | 12 | 0 | 16 | 16 | 25 | 25 | 25 | 0 | 25 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | Yes | | No | Yes | | | No | | | No | |
| Maximum Recall | No | No | | No | No | | | No | | | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 20.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | R | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 20 | 87 | 87 | 4 | 71 | 71 | 26 | 26 | 26 | 16 | 16 |
| g / C, Green / Cycle | 0.14 | 0.62 | 0.62 | 0.03 | 0.50 | 0.50 | 0.18 | 0.18 | 0.18 | 0.11 | 0.11 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.21 | 0.22 | 0.01 | 0.31 | 0.25 | 0.15 | 0.15 | 0.04 | 0.08 | 0.08 |
| s, saturation flow rate [veh/h] | 1771 | 1852 | 1797 | 1714 | 3555 | 1521 | 1774 | 1821 | 1572 | 1751 | 1788 |
| c, Capacity [veh/h] | 252 | 1151 | 1117 | 45 | 1796 | 769 | 324 | 333 | 287 | 196 | 201 |
| d1, Uniform Delay [s] | 59.92 | 12.74 | 12.76 | 66.82 | 24.67 | 22.62 | 54.78 | 54.78 | 48.47 | 59.64 | 59.65 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 145.03 | 0.82 | 0.85 | 1.45 | 1.53 | 2.28 | 3.66 | 3.56 | 0.26 | 3.08 | 3.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.26 | 0.34 | 0.35 | 0.31 | 0.61 | 0.50 | 0.81 | 0.81 | 0.21 | 0.68 | 0.68 |
| d, Delay for Lane Group [s/veh] | 204.95 | 13.56 | 13.61 | 68.27 | 26.20 | 24.90 | 58.44 | 58.34 | 48.74 | 62.72 | 62.68 |
| Lane Group LOS | F | B | B | E | C | C | E | E | D | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 19.05 | 6.14 | 6.00 | 0.51 | 13.06 | 8.62 | 9.31 | 9.54 | 1.83 | 4.79 | 4.89 |
| 50th-Percentile Queue Length [ft/ln] | 476.29 | 153.52 | 150.01 | 12.71 | 326.61 | 215.62 | 232.66 | 238.60 | 45.83 | 119.65 | 122.26 |
| 95th-Percentile Queue Length [veh/ln] | 28.96 | 10.20 | 10.02 | 0.91 | 18.99 | 13.44 | 14.31 | 14.61 | 3.30 | 8.37 | 8.52 |
| 95th-Percentile Queue Length [ft/ln] | 723.93 | 255.12 | 250.44 | 22.87 | 474.80 | 336.03 | 357.73 | 365.26 | 82.49 | 209.34 | 212.93 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 204.95 | 13.59 | 13.61 | 68.27 | 26.20 | 24.90 | 58.39 | 58.34 | 48.74 | 62.72 | 62.68 | 62.68 |
| Movement LOS | F | B | B | E | C | C | E | E | D | E | E | E |
| d_A, Approach Delay [s/veh] | 68.81 | | | 26.26 | | | 57.41 | | | 62.70 | | |
| Approach LOS | E | | | C | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 48.07 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.732 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 59.37 | 59.37 | 59.37 | 59.37 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.959 | 3.137 | 2.717 | 2.064 |
| Crosswalk LOS | C | C | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 721 | 578 | 458 | 469 |
| d_b, Bicycle Delay [s] | 28.63 | 35.41 | 41.66 | 41.01 |
| I_b,int, Bicycle LOS Score for Intersection | 2.469 | 2.784 | 2.825 | 2.007 |
| Bicycle LOS | B | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: Willow Rd (SR 114)/Ivy Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 194.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.429 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 85.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | 40.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road (SR 114) | | Willow Road (SR 114) | | Ivy Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 244 | 933 | 1447 | 52 | 163 | 114 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 3.30 | 2.80 | 0.00 | 0.00 | 2.10 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 244 | 933 | 1447 | 52 | 163 | 114 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 66 | 251 | 389 | 14 | 44 | 31 |
| Total Analysis Volume [veh/h] | 262 | 1003 | 1556 | 56 | 175 | 123 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 3 | | 7 | | 2 | |
| v_di, Inbound Pedestrian Volume crossing m | 2 | | 6 | | 3 | |
| v_co, Outbound Pedestrian Volume crossing | 6 | | 3 | | 3 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 7 | | 3 | | 3 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 5 | | 2 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 9.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Overlap |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | 4,5 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 10 | 11 | 11 |
| Maximum Green [s] | 21 | 30 | 30 | 30 | 21 | 21 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Split [s] | 12 | 98 | 86 | 86 | 32 | 32 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 10 | 7 | 7 | 5 | 5 |
| Pedestrian Clearance [s] | 0 | 0 | 22 | 22 | 24 | 24 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 |
| Minimum Recall | No | Yes | Yes | | No | No |
| Maximum Recall | No | No | No | | No | No |
| Pedestrian Recall | No | No | No | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 6.0 | 6.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 |
| g_i, Effective Green Time [s] | 9 | 103 | 91 | 91 | 20 | 32 |
| g / C, Green / Cycle | 0.07 | 0.79 | 0.70 | 0.70 | 0.15 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.21 | 0.64 | 0.97 | 0.98 | 0.14 | 0.11 |
| s, saturation flow rate [veh/h] | 1270 | 1576 | 831 | 819 | 1253 | 1114 |
| c, Capacity [veh/h] | 89 | 1251 | 583 | 574 | 191 | 272 |
| d1, Uniform Delay [s] | 60.38 | 7.58 | 19.40 | 19.40 | 54.23 | 41.53 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.14 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 911.28 | 5.47 | 182.88 | 191.72 | 19.02 | 0.43 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 2.96 | 0.80 | 1.38 | 1.40 | 0.92 | 0.45 |
| d, Delay for Lane Group [s/veh] | 971.66 | 13.05 | 202.28 | 211.12 | 73.25 | 41.96 |
| Lane Group LOS | F | B | F | F | E | D |
| Critical Lane Group | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 25.29 | 6.62 | 44.13 | 44.91 | 6.64 | 3.40 |
| 50th-Percentile Queue Length [ft/ln] | 632.28 | 165.46 | 1103.26 | 1122.75 | 166.03 | 84.89 |
| 95th-Percentile Queue Length [veh/ln] | 40.48 | 10.84 | 69.22 | 70.84 | 10.87 | 6.11 |
| 95th-Percentile Queue Length [ft/ln] | 1012.12 | 270.94 | 1730.43 | 1770.91 | 271.68 | 152.79 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 971.66 | 13.05 | 206.54 | 211.12 | 73.25 | 41.96 |
| Movement LOS | F | B | F | F | E | D |
| d_A, Approach Delay [s/veh] | 211.59 | | 206.70 | | 60.34 | |
| Approach LOS | F | | F | | E | |
| d_I, Intersection Delay [s/veh] | 194.91 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.429 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.26 | 56.26 | 54.42 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.084 | 3.057 | 2.158 |
| Crosswalk LOS | C | C | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1447 | 1262 | 446 |
| d_b, Bicycle Delay [s] | 4.96 | 8.86 | 39.23 |
| I_b,int, Bicycle LOS Score for Intersection | 2.603 | 2.890 | 1.560 |
| Bicycle LOS | B | C | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 20: Willow Rd (SR 114)/Newbridge St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 186.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.373 |

**Intersection Setup**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 390.00 | 100.00 | 100.00 | 185.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 25.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Willow Road (SR 114) | | | Willow Road (SR 114) | | | Newbridge Street | | | Bay Road | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.30 | 4.40 | 5.30 | 0.00 | 3.40 | 0.00 | 0.00 | 4.40 | 0.50 | 3.80 | 4.40 | 1.30 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 45 |
| Total Hourly Volume [veh/h] | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 449 | 346 | 285 | 11 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 74 | 382 | 98 | 21 | 372 | 7 | 7 | 54 | 123 | 95 | 78 | 3 |
| Total Analysis Volume [veh/h] | 295 | 1526 | 390 | 86 | 1488 | 29 | 30 | 214 | 493 | 380 | 313 | 12 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 11 | | | 20 | | | 10 | | | 19 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 19 | | | 11 | | | 20 | | |
| v_co, Outbound Pedestrian Volume crossing | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 7 | | | 7 | | | 3 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 5 | | | 4 | | | 6 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 130 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 12.00 |

**Phasing & Timing**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 7 | 4 | 4 | 3 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lag | - | - | Lead | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 12 | 12 | 4 | 12 | 12 | 5 | 4 | 4 | 4 | 5 | 5 |
| Maximum Green [s] | 21 | 40 | 40 | 21 | 40 | 40 | 30 | 25 | 25 | 21 | 30 | 30 |
| Amber [s] | 3.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| All red [s] | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 |
| Split [s] | 22 | 46 | 46 | 21 | 45 | 45 | 63 | 32 | 32 | 31 | 22 | 22 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 7 | 7 | 0 | 5 | 5 | 5 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 19 | 19 | 0 | 16 | 16 | 0 | 23 | 23 | 23 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.0 | 3.0 | 3.0 | 1.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 1.0 | 2.0 | 2.0 |
| Minimum Recall | No | Yes | | No | Yes | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 3.00 | 5.00 | 5.00 | 3.00 | 5.00 | 5.00 | 4.00 | 4.00 | 4.00 | 3.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.00 | 3.00 | 3.00 | 1.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.00 | 1.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 19 | 53 | 53 | 14 | 47 | 47 | 52 | 32 | 32 | 16 | 0 | 0 |
| g / C, Green / Cycle | 0.15 | 0.41 | 0.41 | 0.10 | 0.36 | 0.36 | 0.40 | 0.25 | 0.25 | 0.13 | 0.00 | 0.00 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.52 | 0.54 | 0.08 | 0.54 | 0.54 | 0.03 | 0.22 | 0.32 | 0.11 | 0.24 | 0.01 |
| s, saturation flow rate [veh/h] | 1072 | 2481 | 1171 | 1083 | 1853 | 961 | 1083 | 965 | 1544 | 3409 | 1303 | 1598 |
| c, Capacity [veh/h] | 196 | 1009 | 476 | 152 | 676 | 351 | 467 | 240 | 383 | 427 | 0 | 0 |
| d1, Uniform Delay [s] | 58.91 | 38.57 | 38.57 | 58.59 | 41.28 | 41.28 | 25.69 | 47.21 | 48.23 | 55.96 | 0.00 | 0.00 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.04 | 0.50 | 0.50 | 0.11 | 0.35 | 0.50 | 0.04 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 253.32 | 132.78 | 156.58 | 1.23 | 222.15 | 231.04 | 0.06 | 27.89 | 147.50 | 2.57 | 0.00 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.51 | 1.28 | 1.32 | 0.57 | 1.48 | 1.48 | 0.06 | 0.89 | 1.29 | 0.89 | 10000.0 | 10000.0 |
| d, Delay for Lane Group [s/veh] | 312.22 | 171.34 | 195.15 | 59.82 | 263.43 | 272.32 | 25.75 | 75.09 | 195.73 | 58.53 | 0.00 | 0.00 |
| Lane Group LOS | F | F | F | E | F | F | C | E | F | E | F | F |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 20.17 | 34.01 | 35.24 | 2.88 | 31.67 | 33.71 | 0.61 | 8.52 | 27.89 | 6.29 | 0.00 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 504.36 | 850.17 | 881.00 | 71.91 | 791.66 | 842.65 | 15.21 | 213.03 | 697.21 | 157.24 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 32.15 | 50.85 | 53.26 | 5.18 | 50.31 | 53.30 | 1.10 | 13.31 | 41.75 | 10.40 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 803.79 | 1271.16 | 1331.59 | 129.44 | 1257.72 | 1332.60 | 27.38 | 332.71 | 1043.66 | 260.06 | 0.00 | 0.00 |

**Movement, Approach, & Intersection Results**

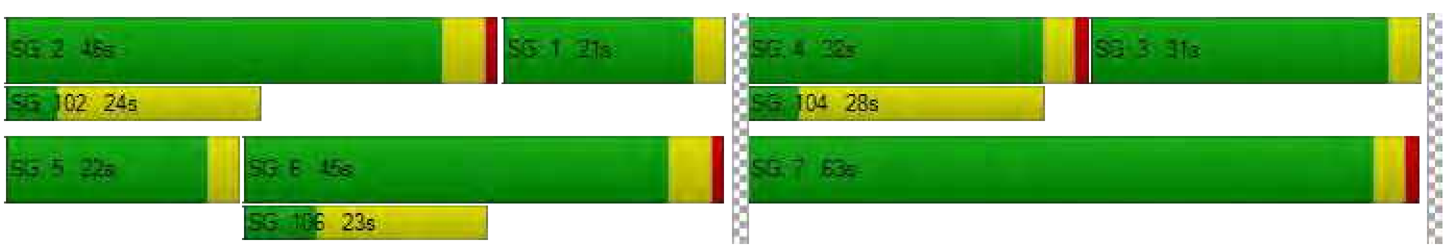
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 312.22 | 175.03 | 195.15 | 59.82 | 266.36 | 272.32 | 25.75 | 75.09 | 195.73 | 58.53 | 0.00 | 0.00 |
| Movement LOS | F | F | F | E | F | F | C | E | F | E | A | A |
| d_A, Approach Delay [s/veh] | | 196.89 | | | 255.39 | | | 153.78 | | | 31.55 | |
| Approach LOS | | F | | | F | | | F | | | C | |
| d_I, Intersection Delay [s/veh] | | | | | | 186.51 | | | | | | |
| Intersection LOS | | | | | | F | | | | | | |
| Intersection V/C | | | | | | 1.373 | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 18.0 | 11.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 48.25 | 54.47 | 56.31 |
| I_p,int, Pedestrian LOS Score for Intersection | 3.494 | 3.023 | 3.195 | 2.892 |
| Crosswalk LOS | C | C | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 631 | 615 | 431 | 0 |
| d_b, Bicycle Delay [s] | 30.47 | 31.23 | 40.10 | 65.00 |
| I_b,int, Bicycle LOS Score for Intersection | 2.776 | 2.441 | 3.064 | 2.797 |
| Bicycle LOS | C | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 21: Willow Rd/Bay Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 98.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.232 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Approach | Northeastbound | | Southwestbound | | Southeastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 175.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 30.00 | | 35.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Bay Road | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 40 | 1319 | 809 | 283 | 349 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.60 | 2.20 | 0.00 | 1.00 | 1.50 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 223 | 0 | 47 |
| Total Hourly Volume [veh/h] | 40 | 1319 | 809 | 60 | 349 | 0 |
| Peak Hour Factor | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 | 0.9700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 340 | 209 | 15 | 90 | 0 |
| Total Analysis Volume [veh/h] | 41 | 1360 | 834 | 62 | 360 | 0 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 1 | | 2 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 2 | | 1 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 10 | | 6 | | 3 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 48 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 8.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 11.00 |

**Phasing & Timing**

| Control Type | Protected | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 6 | 6 | 4 | 4 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | Lag | - |
| Minimum Green [s] | 4 | 10 | 20 | 20 | 4 | 4 |
| Maximum Green [s] | 16 | 36 | 36 | 36 | 36 | 36 |
| Amber [s] | 3.0 | 4.5 | 4.5 | 4.5 | 3.2 | 3.2 |
| All red [s] | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 2.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 1.5 | 3.5 | 3.5 | 3.5 | 2.2 | 2.2 |
| Minimum Recall | No | Yes | Yes | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | R | L | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 67 | 67 | 67 | 67 | 67 | 67 |
| L, Total Lost Time per Cycle [s] | 3.50 | 5.50 | 5.50 | 5.50 | 4.20 | 4.20 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 1.50 | 3.50 | 3.50 | 3.50 | 2.20 | 2.20 |
| g_i, Effective Green Time [s] | 2 | 40 | 35 | 35 | 17 | 17 |
| g / C, Green / Cycle | 0.03 | 0.61 | 0.52 | 0.52 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.81 | 0.50 | 0.08 | 0.22 | 0.00 |
| s, saturation flow rate [veh/h] | 1810 | 1678 | 1684 | 754 | 1651 | 756 |
| c, Capacity [veh/h] | 58 | 1017 | 878 | 393 | 411 | 188 |
| d1, Uniform Delay [s] | 31.98 | 13.15 | 15.16 | 8.32 | 24.08 | 0.00 |
| k, delay calibration | 0.04 | 0.28 | 0.15 | 0.15 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.62 | 155.66 | 8.69 | 0.26 | 2.39 | 0.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.70 | 1.34 | 0.95 | 0.16 | 0.88 | 0.00 |
| d, Delay for Lane Group [s/veh] | 37.61 | 168.82 | 23.85 | 8.59 | 26.47 | 0.00 |
| Lane Group LOS | D | F | C | A | C | A |
| Critical Lane Group | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.72 | 27.67 | 5.81 | 0.42 | 2.67 | 0.00 |
| 50th-Percentile Queue Length [ft/ln] | 18.03 | 691.75 | 145.17 | 10.41 | 66.79 | 0.00 |
| 95th-Percentile Queue Length [veh/ln] | 1.30 | 44.07 | 9.76 | 0.75 | 4.81 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 32.45 | 1101.80 | 243.97 | 18.74 | 120.23 | 0.00 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 37.61 | 168.82 | 23.85 | 8.59 | 26.47 | 0.00 |
| Movement LOS | D | F | C | A | C | A |
| d_A, Approach Delay [s/veh] | 164.98 | | 22.79 | | 26.47 | |
| Approach LOS | F | | C | | C | |
| d_I, Intersection Delay [s/veh] | 98.26 | | | | | |
| Intersection LOS | F | | | | | |
| Intersection V/C | 1.232 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 23.20 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 0.000 | 2.493 |
| Crosswalk LOS | F | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1081 | 1081 | 1081 |
| d_b, Bicycle Delay [s] | 7.06 | 7.04 | 7.03 |
| I_b,int, Bicycle LOS Score for Intersection | 2.715 | 2.483 | 1.560 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 22: Willow Rd/Durham St-VA Med Entrance**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 204.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 1.213 |

**Intersection Setup**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 10.00 | | | 25.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Volumes**

| Name | Willow Road | | | Willow Road | | | VA Medical Center | | | Durham Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 50.00 | 2.10 | 0.00 | 0.00 | 2.60 | 27.60 | 4.30 | 0.00 | 17.90 | 0.00 | 0.00 | 6.20 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 20 | 21 | 8 | 47 |
| Peak Hour Factor | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 | 0.9000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 292 | 1 | 8 | 150 | 5 | 39 | 9 | 6 | 6 | 2 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1169 | 4 | 32 | 601 | 20 | 158 | 34 | 22 | 23 | 9 | 52 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 9 | | | 1 | | | 2 | | | 10 | | |
| v_di, Inbound Pedestrian Volume crossing m | 10 | | | 2 | | | 1 | | | 9 | | |
| v_co, Outbound Pedestrian Volume crossing | 5 | | | 5 | | | 4 | | | 5 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 4 | | | 5 | | | 5 | | | 5 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 3 | | | 9 | | | 1 | | | 1 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 40 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 7.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Split | Split | Split | Split | Split | Overlap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 5 | 2 | 2 | 1 | 6 | 6 | 4 | 4 | 4 | 8 | 8 | 8 |
| Auxiliary Signal Groups | | | | | | | | | | | | 1,8 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lag | - | - | Lag | - | - |
| Minimum Green [s] | 4 | 30 | 30 | 4 | 30 | 30 | 4 | 4 | 4 | 4 | 4 | 4 |
| Maximum Green [s] | 30 | 100 | 100 | 30 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 |
| Amber [s] | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All red [s] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Split [s] | 0 | 30 | 30 | 0 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Vehicle Extension [s] | 3.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Walk [s] | 0 | 7 | 7 | 0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pedestrian Clearance [s] | 0 | 11 | 11 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| I2, Clearance Lost Time [s] | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Minimum Recall | Yes | Yes | | No | Yes | | | No | | | No | No |
| Maximum Recall | No | No | | No | No | | | No | | | No | No |
| Pedestrian Recall | No | No | | No | No | | | No | | | No | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 20.0 | 20.0 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 143 |
| L, Total Lost Time per Cycle [s] | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.50 | 2.50 | 0.00 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0.00 |
| g_i, Effective Green Time [s] | 109 | 100 | 100 | 109 | 103 | 12 | 12 | 12 | 8 | 17 |
| g / C, Green / Cycle | 0.77 | 0.70 | 0.70 | 0.77 | 0.73 | 0.08 | 0.08 | 0.08 | 0.05 | 0.12 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.99 | 0.99 | 0.06 | 1.06 | 0.05 | 0.05 | 0.05 | 0.02 | 0.03 |
| s, saturation flow rate [veh/h] | 515 | 590 | 589 | 575 | 584 | 1748 | 1840 | 445 | 1834 | 1501 |
| c, Capacity [veh/h] | 103 | 413 | 413 | 177 | 423 | 148 | 156 | 38 | 100 | 180 |
| d1, Uniform Delay [s] | 42.19 | 21.39 | 21.39 | 40.17 | 19.67 | 63.19 | 63.18 | 62.67 | 64.95 | 57.18 |
| k, delay calibration | 0.23 | 0.50 | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.87 | 202.77 | 203.00 | 0.49 | 223.32 | 4.41 | 4.14 | 13.47 | 1.81 | 0.88 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 1.42 | 1.42 | 0.18 | 1.47 | 0.63 | 0.63 | 0.58 | 0.32 | 0.29 |
| d, Delay for Lane Group [s/veh] | 43.06 | 224.16 | 224.39 | 40.66 | 242.98 | 67.61 | 67.32 | 76.14 | 66.76 | 58.06 |
| Lane Group LOS | D | F | F | D | F | E | E | E | E | E |
| Critical Lane Group | Yes | No | No | No | Yes | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.09 | 35.91 | 35.88 | 0.24 | 38.83 | 3.58 | 3.74 | 0.93 | 1.18 | 1.78 |
| 50th-Percentile Queue Length [ft/ln] | 2.28 | 897.64 | 896.96 | 5.95 | 970.77 | 89.45 | 93.38 | 23.28 | 29.59 | 44.43 |
| 95th-Percentile Queue Length [veh/ln] | 0.16 | 58.00 | 57.97 | 0.43 | 63.40 | 6.44 | 6.72 | 1.68 | 2.13 | 3.20 |
| 95th-Percentile Queue Length [ft/ln] | 4.10 | 1449.97 | 1449.19 | 10.71 | 1585.01 | 161.01 | 168.08 | 41.90 | 53.26 | 79.98 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 43.06 | 224.28 | 224.39 | 40.66 | 242.98 | 242.98 | 67.49 | 67.32 | 76.14 | 66.76 | 66.76 | 58.06 |
| Movement LOS | D | F | F | D | F | F | E | E | E | E | E | E |
| d_A, Approach Delay [s/veh] | 222.75 | | | 233.07 | | | 68.35 | | | 61.37 | | |
| Approach LOS | F | | | F | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 204.07 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 1.213 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 60.69 | 60.69 | 60.69 | 60.69 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.528 | 2.750 | 2.211 | 2.036 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 281 | 281 | 421 | 421 |
| d_b, Bicycle Delay [s] | 52.75 | 52.91 | 44.45 | 44.45 |
| I_b,int, Bicycle LOS Score for Intersection | 2.536 | 2.637 | 1.942 | 1.698 |
| Bicycle LOS | B | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 4 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**

**Intersection 131: Chilco Street/Hamilton Avenue**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.732 |

**Intersection Setup**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 25.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Volumes**

| Name | Chilco Street | | | Chilco Street | | | Hamilton Avenue | | | Hamilton Avenue | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 |
| Peak Hour Factor | 0.9260 | 0.9260 | 0.9260 | 0.9240 | 0.9240 | 0.9240 | 0.8830 | 0.8830 | 0.8830 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 103 | 5 | 21 | 211 | 10 | 6 | 35 | 7 | 2 | 4 | 15 |
| Total Analysis Volume [veh/h] | 24 | 413 | 19 | 82 | 845 | 39 | 24 | 140 | 26 | 8 | 17 | 61 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 2 | | | 2 | | | 1 | | | 2 | | |
| v_di, Inbound Pedestrian Volume crossing m | 1 | | | 2 | | | 2 | | | 2 | | |
| v_co, Outbound Pedestrian Volume crossing | 2 | | | 1 | | | 1 | | | 3 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 3 | | | 1 | | | 1 | | | 2 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 71 | 0 | 0 | 71 | 0 | 0 | 19 | 0 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 67 | 67 | 15 | 15 |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.17 | 0.17 |
| (v / s)_i Volume / Saturation Flow Rate | 0.29 | 0.61 | 0.12 | 0.06 |
| s, saturation flow rate [veh/h] | 1594 | 1575 | 1597 | 1509 |
| c, Capacity [veh/h] | 1229 | 1216 | 311 | 295 |
| d1, Uniform Delay [s] | 4.04 | 7.19 | 35.36 | 33.17 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.86 | 5.41 | 8.64 | 2.49 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.37 | 0.79 | 0.61 | 0.29 |
| d, Delay for Lane Group [s/veh] | 4.90 | 12.61 | 44.01 | 35.66 |
| Lane Group LOS | A | B | D | D |
| Critical Lane Group | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.49 | 9.96 | 4.66 | 1.84 |
| 50th-Percentile Queue Length [ft/ln] | 62.31 | 249.11 | 116.45 | 46.07 |
| 95th-Percentile Queue Length [veh/ln] | 4.49 | 15.14 | 8.20 | 3.32 |
| 95th-Percentile Queue Length [ft/ln] | 112.15 | 378.53 | 204.94 | 82.92 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 4.90 | 4.90 | 4.90 | 12.61 | 12.61 | 12.61 | 44.01 | 44.01 | 44.01 | 35.66 | 35.66 | 35.66 |
| Movement LOS | A | A | A | B | B | B | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 4.90 | | | 12.61 | | | 44.01 | | | 35.66 | | |
| Approach LOS | A | | | B | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 15.22 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.732 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.379 | 2.464 | 1.860 | 1.992 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1489 | 1489 | 333 | 333 |
| d_b, Bicycle Delay [s] | 2.94 | 2.94 | 31.25 | 31.25 |
| I_b,int, Bicycle LOS Score for Intersection | 2.312 | 3.154 | 1.873 | 1.702 |
| Bicycle LOS | B | C | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 200: O'Brien Drive/Kavanaugh Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 31.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.768 |

**Intersection Setup**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | No | | Yes | | No | |

**Volumes**

| Name | O'Brien Drive | | O'Brien Drive | | Kavanaugh | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 388 | 372 | 167 | 261 | 101 | 336 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 | 4.80 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 388 | 372 | 167 | 261 | 101 | 336 |
| Peak Hour Factor | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 | 0.8700 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 111 | 107 | 48 | 75 | 29 | 97 |
| Total Analysis Volume [veh/h] | 446 | 428 | 192 | 300 | 116 | 386 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

### Intersection Settings

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

### Phasing & Timing

| Control Type | Permissive | Permissive | Permissive | Permissive | Split | Split |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 6 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | - | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 63 | 0 | 0 | 63 | 27 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

### Exclusive Pedestrian Phase

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | L | R |
|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 59 | 23 | 23 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.66 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.52 | 0.31 | 0.16 | 0.07 | 0.25 |
| s, saturation flow rate [veh/h] | 1683 | 620 | 1828 | 1741 | 1554 |
| c, Capacity [veh/h] | 1103 | 242 | 1198 | 445 | 397 |
| d1, Uniform Delay [s] | 11.11 | 35.10 | 6.39 | 26.72 | 33.18 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.86 | 23.01 | 0.50 | 1.42 | 38.70 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.79 | 0.79 | 0.25 | 0.26 | 0.97 |
| d, Delay for Lane Group [s/veh] | 16.97 | 58.11 | 6.89 | 28.14 | 71.88 |
| Lane Group LOS | B | E | A | C | E |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 12.21 | 5.79 | 2.22 | 2.13 | 12.35 |
| 50th-Percentile Queue Length [ft/ln] | 305.29 | 144.78 | 55.55 | 53.25 | 308.64 |
| 95th-Percentile Queue Length [veh/ln] | 17.94 | 9.74 | 4.00 | 3.83 | 18.11 |
| 95th-Percentile Queue Length [ft/ln] | 448.56 | 243.45 | 100.00 | 95.86 | 452.69 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.97 | 16.97 | 58.11 | 6.89 | 28.14 | 71.88 |
| Movement LOS | B | B | E | A | C | E |
| d_A, Approach Delay [s/veh] | 16.97 | | 26.88 | | 61.77 | |
| Approach LOS | B | | C | | E | |
| d_I, Intersection Delay [s/veh] | 31.62 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.768 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 36.45 | 0.00 |
| I_p,int, Pedestrian LOS Score for Intersection | 0.000 | 2.372 | 0.000 |
| Crosswalk LOS | F | B | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1311 | 1311 | 511 |
| d_b, Bicycle Delay [s] | 5.34 | 5.34 | 24.94 |
| I_b,int, Bicycle LOS Score for Intersection | 3.002 | 2.371 | 1.560 |
| Bicycle LOS | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 264: Adams Drive/O'Brien Drive**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.559 |

**Intersection Setup**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Adams Drive | | O'Brien Drive | | O'Brien Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 118 | 63 | 230 | 644 | 280 | 22 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 118 | 63 | 230 | 644 | 280 | 22 |
| Peak Hour Factor | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 | 0.8300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 19 | 69 | 194 | 84 | 7 |
| Total Analysis Volume [veh/h] | 142 | 76 | 277 | 776 | 337 | 27 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 2 | 0 | 0 | 4 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 30 | 0 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 20 | 0 | 0 | 70 | 70 | 0 |
| Vehicle Extension [s] | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 5 | 0 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 10 | 0 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | | No | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | No | | | No | No | |
| Maximum Recall | No | | | No | No | |
| Pedestrian Recall | No | | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | L | C | C |
|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 2.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 16 | 66 | 66 | 66 |
| g / C, Green / Cycle | 0.18 | 0.73 | 0.73 | 0.73 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.28 | 0.43 | 0.20 |
| s, saturation flow rate [veh/h] | 1660 | 988 | 1816 | 1792 |
| c, Capacity [veh/h] | 295 | 716 | 1332 | 1314 |
| d1, Uniform Delay [s] | 35.02 | 7.96 | 5.59 | 4.02 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 15.27 | 1.58 | 1.87 | 0.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | |
|---|---|---|---|---|
| X, volume / capacity | 0.74 | 0.39 | 0.58 | 0.28 |
| d, Delay for Lane Group [s/veh] | 50.29 | 9.54 | 7.46 | 4.54 |
| Lane Group LOS | D | A | A | A |
| Critical Lane Group | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.69 | 2.64 | 5.82 | 1.92 |
| 50th-Percentile Queue Length [ft/ln] | 142.16 | 65.94 | 145.42 | 47.97 |
| 95th-Percentile Queue Length [veh/ln] | 9.60 | 4.75 | 9.77 | 3.45 |
| 95th-Percentile Queue Length [ft/ln] | 239.93 | 118.69 | 244.30 | 86.35 |

**Movement, Approach, & Intersection Results**

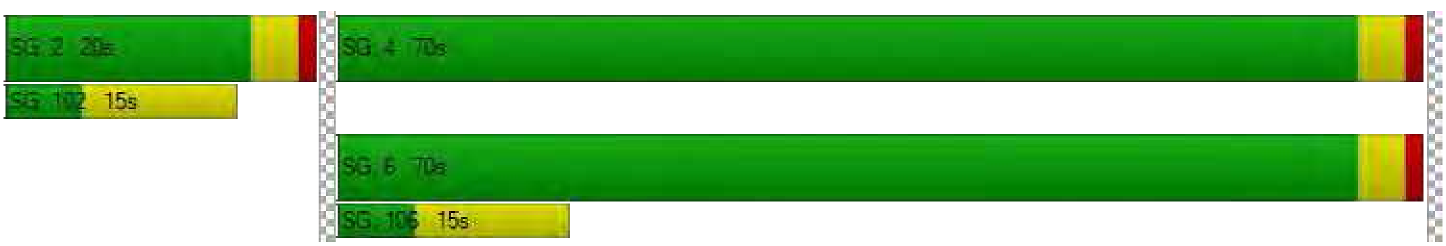
| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 50.29 | 50.29 | 9.54 | 7.46 | 4.54 | 4.54 |
| Movement LOS | D | D | A | A | A | A |
| d_A, Approach Delay [s/veh] | 50.29 | | 8.01 | | 4.54 | |
| Approach LOS | D | | A | | A | |
| d_I, Intersection Delay [s/veh] | 12.87 | | | | | |
| Intersection LOS | B | | | | | |
| Intersection V/C | 0.559 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.365 | 2.418 | 2.341 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 356 | 1467 | 1467 |
| d_b, Bicycle Delay [s] | 30.42 | 3.20 | 3.20 |
| I_b,int, Bicycle LOS Score for Intersection | 1.919 | 3.297 | 2.160 |
| Bicycle LOS | A | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project PM_Imp.pdf

Scenario 25 Imp-Cumulative w/dumbarton PM (2040 vols)+ Project
10/14/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 | 3382 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | 244 | 933 | 1447 | 52 | 163 | 114 | 2953 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 | 5003 |

| ID | Intersection Name | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | 40 | 1319 | 809 | 283 | 349 | 40 | 2840 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 | 1940 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 | 1562 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | 388 | 372 | 167 | 261 | 101 | 336 | 1625 |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | 118 | 63 | 230 | 644 | 280 | 22 | 1357 |

Vistro File: \...\Vistro_AllScenarios_PM - ReducedTripCap_10.7.2021.vistro
Report File: \...\Cumulative w Dumbarton + Project PM_Imp.pdf

Scenario 25 Imp-Cumulative w/dumbarton PM (2040 vols)+ Project
10/14/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 3 | Marsh Rd/Florence St-Bohannon Dr | Final Base | 296 | 675 | 54 | 13 | 1013 | 354 | 461 | 34 | 230 | 125 | 87 | 40 | 3382 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **296** | **675** | **54** | **13** | **1013** | **354** | **461** | **34** | **230** | **125** | **87** | **40** | **3382** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | Willow Rd (SR 114)/Ivy Dr | Final Base | 244 | 933 | 1447 | 52 | 163 | 114 | 2953 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **244** | **933** | **1447** | **52** | **163** | **114** | **2953** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 20 | Willow Rd (SR 114)/Newbridge St | Final Base | 268 | 1389 | 355 | 78 | 1354 | 26 | 27 | 195 | 624 | 346 | 285 | 56 | 5003 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **268** | **1389** | **355** | **78** | **1354** | **26** | **27** | **195** | **624** | **346** | **285** | **56** | **5003** |

| ID | Intersection Name | Volume Type | Northeastbound | | Southwestbound | | Southeastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 21 | Willow Rd/Bay Rd | Final Base | 40 | 1319 | 809 | 283 | 349 | 40 | 2840 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **40** | **1319** | **809** | **283** | **349** | **40** | **2840** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 22 | Willow Rd/Durham St-VA Med Entrance | Final Base | 9 | 1052 | 4 | 29 | 541 | 18 | 142 | 31 | 38 | 21 | 8 | 47 | 1940 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **1052** | **4** | **29** | **541** | **18** | **142** | **31** | **38** | **21** | **8** | **47** | **1940** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 131 | Chilco Street/Hamilton Avenue | Final Base | 22 | 382 | 18 | 76 | 781 | 36 | 21 | 124 | 23 | 7 | 16 | 56 | 1562 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **22** | **382** | **18** | **76** | **781** | **36** | **21** | **124** | **23** | **7** | **16** | **56** | **1562** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 200 | O'Brien Drive/Kavanaugh Drive | Final Base | 388 | 372 | 167 | 261 | 101 | 336 | 1625 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **388** | **372** | **167** | **261** | **101** | **336** | **1625** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 264 | Adams Drive/O'Brien Drive | Final Base | 118 | 63 | 230 | 644 | 280 | 22 | 1357 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **118** | **63** | **230** | **644** | **280** | **22** | **1357** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Study Intersections

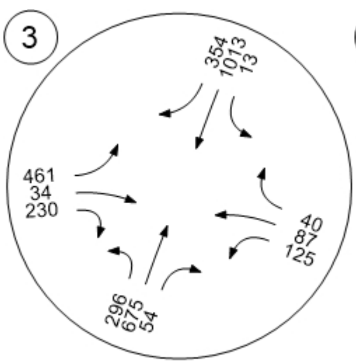
Lane Configuration and Traffic Control


Generated with PTV VISTRO

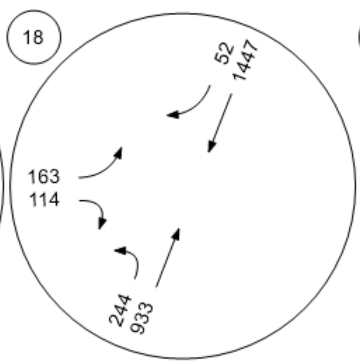
Version 2021 (SP 0-4)

## Traffic Volume - Base Volume

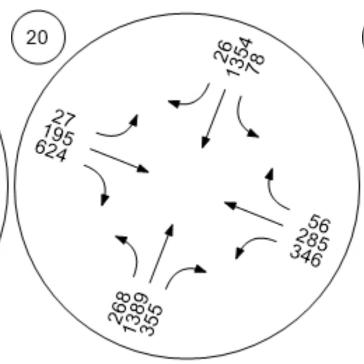

Marsh Rd/Florence St-Bohan



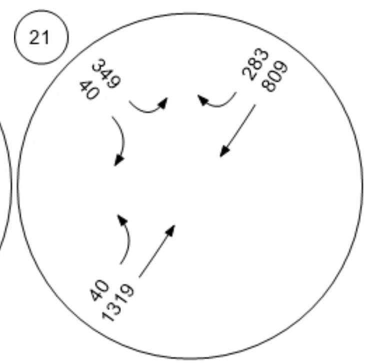

Willow Rd (SR 114)/Ivy Dr



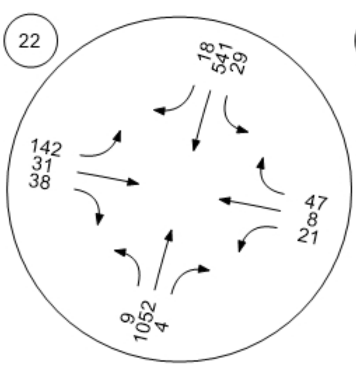

Willow Rd (SR 114)/Newbrid



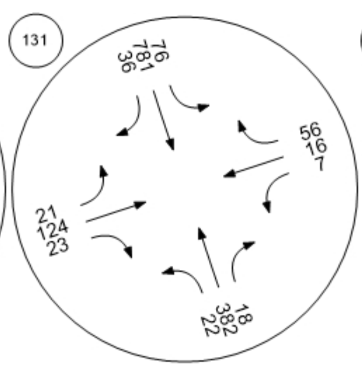

Willow Rd/Bay Rd



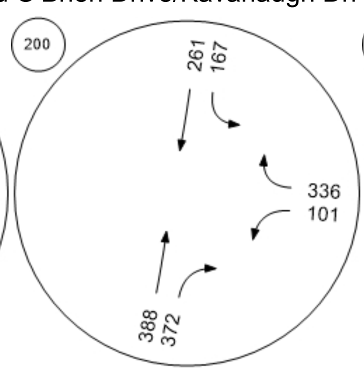

Willow Rd/Durham St-VA Me



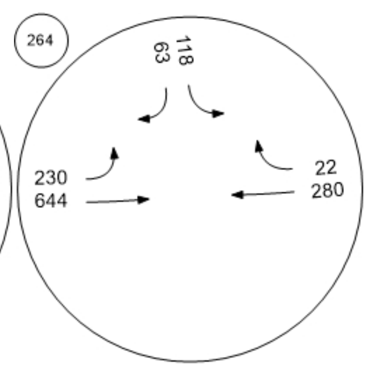

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri

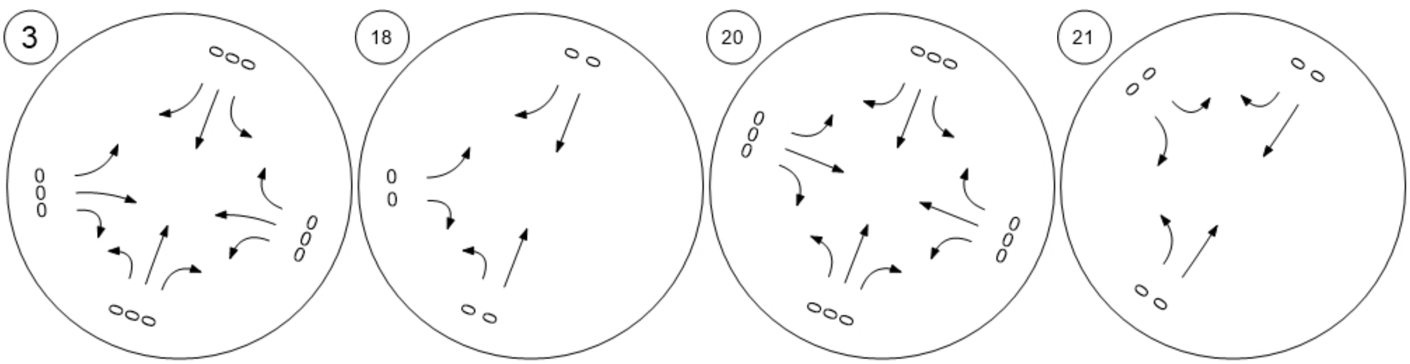



Adams Drive/O'Brien Drive

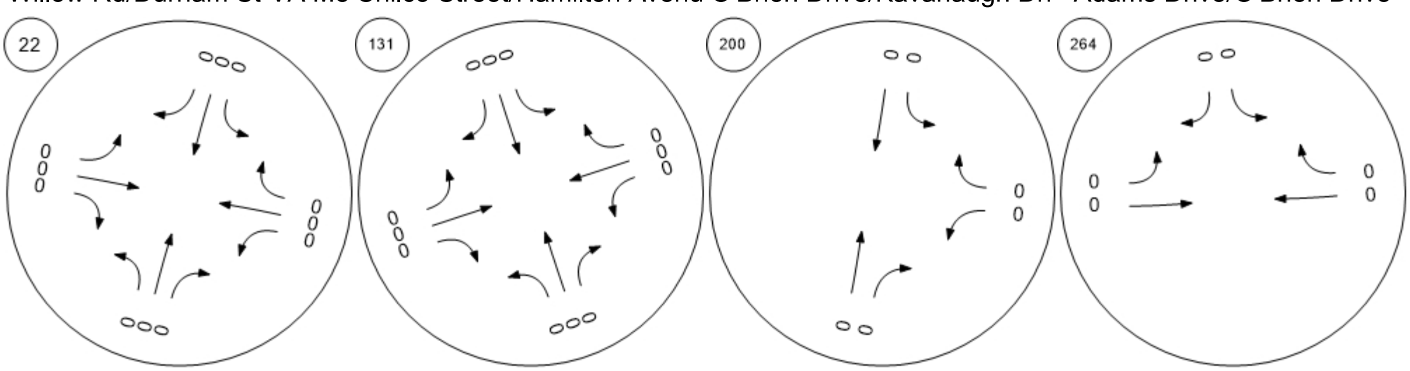


Traffic Volume - In-Process Volume


Marsh Rd/Florence St-Bohan | Willow Rd (SR 114)/Ivy Dr | Willow Rd (SR 114)/Newbrid | Willow Rd/Bay Rd




Willow Rd/Durham St-VA Me | Chilco Street/Hamilton Avenu | O'Brien Drive/Kavanaugh Dri | Adams Drive/O'Brien Drive

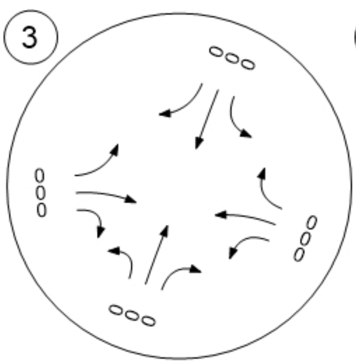


Generated with PTV VISTRO

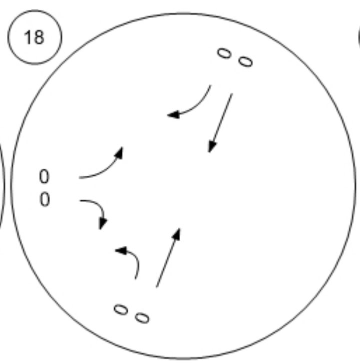
Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

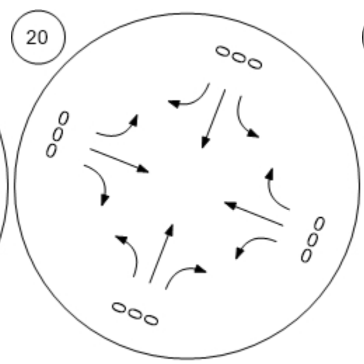

Marsh Rd/Florence St-Bohan



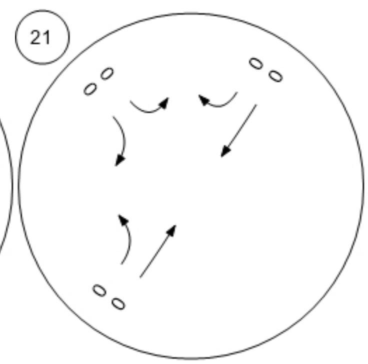

Willow Rd (SR 114)/Ivy Dr



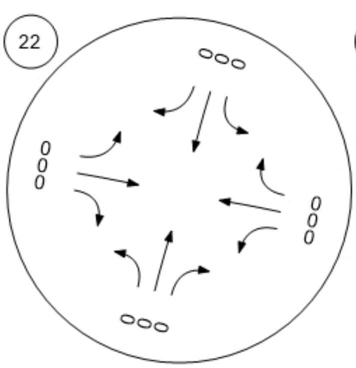

Willow Rd (SR 114)/Newbrid



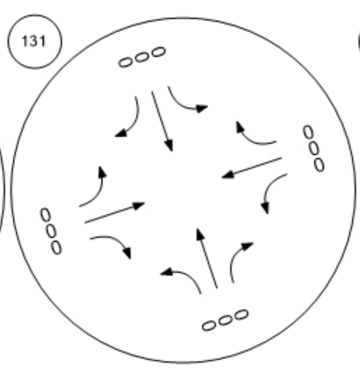

Willow Rd/Bay Rd



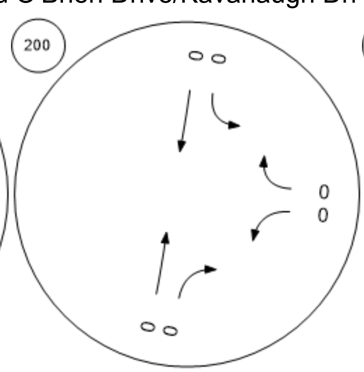

Willow Rd/Durham St-VA Me



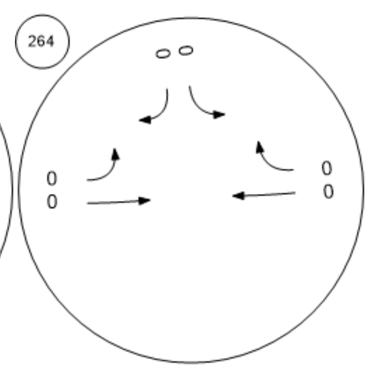

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

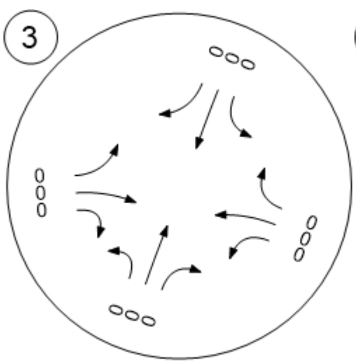


Generated with PTV VISTRO

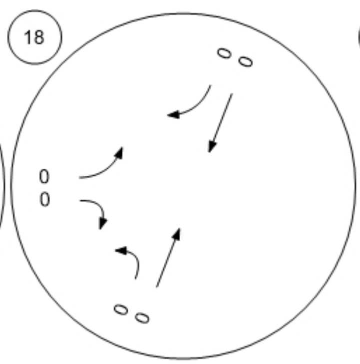
Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

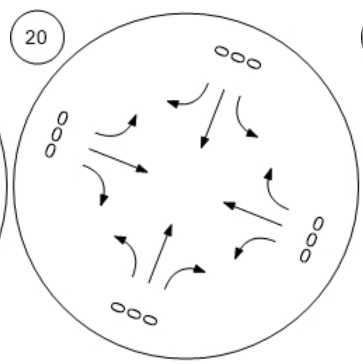

Marsh Rd/Florence St-Bohan



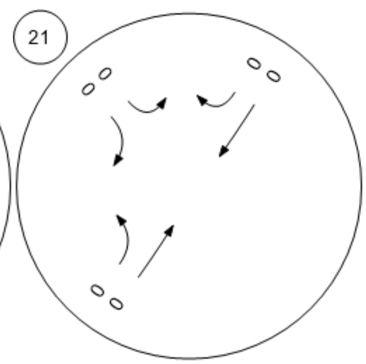

Willow Rd (SR 114)/Ivy Dr



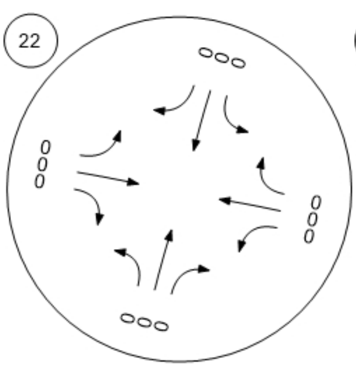

Willow Rd (SR 114)/Newbrid



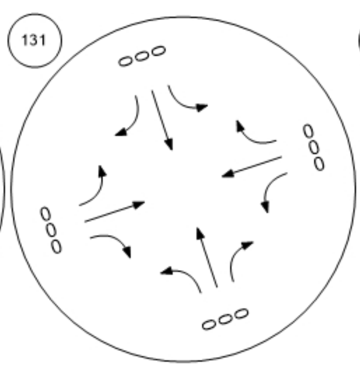

Willow Rd/Bay Rd



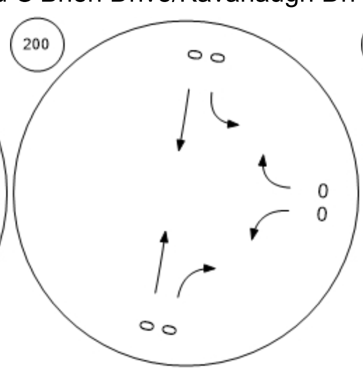

Willow Rd/Durham St-VA Me



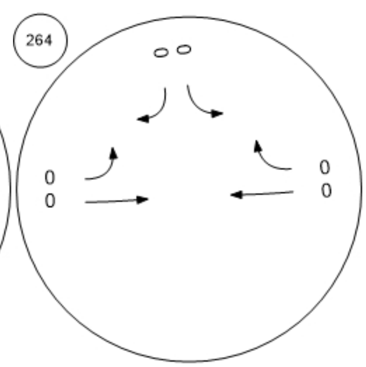

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

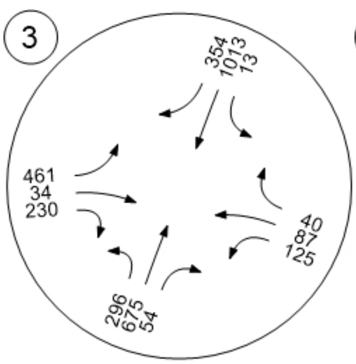


Generated with PTV VISTRO

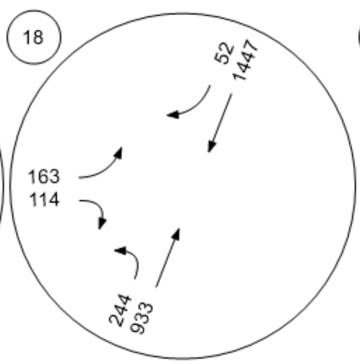
Version 2021 (SP 0-4)

## Traffic Volume - Future Total Volume

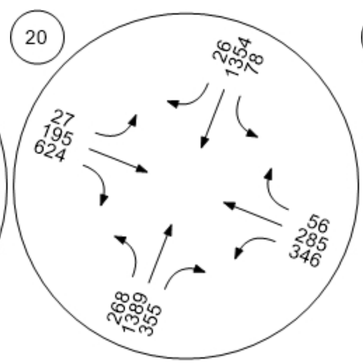

Marsh Rd/Florence St-Bohan



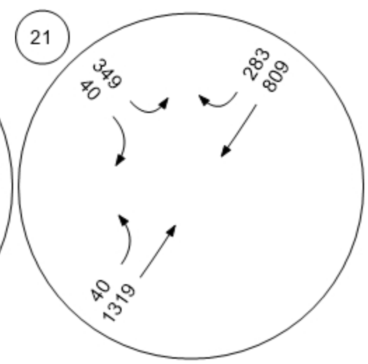

Willow Rd (SR 114)/Ivy Dr



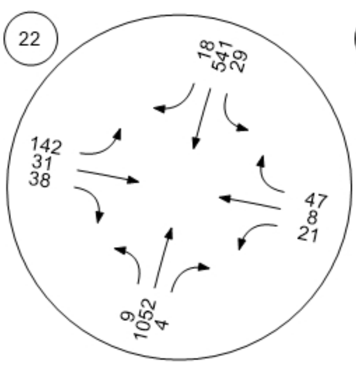

Willow Rd (SR 114)/Newbrid



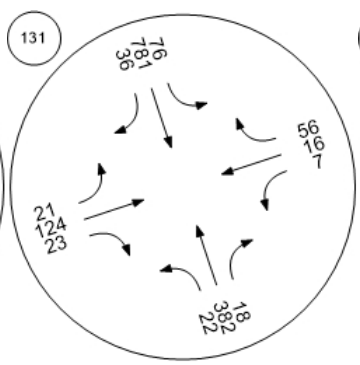

Willow Rd/Bay Rd



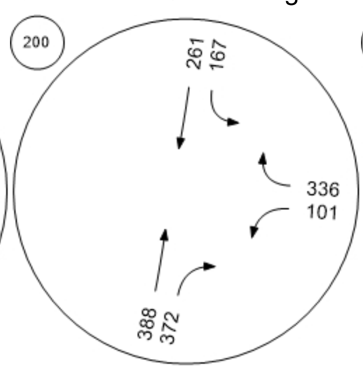

Willow Rd/Durham St-VA Me



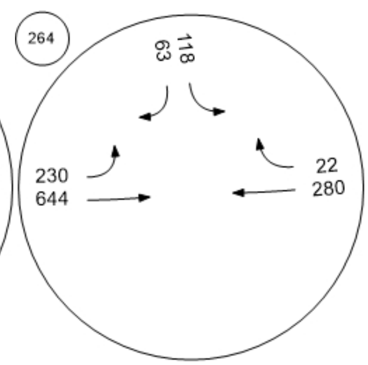

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri

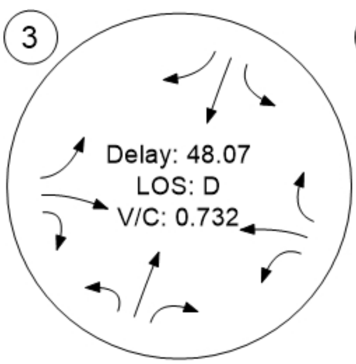



Adams Drive/O'Brien Drive

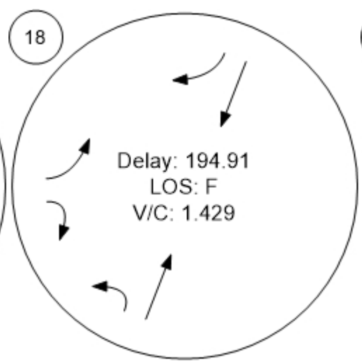


Traffic Conditions

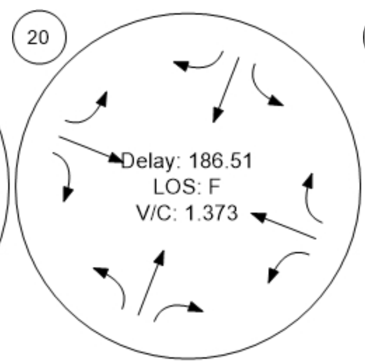

Marsh Rd/Florence St-Bohan



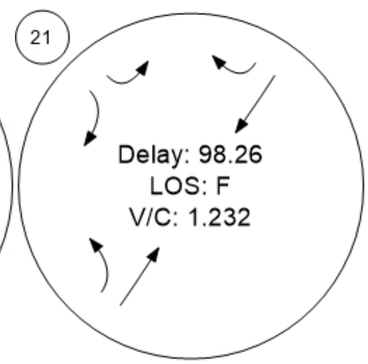

Willow Rd (SR 114)/Ivy Dr



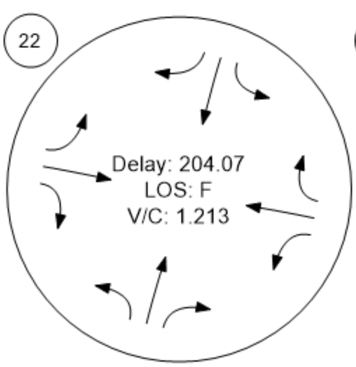

Willow Rd (SR 114)/Newbrid



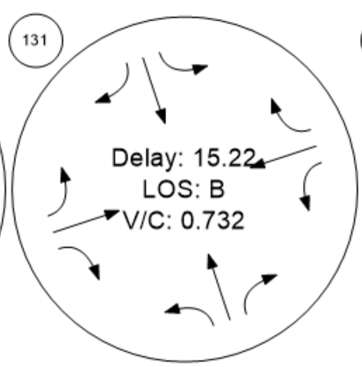

Willow Rd/Bay Rd



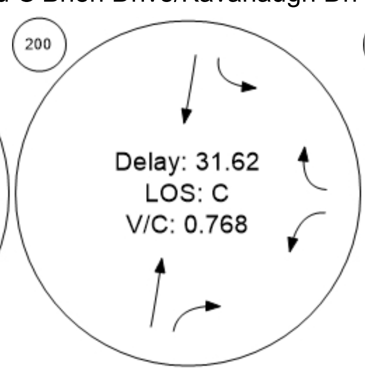

Willow Rd/Durham St-VA Me



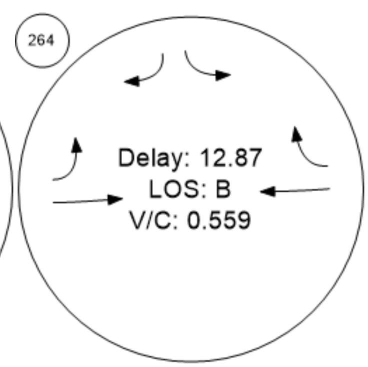

Chilco Street/Hamilton Avenu




O'Brien Drive/Kavanaugh Dri




Adams Drive/O'Brien Drive

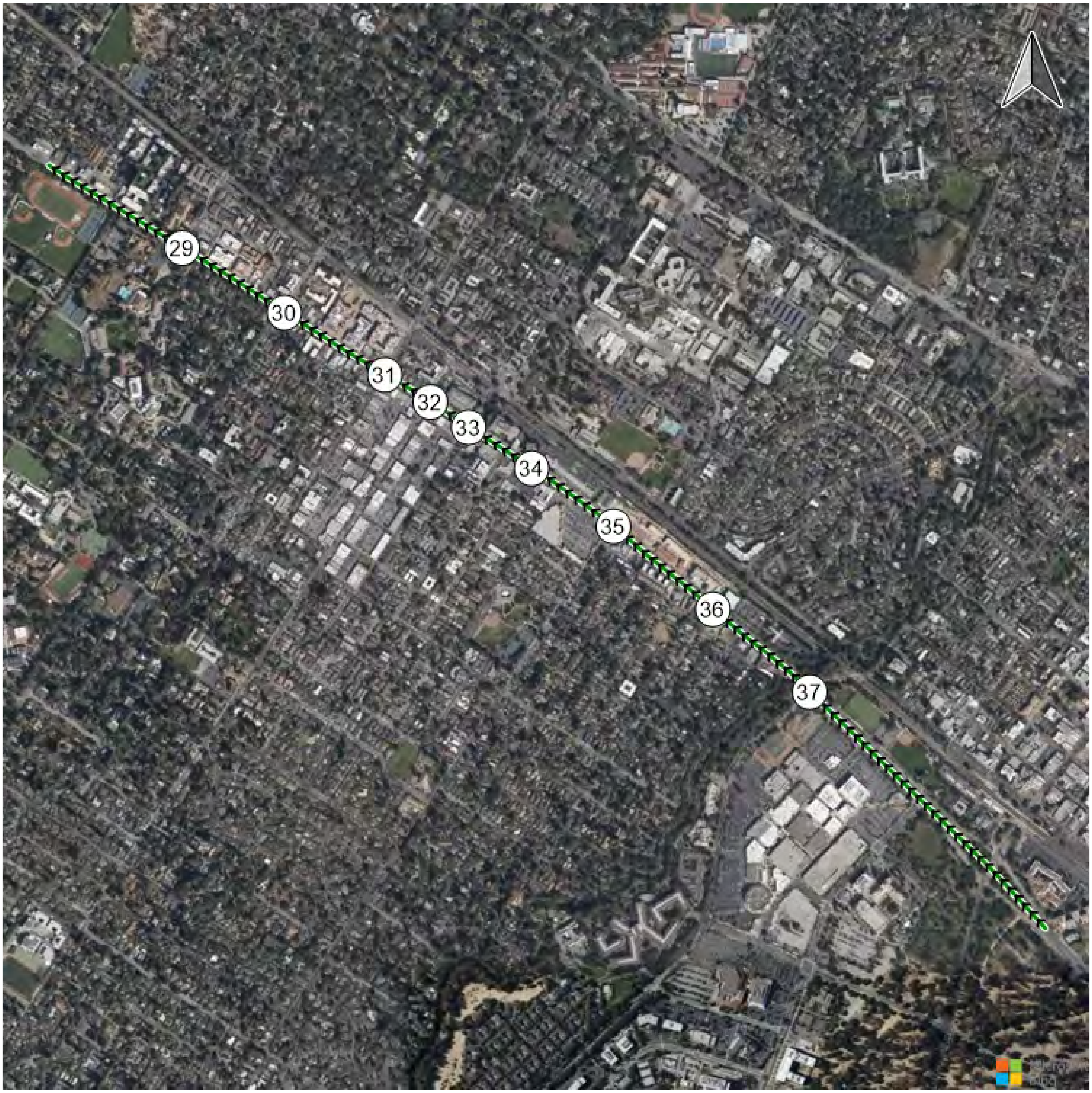


Generated with PTV VISTRO

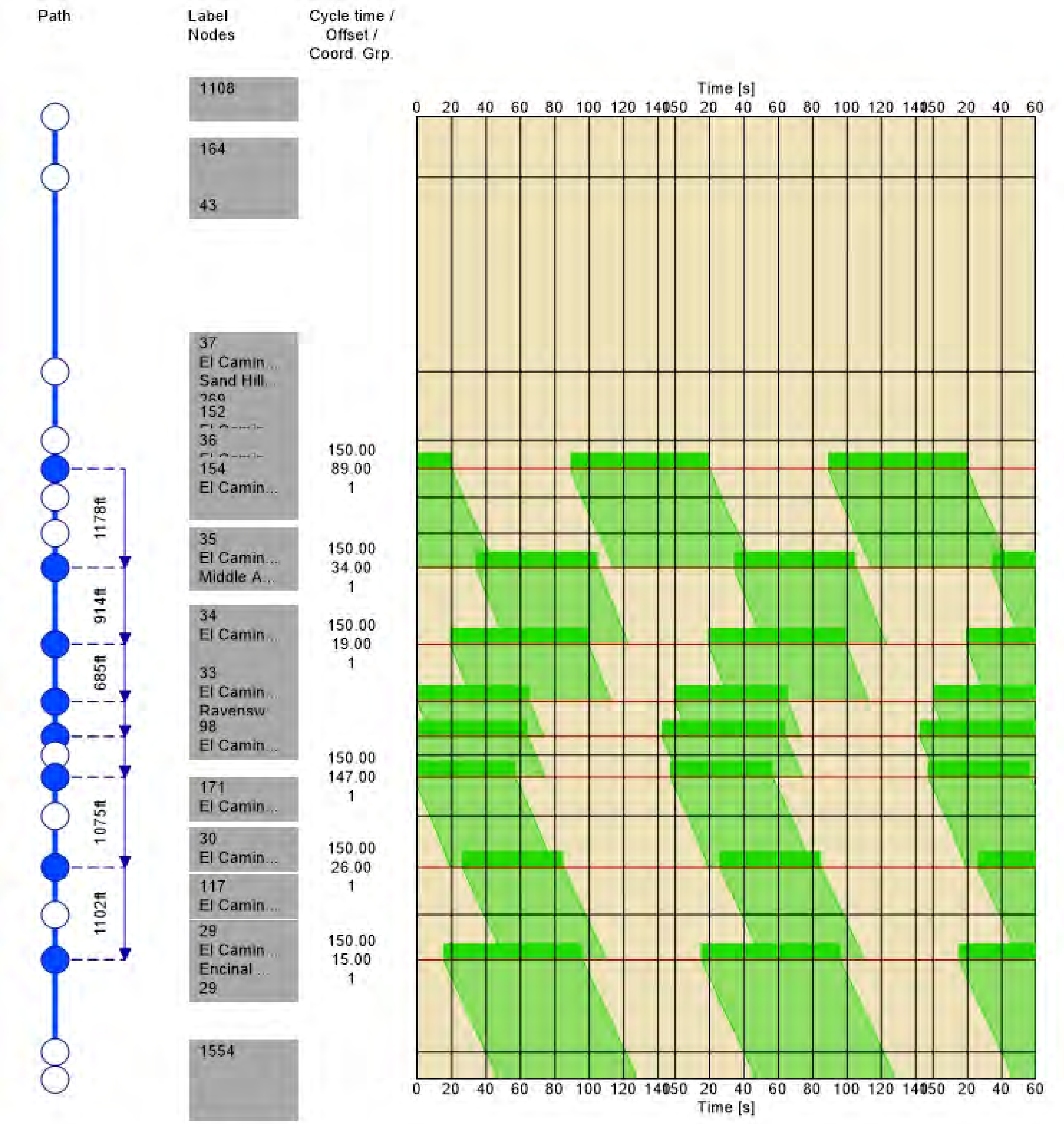
Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 1: ECR NB



Route 1: ECR NB

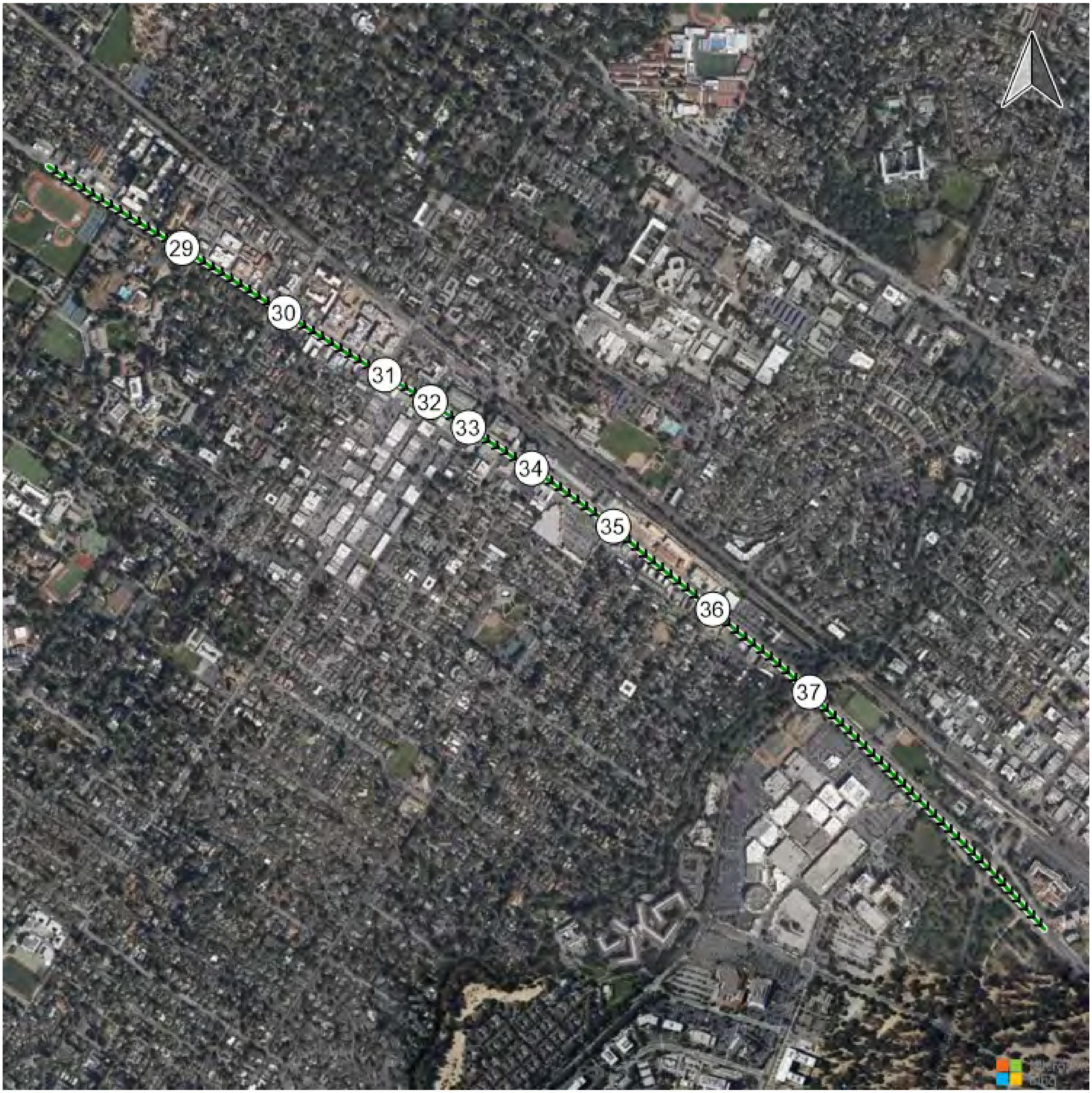


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

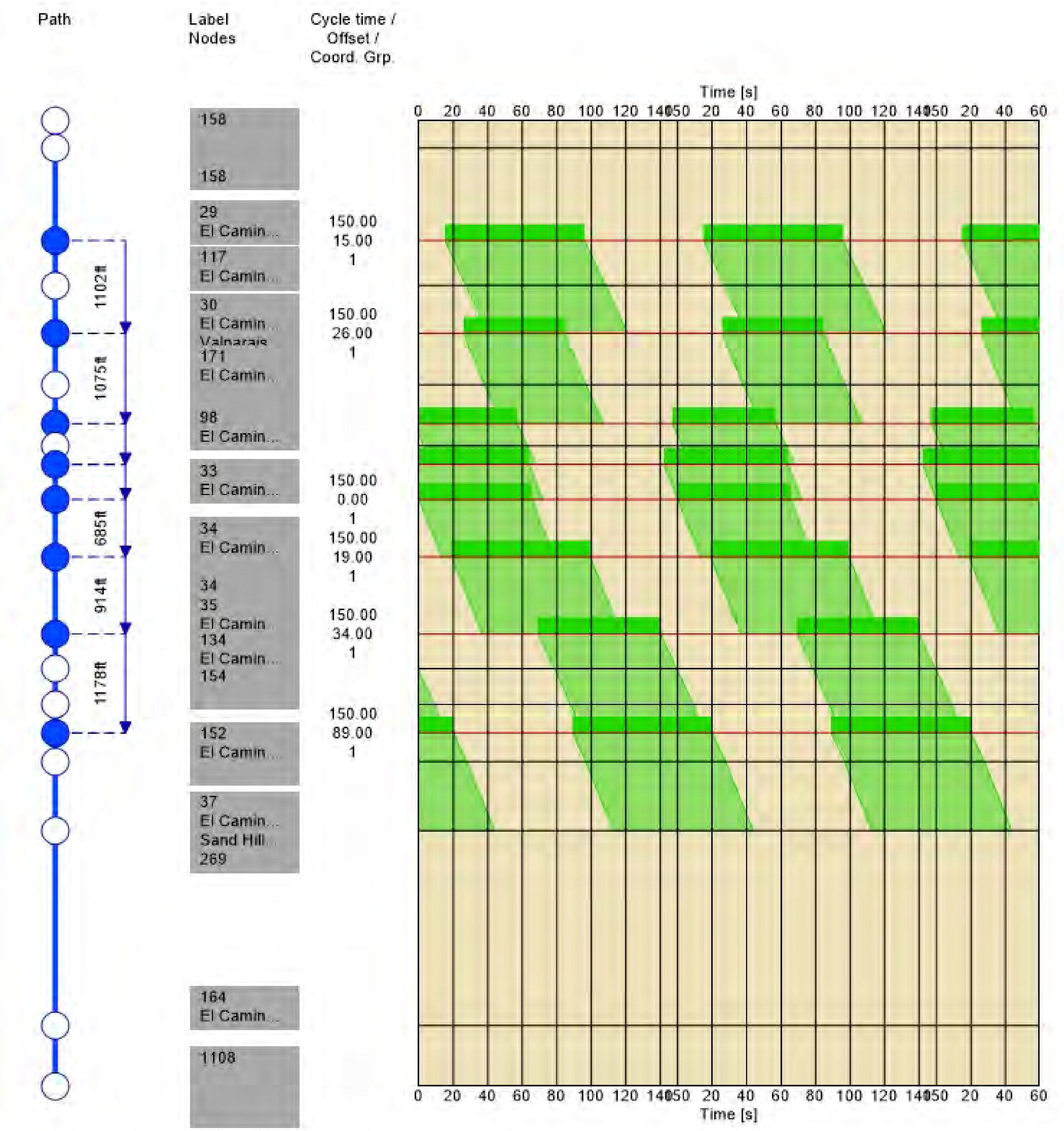
Route 2: ECR SB



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Route 2: ECR SB

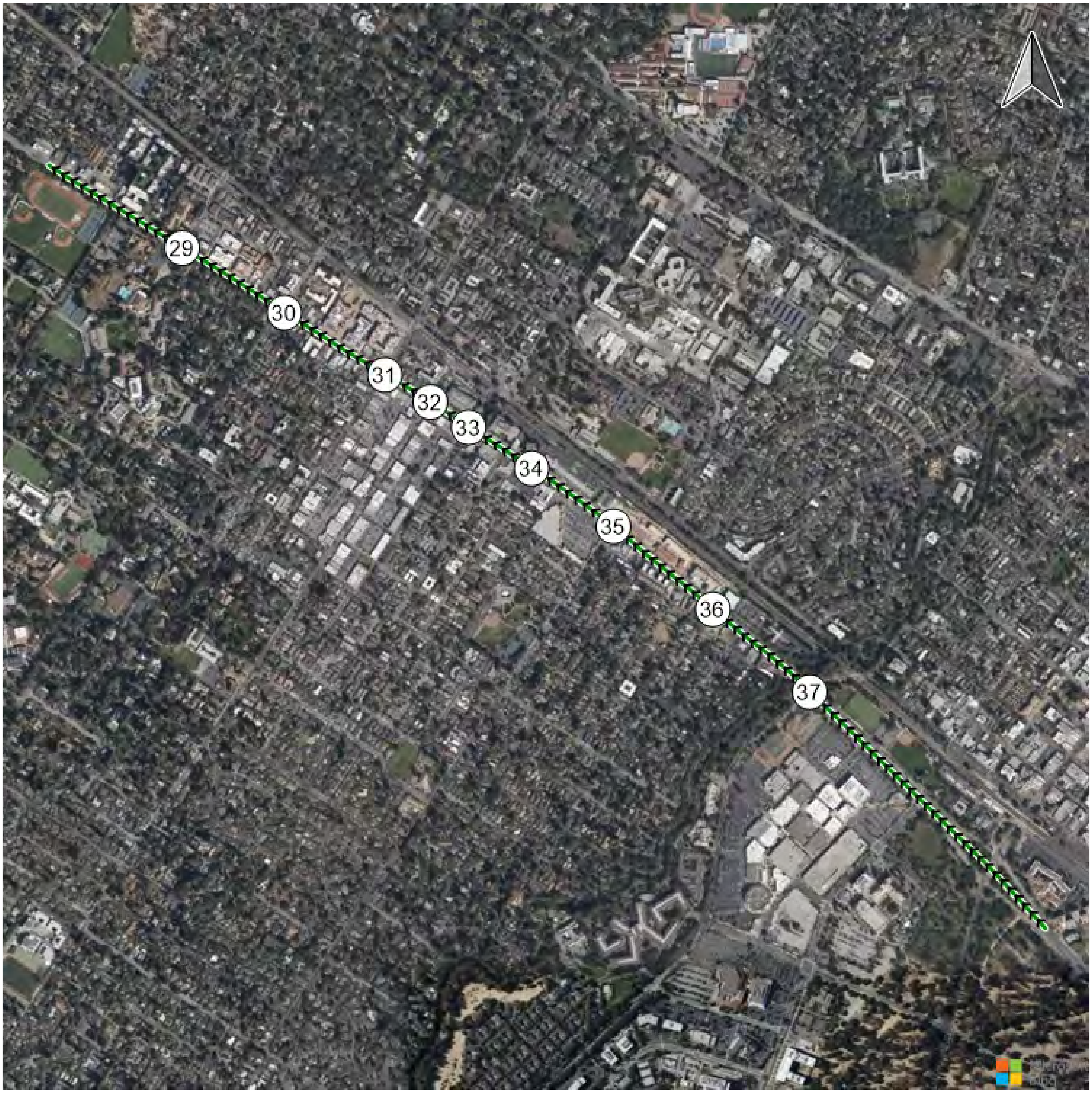


Generated with PTV VISTRO

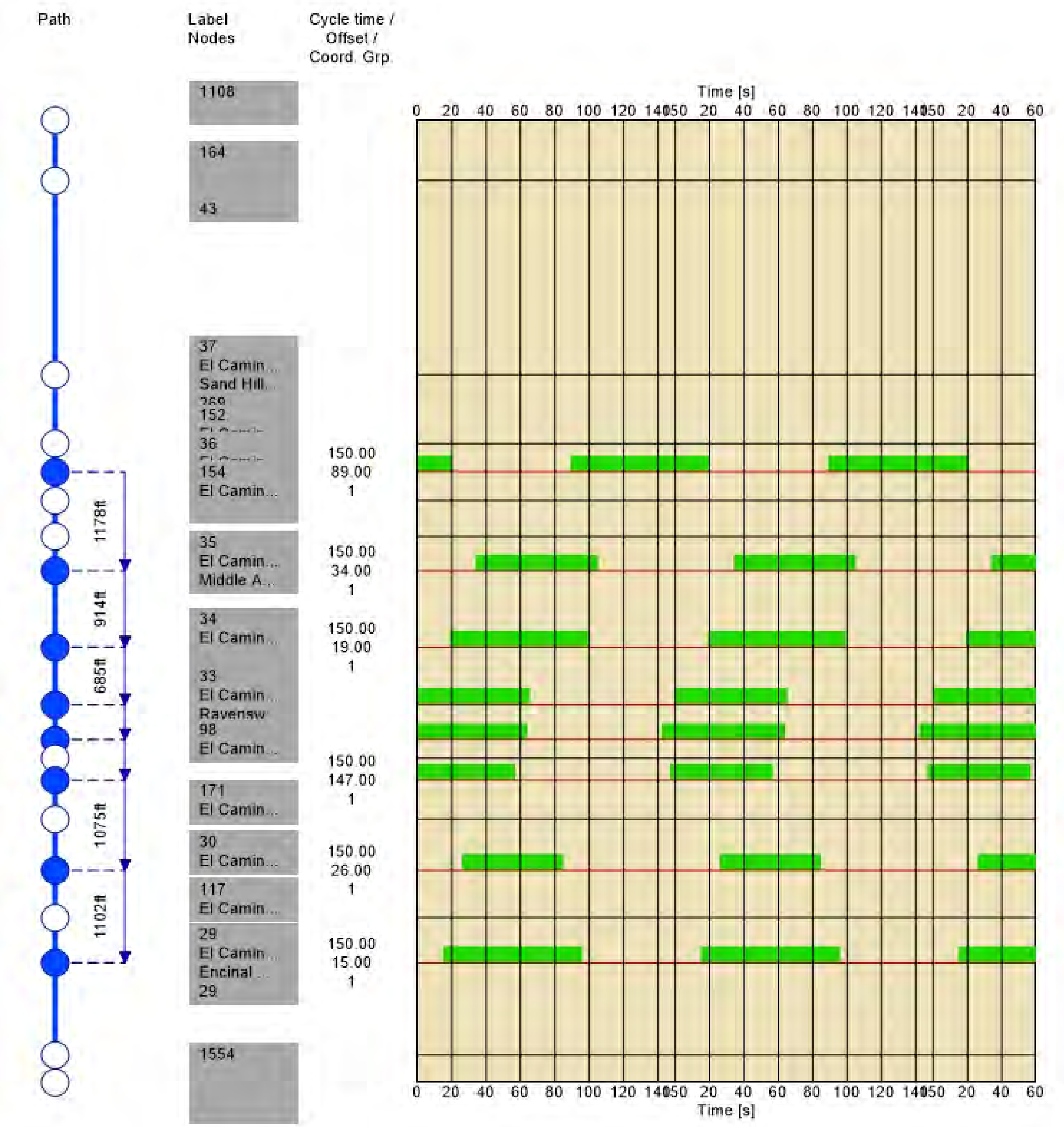
Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 1: ECR NB



# Route 1: ECR NB

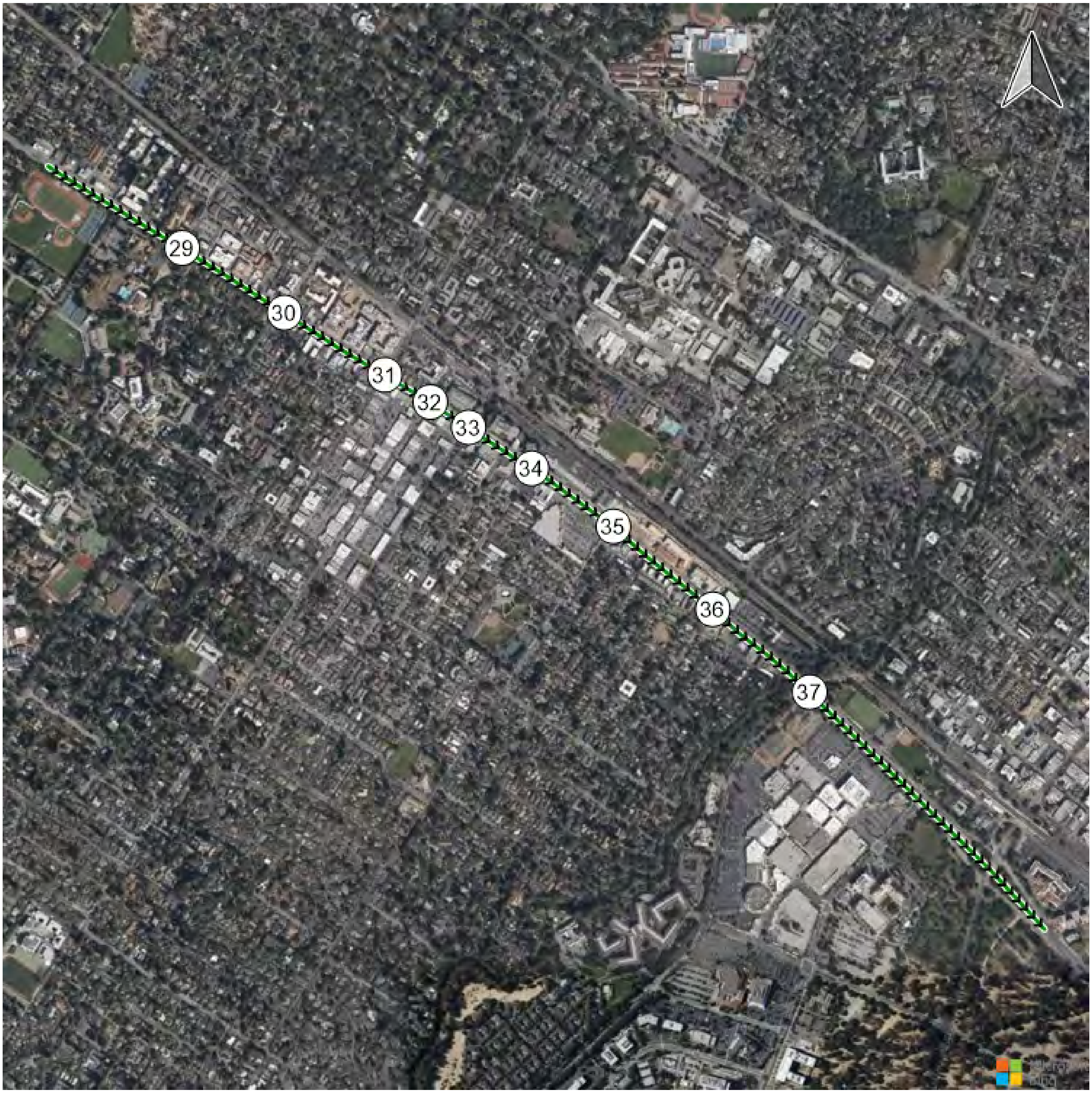


Generated with PTV VISTRO

Version 2021 (SP 0-4)

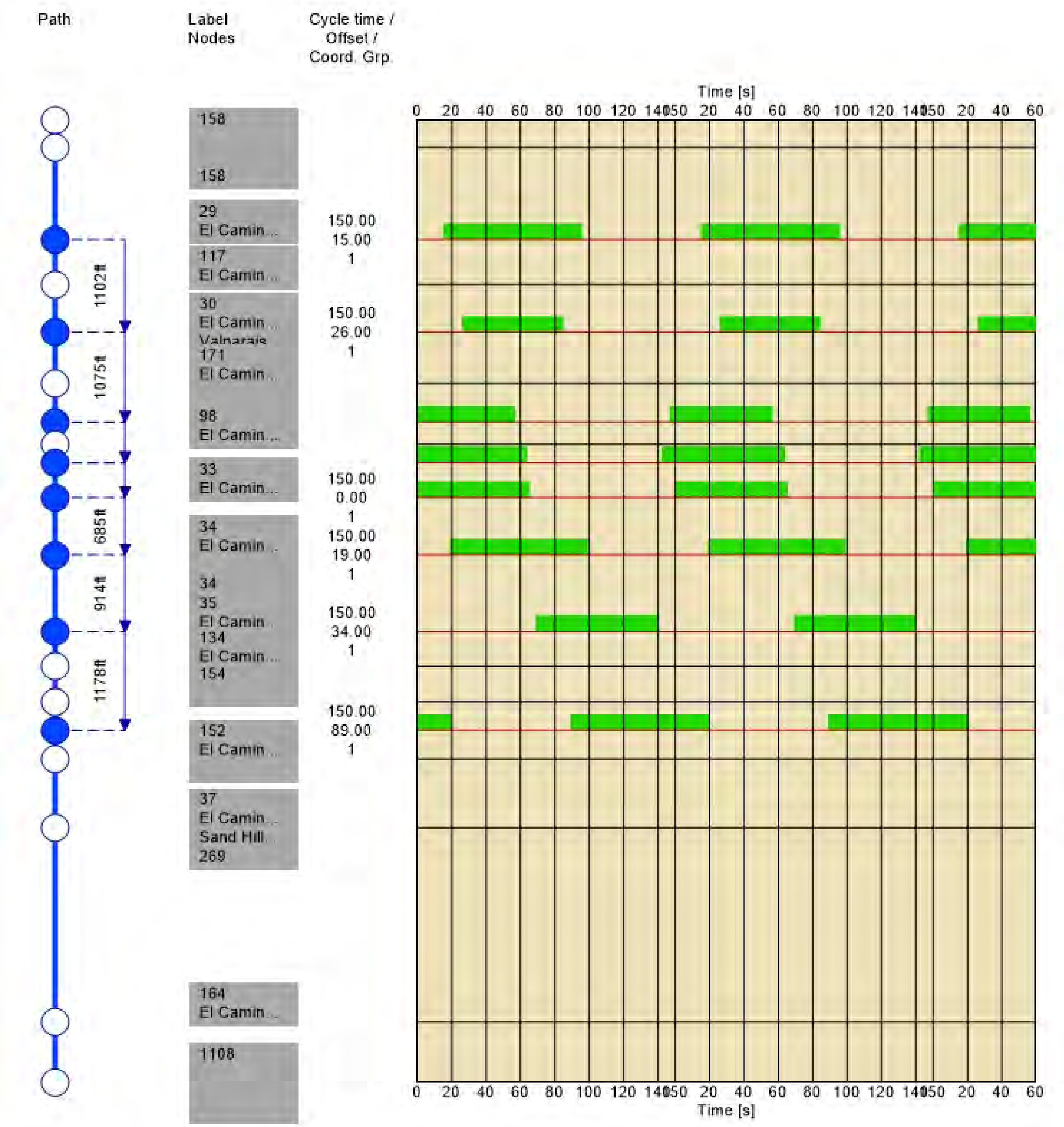
Time Space Diagram - Arterial Band

Route 2: ECR SB



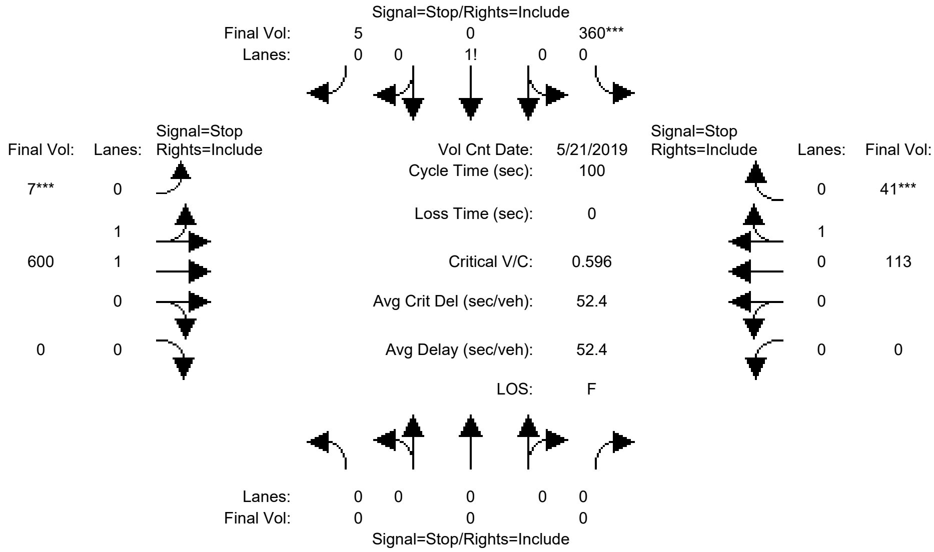
Generated with PTV VISTRO
Version 2021 (SP 0-4)

Route 2: ECR SB



Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue

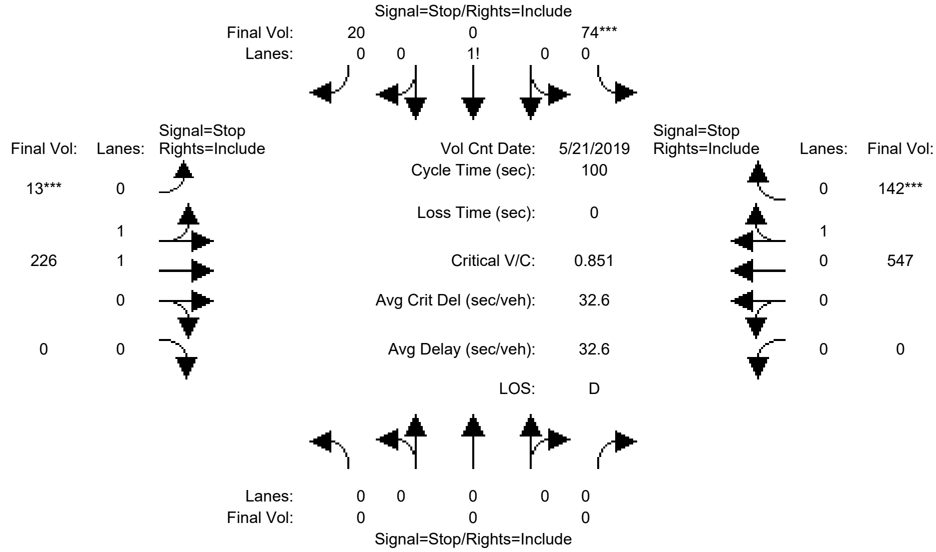



```
Street Name:        East Bayshore Road                 Euclid Avenue
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 21 May 2019 << 7:15-8:15 AM
Base Vol:       0    0     0   360    0     5     7  600     0     0  113    41
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   360    0     5     7  600     0     0  113    41
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0   360    0     5     7  600     0     0  113    41
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   360    0     5     7  600     0     0  113    41
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   360    0     5     7  600     0     0  113    41
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   360    0     5     7  600     0     0  113    41
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.99 0.00  0.01  0.02 1.98  0.00  0.00 0.73  0.27
Final Sat.:     0    0     0   604    0     8    14 1209     0     0  447   162
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.60 xxxx  0.60  0.50 0.50  xxxx  xxxx 0.25  0.25
Crit Moves:                   ****              ****                        ****
Delay/Veh:    0.0  0.0   0.0  16.3  0.0  16.3  13.9 13.8   0.0   0.0 10.4  10.4
Delay Adj:   3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70
AdjDel/Veh:   0.0  0.0   0.0  60.3  0.0  60.3  51.3 51.2   0.0   0.0 38.5  38.5
LOS by Move:    *    *     *     F    *     F     F    F     *     *    E     E
ApproachDel:     xxxxxx             16.3              13.8              10.4
Delay Adj:        xxxxx             3.70              3.70              3.70
ApprAdjDel:      xxxxxx             60.3              51.2              38.5
LOS by Appr:        *                 F                 F                 E
AllWayAvgQ:   0.0  0.0   0.0   1.3  1.3   1.3   0.9  0.9   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   360    0     5     7  600     0     0  113    41
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            761
Minor Approach Volume:          365
Minor Approach Volume Threshold: 379
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




```
Street Name:        East Bayshore Road                  Euclid Avenue
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0    0    0    0    0     0    0    0     0    0    0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 21 May 2019 << 4:45-5:45 PM
Base Vol:       0    0    0   74    0   20    13  226    0     0  547  142
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0    0    0   74    0   20    13  226    0     0  547  142
Added Vol:      0    0    0    0    0    0     0    0    0     0    0    0
PasserByVol:    0    0    0    0    0    0     0    0    0     0    0    0
Initial Fut:    0    0    0   74    0   20    13  226    0     0  547  142
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0    0    0   74    0   20    13  226    0     0  547  142
Reduct Vol:     0    0    0    0    0    0     0    0    0     0    0    0
Reduced Vol:    0    0    0   74    0   20    13  226    0     0  547  142
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:    0    0    0   74    0   20    13  226    0     0  547  142
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.00 0.00 0.00 0.79 0.00 0.21  0.11 1.89 0.00  0.00 0.79 0.21
Final Sat.:     0    0    0  458    0  124    72 1255    0     0  642  167
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx xxxx 0.16 xxxx 0.16  0.18 0.18 xxxx  xxxx 0.85 0.85
Crit Moves:                 ****            ****                       ****
Delay/Veh:    0.0  0.0  0.0  9.9  0.0  9.9   9.2  9.1  0.0   0.0 26.6 26.6
Delay Adj:   1.55 1.55 1.55 1.55 1.55 1.55  1.55 1.55 1.55  1.55 1.55 1.55
AdjDel/Veh:   0.0  0.0  0.0 15.3  0.0 15.3  14.2 14.2  0.0   0.0 41.3 41.3
LOS by Move:    *    *    *    C    *    C     B    B    *     *    E    E
ApproachDel:     xxxxxx            9.9              9.1             26.6
Delay Adj:        xxxxx           1.55             1.55             1.55
ApprAdjDel:      xxxxxx           15.3             14.2             41.3
LOS by Appr:        *                C                B                E
AllWayAvgQ:   0.0  0.0  0.0  0.2  0.2  0.2   0.2  0.2  0.0   4.3  4.3  4.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0    74    0    20    13  226     0     0  547   142
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            928
Minor Approach Volume:          94
Minor Approach Volume Threshold: 311
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 1430 99
Lanes: 0 0 2 0 1

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | 6/5/2019 | | 0 | 52 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.121 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 1.0 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 1.0 | | 0 | 26 |
| | | | LOS: | C | | | |

Lanes: 0 0 1 1 0
Final Vol: 0 614 56
Signal=Uncontrol/Rights=Include

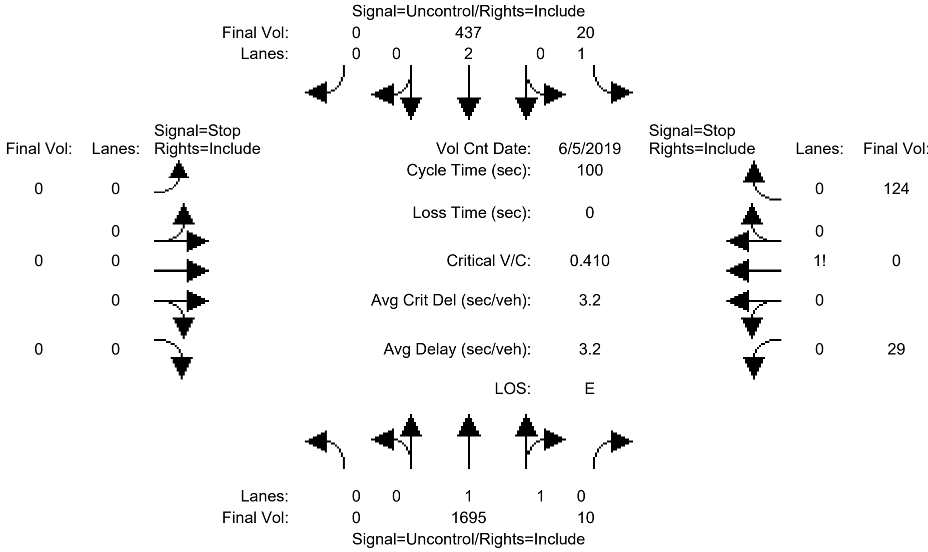
```
Street Name:        University Avenue                   Purdue Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 5 Jun 2019 <<
Base Vol:       0  614    56    99 1430     0     0    0     0    26    0    52
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  614    56    99 1430     0     0    0     0    26    0    52
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  614    56    99 1430     0     0    0     0    26    0    52
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  614    56    99 1430     0     0    0     0    26    0    52
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  614    56    99 1430     0     0    0     0    26    0    52
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   670 xxxx xxxxx  xxxx xxxx xxxxx  1555 2270   335
Potent Cap.: xxxx xxxx xxxxx   909 xxxx xxxxx  xxxx xxxx xxxxx   104   40   661
Move Cap.:   xxxx xxxx xxxxx   909 xxxx xxxxx  xxxx xxxx xxxxx    95   36   661
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    80  105 xxxxx   215  110 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.11 xxxx  xxxx  xxxx xxxx  xxxx  0.12 0.00  0.08
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  390 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.7 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 16.5 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            16.5
ApproachLOS:         *                *                *               C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614    56    99 1430     0     0    0     0    26    0    52
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             16.5
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=78]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2277]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614    56    99 1430     0     0    0     0    26    0    52
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2199
Minor Approach Volume:           78
Minor Approach Volume Threshold: 13 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #8: (36) University Avenue and Purdue Avenue




```
Street Name:        University Avenue                 Purdue Avenue
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 5 Jun 2019 <<
Base Vol:       0 1695    10    20  437     0     0    0     0    29    0   124
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0 1695    10    20  437     0     0    0     0    29    0   124
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0 1695    10    20  437     0     0    0     0    29    0   124
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0 1695    10    20  437     0     0    0     0    29    0   124
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0 1695    10    20  437     0     0    0     0    29    0   124
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1705 xxxx xxxxx  xxxx xxxx xxxxx  1959 2177   853
Potent Cap.: xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    56   46   303
Move Cap.:   xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    53   43   303
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   137  103 xxxxx   114  117 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.05 xxxx  xxxx  xxxx xxxx  xxxx  0.26 0.00  0.41
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.2 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  15.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  230 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  4.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 47.0 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    E     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             47.0
ApproachLOS:        *                *                *                 E
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695   10    20  437    0     0    0    0    29    0   124
ApproachDel:    xxxxxx          xxxxxx          xxxxxx             47.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=153]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2315]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695   10    20  437    0     0    0    0    29    0   124
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2162
Minor Approach Volume:           153
Minor Approach Volume Threshold: 19 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 275 1184*** 0
Lanes: 0 1 1 0 0

Signal=Split
Rights=Overlap

Final Vol: 32*** / 0 / 20
Lanes: 1 / 0 / 0 / 0 / 1

Vol Cnt Date: 4/23/2019
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.526
Avg Crit Del (sec/veh): 12.8
Avg Delay (sec/veh): 9.6
LOS: A

Signal=Split
Rights=Include
Lanes: 0 / 0 / 0 / 0 / 0
Final Vol: 0 / 0 / 0

Lanes: 1 0 2 0 0
Final Vol: 110*** 733 0
Signal=Protect/Rights=Include

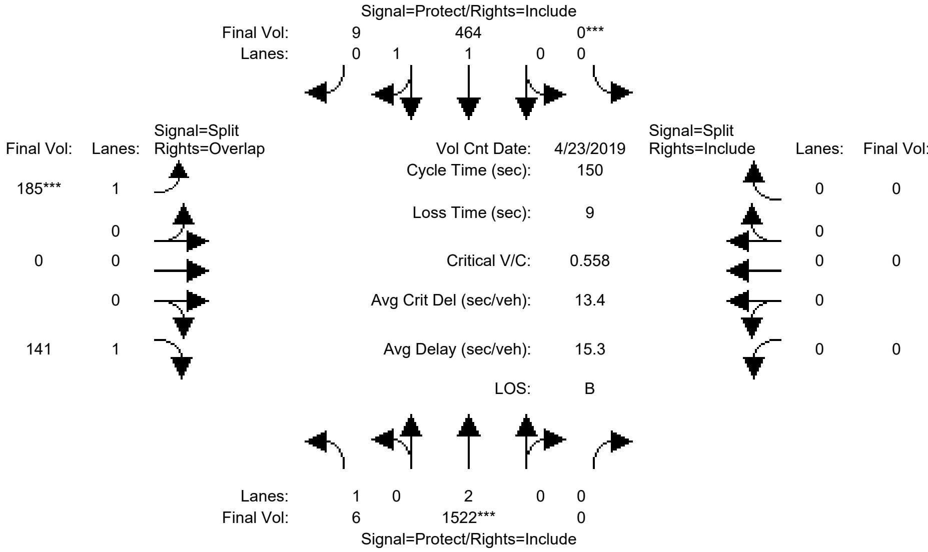
| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 23 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 110 | 733 | 0 | 0 | 1184 | 275 | 32 | 0 | 20 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.62 | 0.38 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2848 | 661 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.20 | 0.00 | 0.00 | 0.42 | 0.42 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 16.7 | 131 | 0.0 | 0.0 | 114 | 114.3 | 10.0 | 0.0 | 26.7 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.55 | 0.23 | 0.00 | 0.00 | 0.55 | 0.55 | 0.27 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 63.0 | 1.5 | 0.0 | 0.0 | 7.3 | 7.3 | 66.5 | 0.0 | 51.3 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 3.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 1.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 66.1 | 1.5 | 0.0 | 0.0 | 7.5 | 7.5 | 67.7 | 0.0 | 51.4 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 66.1 | 1.5 | 0.0 | 0.0 | 7.5 | 7.5 | 67.7 | 0.0 | 51.4 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | A | A | E | A | D | A | A | A |
| HCM2kAvgQ: | 5 | 3 | 0 | 0 | 14 | 14 | 2 | 0 | 1 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #9: (38) University Avenue and O'Brien Drive



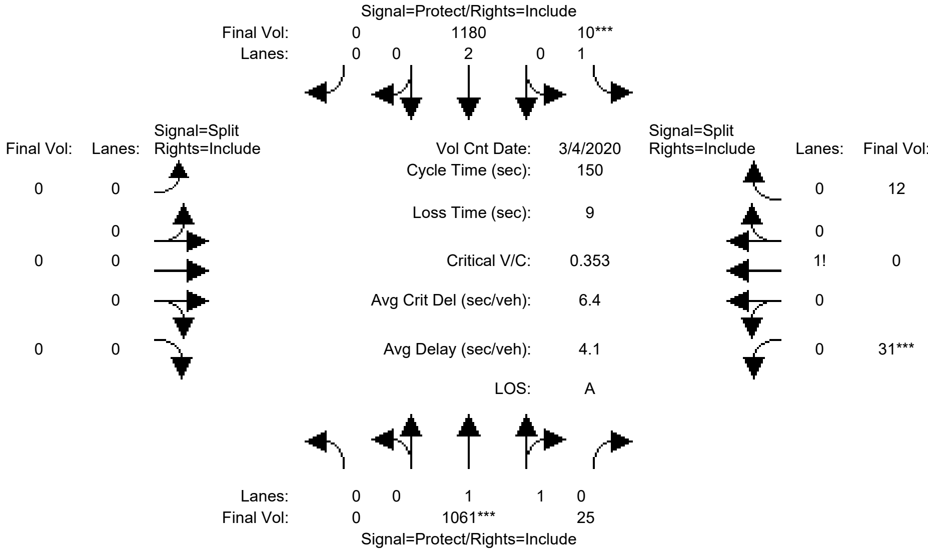

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 23 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 6 | 1522 | 0 | 0 | 464 | 9 | 185 | 0 | 141 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.96 | 0.04 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3531 | 68 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.42 | 0.00 | 0.00 | 0.13 | 0.13 | 0.10 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 29.7 | 113 | 0.0 | 0.0 | 83.7 | 83.7 | 27.6 | 0.0 | 57.3 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.02 | 0.56 | 0.00 | 0.00 | 0.24 | 0.24 | 0.56 | 0.00 | 0.23 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 48.4 | 7.7 | 0.0 | 0.0 | 16.9 | 16.9 | 55.7 | 0.0 | 31.4 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | 2.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 48.4 | 8.0 | 0.0 | 0.0 | 16.9 | 16.9 | 57.8 | 0.0 | 31.6 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 48.4 | 8.0 | 0.0 | 0.0 | 16.9 | 16.9 | 57.8 | 0.0 | 31.6 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | A | A | A | B | B | E | A | C | A | A | A |
| HCM2kAvgQ: | 0 | 15 | 0 | 0 | 6 | 6 | 8 | 0 | 4 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]




| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 4 Mar 2020 << | | | | | | | | | | | | |
| Base Vol: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1061 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.93 |
| Lanes: | 0.00 | 1.95 | 0.05 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 | 0.28 |
| Final Sat.: | 0 | 3516 | 83 | 1805 | 3610 | 0 | 0 | 0 | 0 | 1272 | 0 | 492 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.30 | 0.30 | 0.01 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 124 | 124.0 | 7.0 | 131 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 10.0 |
| Volume/Cap: | 0.00 | 0.37 | 0.37 | 0.12 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.37 |
| Uniform Del: | 0.0 | 3.2 | 3.2 | 68.5 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 66.9 | 0.0 | 66.9 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 1.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 3.3 | 3.3 | 69.2 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 68.9 | 0.0 | 68.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 3.3 | 3.3 | 69.2 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 68.9 | 0.0 | 68.9 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 6 | 6 | 1 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

Signal=Protect/Rights=Include
Final Vol: 0 581 18***
Lanes: 0 0 2 0 1

Westbound (left side): Signal=Split, Rights=Include
Final Vol: 0 / 0 / 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: 3/4/2020
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.515
Avg Crit Del (sec/veh): 11.6
Avg Delay (sec/veh): 9.3
LOS: A

Signal=Split
Rights=Include
Lanes: 0, 0, 1!, 0, 0
Final Vol: 34, 0, 79***

Lanes: 0 0 1 1 0
Final Vol: 0 1445*** 29
Signal=Protect/Rights=Include

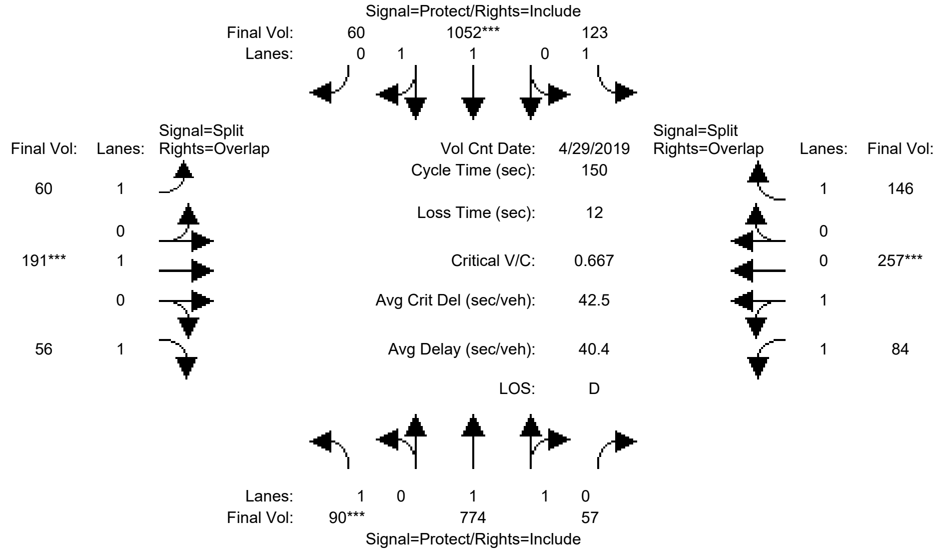
| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 4 Mar 2020 << | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 18 | 581 | 0 | 0 | 0 | 0 | 79 | 0 | 34 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.93 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.00 | 0.30 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 1231 | 0 | 530 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.06 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 116 | 115.8 | 7.0 | 123 | 0.0 | 0.0 | 0.0 | 0.0 | 18.2 | 0.0 | 18.2 |
| Volume/Cap: | 0.00 | 0.53 | 0.53 | 0.21 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 | 0.53 |
| Uniform Del: | 0.0 | 6.6 | 6.6 | 68.8 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | 61.9 | 0.0 | 61.9 |
| IncremntDel: | 0.0 | 0.2 | 0.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 6.8 | 6.8 | 70.1 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 64.4 | 0.0 | 64.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 6.8 | 6.8 | 70.1 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 64.4 | 0.0 | 64.4 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 14 | 14 | 1 | 3 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #11: (40) University Avenue and Bay Road



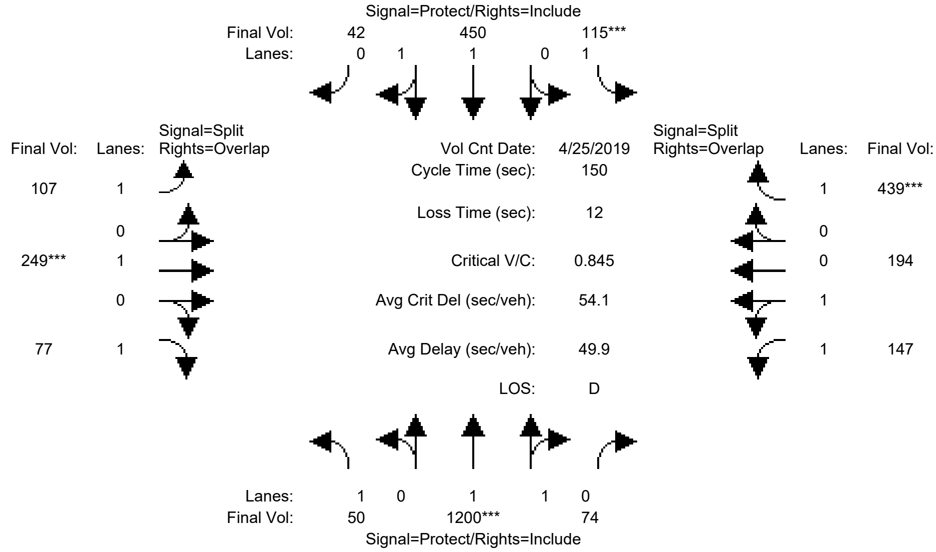

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 29 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 90 | 774 | 57 | 123 | 1052 | 60 | 60 | 191 | 56 | 84 | 257 | 146 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.93 | 0.98 | 0.83 | 0.97 | 0.97 | 0.83 |
| Lanes: | 1.00 | 1.86 | 0.14 | 1.00 | 1.89 | 0.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 3232 | 238 | 1753 | 3290 | 188 | 1769 | 1862 | 1583 | 1840 | 1840 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.24 | 0.24 | 0.07 | 0.32 | 0.32 | 0.03 | 0.10 | 0.04 | 0.05 | 0.14 | 0.09 |
| Crit Moves: | **** | | | | **** | | | **** | | | **** | |
| Green Time: | 11.6 | 64.6 | 64.6 | 18.9 | 71.9 | 71.9 | 23.1 | 23.1 | 34.6 | 31.4 | 31.4 | 50.4 |
| Volume/Cap: | 0.67 | 0.56 | 0.56 | 0.56 | 0.67 | 0.67 | 0.22 | 0.67 | 0.15 | 0.22 | 0.67 | 0.27 |
| Uniform Del: | 67.4 | 32.0 | 32.0 | 61.6 | 29.9 | 29.9 | 55.6 | 59.8 | 46.0 | 49.1 | 54.5 | 36.5 |
| IncremntDel: | 12.0 | 0.5 | 0.5 | 3.1 | 1.0 | 1.0 | 0.4 | 5.9 | 0.2 | 0.1 | 3.4 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 79.4 | 32.5 | 32.5 | 64.7 | 30.9 | 30.9 | 56.0 | 65.7 | 46.2 | 49.2 | 57.8 | 36.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 79.4 | 32.5 | 32.5 | 64.7 | 30.9 | 30.9 | 56.0 | 65.7 | 46.2 | 49.2 | 57.8 | 36.7 |
| LOS by Move: | E | C | C | E | C | C | E | E | D | D | E | D |
| HCM2kAvgQ: | 5 | 15 | 15 | 6 | 21 | 21 | 2 | 9 | 2 | 3 | 12 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #11: (40) University Avenue and Bay Road




| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 50 | 1200 | 74 | 115 | 450 | 42 | 107 | 249 | 77 | 147 | 194 | 439 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.91 | 0.91 | 0.92 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.96 | 0.96 | 0.83 |
| Lanes: | 1.00 | 1.88 | 0.12 | 1.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 3272 | 202 | 1753 | 3164 | 295 | 1769 | 1862 | 1583 | 1823 | 1823 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.37 | 0.37 | 0.07 | 0.14 | 0.14 | 0.06 | 0.13 | 0.05 | 0.08 | 0.11 | 0.28 |
| Crit Moves: | | **** | | **** | | | | **** | | | | **** |
| Green Time: | 19.0 | 65.1 | 65.1 | 11.6 | 57.8 | 57.8 | 23.7 | 23.7 | 42.7 | 37.6 | 37.6 | 49.2 |
| Volume/Cap: | 0.23 | 0.85 | 0.85 | 0.85 | 0.37 | 0.37 | 0.38 | 0.85 | 0.17 | 0.32 | 0.42 | 0.85 |
| Uniform Del: | 58.9 | 38.0 | 38.0 | 68.3 | 33.1 | 33.1 | 56.6 | 61.4 | 40.4 | 45.8 | 47.2 | 46.9 |
| IncremntDel: | 0.5 | 4.6 | 4.6 | 35.9 | 0.2 | 0.2 | 0.9 | 19.6 | 0.2 | 0.2 | 0.4 | 12.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 59.4 | 42.6 | 42.6 | 104.2 | 33.2 | 33.2 | 57.4 | 81.0 | 40.5 | 46.0 | 47.5 | 59.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 59.4 | 42.6 | 42.6 | 104.2 | 33.2 | 33.2 | 57.4 | 81.0 | 40.5 | 46.0 | 47.5 | 59.0 |
| LOS by Move: | E | D | D | F | C | C | E | F | D | D | D | E |
| HCM2kAvgQ: | 2 | 29 | 29 | 7 | 8 | 8 | 5 | 14 | 3 | 5 | 8 | 21 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 132 854 247***
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (Eastbound)
Final Vol: / Lanes:
7 / 0
0
89 / 1!
0
4 / 0

Vol Cnt Date: 4/25/2019
Cycle Time (sec): 60
Loss Time (sec): 6
Critical V/C: 0.576
Avg Crit Del (sec/veh): 14.2
Avg Delay (sec/veh): 6.1
LOS: A

Signal=Permit Rights=Include (Westbound)
Lanes: / Final Vol:
0 / 32
0
1! / 148***
0
0 / 10

Lanes: 1 0 1 1 0
Final Vol: 12 805 33
Signal=Permit/Rights=Include

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 12 | 805 | 33 | 247 | 854 | 132 | 7 | 89 | 4 | 10 | 148 | 32 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.27 | 0.94 | 0.94 | 0.31 | 0.93 | 0.93 | 0.98 | 0.98 | 0.98 | 0.96 | 0.96 | 0.96 |
| Lanes: | 1.00 | 1.92 | 0.08 | 1.00 | 1.73 | 0.27 | 0.07 | 0.89 | 0.04 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 505 | 3447 | 141 | 597 | 3064 | 474 | 130 | 1652 | 74 | 96 | 1421 | 307 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.23 | 0.23 | 0.41 | 0.28 | 0.28 | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.10 |
| Crit Moves: | | | | **** | | | | | | | **** | |
| Green Time: | 43.1 | 43.1 | 43.1 | 43.1 | 43.1 | 43.1 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 |
| Volume/Cap: | 0.03 | 0.32 | 0.32 | 0.58 | 0.39 | 0.39 | 0.30 | 0.30 | 0.30 | 0.58 | 0.58 | 0.58 |
| Uniform Del: | 2.4 | 3.1 | 3.1 | 4.0 | 3.3 | 3.3 | 21.3 | 21.3 | 21.3 | 22.5 | 22.5 | 22.5 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 1.9 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 | 2.5 | 2.5 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.5 | 3.2 | 3.2 | 6.0 | 3.4 | 3.4 | 21.8 | 21.8 | 21.8 | 25.0 | 25.0 | 25.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.5 | 3.2 | 3.2 | 6.0 | 3.4 | 3.4 | 21.8 | 21.8 | 21.8 | 25.0 | 25.0 | 25.0 |
| LOS by Move: | A | A | A | A | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 0 | 3 | 3 | 3 | 4 | 4 | 2 | 2 | 2 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 20 641 34
Lanes: 0 1 1 0 1

| Final Vol: | Lanes: | Signal=Permit Rights=Include | | | Signal=Permit Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | 4/25/2019 | | | |
| 10 | 0 | | Cycle Time (sec): | 60 | | 0 | 121 |
| | 0 | | Loss Time (sec): | 6 | | 0 | |
| 71 | 1! | | Critical V/C: | 0.546 | | 1! | 114*** |
| | 0 | | Avg Crit Del (sec/veh): | 9.5 | | 0 | |
| 26 | 0 | | Avg Delay (sec/veh): | 8.7 | | 0 | 40 |
| | | | LOS: | A | | | |

Lanes: 1 0 1 1 0
Final Vol: 31 1115*** 64
Signal=Permit/Rights=Include

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 31 | 1115 | 64 | 34 | 641 | 20 | 10 | 71 | 26 | 40 | 114 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.36 | 0.94 | 0.94 | 0.18 | 0.95 | 0.95 | 0.94 | 0.94 | 0.94 | 0.89 | 0.89 | 0.89 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.94 | 0.06 | 0.09 | 0.67 | 0.24 | 0.15 | 0.41 | 0.44 |
| Final Sat.: | 692 | 3387 | 194 | 336 | 3487 | 109 | 166 | 1179 | 432 | 247 | 703 | 747 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.33 | 0.33 | 0.10 | 0.18 | 0.18 | 0.06 | 0.06 | 0.06 | 0.16 | 0.16 | 0.16 |
| Crit Moves: | | **** | | | | | | | | | **** | |
| Green Time: | 36.2 | 36.2 | 36.2 | 36.2 | 36.2 | 36.2 | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 |
| Volume/Cap: | 0.07 | 0.55 | 0.55 | 0.17 | 0.30 | 0.30 | 0.20 | 0.20 | 0.20 | 0.55 | 0.55 | 0.55 |
| Uniform Del: | 4.9 | 7.0 | 7.0 | 5.3 | 5.8 | 5.8 | 15.8 | 15.8 | 15.8 | 17.7 | 17.7 | 17.7 |
| IncremntDel: | 0.1 | 0.3 | 0.3 | 0.4 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 1.3 | 1.3 | 1.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 5.0 | 7.3 | 7.3 | 5.7 | 5.9 | 5.9 | 16.0 | 16.0 | 16.0 | 19.0 | 19.0 | 19.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 5.0 | 7.3 | 7.3 | 5.7 | 5.9 | 5.9 | 16.0 | 16.0 | 16.0 | 19.0 | 19.0 | 19.0 |
| LOS by Move: | A | A | A | A | A | A | B | B | B | B | B | B |
| HCM2kAvgQ: | 0 | 7 | 7 | 0 | 3 | 3 | 2 | 2 | 2 | 5 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 36 985*** 33
Lanes: 0 1 1 0 1

| Final Vol: | Lanes: | Signal=Permit Rights=Include | | | Signal=Permit Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | 4/25/2019 | | | |
| 10 | 0 | | Cycle Time (sec): | 60 | | 0 | 20 |
| | 0 | | Loss Time (sec): | 9 | | 0 | |
| 42 | 1! | | Critical V/C: | 0.445 | | 1! | 76*** |
| | 0 | | Avg Crit Del (sec/veh): | 10.2 | | 0 | |
| 12 | 0 | | Avg Delay (sec/veh): | 11.3 | | 0 | 38 |
| | | | LOS: | B | | | |

Lanes: 1 0 1 1 0
Final Vol: 25*** 856 35
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << 7:15-8:15 AM | | | | | | | | | | | | |
| Base Vol: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 25 | 856 | 35 | 33 | 985 | 36 | 10 | 42 | 12 | 38 | 76 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.94 | 0.94 | 0.95 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.88 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.92 | 0.08 | 1.00 | 1.93 | 0.07 | 0.15 | 0.66 | 0.19 | 0.28 | 0.57 | 0.15 |
| Final Sat.: | 1805 | 3447 | 141 | 1805 | 3465 | 127 | 276 | 1159 | 331 | 474 | 948 | 250 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.25 | 0.25 | 0.02 | 0.28 | 0.28 | 0.04 | 0.04 | 0.04 | 0.08 | 0.08 | 0.08 |
| Crit Moves: | **** | | | | **** | | | | | | **** | |
| Green Time: | 7.0 | 27.9 | 27.9 | 13.1 | 34.0 | 34.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Volume/Cap: | 0.12 | 0.53 | 0.53 | 0.08 | 0.50 | 0.50 | 0.22 | 0.22 | 0.22 | 0.48 | 0.48 | 0.48 |
| Uniform Del: | 23.7 | 11.4 | 11.4 | 18.7 | 7.9 | 7.9 | 21.6 | 21.6 | 21.6 | 22.6 | 22.6 | 22.6 |
| IncremntDel: | 0.3 | 0.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | 1.3 | 1.3 | 1.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 24.0 | 11.8 | 11.8 | 18.8 | 8.1 | 8.1 | 22.0 | 22.0 | 22.0 | 24.0 | 24.0 | 24.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 24.0 | 11.8 | 11.8 | 18.8 | 8.1 | 8.1 | 22.0 | 22.0 | 22.0 | 24.0 | 24.0 | 24.0 |
| LOS by Move: | C | B | B | B | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 7 | 7 | 1 | 6 | 6 | 1 | 1 | 1 | 3 | 3 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include

| | L | T | R |
|---|---|---|---|
| Final Vol: | 24 | 649 | 48*** |
| Lanes: | 0 1 | 1 | 0 1 |

| Final Vol: | Lanes: | Signal=Permit Rights=Include | | | Signal=Permit Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 14 | 0 | | Vol Cnt Date: | 4/25/2019 | | 0 | 23 |
| | | | Cycle Time (sec): | 75 | | | |
| | 0 | | Loss Time (sec): | 9 | | 0 | |
| 74 | 1! | | Critical V/C: | 0.635 | | 1! | 168*** |
| | 0 | | Avg Crit Del (sec/veh): | 16.5 | | 0 | |
| 43 | 0 | | Avg Delay (sec/veh): | 16.8 | | 0 | 75 |
| | | | LOS: | B | | | |

| | L | T | R |
|---|---|---|---|
| Lanes: | 1 0 | 1 | 1 0 |
| Final Vol: | 75 | 1181*** | 141 |

Signal=Protect/Rights=Include

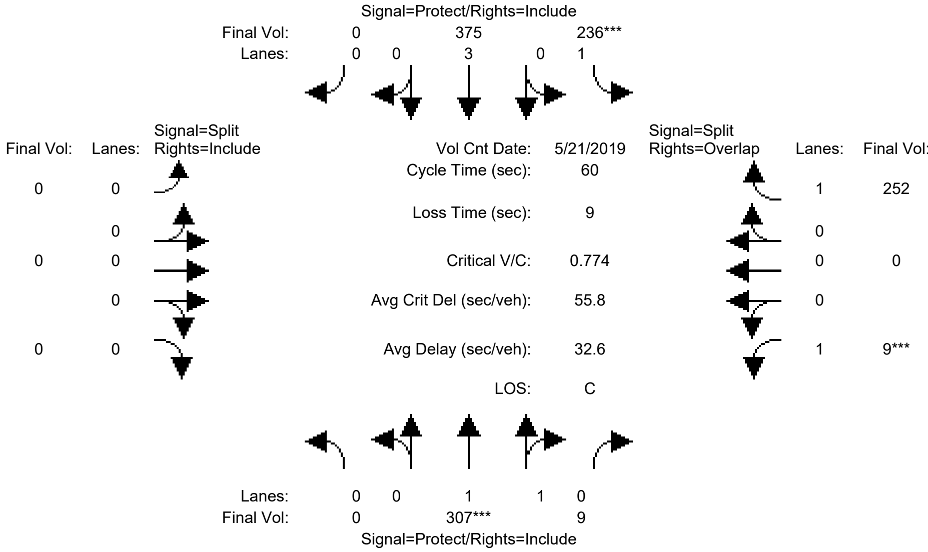
| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << 4:30-5:30 PM | | | | | | | | | | | | |
| Base Vol: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1181 | 141 | 48 | 649 | 24 | 14 | 74 | 43 | 75 | 168 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.87 | 0.87 | 0.87 |
| Lanes: | 1.00 | 1.79 | 0.21 | 1.00 | 1.93 | 0.07 | 0.11 | 0.56 | 0.33 | 0.28 | 0.63 | 0.09 |
| Final Sat.: | 1805 | 3173 | 379 | 1805 | 3464 | 128 | 187 | 990 | 575 | 468 | 1049 | 144 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.37 | 0.37 | 0.03 | 0.19 | 0.19 | 0.07 | 0.07 | 0.07 | 0.16 | 0.16 | 0.16 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 16.0 | 41.3 | 41.3 | 7.0 | 32.2 | 32.2 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 |
| Volume/Cap: | 0.19 | 0.68 | 0.68 | 0.28 | 0.44 | 0.44 | 0.32 | 0.32 | 0.32 | 0.68 | 0.68 | 0.68 |
| Uniform Del: | 24.2 | 12.1 | 12.1 | 31.7 | 15.0 | 15.0 | 23.6 | 23.6 | 23.6 | 26.0 | 26.0 | 26.0 |
| IncremntDel: | 0.2 | 1.0 | 1.0 | 0.9 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | 4.7 | 4.7 | 4.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 24.4 | 13.1 | 13.1 | 32.6 | 15.2 | 15.2 | 24.1 | 24.1 | 24.1 | 30.7 | 30.7 | 30.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 24.4 | 13.1 | 13.1 | 32.6 | 15.2 | 15.2 | 24.1 | 24.1 | 24.1 | 30.7 | 30.7 | 30.7 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 2 | 12 | 12 | 1 | 6 | 6 | 3 | 3 | 3 | 7 | 7 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #20: (50) East Bayshore Road and Donohoe Street




| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 21 May 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 307 | 9 | 236 | 375 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 35 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.38 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.46 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 16.5 | 16.5 | 24.5 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 34.5 |
| Volume/Cap: | 0.00 | 0.94 | 0.94 | 0.94 | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.80 |
| Uniform Del: | 0.0 | 21.3 | 21.3 | 17.0 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 10.0 |
| IncremntDel: | 0.0 | 34.0 | 34.0 | 40.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 13.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 55.3 | 55.3 | 57.9 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 23.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 55.3 | 55.3 | 57.9 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 23.3 |
| LOS by Move: | A | E | E | E | A | A | A | A | A | C | A | C |
| HCM2kAvgQ: | 0 | 7 | 7 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 754 396***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include (Eastbound) — Final Vol: 0, 0, 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: 5/21/2019
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.842
Avg Crit Del (sec/veh): 72.6
Avg Delay (sec/veh): 38.5
LOS: D

Signal=Split Rights=Overlap (Westbound) — Lanes: 1, 0, 0, 0, 1; Final Vol: 149, 0, 7***

Lanes: 0 0 1 1 0
Final Vol: 0 463*** 26
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 21 May 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 463 | 26 | 396 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 149 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.89 | 0.11 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1706 | 96 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.27 | 0.27 | 0.44 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.18 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 15.7 | 15.7 | 25.3 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.3 |
| Volume/Cap: | 0.00 | 1.04 | 1.04 | 1.04 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.31 |
| Uniform Del: | 0.0 | 22.1 | 22.1 | 17.4 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 6.2 |
| IncremntDel: | 0.0 | 50.9 | 50.9 | 55.5 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 73.0 | 73.0 | 72.9 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 6.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 73.0 | 73.0 | 72.9 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 6.6 |
| LOS by Move: | A | E | E | E | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 11 | 11 | 15 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

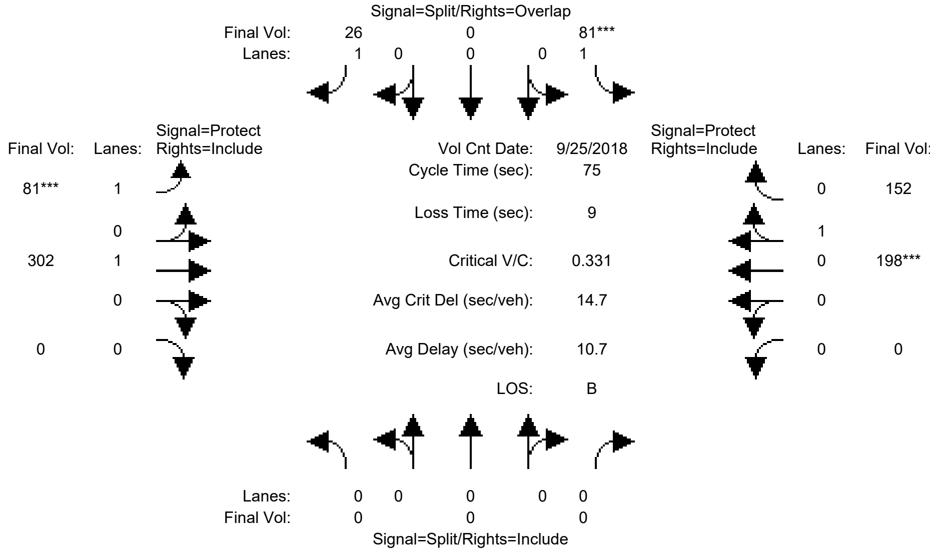
Intersection #25: (54) East Bayshore Road and Clarke Avenue

```
                          Signal=Split/Rights=Overlap
              Final Vol:   32          0          312***
                  Lanes:    1    0     0     0    1

             Signal=Protect                              Signal=Protect
Final Vol:  Lanes: Rights=Include   Vol Cnt Date:  9/25/2018  Rights=Include   Lanes:  Final Vol:
                                  Cycle Time (sec):   60
  57***       1                                                              0       64
                                   Loss Time (sec):    9
              0                                                              1
   204        1                      Critical V/C:   0.362                   0      111***
              0                Avg Crit Del (sec/veh):  14.6                 0
    0         0                  Avg Delay (sec/veh):   13.9                 0        0
                                              LOS:       B

                  Lanes:    0    0     0     0    0
              Final Vol:    0          0          0
                          Signal=Split/Rights=Include
```

```
Street Name:         East Bayshore Road                    Clarke Avenue
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0     0    10    0    10     7   10     0     0   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 25 Sep 2018 <<
Base Vol:       0    0     0   312    0    32    57  204     0     0  111    64
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   312    0    32    57  204     0     0  111    64
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0   312    0    32    57  204     0     0  111    64
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   312    0    32    57  204     0     0  111    64
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   312    0    32    57  204     0     0  111    64
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   312    0    32    57  204     0     0  111    64
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  0.93 1.00  0.83  0.93 0.98  1.00  1.00 0.93  0.93
Lanes:       0.00 0.00  0.00  1.00 0.00  1.00  1.00 1.00  0.00  0.00 0.63  0.37
Final Sat.:     0    0     0  1769    0  1583  1769 1862     0     0 1123   648
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00  0.18 0.00  0.02  0.03 0.11  0.00  0.00 0.10  0.10
Crit Moves:                   ****             ****                  ****
Green Time:   0.0  0.0   0.0  28.2  0.0  35.2   7.0 22.8   0.0   0.0 15.8  15.8
Volume/Cap:  0.00 0.00  0.00  0.38 0.00  0.03  0.28 0.29  0.00  0.00 0.38  0.38
Uniform Del:  0.0  0.0   0.0  10.2  0.0   5.2  24.2 13.0   0.0   0.0 18.1  18.1
IncremntDel:  0.0  0.0   0.0   0.3  0.0   0.0   0.7  0.2   0.0   0.0  0.5   0.5
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay Adj:   0.00 0.00  0.00  1.00 0.00  1.00  1.00 1.00  0.00  0.00 1.00  1.00
Delay/Veh:    0.0  0.0   0.0  10.5  0.0   5.2  24.9 13.2   0.0   0.0 18.6  18.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  10.5  0.0   5.2  24.9 13.2   0.0   0.0 18.6  18.6
LOS by Move:    A    A     A     B    A     A     C    B     A     A    B     B
HCM2kAvgQ:      0    0     0     4    0     0     1    3     0     0    3     3
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue



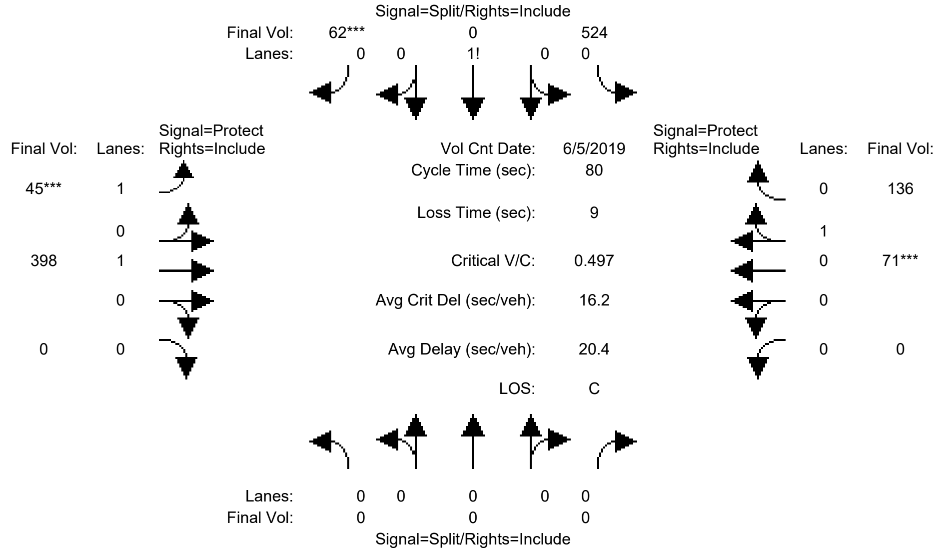

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Sep 2018 << | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 81 | 0 | 26 | 81 | 302 | 0 | 0 | 198 | 152 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.57 | 0.43 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 991 | 761 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.02 | 0.05 | 0.16 | 0.00 | 0.00 | 0.20 | 0.20 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 10.4 | 0.0 | 20.7 | 10.4 | 55.6 | 0.0 | 0.0 | 45.3 | 45.3 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 | 0.06 | 0.33 | 0.22 | 0.00 | 0.00 | 0.33 | 0.33 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 29.2 | 0.0 | 20.0 | 29.2 | 3.0 | 0.0 | 0.0 | 7.4 | 7.4 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.1 | 0.8 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 30.0 | 0.0 | 20.0 | 30.0 | 3.1 | 0.0 | 0.0 | 7.6 | 7.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 30.0 | 0.0 | 20.0 | 30.0 | 3.1 | 0.0 | 0.0 | 7.6 | 7.6 |
| LOS by Move: | A | A | A | C | A | C | C | A | A | A | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road




| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 5 Jun 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 71 | 136 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.34 | 0.66 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 652 | 1248 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.21 | 0.00 | 0.00 | 0.11 | 0.11 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 47.3 | 0.0 | 47.3 | 7.0 | 23.7 | 0.0 | 0.0 | 16.7 | 16.7 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.52 | 0.00 | 0.52 | 0.27 | 0.71 | 0.00 | 0.00 | 0.52 | 0.52 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 9.7 | 0.0 | 9.7 | 34.1 | 25.1 | 0.0 | 0.0 | 28.1 | 28.1 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.4 | 0.9 | 4.1 | 0.0 | 0.0 | 1.3 | 1.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 10.1 | 0.0 | 10.1 | 35.0 | 29.2 | 0.0 | 0.0 | 29.4 | 29.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 10.1 | 0.0 | 10.1 | 35.0 | 29.2 | 0.0 | 0.0 | 29.4 | 29.4 |
| LOS by Move: | A | A | A | B | A | B | C | C | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 9 | 0 | 9 | 1 | 10 | 0 | 0 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

Signal=Split/Rights=Include
Final Vol: 80*** 0 202
Lanes: 0 0 1! 0 0

Signal=Protect
Rights=Include

Final Vol: 127*** / 265 / 0
Lanes: 1 / 0 / 1 / 0 / 0

Vol Cnt Date: 6/5/2019
Cycle Time (sec): 80
Loss Time (sec): 9
Critical V/C: 0.733
Avg Crit Del (sec/veh): 23.1
Avg Delay (sec/veh): 19.9
LOS: B

Signal=Protect
Rights=Include

Lanes: 0 / 1 / 0 / 0 / 0
Final Vol: 559 / 268*** / 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

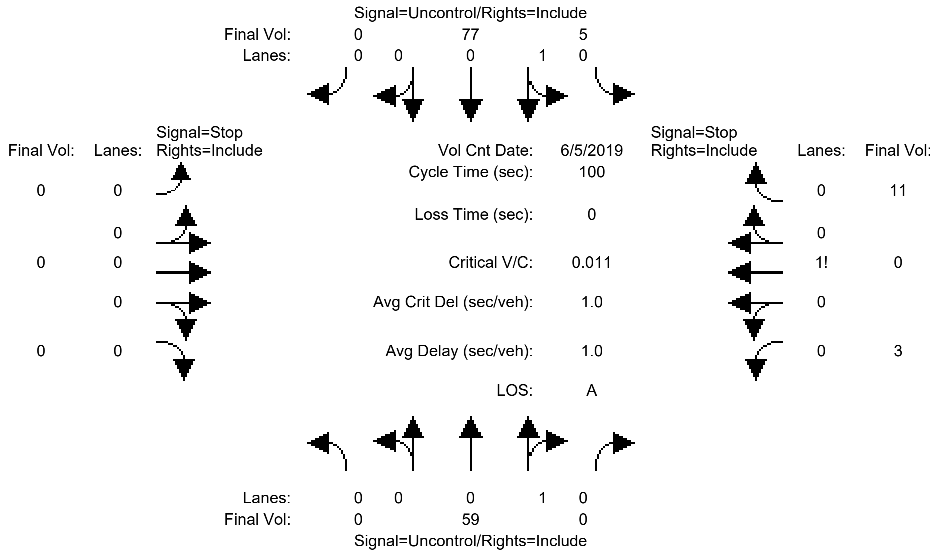
| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 5 Jun 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 202 | 0 | 80 | 127 | 265 | 0 | 0 | 268 | 559 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 | 0.28 | 1.00 | 1.00 | 0.00 | 0.00 | 0.32 | 0.68 |
| Final Sat.: | 0 | 0 | 0 | 1361 | 0 | 539 | 1900 | 1900 | 0 | 0 | 616 | 1284 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.15 | 0.07 | 0.14 | 0.00 | 0.00 | 0.44 | 0.44 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 16.2 | 0.0 | 16.2 | 7.3 | 54.8 | 0.0 | 0.0 | 47.5 | 47.5 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.73 | 0.00 | 0.73 | 0.73 | 0.20 | 0.00 | 0.00 | 0.73 | 0.73 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 29.9 | 0.0 | 29.9 | 35.4 | 4.6 | 0.0 | 0.0 | 11.7 | 11.7 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 7.1 | 0.0 | 7.1 | 14.9 | 0.1 | 0.0 | 0.0 | 2.5 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 37.0 | 0.0 | 37.0 | 50.3 | 4.7 | 0.0 | 0.0 | 14.2 | 14.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 37.0 | 0.0 | 37.0 | 50.3 | 4.7 | 0.0 | 0.0 | 14.2 | 14.2 |
| LOS by Move: | A | A | A | D | A | D | D | A | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 8 | 0 | 8 | 5 | 2 | 0 | 0 | 16 | 16 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #32: (51) East Bayshore Road and Holland Street




```
Street Name:        East Bayshore Road                  Holland Street
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 5 Jun 2019 <<
Base Vol:       0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   59     0     5   77     0     0    0     0     3    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx              8.8
ApproachLOS:          *                *                *                A
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             141
Minor Approach Volume:           14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #32: (51) East Bayshore Road and Holland Street

Signal=Uncontrol/Rights=Include
Final Vol: 0 88 10
Lanes: 0 0 0 1 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | 6/5/2019 | | | |
| 0 | 0 | | Cycle Time (sec): | 100 | | 0 | 4 |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.007 | | 1! | 0 |
| | 1 | | Avg Crit Del (sec/veh): | 0.4 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 0.4 | | 0 | 3 |
| | | | LOS: | A | | | |

Lanes: 0 0 0 1 0
Final Vol: 0 238 6
Signal=Uncontrol/Rights=Include

```
Street Name:        East Bayshore Road                Holland Street
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 5 Jun 2019 <<
Base Vol:       0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  238     6    10   88     0     0    0     0     3    0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             10.0
ApproachLOS:        *                *                *                 A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
ApproachDel:    xxxxxx          xxxxxx           xxxxxx            10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            342
Minor Approach Volume:          7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 161 1283*** 0
Lanes: 0 1 1 0 0

West approach (Signal=Split, Rights=Include):
Final Vol: 34*** / Lanes: 0
Lanes: 0
Final Vol: 0 / Lanes: 1!
Lanes: 0
Final Vol: 28 / Lanes: 0

East approach (Signal=Split, Rights=Include):
Lanes: 0 / Final Vol: 0
Lanes: 0
Lanes: 0 / Final Vol: 0
Lanes: 0
Lanes: 0 / Final Vol: 0

Vol Cnt Date: 4/25/2019
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.497
Avg Crit Del (sec/veh): 8.9
Avg Delay (sec/veh): 6.3
LOS: A

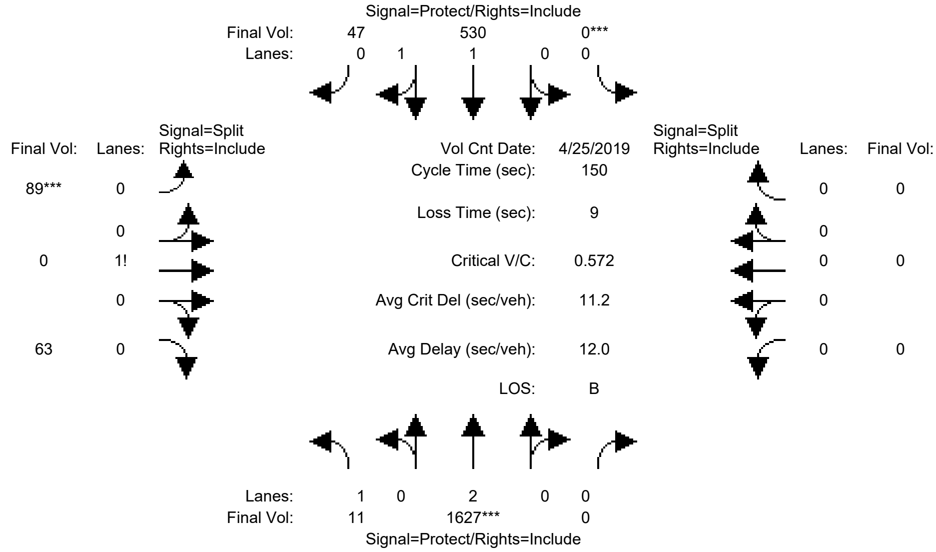
Lanes: 1 0 2 0 0
Final Vol: 44*** 883 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 44 | 883 | 0 | 0 | 1283 | 161 | 34 | 0 | 28 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.91 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.55 | 0.00 | 0.45 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3153 | 396 | 952 | 0 | 784 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.24 | 0.00 | 0.00 | 0.41 | 0.41 | 0.04 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 7.4 | 130 | 0.0 | 0.0 | 123 | 122.9 | 10.8 | 0.0 | 10.8 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.50 | 0.28 | 0.00 | 0.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 69.5 | 1.7 | 0.0 | 0.0 | 4.1 | 4.1 | 67.0 | 0.0 | 67.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 4.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 3.1 | 0.0 | 3.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 73.8 | 1.8 | 0.0 | 0.0 | 4.3 | 4.3 | 70.1 | 0.0 | 70.1 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 73.8 | 1.8 | 0.0 | 0.0 | 4.3 | 4.3 | 70.1 | 0.0 | 70.1 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | A | A | E | A | E | A | A | A |
| HCM2kAvgQ: | 3 | 4 | 0 | 0 | 11 | 11 | 3 | 0 | 3 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive



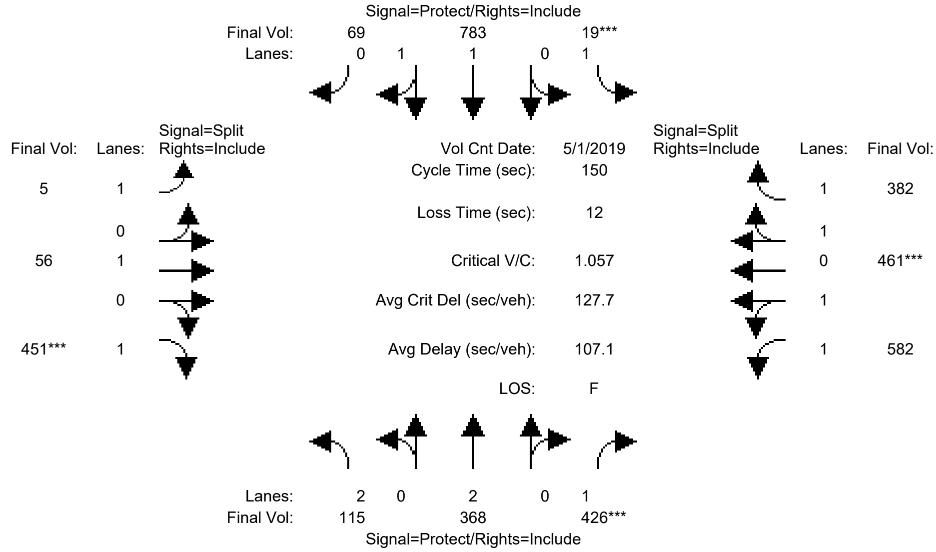

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 11 | 1627 | 0 | 0 | 530 | 47 | 89 | 0 | 63 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.92 | 1.00 | 0.92 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.84 | 0.16 | 0.59 | 0.00 | 0.41 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3276 | 291 | 1021 | 0 | 723 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.45 | 0.00 | 0.00 | 0.16 | 0.16 | 0.09 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 26.5 | 118 | 0.0 | 0.0 | 91.7 | 91.7 | 22.9 | 0.0 | 22.9 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.03 | 0.57 | 0.00 | 0.00 | 0.26 | 0.26 | 0.57 | 0.00 | 0.57 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 51.2 | 6.2 | 0.0 | 0.0 | 13.5 | 13.5 | 59.0 | 0.0 | 59.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 51.2 | 6.4 | 0.0 | 0.0 | 13.6 | 13.6 | 62.0 | 0.0 | 62.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.2 | 6.4 | 0.0 | 0.0 | 13.6 | 13.6 | 62.0 | 0.0 | 62.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | A | A | A | B | B | E | A | E | A | A | A |
| HCM2kAvgQ: | 0 | 15 | 0 | 0 | 6 | 6 | 7 | 0 | 7 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #45: (43) University/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: >> Count Date: 1 May 2019 << | | | | | | | | | | | | |
| Base Vol: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 115 | 368 | 426 | 19 | 783 | 69 | 5 | 56 | 451 | 582 | 461 | 382 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.74 | 0.74 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.84 | 0.16 | 1.00 | 1.00 | 1.00 | 1.64 | 1.29 | 1.07 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2573 | 227 | 1417 | 1492 | 1268 | 2178 | 1725 | 1429 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.13 | 0.34 | 0.01 | 0.30 | 0.30 | 0.00 | 0.04 | 0.36 | 0.27 | 0.27 | 0.27 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 10.0 | 44.8 | 44.8 | 10.0 | 44.8 | 44.8 | 47.5 | 47.5 | 47.5 | 35.7 | 35.7 | 35.7 |
| Volume/Cap: | 0.63 | 0.43 | 1.12 | 0.20 | 1.02 | 1.02 | 0.01 | 0.12 | 1.12 | 1.12 | 1.12 | 1.12 |
| Uniform Del: | 68.2 | 42.4 | 52.6 | 66.2 | 52.6 | 52.6 | 35.2 | 36.4 | 51.3 | 57.2 | 57.2 | 57.2 |
| IncremntDel: | 6.7 | 0.4 | 84.2 | 1.1 | 35.6 | 35.6 | 0.0 | 0.1 | 83.0 | 66.5 | 66.5 | 66.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 74.9 | 42.7 | 136.8 | 67.3 | 88.2 | 88.2 | 35.2 | 36.5 | 134.3 | 123.7 | 124 | 123.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 74.9 | 42.7 | 136.8 | 67.3 | 88.2 | 88.2 | 35.2 | 36.5 | 134.3 | 123.7 | 124 | 123.7 |
| LOS by Move: | E | D | F | E | F | F | D | D | F | F | F | F |
| HCM2kAvgQ: | 4 | 7 | 29 | 1 | 27 | 27 | 0 | 2 | 30 | 26 | 26 | 26 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #45: (43) University/Donohoe

Signal=Protect/Rights=Include
Final Vol: 116 674 44***
Lanes: 0 1 1 0 1

Signal=Split Rights=Include
Final Vol: 8, Lanes: 1
Lanes: 0
Final Vol: 81, Lanes: 1
Lanes: 0
Final Vol: 194***, Lanes: 1

Vol Cnt Date: 5/1/2019
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.020
Avg Crit Del (sec/veh): 102.6
Avg Delay (sec/veh): 75.2
LOS: E

Signal=Split Rights=Include
Lanes: 1, Final Vol: 458***
Lanes: 1
Lanes: 0, Final Vol: 589
Lanes: 1
Lanes: 1, Final Vol: 355

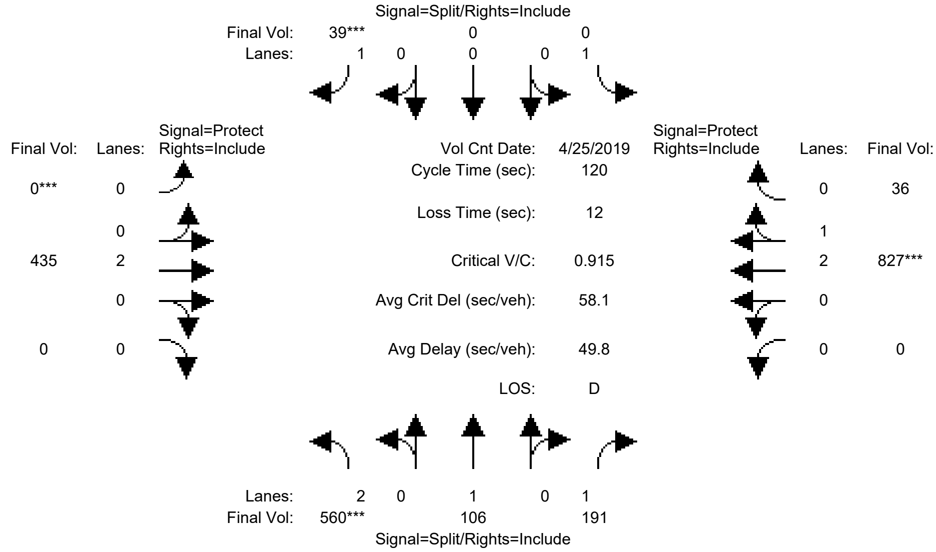
Lanes: 2 0 2 0 1
Final Vol: 293 588 714***
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: >> Count Date: 1 May 2019 << | | | | | | | | | | | | |
| Base Vol: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 293 | 588 | 714 | 44 | 674 | 116 | 8 | 81 | 194 | 355 | 589 | 458 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.79 | 0.79 | 0.80 | 0.85 | 0.72 | 0.75 | 0.75 | 0.75 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.71 | 0.29 | 1.00 | 1.00 | 1.00 | 1.01 | 1.68 | 1.31 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 2545 | 438 | 1525 | 1606 | 1365 | 1451 | 2408 | 1873 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.19 | 0.52 | 0.03 | 0.26 | 0.26 | 0.01 | 0.05 | 0.14 | 0.24 | 0.24 | 0.24 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 22.8 | 73.6 | 73.6 | 10.0 | 60.8 | 60.8 | 20.0 | 20.0 | 20.0 | 34.4 | 34.4 | 34.4 |
| Volume/Cap: | 0.65 | 0.39 | 1.07 | 0.43 | 0.65 | 0.65 | 0.04 | 0.38 | 1.07 | 1.07 | 1.07 | 1.07 |
| Uniform Del: | 59.9 | 24.1 | 38.2 | 67.3 | 36.0 | 36.0 | 56.6 | 59.3 | 65.0 | 57.8 | 57.8 | 57.8 |
| IncremntDel: | 3.4 | 0.2 | 53.8 | 2.9 | 1.3 | 1.3 | 0.1 | 1.1 | 85.4 | 44.6 | 44.6 | 44.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 63.3 | 24.3 | 92.0 | 70.2 | 37.3 | 37.3 | 56.7 | 60.5 | 150.4 | 102.4 | 102 | 102.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 63.3 | 24.3 | 92.0 | 70.2 | 37.3 | 37.3 | 56.7 | 60.5 | 150.4 | 102.4 | 102 | 102.4 |
| LOS by Move: | E | C | F | E | D | D | E | E | F | F | F | F |
| HCM2kAvgQ: | 8 | 9 | 42 | 2 | 16 | 16 | 0 | 4 | 14 | 24 | 24 | 24 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #46: (44) Capitol/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 560 | 106 | 191 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.37 | 0.13 | 0.28 | 0.00 | 0.00 | 0.06 | 0.00 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |
| Green Time: | 46.9 | 46.9 | 46.9 | 0.0 | 0.0 | 12.0 | 0.0 | 49.1 | 0.0 | 0.0 | 49.1 | 49.1 |
| Volume/Cap: | 0.96 | 0.33 | 0.71 | 0.00 | 0.00 | 0.57 | 0.00 | 0.69 | 0.00 | 0.00 | 0.96 | 0.96 |
| Uniform Del: | 35.6 | 25.6 | 30.8 | 0.0 | 0.0 | 51.5 | 0.0 | 29.2 | 0.0 | 0.0 | 34.5 | 34.5 |
| IncremntDel: | 27.0 | 0.6 | 8.4 | 0.0 | 0.0 | 10.5 | 0.0 | 3.2 | 0.0 | 0.0 | 20.5 | 20.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 62.6 | 26.2 | 39.2 | 0.0 | 0.0 | 62.0 | 0.0 | 32.4 | 0.0 | 0.0 | 54.9 | 54.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 62.6 | 26.2 | 39.2 | 0.0 | 0.0 | 62.0 | 0.0 | 32.4 | 0.0 | 0.0 | 54.9 | 54.9 |
| LOS by Move: | E | C | D | A | A | E | A | C | A | A | D | D |
| HCM2kAvgQ: | 15 | 3 | 7 | 0 | 0 | 2 | 0 | 8 | 0 | 0 | 16 | 16 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include
Final Vol: 89*** 0 11
Lanes: 1 0 0 0 1

Signal=Permit Rights=Include (West/left approach)
Final Vol: 0, Lanes: 0
Lanes: 0
Final Vol: 875***, Lanes: 2
Lanes: 0
Final Vol: 0, Lanes: 0

Vol Cnt Date: 4/25/2019
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.422
Avg Crit Del (sec/veh): 241.8
Avg Delay (sec/veh): 142.5
LOS: F

Signal=Permit Rights=Include (East/right approach)
Lanes: 0, Final Vol: 18
Lanes: 1
Lanes: 2, Final Vol: 710
Lanes: 0
Lanes: 0, Final Vol: 0

Lanes: 2 0 1 0 1
Final Vol: 697 24 605***
Signal=Split/Rights=Include

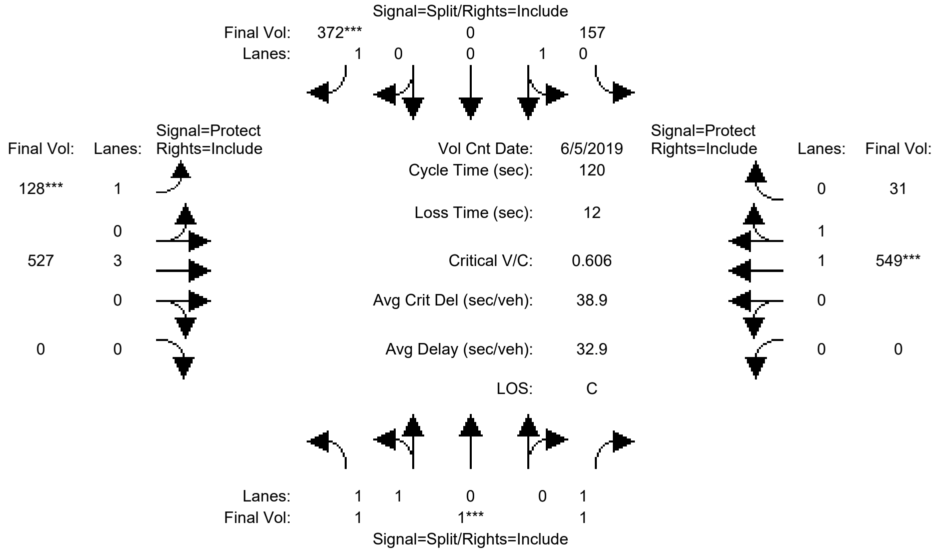
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 697 | 24 | 605 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 710 | 18 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.93 | 0.07 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2645 | 67 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.38 | 0.02 | 0.71 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.27 | 0.27 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 60.2 | 60.2 | 60.2 | 8.9 | 0.0 | 8.9 | 0.0 | 38.9 | 0.0 | 0.0 | 38.9 | 38.9 |
| Volume/Cap: | 0.76 | 0.05 | 1.42 | 0.16 | 0.00 | 1.42 | 0.00 | 1.42 | 0.00 | 0.00 | 0.83 | 0.83 |
| Uniform Del: | 24.0 | 15.3 | 29.9 | 52.1 | 0.0 | 55.6 | 0.0 | 40.5 | 0.0 | 0.0 | 37.4 | 37.4 |
| IncremntDel: | 3.6 | 0.0 | 203.4 | 1.1 | 0.0 | 260.7 | 0.0 | 199 | 0.0 | 0.0 | 6.5 | 6.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 27.6 | 15.3 | 233.3 | 53.1 | 0.0 | 316.3 | 0.0 | 240 | 0.0 | 0.0 | 43.9 | 43.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 27.6 | 15.3 | 233.3 | 53.1 | 0.0 | 316.3 | 0.0 | 240 | 0.0 | 0.0 | 43.9 | 43.9 |
| LOS by Move: | C | B | F | D | A | F | A | F | A | A | D | D |
| HCM2kAvgQ: | 12 | 0 | 46 | 1 | 0 | 8 | 0 | 35 | 0 | 0 | 11 | 11 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #47: (45) Cooley/Donohoe



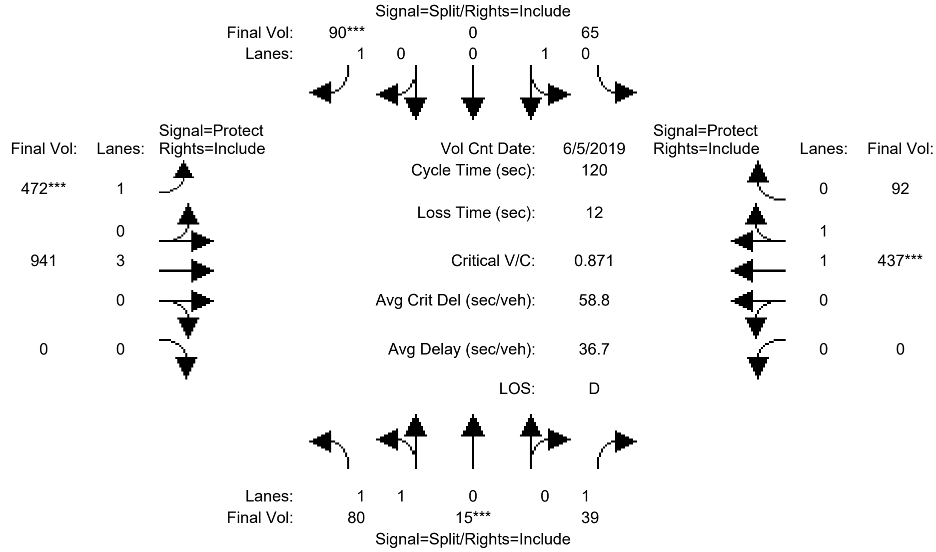

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: >> Count Date: 5 Jun 2019 << | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 157 | 0 | 372 | 128 | 527 | 0 | 0 | 549 | 31 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.85 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.89 | 0.11 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 0 | 2881 | 163 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.27 | 0.08 | 0.12 | 0.00 | 0.00 | 0.19 | 0.19 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 49.2 | 0.0 | 49.2 | 15.2 | 49.8 | 0.0 | 0.0 | 34.6 | 34.6 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.25 | 0.00 | 0.66 | 0.66 | 0.29 | 0.00 | 0.00 | 0.66 | 0.66 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 23.2 | 0.0 | 28.6 | 50.0 | 23.3 | 0.0 | 0.0 | 37.5 | 37.5 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 2.9 | 8.2 | 0.1 | 0.0 | 0.0 | 1.9 | 1.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 23.5 | 0.0 | 31.5 | 58.2 | 23.4 | 0.0 | 0.0 | 39.4 | 39.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 23.5 | 0.0 | 31.5 | 58.2 | 23.4 | 0.0 | 0.0 | 39.4 | 39.4 |
| LOS by Move: | D | D | D | C | A | C | E | C | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 12 | 6 | 5 | 0 | 0 | 11 | 11 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #47: (45) Cooley/Donohoe



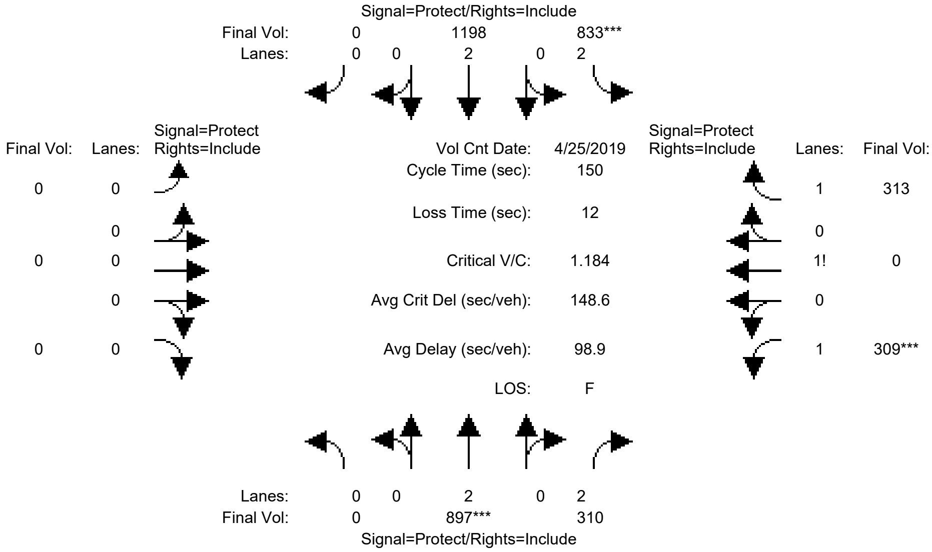

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: >> Count Date: 5 Jun 2019 << | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 65 | 0 | 90 | 472 | 941 | 0 | 0 | 437 | 92 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.65 | 0.35 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1830 | 385 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.06 | 0.00 | 0.09 | 0.42 | 0.29 | 0.00 | 0.00 | 0.24 | 0.24 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 11.8 | 0.0 | 11.8 | 55.4 | 87.2 | 0.0 | 0.0 | 31.8 | 31.8 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.58 | 0.00 | 0.90 | 0.90 | 0.40 | 0.00 | 0.00 | 0.90 | 0.90 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 51.7 | 0.0 | 53.5 | 29.8 | 6.3 | 0.0 | 0.0 | 42.5 | 42.5 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 7.4 | 0.0 | 58.9 | 18.4 | 0.1 | 0.0 | 0.0 | 16.8 | 16.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 59.2 | 0.0 | 112.4 | 48.1 | 6.4 | 0.0 | 0.0 | 59.4 | 59.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 59.2 | 0.0 | 112.4 | 48.1 | 6.4 | 0.0 | 0.0 | 59.4 | 59.4 |
| LOS by Move: | E | E | E | E | A | F | D | A | A | A | E | E |
| HCM2kAvgQ: | 3 | 3 | 2 | 3 | 0 | 6 | 20 | 5 | 0 | 0 | 13 | 13 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #48: (46) University/US 101 SB Ramps




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 897 | 310 | 833 | 1198 | 0 | 0 | 0 | 0 | 309 | 0 | 313 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.50 | 0.56 | 0.50 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 0.00 | 1.50 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1430 | 0 | 1436 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.45 | 0.20 | 0.43 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 | 0.22 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 56.5 | 56.5 | 54.1 | 111 | 0.0 | 0.0 | 0.0 | 0.0 | 27.4 | 0.0 | 27.4 |
| Volume/Cap: | 0.00 | 1.18 | 0.52 | 1.18 | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 1.18 | 0.00 | 1.19 |
| Uniform Del: | 0.0 | 46.7 | 36.2 | 47.9 | 12.8 | 0.0 | 0.0 | 0.0 | 0.0 | 61.3 | 0.0 | 61.3 |
| IncremntDel: | 0.0 | 96.0 | 0.8 | 96.9 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 100.9 | 0.0 | 105.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 143 | 37.0 | 144.8 | 16.2 | 0.0 | 0.0 | 0.0 | 0.0 | 162.2 | 0.0 | 166.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 143 | 37.0 | 144.8 | 16.2 | 0.0 | 0.0 | 0.0 | 0.0 | 162.2 | 0.0 | 166.4 |
| LOS by Move: | A | F | D | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 33 | 7 | 30 | 21 | 0 | 0 | 0 | 0 | 16 | 0 | 16 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #48: (46) University/US 101 SB Ramps

Signal=Protect/Rights=Include
Final Vol: 0 770 501***
Lanes: 0 0 2 0 2

| Final Vol: | Lanes: | Signal=Protect Rights=Include | | | Signal=Protect Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | 4/25/2019 | | | |
| 0 | 0 | | Cycle Time (sec): | 150 | | 1 | 793*** |
| | 0 | | Loss Time (sec): | 12 | | 0 | |
| 0 | 0 | | Critical V/C: | 1.120 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 119.1 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 87.1 | | 1 | 299 |
| | | | LOS: | F | | | |

Lanes: 0 0 2 0 2
Final Vol: 0 1206*** 243
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1206 | 243 | 501 | 770 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 0.00 | 1.73 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1552 | 0 | 2103 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.46 | 0.12 | 0.20 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 61.3 | 61.3 | 26.2 | 87.5 | 0.0 | 0.0 | 0.0 | 0.0 | 50.5 | 0.0 | 50.5 |
| Volume/Cap: | 0.00 | 1.12 | 0.29 | 1.12 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.57 | 0.00 | 1.12 |
| Uniform Del: | 0.0 | 44.4 | 29.7 | 61.9 | 18.4 | 0.0 | 0.0 | 0.0 | 0.0 | 40.9 | 0.0 | 49.8 |
| IncremntDel: | 0.0 | 66.7 | 0.2 | 79.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 67.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 111 | 29.9 | 141.5 | 18.6 | 0.0 | 0.0 | 0.0 | 0.0 | 41.3 | 0.0 | 117.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 111 | 29.9 | 141.5 | 18.6 | 0.0 | 0.0 | 0.0 | 0.0 | 41.3 | 0.0 | 117.6 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 41 | 4 | 18 | 11 | 0 | 0 | 0 | 0 | 9 | 0 | 30 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 477*** 913 179
Lanes: 1 0 2 0 1

Final Vol: Lanes: Signal=Split Rights=Include
382*** 2
0
73 0
1
47 0

Vol Cnt Date: 4/25/2019
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 0.845
Avg Crit Del (sec/veh): 81.0
Avg Delay (sec/veh): 67.1
LOS: E

Signal=Split Rights=Include Lanes: Final Vol:
1 303***
0
0 100
1
0 26

Lanes: 1 0 1 1 0
Final Vol: 49*** 609 12
Signal=Protect/Rights=Include

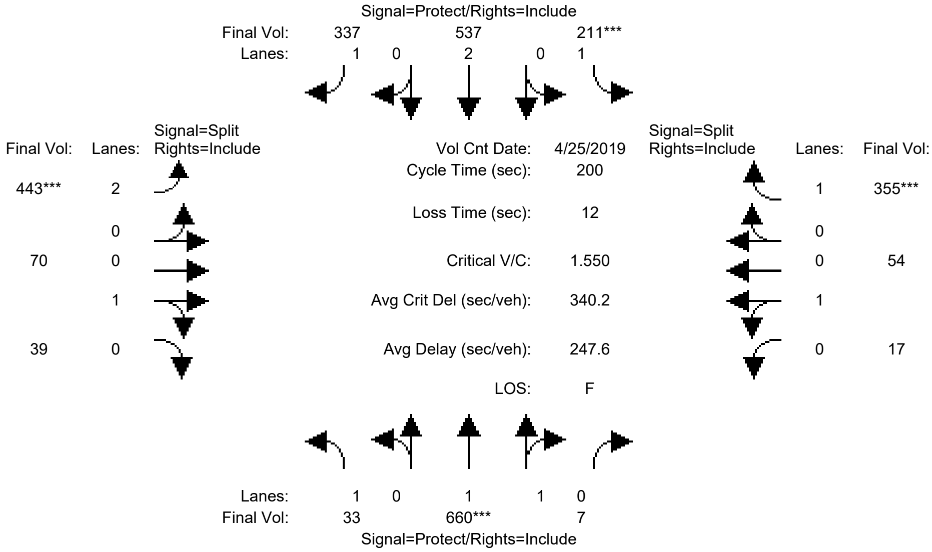
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 49 | 609 | 12 | 179 | 913 | 477 | 382 | 73 | 47 | 26 | 100 | 303 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 | 0.66 | 0.72 | 0.73 | 0.73 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 1.00 | 2.00 | 1.00 | 2.00 | 0.61 | 0.39 | 0.21 | 0.79 | 1.00 |
| Final Sat.: | 1408 | 2753 | 54 | 1408 | 2816 | 1260 | 2731 | 848 | 546 | 303 | 1164 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.22 | 0.22 | 0.13 | 0.32 | 0.38 | 0.14 | 0.09 | 0.09 | 0.09 | 0.09 | 0.24 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 8.2 | 62.2 | 62.2 | 35.7 | 89.7 | 89.7 | 33.1 | 33.1 | 33.1 | 57.0 | 57.0 | 57.0 |
| Volume/Cap: | 0.84 | 0.71 | 0.71 | 0.71 | 0.72 | 0.84 | 0.84 | 0.52 | 0.52 | 0.30 | 0.30 | 0.84 |
| Uniform Del: | 95.2 | 61.0 | 61.0 | 77.3 | 45.0 | 49.0 | 80.9 | 76.2 | 76.2 | 56.0 | 56.0 | 67.3 |
| IncremntDel: | 65.4 | 2.8 | 2.8 | 9.2 | 2.1 | 11.2 | 13.6 | 2.1 | 2.1 | 0.4 | 0.4 | 16.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 160.7 | 63.7 | 63.7 | 86.4 | 47.1 | 60.2 | 94.5 | 78.3 | 78.3 | 56.4 | 56.4 | 83.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 160.7 | 63.7 | 63.7 | 86.4 | 47.1 | 60.2 | 94.5 | 78.3 | 78.3 | 56.4 | 56.4 | 83.9 |
| LOS by Move: | F | E | E | F | D | E | F | E | E | E | E | F |
| HCM2kAvgQ: | 5 | 18 | 18 | 11 | 24 | 28 | 14 | 7 | 7 | 6 | 6 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #49: (47) University/Woodland



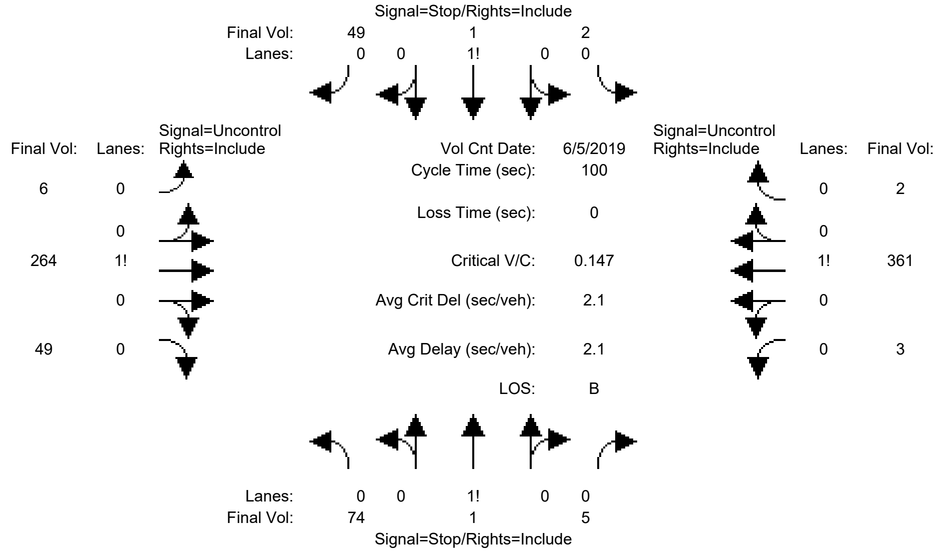

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 33 | 660 | 7 | 211 | 537 | 337 | 443 | 70 | 39 | 17 | 54 | 355 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.64 | 0.36 | 0.24 | 0.76 | 1.00 |
| Final Sat.: | 803 | 1588 | 17 | 803 | 1606 | 719 | 1558 | 514 | 286 | 200 | 635 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.42 | 0.26 | 0.33 | 0.47 | 0.28 | 0.14 | 0.14 | 0.08 | 0.08 | 0.49 |
| Crit Moves: | | **** | | **** | | | **** | | | | | **** |
| Green Time: | 7.1 | 53.6 | 53.6 | 33.9 | 80.5 | 80.5 | 36.7 | 36.7 | 36.7 | 63.8 | 63.8 | 63.8 |
| Volume/Cap: | 1.17 | 1.55 | 1.55 | 1.55 | 0.83 | 1.17 | 1.55 | 0.74 | 0.74 | 0.27 | 0.27 | 1.55 |
| Uniform Del: | 96.5 | 73.2 | 73.2 | 83.0 | 53.6 | 59.8 | 81.7 | 77.2 | 77.2 | 50.7 | 50.7 | 68.1 |
| IncremntDel: | 223.4 | 259 | 258.6 | 280.2 | 8.9 | 105.3 | 263.9 | 18.3 | 18.3 | 0.5 | 0.5 | 267.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 319.9 | 332 | 331.7 | 363.2 | 62.5 | 165.0 | 345.6 | 95.5 | 95.5 | 51.3 | 51.3 | 335.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 319.9 | 332 | 331.7 | 363.2 | 62.5 | 165.0 | 345.6 | 95.5 | 95.5 | 51.3 | 51.3 | 335.9 |
| LOS by Move: | F | F | F | F | E | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 4 | 38 | 38 | 23 | 17 | 29 | 25 | 8 | 8 | 3 | 3 | 38 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street




| Street Name: | Saratoga Avenue | | | | | | Newbridge Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Volume Module: >> Count Date: 5 Jun 2019 << | | | | | | | | | | | | |
| Base Vol: | 74 | 1 | 5 | 2 | 1 | 49 | 6 | 264 | 49 | 3 | 361 | 2 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 74 | 1 | 5 | 2 | 1 | 49 | 6 | 264 | 49 | 3 | 361 | 2 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 74 | 1 | 5 | 2 | 1 | 49 | 6 | 264 | 49 | 3 | 361 | 2 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 74 | 1 | 5 | 2 | 1 | 49 | 6 | 264 | 49 | 3 | 361 | 2 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 74 | 1 | 5 | 2 | 1 | 49 | 6 | 264 | 49 | 3 | 361 | 2 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | xxxx | xxxxx | 4.1 | xxxx | xxxxx |
| FollowUpTim: | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | xxxx | xxxxx | 2.2 | xxxx | xxxxx |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | 694 | 670 | 289 | 672 | 693 | 362 | 363 | xxxx | xxxxx | 313 | xxxx | xxxxx |
| Potent Cap.: | 360 | 381 | 755 | 373 | 369 | 687 | 1207 | xxxx | xxxxx | 1259 | xxxx | xxxxx |
| Move Cap.: | 332 | 378 | 755 | 367 | 367 | 687 | 1207 | xxxx | xxxxx | 1259 | xxxx | xxxxx |
| Total Cap: | 503 | 523 | xxxxx | 543 | 517 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.15 | 0.00 | 0.01 | 0.00 | 0.00 | 0.07 | 0.00 | xxxx | xxxx | 0.00 | xxxx | xxxx |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | 0.0 | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 8.0 | xxxx | xxxxx | 7.9 | xxxx | xxxxx |
| LOS by Move: | * | * | * | * | * | * | A | * | * | A | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | 514 | xxxxx | xxxx | 676 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | 0.5 | xxxxx | xxxxx | 0.2 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | 13.3 | xxxxx | xxxxx | 10.8 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | B | * | * | B | * | * | * | * | * | * | * |
| ApproachDel: | | 13.3 | | | 10.8 | | | xxxxxx | | | xxxxxx | |
| ApproachLOS: | | B | | | B | | | * | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

Intersection #52 (52) Saratoga Avenue and Newbridge Street

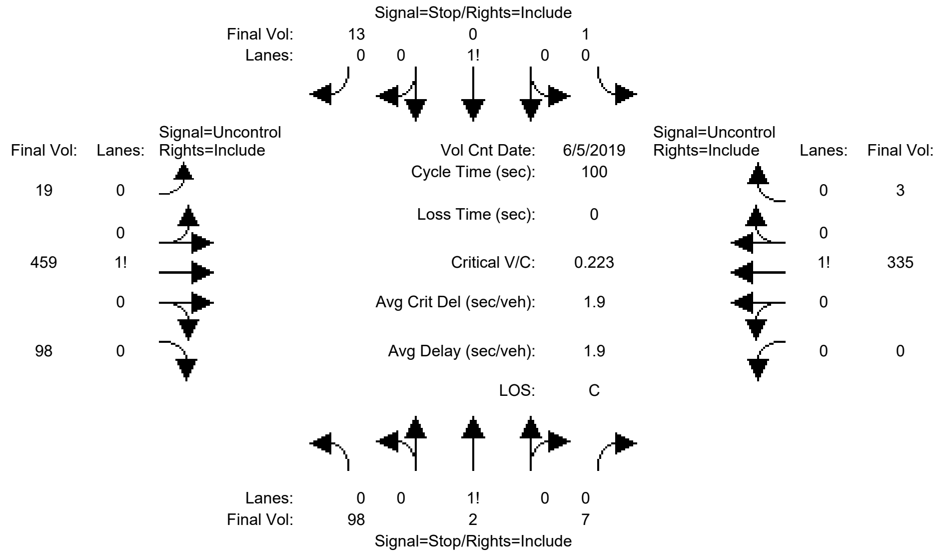
 

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   74    1     5     2    1    49     6  264    49     3  361     2
ApproachDel:      13.3              10.8           xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=80]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=817]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=52]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=817]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   74    1     5     2    1    49     6  264    49     3  361     2
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             685
Minor Approach Volume:           80
Minor Approach Volume Threshold: 320
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

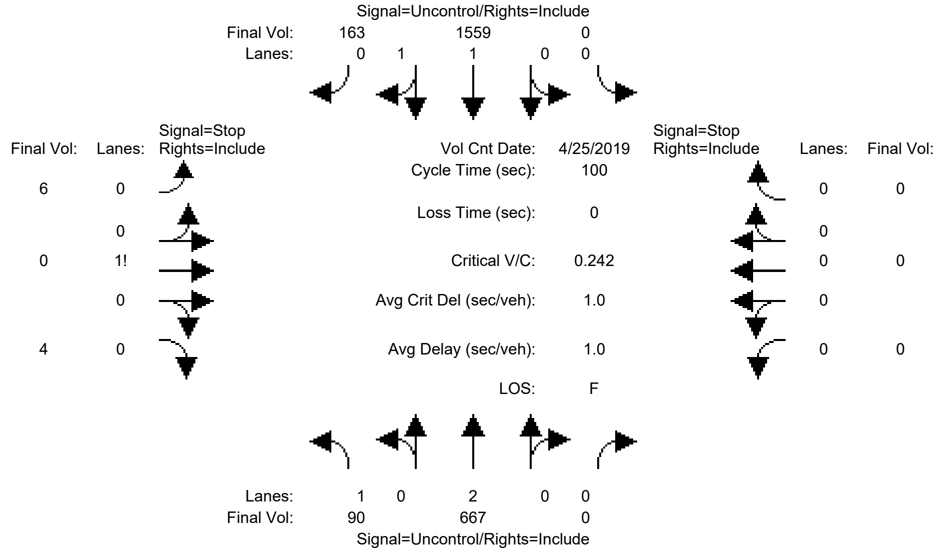



```
Street Name:          Saratoga Avenue                  Newbridge Street
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 5 Jun 2019 <<
Base Vol:      98    2    7     1    0    13    19  459    98     0  335     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   98    2    7     1    0    13    19  459    98     0  335     3
Added Vol:      0    0    0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0    0     0    0     0     0    0     0     0    0     0
Initial Fut:   98    2    7     1    0    13    19  459    98     0  335     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    98    2    7     1    0    13    19  459    98     0  335     3
Reduct Vol:     0    0    0     0    0     0     0    0     0     0    0     0
FinalVolume:   98    2    7     1    0    13    19  459    98     0  335     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  889  884   508   887  932   337   338 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  266  286   569   267  269   710  1232 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    258  282   569   259  265   710  1232 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    439  440 xxxxx   439  425 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.22 0.00  0.01  0.00 0.00  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  446 xxxxx  xxxx  680 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.9 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 15.6 xxxxx xxxxx 10.4 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:      15.6              10.4             xxxxxx           xxxxxx
ApproachLOS:         C                 B                *                *
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98    2     7     1     0    13    19  459    98     0  335     3
ApproachDel:      15.6             10.4            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=107]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1035]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1035]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98    2     7     1     0    13    19  459    98     0  335     3
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             914
Minor Approach Volume:           107
Minor Approach Volume Threshold: 243
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #300: (37) University Ave & Adams Dr




```
Street Name:          University Ave                    Adams Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 25 Apr 2019 <<
Base Vol:      90  667     0     0 1559   163     6    0     4     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   90  667     0     0 1559   163     6    0     4     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   90  667     0     0 1559   163     6    0     4     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    90  667     0     0 1559   163     6    0     4     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   90  667     0     0 1559   163     6    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1722 xxxx xxxxx  xxxx xxxx xxxxx  2154 2488   861  xxxx xxxx xxxxx
Potent Cap.:  372 xxxx xxxxx  xxxx xxxx xxxxx    42   30   303  xxxx xxxx xxxxx
Move Cap.:    372 xxxx xxxxx  xxxx xxxx xxxxx    34   23   303  xxxx xxxx xxxxx
Volume/Cap:  0.24 xxxx  xxxx  xxxx xxxx  xxxx  0.18 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.9 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del: 17.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    C    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   53 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 88.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             88.1            xxxxxx
ApproachLOS:        *                *                 F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   163     6    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx              88.1            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2489]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   163     6    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2479
Minor Approach Volume:           10
Minor Approach Volume Threshold: -28 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #300: (37) University Ave & Adams Dr

Signal=Uncontrol/Rights=Include
Final Vol: 13 374 0
Lanes: 0 1 1 0 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | 4/25/2019 | | | |
| 201 | 0 | | Cycle Time (sec): | 100 | | 0 | 0 |
| | | | Loss Time (sec): | 0 | | | |
| | 0 | | | | | 0 | |
| 0 | 1! | | Critical V/C: | 1.290 | | 0 | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 23.7 | | 0 | |
| 44 | 0 | | Avg Delay (sec/veh): | 23.7 | | 0 | 0 |
| | | | LOS: | F | | | |

Lanes: 1 0 2 0 0
Final Vol: 7 1802 0
Signal=Uncontrol/Rights=Include

| Street Name: | University Ave | | | | | | Adams Dr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Volume Module: >> Count Date: 25 Apr 2019 << | | | | | | | | | | | | |
| Base Vol: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | 6.5 | 6.9 | xxxxx | xxxx | xxxxx |
| FollowUpTim: | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | 4.0 | 3.3 | xxxxx | xxxx | xxxxx |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | 387 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1296 | 2197 | 194 | xxxx | xxxx | xxxxx |
| Potent Cap.: | 1183 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 157 | 46 | 822 | xxxx | xxxx | xxxxx |
| Move Cap.: | 1183 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 156 | 45 | 822 | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.01 | xxxx | xxxx | xxxx | xxxx | xxxx | 1.29 | 0.00 | 0.05 | xxxx | xxxx | xxxx |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | 0.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | 8.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | A | * | * | * | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | 182 | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 14.3 | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 236 | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | F | * | * | * | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | 235.8 | | | xxxxxx | |
| ApproachLOS: | | * | | | * | | | F | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

**********************************************************************************

Intersection #300 (37) University Ave & Adams Dr

**********************************************************************************

Future Volume Alternative: Peak Hour Warrant Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   201    0    44     0    0     0
ApproachDel:    xxxxxx           xxxxxx            235.8            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=16.0]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=245]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2441]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   201    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2196
Minor Approach Volume:           245
Minor Approach Volume Threshold: 14 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)

Signal=Protect/Rights=Include
Final Vol: 0 0 0
Lanes: 0 0 0 0 0

Signal=Protect Rights=Include (West) | Signal=Protect Rights=Include (East)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | 0 | 0 |
| | | | Cycle Time (sec): | 100 | | |
| | 0 | | Loss Time (sec): | 0 | 0 | |
| 0 | 0 | | Critical V/C: | 0.000 | 0 | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 0.0 | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 0.0 | 0 | 0 |
| | | | LOS: | | | |

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Protect/Rights=Include

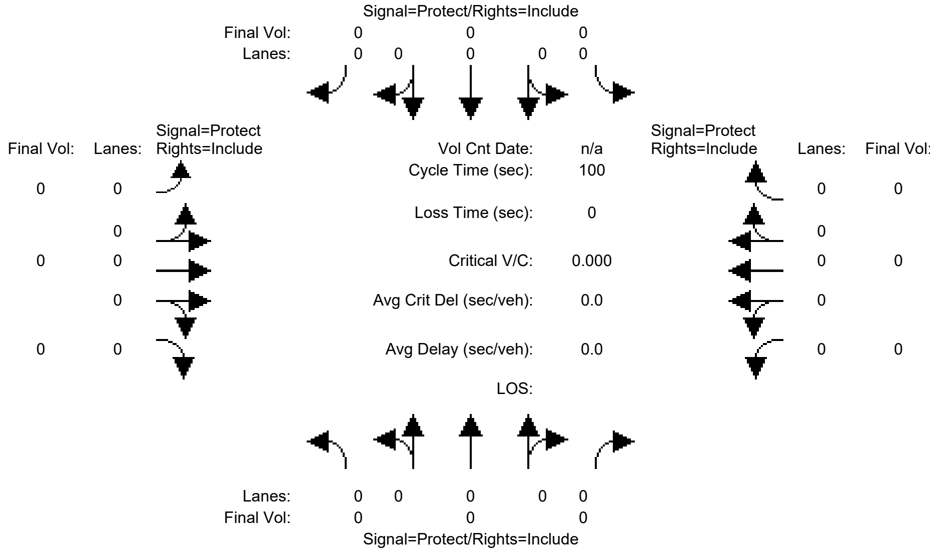
| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



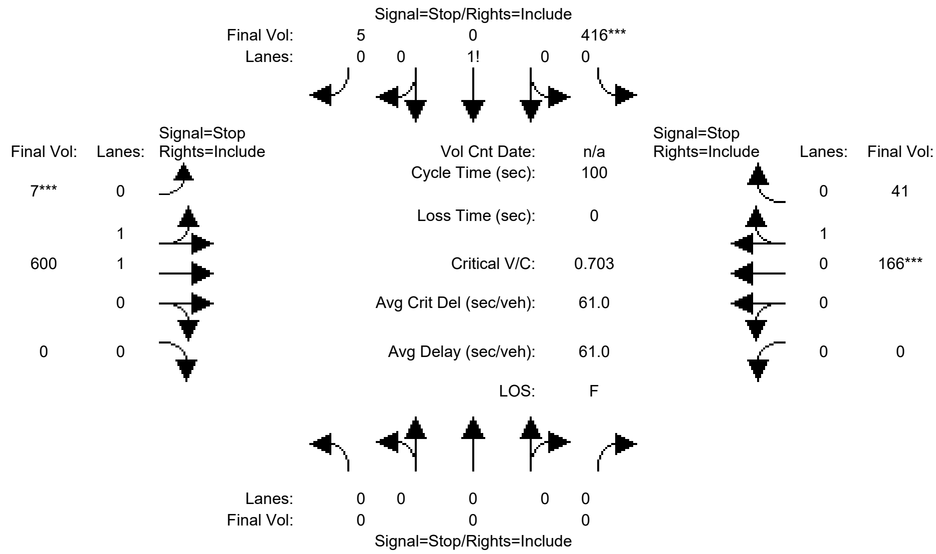

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 416 | 0 | 5 | 7 | 600 | 0 | 0 | 166 | 41 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.01 | 0.02 | 1.98 | 0.00 | 0.00 | 0.80 | 0.20 |
| Final Sat.: | 0 | 0 | 0 | 591 | 0 | 7 | 13 | 1150 | 0 | 0 | 466 | 115 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 0.70 | xxxx | 0.70 | 0.52 | 0.52 | xxxx | xxxx | 0.36 | 0.36 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 20.8 | 0.0 | 20.8 | 15.0 | 15.0 | 0.0 | 0.0 | 11.9 | 11.9 |
| Delay Adj: | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 77.1 | 0.0 | 77.1 | 55.7 | 55.6 | 0.0 | 0.0 | 44.2 | 44.2 |
| LOS by Move: | * | * | * | F | * | F | F | F | * | * | E | E |
| ApproachDel: | | xxxxxx | | | 20.8 | | | 15.0 | | | 11.9 | |
| Delay Adj: | | xxxxx | | | 3.70 | | | 3.70 | | | 3.70 | |
| ApprAdjDel: | | xxxxxx | | | 77.1 | | | 55.6 | | | 44.2 | |
| LOS by Appr: | | * | | | F | | | F | | | E | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 | 0.0 | 0.5 | 0.5 | 0.5 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

*****************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

*****************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   416    0     5     7  600     0     0  166    41
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             814
Minor Approach Volume:           421
Minor Approach Volume Threshold: 356
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue

Signal=Stop/Rights=Include
Final Vol: 21 0 183***
Lanes: 0 0 1! 0 0

Signal=Stop Rights=Include (West approach) — Final Vol: 16***, 292, 0; Lanes: 0, 1, 1, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 1.011
Avg Crit Del (sec/veh): 60.3
Avg Delay (sec/veh): 60.3
LOS: F

Signal=Stop Rights=Include (East approach) — Lanes: 0, 1, 0, 0, 0; Final Vol: 142, 595***, 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Stop/Rights=Include

```
Street Name:        East Bayshore Road                 Euclid Avenue
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0  183    0    21   16  292     0    0  595   142
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0  183    0    21   16  292     0    0  595   142
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0  183    0    21   16  292     0    0  595   142
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0    0     0  183    0    21   16  292     0    0  595   142
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0  183    0    21   16  292     0    0  595   142
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    0     0  183    0    21   16  292     0    0  595   142
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 0.00  0.00 0.90 0.00  0.10 0.10 1.90  0.00 0.00 0.81  0.19
Final Sat.:     0    0     0  506    0    58   62 1143     0    0  588   140
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx 0.36 xxxx  0.36 0.26 0.26  xxxx xxxx 1.01  1.01
Crit Moves:                  ****            ****                  ****
Delay/Veh:    0.0  0.0   0.0 12.7  0.0  12.7 10.6 10.6   0.0  0.0 58.0  58.0
Delay Adj:   1.55 1.55  1.55 1.55 1.55  1.55 1.55 1.55  1.55 1.55 1.55  1.55
AdjDel/Veh:   0.0  0.0   0.0 19.7  0.0  19.7 16.4 16.4   0.0  0.0 89.8  89.8
LOS by Move:    *    *     *    C    *     C    C    C     *    *    F     F
ApproachDel:     xxxxxx            12.7             10.6             58.0
Delay Adj:        xxxxx            1.55             1.55             1.55
ApprAdjDel:      xxxxxx            19.7             16.4             89.8
LOS by Appr:        *                C                C                F
AllWayAvgQ:   0.0  0.0   0.0  0.5  0.5   0.5  0.3  0.3   0.0 10.1 10.1  10.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign         Stop Sign         Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   183    0    21    16  292     0     0  595   142
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1045
Minor Approach Volume:          204
Minor Approach Volume Threshold: 270
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue

Signal=Stop/Rights=Include
Final Vol: 5 0 426***
Lanes: 0 0 1! 0 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 100 | | | |
| 7*** | 0 | | | | | 0 | 41*** |
| | | | Loss Time (sec): | 0 | | | |
| | 1 | | | | | 1 | |
| 600 | 1 | | Critical V/C: | 0.731 | | 0 | 205 |
| | 0 | | Avg Crit Del (sec/veh): | 64.6 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 64.6 | | 0 | 0 |
| | | | LOS: | F | | | |

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Stop/Rights=Include

```
Street Name:        East Bayshore Road                 Euclid Avenue
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0  426    0     5    7  600     0    0  205    41
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0  426    0     5    7  600     0    0  205    41
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0  426    0     5    7  600     0    0  205    41
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0  426    0     5    7  600     0    0  205    41
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0  426    0     5    7  600     0    0  205    41
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0  426    0     5    7  600     0    0  205    41
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.99 0.00  0.01  0.02 1.98  0.00  0.00 0.83  0.17
Final Sat.:     0    0     0  583    0     7   13 1125     0    0  479    96
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.73 xxxx  0.73  0.53 0.53  xxxx  xxxx 0.43  0.43
Crit Moves:                   ****             ****                        ****
Delay/Veh:    0.0  0.0   0.0  22.6  0.0  22.6  15.5 15.5   0.0   0.0 13.1  13.1
Delay Adj:   3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70
AdjDel/Veh:   0.0  0.0   0.0  83.8  0.0  83.8  57.5 57.4   0.0   0.0 48.6  48.6
LOS by Move:    *    *     *     F    *     F     F    F     *     *    E     E
ApproachDel:    xxxxxx             22.6              15.5              13.1
Delay Adj:       xxxxx             3.70              3.70              3.70
ApprAdjDel:     xxxxxx             83.8              57.4              48.6
LOS by Appr:       *                 F                 F                 E
AllWayAvgQ:   0.0  0.0   0.0   2.2  2.2   2.2   1.0  1.0   0.0   0.7  0.7   0.7
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

Future Volume Alternative: Peak Hour Warrant Met

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Stop Sign | | | Stop Sign | | | Stop Sign | | | Stop Sign | | |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 1! | 0 0 | 0 1 | 1 | 0 0 | 0 0 | 0 | 1 0 |
| Initial Vol: | 0 | 0 | 0 | 426 | 0 | 5 | 7 | 600 | 0 | 0 | 205 | 41 |

Major Street Volume: 853
Minor Approach Volume: 431
Minor Approach Volume Threshold: 340

SIGNAL WARRANT DISCLAIMER

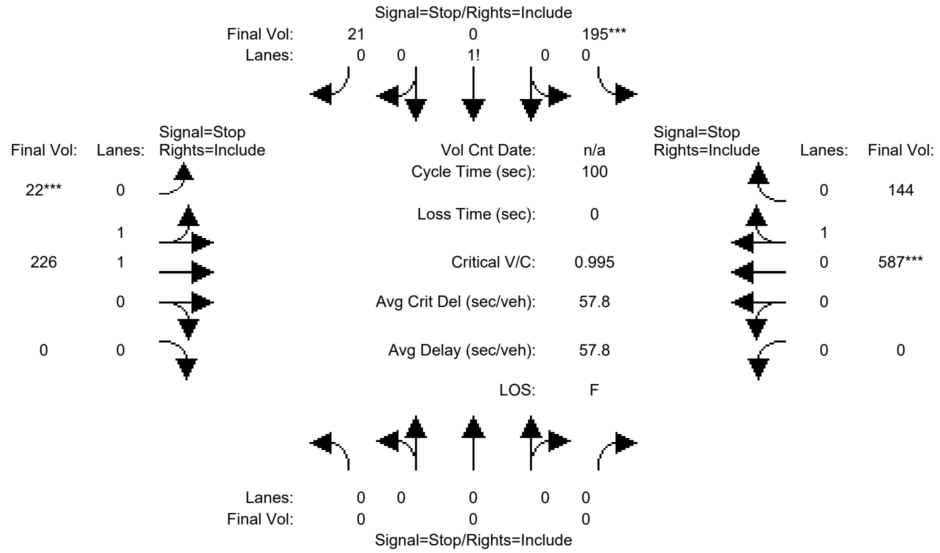
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 195 | 0 | 21 | 22 | 226 | 0 | 0 | 587 | 144 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.10 | 0.18 | 1.82 | 0.00 | 0.00 | 0.80 | 0.20 |
| Final Sat.: | 0 | 0 | 0 | 516 | 0 | 56 | 105 | 1086 | 0 | 0 | 590 | 145 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 0.38 | xxxx | 0.38 | 0.21 | 0.21 | xxxx | xxxx | 1.00 | 1.00 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 12.8 | 10.2 | 10.2 | 0.0 | 0.0 | 53.7 | 53.7 |
| Delay Adj: | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 19.9 | 0.0 | 19.9 | 15.9 | 15.8 | 0.0 | 0.0 | 83.3 | 83.3 |
| LOS by Move: | * | * | * | C | * | C | C | C | * | * | F | F |
| ApproachDel: | | xxxxxx | | | 12.8 | | | 10.2 | | | 53.7 | |
| Delay Adj: | | xxxxx | | | 1.55 | | | 1.55 | | | 1.55 | |
| ApprAdjDel: | | xxxxxx | | | 19.9 | | | 15.8 | | | 83.3 | |
| LOS by Appr: | | * | | | C | | | C | | | F | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.3 | 0.2 | 0.0 | 9.3 | 9.3 | 9.3 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

*****************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

*****************************************************************************

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L - T - R    L - T - R    L - T - R    L - T - R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   195    0    21    22  226     0     0  587   144
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             979
Minor Approach Volume:           216
Minor Approach Volume Threshold: 292
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 1430 209
Lanes: 0 0 2 0 1

Signal=Stop Rights=Include (West approach) — Final Vol: 0, 0, 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.239
Avg Crit Del (sec/veh): 1.7
Avg Delay (sec/veh): 1.7
LOS: C

Signal=Stop Rights=Include (East approach) — Lanes: 0, 0, 1!, 0, 0; Final Vol: 79, 0, 27

Lanes: 0 0 1 1 0
Final Vol: 0 658 57
Signal=Uncontrol/Rights=Include

```
Street Name:          University Avenue                    Purdue Avenue
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  658    57   209 1430     0     0    0     0    27    0    79
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  658    57   209 1430     0     0    0     0    27    0    79
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  658    57   209 1430     0     0    0     0    27    0    79
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  658    57   209 1430     0     0    0     0    27    0    79
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  658    57   209 1430     0     0    0     0    27    0    79
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   715 xxxx xxxxx  xxxx xxxx xxxxx  1820 2535   358
Potent Cap.: xxxx xxxx xxxxx   875 xxxx xxxxx  xxxx xxxx xxxxx    69   27   639
Move Cap.:   xxxx xxxx xxxxx   875 xxxx xxxxx  xxxx xxxx xxxxx    56   21   639
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    50   68 xxxxx   151   76 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.24 xxxx  xxxx  xxxx xxxx  xxxx  0.18 0.00  0.12
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.9 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  10.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  350 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.3 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 19.7 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx             19.7
ApproachLOS:          *                 *                 *                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  658    57   209 1430     0     0    0     0    27    0    79
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             19.7
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=106]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2460]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  658    57   209 1430     0     0    0     0    27    0    79
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2354
Minor Approach Volume:           106
Minor Approach Volume Threshold: -10 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #8: (36) University Avenue and Purdue Avenue

```
                        Signal=Uncontrol/Rights=Include
            Final Vol:     0         453        46
                Lanes:     0    0     2     0    1

                  Signal=Stop                                   Signal=Stop
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:      n/a  Rights=Include    Lanes:  Final Vol:
                                      Cycle Time (sec):    100
   0         0                                                                      0       202
                                        Loss Time (sec):    0
             0                                                                      0
   0         0                          Critical V/C:     0.667                     1!       0
             0                    Avg Crit Del (sec/veh):  13.3                     0
   0         0                        Avg Delay (sec/veh): 13.3                     0        46
                                                   LOS:     F

                Lanes:     0    0     1     1    0
            Final Vol:     0         1695        10
                        Signal=Uncontrol/Rights=Include

Street Name:        University Avenue                Purdue Avenue
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0 1695    10    46  453     0     0    0     0    46    0   202
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0 1695    10    46  453     0     0    0     0    46    0   202
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0 1695    10    46  453     0     0    0     0    46    0   202
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0 1695    10    46  453     0     0    0     0    46    0   202
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0 1695    10    46  453     0     0    0     0    46    0   202
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1705 xxxx xxxxx  xxxx xxxx xxxxx  2019 2245   853
Potent Cap.: xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    51   41   303
Move Cap.:   xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    46   36   303
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    54   83 xxxxx   111  112 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.13 xxxx  xxxx  xxxx xxxx  xxxx  0.41 0.00  0.67
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  16.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  229 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.9 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  128 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           128.5
ApproachLOS:        *                *                *                F
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695    10    46  453     0     0    0     0    46    0   202
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            128.5
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=8.9]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=248]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2452]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695    10    46  453     0     0    0     0    46    0   202
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2204
Minor Approach Volume:           248
Minor Approach Volume Threshold: 13 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 1430 214
Lanes: 0 0 2 0 1

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| 0 | 0 | | Cycle Time (sec): | 100 | | 0 | 90 |
| | | | Loss Time (sec): | 0 | | | |
| | 0 | | | | | 0 | |
| 0 | 0 | | Critical V/C: | 0.357 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 2.6 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 2.6 | | 0 | 54 |
| | | | LOS: | D | | | |

Lanes: 0 0 1 1 0
Final Vol: 0 614 79
Signal=Uncontrol/Rights=Include

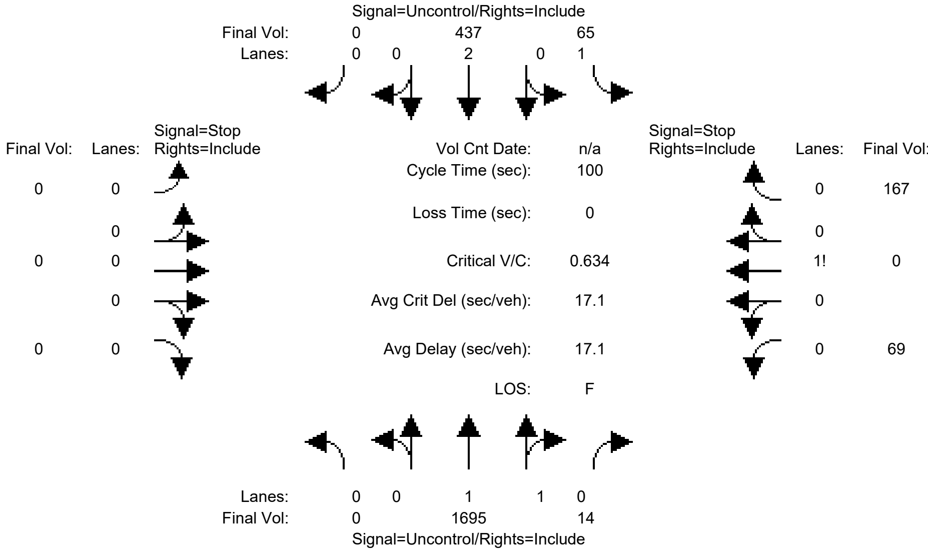
```
Street Name:        University Avenue                    Purdue Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  614    79   214 1430     0     0    0     0    54    0    90
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  614    79   214 1430     0     0    0     0    54    0    90
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  614    79   214 1430     0     0    0     0    54    0    90
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  614    79   214 1430     0     0    0     0    54    0    90
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  614    79   214 1430     0     0    0     0    54    0    90
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   693 xxxx xxxxx  xxxx xxxx xxxxx  1797 2512   347
Potent Cap.: xxxx xxxx xxxxx   891 xxxx xxxxx  xxxx xxxx xxxxx    72   28   650
Move Cap.:   xxxx xxxx xxxxx   891 xxxx xxxxx  xxxx xxxx xxxxx    58   21   650
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    49   67 xxxxx   151   75 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.24 xxxx  xxxx  xxxx xxxx  xxxx  0.36 0.00  0.14
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.9 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  10.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  290 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.6 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 29.0 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    D     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             29.0
ApproachLOS:         *                *                *                D
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614    79   214 1430     0     0     0     0    54     0    90
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             29.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=144]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2481]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614    79   214 1430     0     0     0     0    54     0    90
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2337
Minor Approach Volume:           144
Minor Approach Volume Threshold: -8 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #8: (36) University Avenue and Purdue Avenue




```
Street Name:        University Avenue                  Purdue Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0 1695    14    65  437     0     0    0     0    69    0   167
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0 1695    14    65  437     0     0    0     0    69    0   167
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0 1695    14    65  437     0     0    0     0    69    0   167
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0 1695    14    65  437     0     0    0     0    69    0   167
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0 1695    14    65  437     0     0    0     0    69    0   167
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1709 xxxx xxxxx  xxxx xxxx xxxxx  2051 2269   855
Potent Cap.: xxxx xxxx xxxxx   363 xxxx xxxxx  xxxx xxxx xxxxx    48   40   302
Move Cap.:   xxxx xxxx xxxxx   363 xxxx xxxxx  xxxx xxxx xxxxx    42   33   302
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    68   68 xxxxx   109  110 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.18 xxxx  xxxx  xxxx xxxx  xxxx  0.63 0.00  0.55
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  17.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     C    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  199 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  172 xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           172.4
ApproachLOS:          *                *                *                F
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695   14    65  437    0     0    0     0    69    0   167
ApproachDel:    xxxxxx          xxxxxx          xxxxxx            172.4
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=11.3]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=236]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2447]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695   14    65  437    0     0    0     0    69    0   167
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2211
Minor Approach Volume:           236
Minor Approach Volume Threshold: 11 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 275 1184*** 0
Lanes: 0 1 1 0 0

Final Vol: Lanes: Signal=Split Rights=Overlap
33*** 1
0
0 0
0
20 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.527
Avg Crit Del (sec/veh): 12.8
Avg Delay (sec/veh): 9.5
LOS: A

Signal=Split Rights=Include Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 110*** 778 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 110 | 778 | 0 | 0 | 1184 | 275 | 33 | 0 | 20 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.62 | 0.38 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2848 | 661 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.22 | 0.00 | 0.00 | 0.42 | 0.42 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 16.7 | 131 | 0.0 | 0.0 | 114 | 114.3 | 10.0 | 0.0 | 26.7 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.55 | 0.25 | 0.00 | 0.00 | 0.55 | 0.55 | 0.27 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 63.0 | 1.5 | 0.0 | 0.0 | 7.3 | 7.3 | 66.6 | 0.0 | 51.3 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 3.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 1.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 66.1 | 1.6 | 0.0 | 0.0 | 7.5 | 7.5 | 67.8 | 0.0 | 51.4 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 66.1 | 1.6 | 0.0 | 0.0 | 7.5 | 7.5 | 67.8 | 0.0 | 51.4 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | A | A | E | A | D | A | A | A |
| HCM2kAvgQ: | 5 | 3 | 0 | 0 | 14 | 14 | 2 | 0 | 1 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 23 485 0***
Lanes: 0 1 1 0 0

Signal=Split
Rights=Overlap
Final Vol: Lanes:
185*** 1
0
0 0
0
161 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.558
Avg Crit Del (sec/veh): 13.4
Avg Delay (sec/veh): 15.4
LOS: B

Signal=Split
Rights=Include
Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 6 1522*** 0
Signal=Protect/Rights=Include

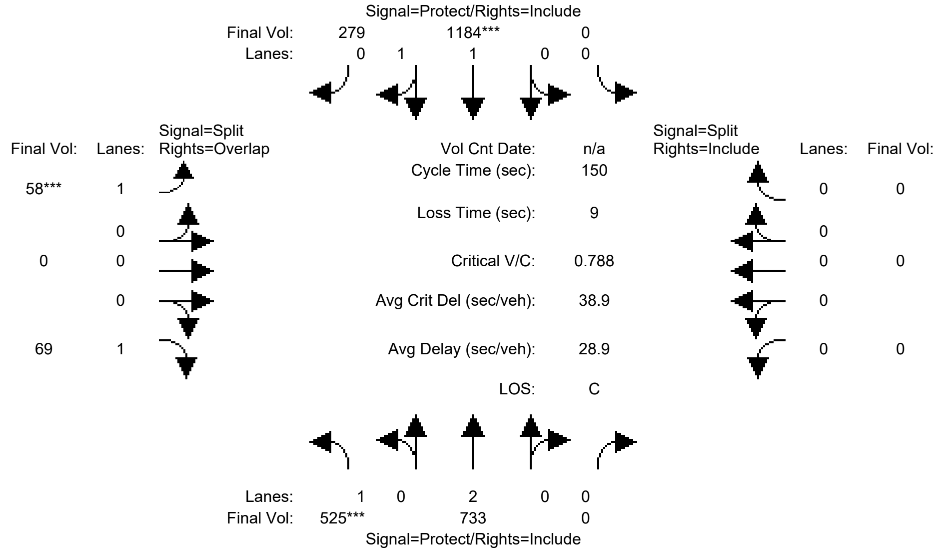
| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 6 | 1522 | 0 | 0 | 485 | 23 | 185 | 0 | 161 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.91 | 0.09 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3422 | 162 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.42 | 0.00 | 0.00 | 0.14 | 0.14 | 0.10 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 28.1 | 113 | 0.0 | 0.0 | 85.3 | 85.3 | 27.6 | 0.0 | 55.7 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.02 | 0.56 | 0.00 | 0.00 | 0.25 | 0.25 | 0.56 | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 49.7 | 7.7 | 0.0 | 0.0 | 16.2 | 16.2 | 55.7 | 0.0 | 32.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | 2.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 49.7 | 8.0 | 0.0 | 0.0 | 16.3 | 16.3 | 57.8 | 0.0 | 33.2 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 49.7 | 8.0 | 0.0 | 0.0 | 16.3 | 16.3 | 57.8 | 0.0 | 33.2 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | A | A | A | B | B | E | A | C | A | A | A |
| HCM2kAvgQ: | 0 | 15 | 0 | 0 | 6 | 6 | 8 | 0 | 5 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #9: (38) University Avenue and O'Brien Drive




| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 525 | 733 | 0 | 0 | 1184 | 279 | 58 | 0 | 69 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.62 | 0.38 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2837 | 668 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.29 | 0.20 | 0.00 | 0.00 | 0.42 | 0.42 | 0.03 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 53.8 | 131 | 0.0 | 0.0 | 77.2 | 77.2 | 10.0 | 0.0 | 63.8 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.81 | 0.23 | 0.00 | 0.00 | 0.81 | 0.81 | 0.48 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 43.5 | 1.5 | 0.0 | 0.0 | 30.3 | 30.3 | 67.5 | 0.0 | 25.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 7.6 | 0.0 | 0.0 | 0.0 | 2.9 | 2.9 | 3.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 51.1 | 1.5 | 0.0 | 0.0 | 33.2 | 33.2 | 70.5 | 0.0 | 25.9 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.1 | 1.5 | 0.0 | 0.0 | 33.2 | 33.2 | 70.5 | 0.0 | 25.9 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | A | A | A | C | C | E | A | C | A | A | A |
| HCM2kAvgQ: | 23 | 3 | 0 | 0 | 30 | 30 | 3 | 0 | 2 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 34 464 0***
Lanes: 0 1 1 0 0

Signal=Split
Rights=Overlap
Final Vol: Lanes:
185 1
0
0 0
0
604*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.833
Avg Crit Del (sec/veh): 30.1
Avg Delay (sec/veh): 30.5
LOS: C

Signal=Split
Rights=Include
Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 22 1522*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 22 | 1522 | 0 | 0 | 464 | 34 | 185 | 0 | 604 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.86 | 0.14 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3330 | 244 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.42 | 0.00 | 0.00 | 0.14 | 0.14 | 0.10 | 0.00 | 0.37 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 19.9 | 79.4 | 0.0 | 0.0 | 59.5 | 59.5 | 61.6 | 0.0 | 81.5 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.09 | 0.80 | 0.00 | 0.00 | 0.35 | 0.35 | 0.25 | 0.00 | 0.69 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 57.1 | 28.7 | 0.0 | 0.0 | 31.7 | 31.7 | 29.0 | 0.0 | 25.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.2 | 2.4 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.0 | 2.3 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 57.3 | 31.2 | 0.0 | 0.0 | 31.9 | 31.9 | 29.2 | 0.0 | 27.3 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 31.2 | 0.0 | 0.0 | 31.9 | 31.9 | 29.2 | 0.0 | 27.3 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | C | A | A | C | C | C | A | C | A | A | A |
| HCM2kAvgQ: | 1 | 31 | 0 | 0 | 8 | 8 | 5 | 0 | 20 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

Signal=Protect/Rights=Include
Final Vol: 0 1180 10***
Lanes: 0 0 2 0 1

Signal=Split Rights=Include (West approach)
Final Vol: 0, 0, 0
Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.366
Avg Crit Del (sec/veh): 6.3
Avg Delay (sec/veh): 4.1
LOS: A

Signal=Split Rights=Include (East approach)
Lanes: 0, 0, 1!, 0, 0
Final Vol: 12, 0, 31***

Lanes: 0 0 1 1 0
Final Vol: 0 1105*** 25
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1105 | 25 | 10 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 12 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.93 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 | 0.28 |
| Final Sat.: | 0 | 3520 | 80 | 1805 | 3610 | 0 | 0 | 0 | 0 | 1272 | 0 | 492 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.31 | 0.31 | 0.01 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 124 | 124.0 | 7.0 | 131 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 10.0 |
| Volume/Cap: | 0.00 | 0.38 | 0.38 | 0.12 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.37 |
| Uniform Del: | 0.0 | 3.3 | 3.3 | 68.5 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 67.0 | 0.0 | 67.0 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 1.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 3.4 | 3.4 | 69.2 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 68.9 | 0.0 | 68.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 3.4 | 3.4 | 69.2 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 68.9 | 0.0 | 68.9 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 7 | 7 | 1 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

Signal=Protect/Rights=Include
Final Vol: 0 620 18***
Lanes: 0 0 2 0 1

| Final Vol: | Lanes: | Signal=Split Rights=Include | | | Signal=Split Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | | 0 | 36 |
| | | | Cycle Time (sec): | 150 | | | |
| | 0 | | Loss Time (sec): | 9 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.516 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 11.8 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 9.4 | | 0 | 80*** |
| | | | LOS: | A | | | |

Lanes: 0 0 1 1 0
Final Vol: 0 1445*** 29
Signal=Protect/Rights=Include

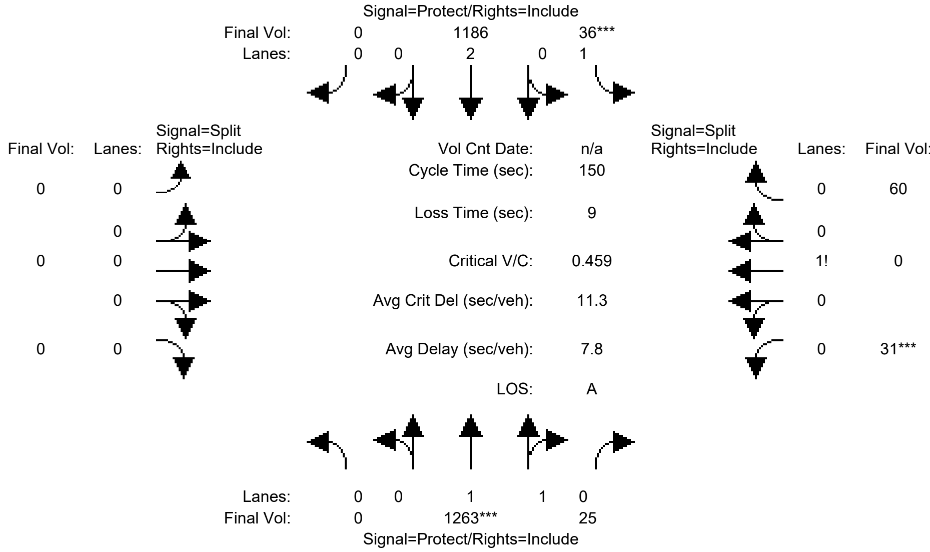
| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 18 | 620 | 0 | 0 | 0 | 0 | 80 | 0 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.93 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 | 0.00 | 0.31 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 1214 | 0 | 546 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.07 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 115 | 115.4 | 7.0 | 122 | 0.0 | 0.0 | 0.0 | 0.0 | 18.6 | 0.0 | 18.6 |
| Volume/Cap: | 0.00 | 0.53 | 0.53 | 0.21 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 | 0.53 |
| Uniform Del: | 0.0 | 6.7 | 6.7 | 68.8 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 61.6 | 0.0 | 61.6 |
| IncremntDel: | 0.0 | 0.2 | 0.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 6.9 | 6.9 | 70.1 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 64.2 | 0.0 | 64.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 6.9 | 6.9 | 70.1 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 64.2 | 0.0 | 64.2 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 14 | 14 | 1 | 3 | 0 | 0 | 0 | 0 | 6 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]



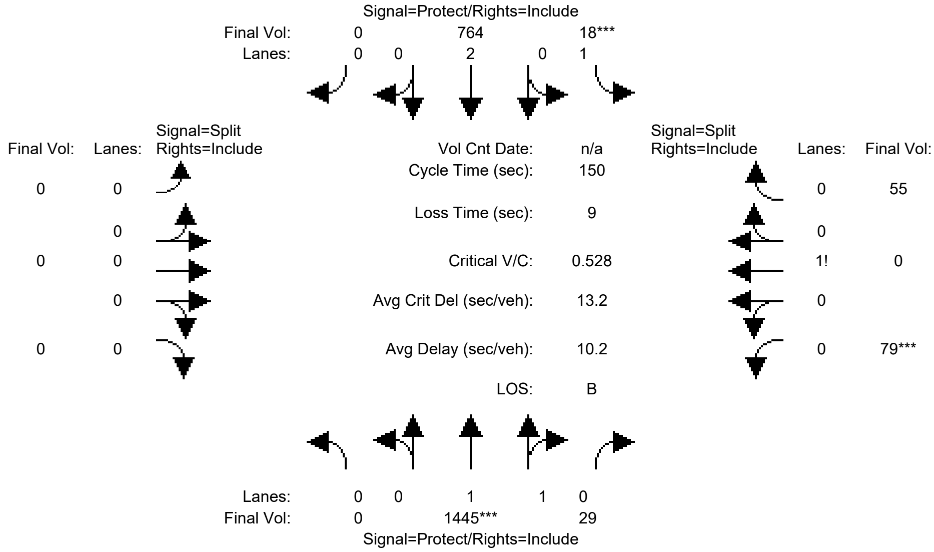

| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1263 | 25 | 36 | 1186 | 0 | 0 | 0 | 0 | 31 | 0 | 60 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.66 |
| Final Sat.: | 0 | 3529 | 70 | 1805 | 3610 | 0 | 0 | 0 | 0 | 580 | 0 | 1122 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.36 | 0.36 | 0.02 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.05 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 117 | 116.6 | 7.0 | 124 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 | 0.0 | 17.4 |
| Volume/Cap: | 0.00 | 0.46 | 0.46 | 0.43 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.46 | 0.00 | 0.46 |
| Uniform Del: | 0.0 | 5.8 | 5.8 | 69.6 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 61.9 | 0.0 | 61.9 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 3.5 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 1.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 5.9 | 5.9 | 73.0 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 63.6 | 0.0 | 63.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 5.9 | 5.9 | 73.0 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 63.6 | 0.0 | 63.6 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 11 | 11 | 2 | 7 | 0 | 0 | 0 | 0 | 4 | 0 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

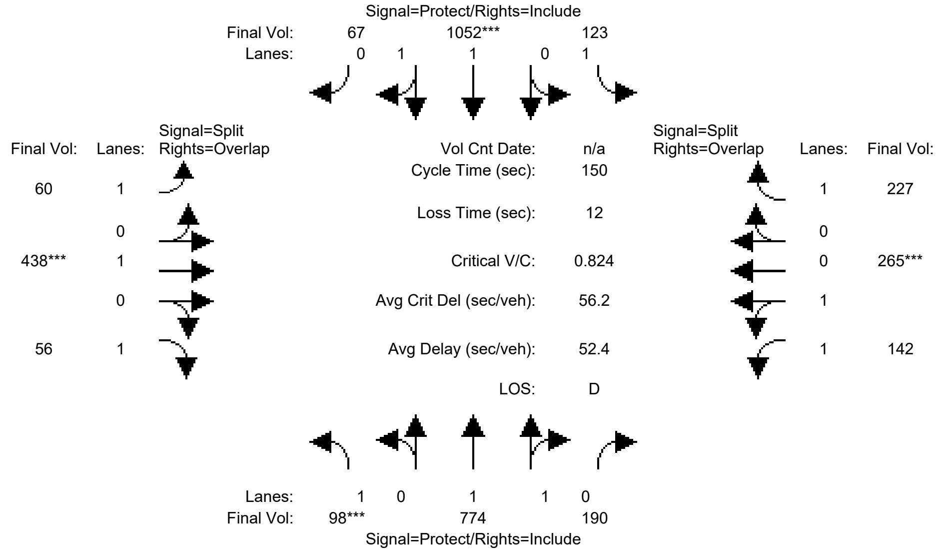



| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 18 | 764 | 0 | 0 | 0 | 0 | 79 | 0 | 55 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.92 | 1.00 | 0.92 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.59 | 0.00 | 0.41 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 1028 | 0 | 716 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.08 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 113 | 112.8 | 7.0 | 120 | 0.0 | 0.0 | 0.0 | 0.0 | 21.2 | 0.0 | 21.2 |
| Volume/Cap: | 0.00 | 0.54 | 0.54 | 0.21 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.54 |
| Uniform Del: | 0.0 | 7.8 | 7.8 | 68.8 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 59.9 | 0.0 | 59.9 |
| IncremntDel: | 0.0 | 0.2 | 0.2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 8.0 | 8.0 | 70.1 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.4 | 0.0 | 62.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 8.0 | 8.0 | 70.1 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.4 | 0.0 | 62.4 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 15 | 15 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #11: (40) University Avenue and Bay Road




| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 98 | 774 | 190 | 123 | 1052 | 67 | 60 | 438 | 56 | 142 | 265 | 227 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.89 | 0.89 | 0.92 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.96 | 0.96 | 0.83 |
| Lanes: | 1.00 | 1.61 | 0.39 | 1.00 | 1.88 | 0.12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 2730 | 670 | 1753 | 3266 | 208 | 1769 | 1862 | 1583 | 1830 | 1830 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.28 | 0.28 | 0.07 | 0.32 | 0.32 | 0.03 | 0.24 | 0.04 | 0.08 | 0.14 | 0.14 |
| Crit Moves: | **** | | | | **** | | | **** | | | **** | |
| Green Time: | 10.2 | 55.2 | 55.2 | 13.7 | 58.6 | 58.6 | 42.8 | 42.8 | 53.0 | 26.4 | 26.4 | 40.0 |
| Volume/Cap: | 0.82 | 0.77 | 0.77 | 0.77 | 0.82 | 0.82 | 0.12 | 0.82 | 0.10 | 0.44 | 0.82 | 0.54 |
| Uniform Del: | 69.0 | 41.8 | 41.8 | 66.6 | 41.0 | 41.0 | 39.6 | 50.1 | 32.5 | 55.2 | 59.6 | 47.1 |
| IncremntDel: | 35.2 | 3.0 | 3.0 | 20.3 | 4.2 | 4.2 | 0.1 | 10.1 | 0.1 | 0.3 | 10.8 | 1.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 104.3 | 44.8 | 44.8 | 86.9 | 45.3 | 45.3 | 39.7 | 60.2 | 32.6 | 55.6 | 70.4 | 48.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 104.3 | 44.8 | 44.8 | 86.9 | 45.3 | 45.3 | 39.7 | 60.2 | 32.6 | 55.6 | 70.4 | 48.5 |
| LOS by Move: | F | D | D | F | D | D | D | E | C | E | E | D |
| HCM2kAvgQ: | 6 | 22 | 22 | 7 | 26 | 26 | 2 | 21 | 2 | 6 | 14 | 9 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #11: (40) University Avenue and Bay Road

Signal=Protect/Rights=Include
Final Vol: 42 450 212***
Lanes: 0 1 1 0 1

Signal=Split Rights=Overlap (West) | Signal=Split Rights=Overlap (East)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 107 | 1 | | Vol Cnt Date: | n/a | 1 | 439 |
| | | | Cycle Time (sec): | 150 | | |
| | 0 | | Loss Time (sec): | 12 | 0 | |
| 294*** | 1 | | Critical V/C: | 0.941 | 0 | 364*** |
| | 0 | | Avg Crit Del (sec/veh): | 70.7 | 1 | |
| 85 | 1 | | Avg Delay (sec/veh): | 60.9 | 1 | 321 |
| | | | LOS: | E | | |

Lanes: 1 0 1 1 0
Final Vol: 59 1200*** 136
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 59 | 1200 | 136 | 212 | 450 | 42 | 107 | 294 | 85 | 321 | 364 | 439 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.91 | 0.91 | 0.92 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.96 | 0.96 | 0.83 |
| Lanes: | 1.00 | 1.80 | 0.20 | 1.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 3101 | 351 | 1753 | 3164 | 295 | 1769 | 1862 | 1583 | 1819 | 1819 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.39 | 0.39 | 0.12 | 0.14 | 0.14 | 0.06 | 0.16 | 0.05 | 0.18 | 0.20 | 0.28 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 20.0 | 61.7 | 61.7 | 19.3 | 60.9 | 60.9 | 25.2 | 25.2 | 45.2 | 31.9 | 31.9 | 51.2 |
| Volume/Cap: | 0.25 | 0.94 | 0.94 | 0.94 | 0.35 | 0.35 | 0.36 | 0.94 | 0.18 | 0.83 | 0.94 | 0.81 |
| Uniform Del: | 58.3 | 42.4 | 42.4 | 64.8 | 30.8 | 30.8 | 55.3 | 61.7 | 38.7 | 56.5 | 58.1 | 45.1 |
| IncremntDel: | 0.6 | 12.5 | 12.5 | 43.7 | 0.2 | 0.2 | 0.8 | 35.6 | 0.2 | 7.1 | 20.3 | 9.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 58.9 | 54.9 | 54.9 | 108.5 | 31.0 | 31.0 | 56.0 | 97.3 | 38.9 | 63.6 | 78.4 | 54.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 58.9 | 54.9 | 54.9 | 108.5 | 31.0 | 31.0 | 56.0 | 97.3 | 38.9 | 63.6 | 78.4 | 54.2 |
| LOS by Move: | E | D | D | F | C | C | E | F | D | E | E | D |
| HCM2kAvgQ: | 3 | 35 | 35 | 13 | 8 | 8 | 5 | 17 | 3 | 16 | 20 | 20 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #11: (40) University Avenue and Bay Road

Signal=Protect/Rights=Include
Final Vol: 62 1068*** 123
Lanes: 0 1 1 0 1

| Final Vol: | Lanes: | Signal=Split Rights=Overlap | | | Signal=Split Rights=Overlap | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 150 | | | |
| 60 | 1 | | | | | 1 | 237 |
| | | | Loss Time (sec): | 12 | | | |
| | 0 | | | | | 0 | |
| 413*** | 1 | | Critical V/C: | 0.870 | | 0 | 262*** |
| | 0 | | Avg Crit Del (sec/veh): | 62.9 | | 1 | |
| 56 | 1 | | Avg Delay (sec/veh): | 54.7 | | 1 | 137 |
| | | | LOS: | D | | | |

Lanes: 1 0 1 1 0
Final Vol: 194*** 890 146
Signal=Protect/Rights=Include

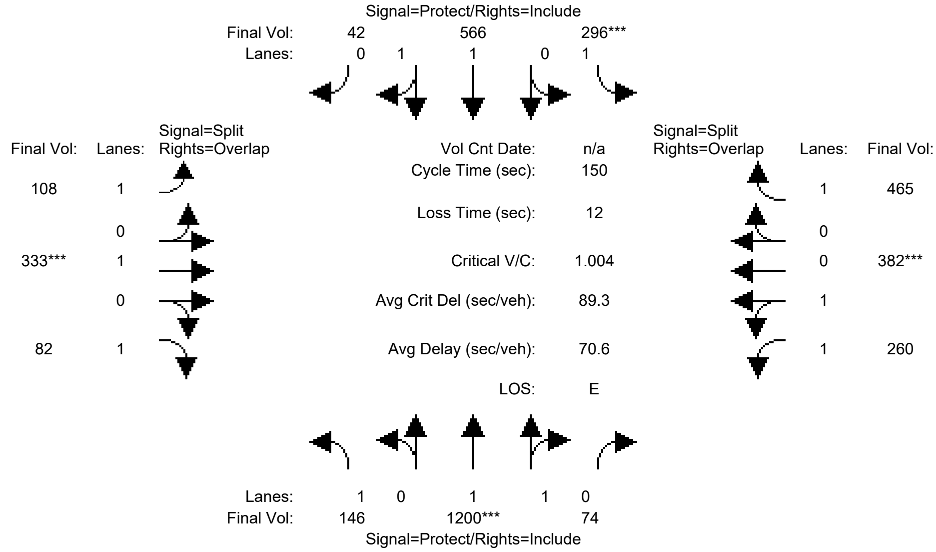
| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 194 | 890 | 146 | 123 | 1068 | 62 | 60 | 413 | 56 | 137 | 262 | 237 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.90 | 0.90 | 0.92 | 0.92 | 0.92 | 0.93 | 0.98 | 0.83 | 0.96 | 0.96 | 0.83 |
| Lanes: | 1.00 | 1.72 | 0.28 | 1.00 | 1.89 | 0.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 2948 | 484 | 1753 | 3286 | 191 | 1769 | 1862 | 1583 | 1830 | 1830 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.30 | 0.30 | 0.07 | 0.32 | 0.32 | 0.03 | 0.22 | 0.04 | 0.07 | 0.14 | 0.15 |
| Crit Moves: | **** | | | | **** | | | **** | | | **** | |
| Green Time: | 19.1 | 60.9 | 60.9 | 14.2 | 56.0 | 56.0 | 38.2 | 38.2 | 57.3 | 24.7 | 24.7 | 38.8 |
| Volume/Cap: | 0.87 | 0.74 | 0.74 | 0.74 | 0.87 | 0.87 | 0.13 | 0.87 | 0.09 | 0.46 | 0.87 | 0.58 |
| Uniform Del: | 64.2 | 37.9 | 37.9 | 66.1 | 43.6 | 43.6 | 43.1 | 53.5 | 29.7 | 56.6 | 61.1 | 48.4 |
| IncremntDel: | 28.7 | 2.2 | 2.2 | 16.5 | 6.6 | 6.6 | 0.1 | 15.8 | 0.1 | 0.4 | 16.3 | 2.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 93.0 | 40.1 | 40.1 | 82.7 | 50.2 | 50.2 | 43.2 | 69.4 | 29.8 | 57.0 | 77.4 | 50.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 93.0 | 40.1 | 40.1 | 82.7 | 50.2 | 50.2 | 43.2 | 69.4 | 29.8 | 57.0 | 77.4 | 50.5 |
| LOS by Move: | F | D | D | F | D | D | D | E | C | E | E | D |
| HCM2kAvgQ: | 11 | 22 | 22 | 7 | 28 | 28 | 2 | 21 | 2 | 6 | 14 | 10 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #11: (40) University Avenue and Bay Road



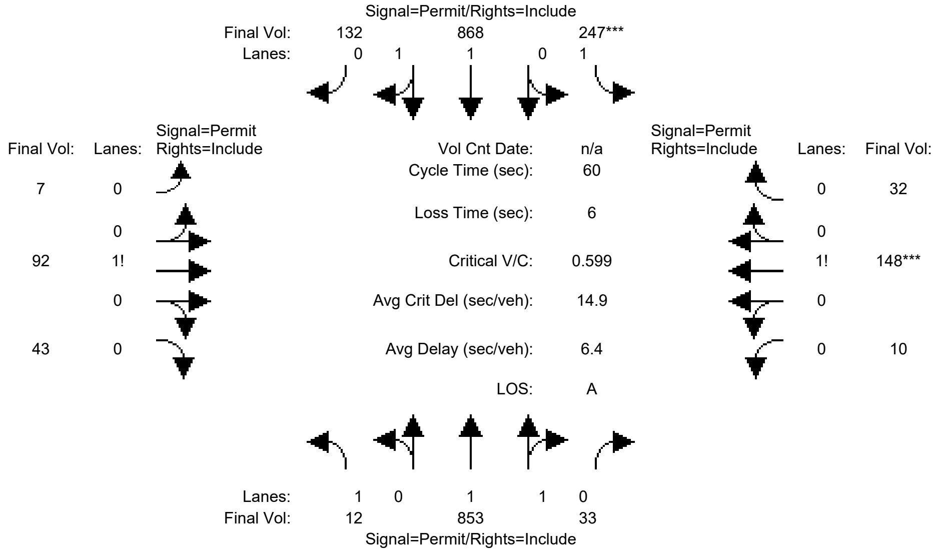

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 146 | 1200 | 74 | 296 | 566 | 42 | 108 | 333 | 82 | 260 | 382 | 465 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.91 | 0.91 | 0.92 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.96 | 0.96 | 0.83 |
| Lanes: | 1.00 | 1.88 | 0.12 | 1.00 | 1.86 | 0.14 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1753 | 3272 | 202 | 1753 | 3231 | 240 | 1769 | 1862 | 1583 | 1825 | 1825 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.37 | 0.37 | 0.17 | 0.18 | 0.18 | 0.06 | 0.18 | 0.05 | 0.14 | 0.21 | 0.29 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 25.8 | 54.8 | 54.8 | 25.2 | 54.2 | 54.2 | 26.7 | 26.7 | 52.5 | 31.3 | 31.3 | 56.5 |
| Volume/Cap: | 0.48 | 1.00 | 1.00 | 1.00 | 0.48 | 0.48 | 0.34 | 1.00 | 0.15 | 0.68 | 1.00 | 0.78 |
| Uniform Del: | 56.1 | 47.6 | 47.6 | 62.4 | 37.1 | 37.1 | 54.0 | 61.6 | 33.4 | 54.8 | 59.4 | 41.3 |
| IncremntDel: | 1.2 | 26.3 | 26.3 | 53.5 | 0.3 | 0.3 | 0.7 | 50.5 | 0.1 | 2.1 | 36.6 | 6.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 73.9 | 73.9 | 115.9 | 37.4 | 37.4 | 54.6 | 112 | 33.5 | 56.9 | 96.0 | 47.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 73.9 | 73.9 | 115.9 | 37.4 | 37.4 | 54.6 | 112 | 33.5 | 56.9 | 96.0 | 47.8 |
| LOS by Move: | E | E | E | F | D | D | D | F | C | E | F | D |
| HCM2kAvgQ: | 6 | 37 | 37 | 18 | 11 | 11 | 4 | 20 | 3 | 12 | 23 | 20 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #12: (41) University Avenue and Runnymede Street



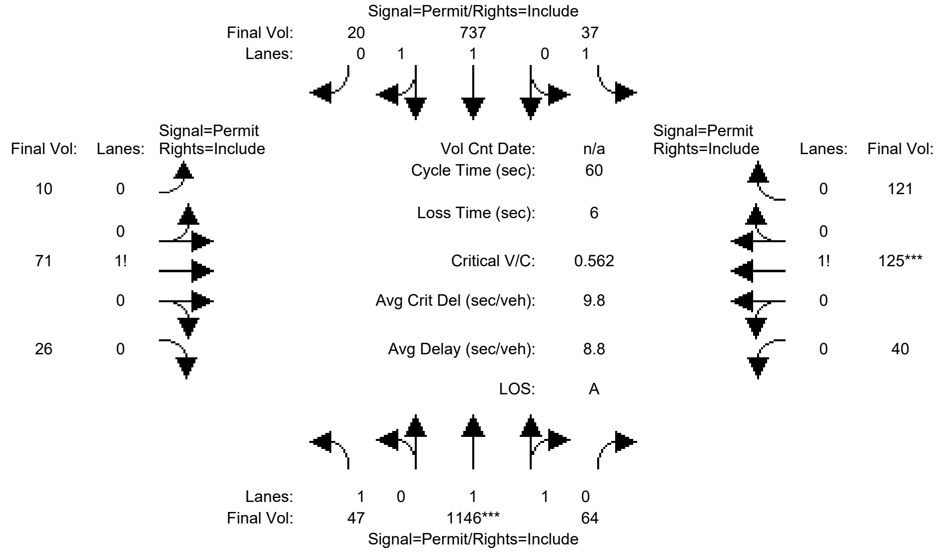

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 12 | 853 | 33 | 247 | 868 | 132 | 7 | 92 | 43 | 10 | 148 | 32 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.26 | 0.94 | 0.94 | 0.30 | 0.93 | 0.93 | 0.95 | 0.95 | 0.95 | 0.96 | 0.96 | 0.96 |
| Lanes: | 1.00 | 1.93 | 0.07 | 1.00 | 1.74 | 0.26 | 0.05 | 0.65 | 0.30 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 498 | 3455 | 134 | 568 | 3071 | 467 | 89 | 1166 | 545 | 96 | 1421 | 307 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.25 | 0.25 | 0.43 | 0.28 | 0.28 | 0.08 | 0.08 | 0.08 | 0.10 | 0.10 | 0.10 |
| Crit Moves: | | | | **** | | | | | | | **** | |
| Green Time: | 43.6 | 43.6 | 43.6 | 43.6 | 43.6 | 43.6 | 10.4 | 10.4 | 10.4 | 10.4 | 10.4 | 10.4 |
| Volume/Cap: | 0.03 | 0.34 | 0.34 | 0.60 | 0.39 | 0.39 | 0.45 | 0.45 | 0.45 | 0.60 | 0.60 | 0.60 |
| Uniform Del: | 2.3 | 3.0 | 3.0 | 4.0 | 3.1 | 3.1 | 22.2 | 22.2 | 22.2 | 22.9 | 22.9 | 22.9 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 2.4 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 | 3.1 | 3.1 | 3.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.3 | 3.1 | 3.1 | 6.4 | 3.2 | 3.2 | 23.3 | 23.3 | 23.3 | 26.0 | 26.0 | 26.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.3 | 3.1 | 3.1 | 6.4 | 3.2 | 3.2 | 23.3 | 23.3 | 23.3 | 26.0 | 26.0 | 26.0 |
| LOS by Move: | A | A | A | A | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 0 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #12: (41) University Avenue and Runnymede Street



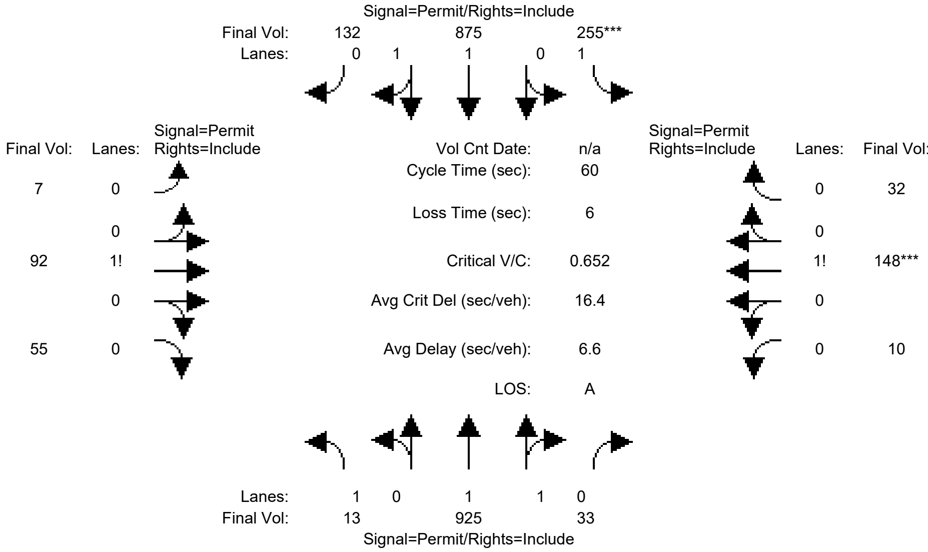

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 47 | 1146 | 64 | 37 | 737 | 20 | 10 | 71 | 26 | 40 | 125 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.32 | 0.94 | 0.94 | 0.17 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.90 | 0.90 | 0.90 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.95 | 0.05 | 0.09 | 0.67 | 0.24 | 0.14 | 0.44 | 0.42 |
| Final Sat.: | 608 | 3392 | 189 | 317 | 3501 | 95 | 166 | 1178 | 431 | 238 | 744 | 720 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.34 | 0.34 | 0.12 | 0.21 | 0.21 | 0.06 | 0.06 | 0.06 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | | **** | | | | | | | | | **** | |
| Green Time: | 36.1 | 36.1 | 36.1 | 36.1 | 36.1 | 36.1 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 |
| Volume/Cap: | 0.13 | 0.56 | 0.56 | 0.19 | 0.35 | 0.35 | 0.20 | 0.20 | 0.20 | 0.56 | 0.56 | 0.56 |
| Uniform Del: | 5.2 | 7.2 | 7.2 | 5.4 | 6.0 | 6.0 | 15.7 | 15.7 | 15.7 | 17.7 | 17.7 | 17.7 |
| IncremntDel: | 0.2 | 0.3 | 0.3 | 0.5 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 1.4 | 1.4 | 1.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 5.3 | 7.6 | 7.6 | 5.9 | 6.1 | 6.1 | 15.9 | 15.9 | 15.9 | 19.2 | 19.2 | 19.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 5.3 | 7.6 | 7.6 | 5.9 | 6.1 | 6.1 | 15.9 | 15.9 | 15.9 | 19.2 | 19.2 | 19.2 |
| LOS by Move: | A | A | A | A | A | A | B | B | B | B | B | B |
| HCM2kAvgQ: | 0 | 8 | 8 | 1 | 4 | 4 | 2 | 2 | 2 | 5 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #12: (41) University Avenue and Runnymede Street




| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 13 | 925 | 33 | 255 | 875 | 132 | 7 | 92 | 55 | 10 | 148 | 32 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.26 | 0.95 | 0.95 | 0.28 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.96 | 0.96 | 0.96 |
| Lanes: | 1.00 | 1.93 | 0.07 | 1.00 | 1.74 | 0.26 | 0.04 | 0.60 | 0.36 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 496 | 3468 | 124 | 528 | 3074 | 464 | 81 | 1067 | 638 | 96 | 1424 | 308 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.27 | 0.27 | 0.48 | 0.28 | 0.28 | 0.09 | 0.09 | 0.09 | 0.10 | 0.10 | 0.10 |
| Crit Moves: | | | | **** | | | | | | | **** | |
| Green Time: | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Volume/Cap: | 0.04 | 0.36 | 0.36 | 0.66 | 0.39 | 0.39 | 0.52 | 0.52 | 0.52 | 0.62 | 0.62 | 0.62 |
| Uniform Del: | 2.2 | 2.9 | 2.9 | 4.1 | 3.0 | 3.0 | 22.8 | 22.8 | 22.8 | 23.2 | 23.2 | 23.2 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 4.1 | 0.1 | 0.1 | 1.6 | 1.6 | 1.6 | 4.0 | 4.0 | 4.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.2 | 3.0 | 3.0 | 8.3 | 3.1 | 3.1 | 24.4 | 24.4 | 24.4 | 27.2 | 27.2 | 27.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.2 | 3.0 | 3.0 | 8.3 | 3.1 | 3.1 | 24.4 | 24.4 | 24.4 | 27.2 | 27.2 | 27.2 |
| LOS by Move: | A | A | A | A | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 0 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 20 806 96
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (Westbound)
Signal=Permit Rights=Include (Eastbound)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 10 | 0 | | Vol Cnt Date: | n/a | | |
| | | | Cycle Time (sec): | 60 | 0 | 121 |
| | 0 | | Loss Time (sec): | 6 | 0 | |
| 72 | 1! | | Critical V/C: | 0.553 | 1! | 123*** |
| | 0 | | Avg Crit Del (sec/veh): | 9.7 | 0 | |
| 26 | 0 | | Avg Delay (sec/veh): | 8.8 | 0 | 40 |
| | | | LOS: | A | | |

Lanes: 1 0 1 1 0
Final Vol: 159 1120*** 64
Signal=Permit/Rights=Include

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 159 | 1120 | 64 | 96 | 806 | 20 | 10 | 72 | 26 | 40 | 123 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.29 | 0.94 | 0.94 | 0.17 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.89 | 0.89 | 0.89 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.95 | 0.05 | 0.09 | 0.67 | 0.24 | 0.14 | 0.43 | 0.43 |
| Final Sat.: | 557 | 3388 | 194 | 331 | 3509 | 87 | 164 | 1183 | 427 | 239 | 736 | 724 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.29 | 0.33 | 0.33 | 0.29 | 0.23 | 0.23 | 0.06 | 0.06 | 0.06 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | | **** | | | | | | | | | **** | |
| Green Time: | 35.9 | 35.9 | 35.9 | 35.9 | 35.9 | 35.9 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 |
| Volume/Cap: | 0.48 | 0.55 | 0.55 | 0.49 | 0.38 | 0.38 | 0.20 | 0.20 | 0.20 | 0.55 | 0.55 | 0.55 |
| Uniform Del: | 6.8 | 7.2 | 7.2 | 6.8 | 6.3 | 6.3 | 15.6 | 15.6 | 15.6 | 17.5 | 17.5 | 17.5 |
| IncremntDel: | 1.1 | 0.3 | 0.3 | 1.9 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 1.3 | 1.3 | 1.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 7.9 | 7.6 | 7.6 | 8.7 | 6.4 | 6.4 | 15.7 | 15.7 | 15.7 | 18.9 | 18.9 | 18.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 7.9 | 7.6 | 7.6 | 8.7 | 6.4 | 6.4 | 15.7 | 15.7 | 15.7 | 18.9 | 18.9 | 18.9 |
| LOS by Move: | A | A | A | A | A | A | B | B | B | B | B | B |
| HCM2kAvgQ: | 2 | 7 | 7 | 2 | 4 | 4 | 2 | 2 | 2 | 5 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 47 1023*** 33
Lanes: 0 1 1 0 1

Signal=Permit
Rights=Include

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 10 | 0 | Vol Cnt Date: | n/a | | 0 | 20 |
| | | Cycle Time (sec): | 60 | | | |
| | 0 | Loss Time (sec): | 9 | | 0 | |
| 53 | 1! | Critical V/C: | 0.477 | | 1! | 93*** |
| | 0 | Avg Crit Del (sec/veh): | 10.7 | | 0 | |
| 12 | 0 | Avg Delay (sec/veh): | 11.7 | | 0 | 38 |
| | | LOS: | B | | | |

Signal=Permit
Rights=Include

Lanes: 1 0 1 1 0
Final Vol: 32*** 902 35
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 32 | 902 | 35 | 33 | 1023 | 47 | 10 | 53 | 12 | 38 | 93 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.94 | 0.94 | 0.95 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.89 | 0.89 | 0.89 |
| Lanes: | 1.00 | 1.93 | 0.07 | 1.00 | 1.91 | 0.09 | 0.13 | 0.71 | 0.16 | 0.25 | 0.62 | 0.13 |
| Final Sat.: | 1805 | 3454 | 134 | 1805 | 3427 | 157 | 239 | 1265 | 286 | 425 | 1041 | 224 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.26 | 0.26 | 0.02 | 0.30 | 0.30 | 0.04 | 0.04 | 0.04 | 0.09 | 0.09 | 0.09 |
| Crit Moves: | **** | | | | **** | | | | | | **** | |
| Green Time: | 7.0 | 28.2 | 28.2 | 12.6 | 33.9 | 33.9 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 |
| Volume/Cap: | 0.15 | 0.55 | 0.55 | 0.09 | 0.53 | 0.53 | 0.25 | 0.25 | 0.25 | 0.53 | 0.53 | 0.53 |
| Uniform Del: | 23.8 | 11.4 | 11.4 | 19.1 | 8.1 | 8.1 | 21.6 | 21.6 | 21.6 | 22.8 | 22.8 | 22.8 |
| IncremntDel: | 0.3 | 0.4 | 0.4 | 0.1 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 1.9 | 1.9 | 1.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 24.2 | 11.8 | 11.8 | 19.2 | 8.4 | 8.4 | 22.1 | 22.1 | 22.1 | 24.6 | 24.6 | 24.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 24.2 | 11.8 | 11.8 | 19.2 | 8.4 | 8.4 | 22.1 | 22.1 | 22.1 | 24.6 | 24.6 | 24.6 |
| LOS by Move: | C | B | B | B | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 7 | 7 | 1 | 7 | 7 | 1 | 1 | 1 | 3 | 3 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 64 705 48***
Lanes: 0 1 1 0 1

Signal=Permit
Rights=Include

| Final Vol: | Lanes: | | | |
|---|---|---|---|---|
| 14 | 0 | | | |
| | 0 | Loss Time (sec): | 9 | |
| 86 | 1! | Critical V/C: | 0.689 | |
| | 0 | Avg Crit Del (sec/veh): | 18.8 | |
| 57 | 0 | Avg Delay (sec/veh): | 18.3 | |

Vol Cnt Date: n/a
Cycle Time (sec): 75
LOS: B

Signal=Permit
Rights=Include

| Lanes: | Final Vol: |
|---|---|
| 0 | 24 |
| 0 | |
| 1! | 219*** |
| 0 | |
| 0 | 76 |

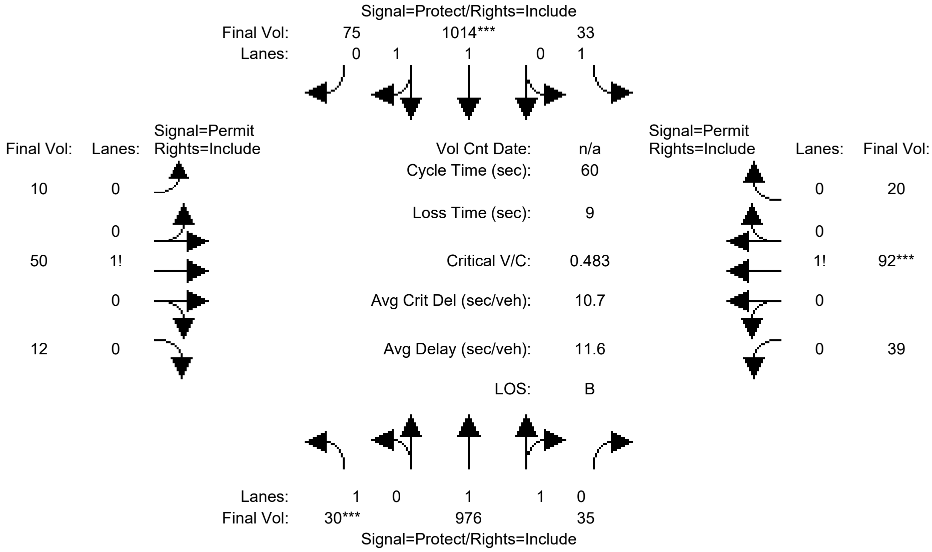
Lanes: 1 0 1 1 0
Final Vol: 75 1228*** 156
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1228 | 156 | 48 | 705 | 64 | 14 | 86 | 57 | 76 | 219 | 24 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.94 | 0.94 | 0.92 | 0.92 | 0.92 | 0.88 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.77 | 0.23 | 1.00 | 1.83 | 0.17 | 0.09 | 0.55 | 0.36 | 0.24 | 0.69 | 0.07 |
| Final Sat.: | 1805 | 3149 | 400 | 1805 | 3270 | 297 | 156 | 957 | 634 | 400 | 1152 | 126 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.39 | 0.39 | 0.03 | 0.22 | 0.22 | 0.09 | 0.09 | 0.09 | 0.19 | 0.19 | 0.19 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 14.1 | 39.7 | 39.7 | 7.0 | 32.6 | 32.6 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| Volume/Cap: | 0.22 | 0.74 | 0.74 | 0.28 | 0.50 | 0.50 | 0.35 | 0.35 | 0.35 | 0.74 | 0.74 | 0.74 |
| Uniform Del: | 25.8 | 13.6 | 13.6 | 31.7 | 15.3 | 15.3 | 22.7 | 22.7 | 22.7 | 25.5 | 25.5 | 25.5 |
| IncremntDel: | 0.3 | 1.6 | 1.6 | 0.9 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 6.6 | 6.6 | 6.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 26.1 | 15.2 | 15.2 | 32.6 | 15.6 | 15.6 | 23.2 | 23.2 | 23.2 | 32.1 | 32.1 | 32.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 26.1 | 15.2 | 15.2 | 32.6 | 15.6 | 15.6 | 23.2 | 23.2 | 23.2 | 32.1 | 32.1 | 32.1 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 2 | 14 | 14 | 1 | 7 | 7 | 3 | 3 | 3 | 8 | 8 | 8 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #13: (42) University Avenue and Bell Street

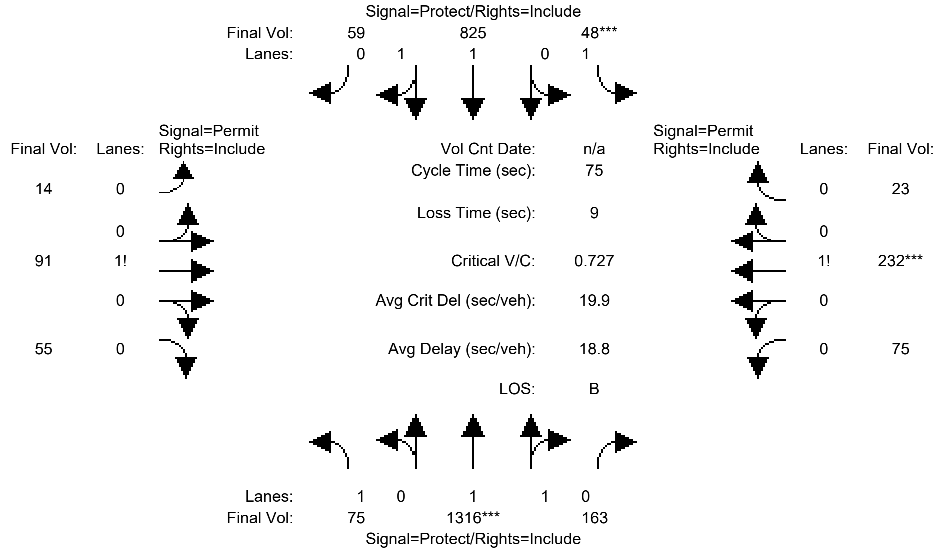



| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 30 | 976 | 35 | 33 | 1014 | 75 | 10 | 50 | 12 | 39 | 92 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 0.95 | 0.95 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.89 | 0.89 | 0.89 |
| Lanes: | 1.00 | 1.93 | 0.07 | 1.00 | 1.86 | 0.14 | 0.14 | 0.69 | 0.17 | 0.26 | 0.61 | 0.13 |
| Final Sat.: | 1805 | 3468 | 124 | 1805 | 3328 | 246 | 248 | 1240 | 298 | 436 | 1028 | 223 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.28 | 0.28 | 0.02 | 0.30 | 0.30 | 0.04 | 0.04 | 0.04 | 0.09 | 0.09 | 0.09 |
| Crit Moves: | **** | | | | **** | | | | | | **** | |
| Green Time: | 7.0 | 29.0 | 29.0 | 12.0 | 34.0 | 34.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Volume/Cap: | 0.14 | 0.58 | 0.58 | 0.09 | 0.54 | 0.54 | 0.24 | 0.24 | 0.24 | 0.54 | 0.54 | 0.54 |
| Uniform Del: | 23.8 | 11.2 | 11.2 | 19.5 | 8.1 | 8.1 | 21.7 | 21.7 | 21.7 | 22.9 | 22.9 | 22.9 |
| IncremntDel: | 0.3 | 0.5 | 0.5 | 0.1 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 2.1 | 2.1 | 2.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 24.1 | 11.7 | 11.7 | 19.7 | 8.4 | 8.4 | 22.1 | 22.1 | 22.1 | 24.9 | 24.9 | 24.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 24.1 | 11.7 | 11.7 | 19.7 | 8.4 | 8.4 | 22.1 | 22.1 | 22.1 | 24.9 | 24.9 | 24.9 |
| LOS by Move: | C | B | B | B | A | A | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 8 | 8 | 1 | 7 | 7 | 1 | 1 | 1 | 3 | 3 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #13: (42) University Avenue and Bell Street

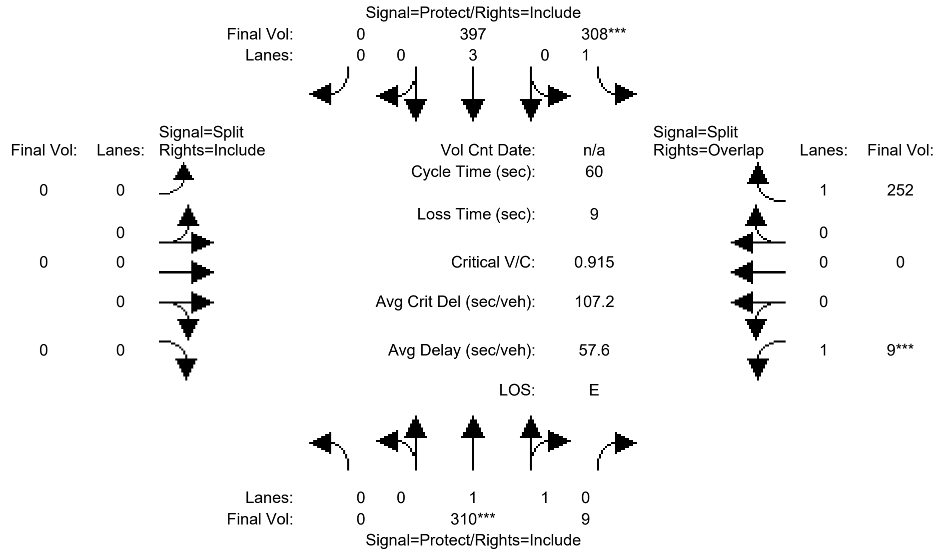



| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1316 | 163 | 48 | 825 | 59 | 14 | 91 | 55 | 75 | 232 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.94 | 0.94 | 0.92 | 0.92 | 0.92 | 0.88 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.78 | 0.22 | 1.00 | 1.87 | 0.13 | 0.09 | 0.57 | 0.34 | 0.23 | 0.70 | 0.07 |
| Final Sat.: | 1805 | 3161 | 391 | 1805 | 3335 | 239 | 153 | 994 | 601 | 382 | 1181 | 117 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.42 | 0.03 | 0.25 | 0.25 | 0.09 | 0.09 | 0.09 | 0.20 | 0.20 | 0.20 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 12.9 | 40.1 | 40.1 | 7.0 | 34.2 | 34.2 | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 |
| Volume/Cap: | 0.24 | 0.78 | 0.78 | 0.28 | 0.54 | 0.54 | 0.36 | 0.36 | 0.36 | 0.78 | 0.78 | 0.78 |
| Uniform Del: | 26.8 | 13.9 | 13.9 | 31.7 | 14.8 | 14.8 | 23.1 | 23.1 | 23.1 | 26.1 | 26.1 | 26.1 |
| IncremntDel: | 0.4 | 2.1 | 2.1 | 0.9 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 8.9 | 8.9 | 8.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 27.2 | 16.1 | 16.1 | 32.6 | 15.1 | 15.1 | 23.6 | 23.6 | 23.6 | 35.0 | 35.0 | 35.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 27.2 | 16.1 | 16.1 | 32.6 | 15.1 | 15.1 | 23.6 | 23.6 | 23.6 | 35.0 | 35.0 | 35.0 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | D | D | D |
| HCM2kAvgQ: | 2 | 16 | 16 | 1 | 8 | 8 | 3 | 3 | 3 | 9 | 9 | 9 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #20: (50) East Bayshore Road and Donohoe Street




| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 310 | 9 | 308 | 397 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 34 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.50 | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.46 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 14.0 | 14.0 | 27.0 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 37.0 |
| Volume/Cap: | 0.00 | 1.12 | 1.12 | 1.12 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.74 |
| Uniform Del: | 0.0 | 23.0 | 23.0 | 16.5 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 8.2 |
| IncremntDel: | 0.0 | 88.2 | 88.2 | 89.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 8.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 111 | 111.2 | 105.6 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 111 | 111.2 | 105.6 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.9 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 9 | 9 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 757 404***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include
Final Vol: Lanes:
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.856
Avg Crit Del (sec/veh): 77.8
Avg Delay (sec/veh): 40.4
LOS: D

Signal=Split Rights=Overlap
Lanes: Final Vol:
1 200
0
0 0
0
1 7***

Lanes: 0 0 1 1 0
Final Vol: 0 469*** 26
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 469 | 26 | 404 | 757 | 0 | 0 | 0 | 0 | 7 | 0 | 200 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.89 | 0.11 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1707 | 95 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.27 | 0.27 | 0.44 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.25 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 15.7 | 15.7 | 25.3 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.3 |
| Volume/Cap: | 0.00 | 1.05 | 1.05 | 1.05 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.42 |
| Uniform Del: | 0.0 | 22.2 | 22.2 | 17.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 6.7 |
| IncremntDel: | 0.0 | 56.3 | 56.3 | 60.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 78.4 | 78.4 | 78.0 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 78.4 | 78.4 | 78.0 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.3 |
| LOS by Move: | A | E | E | E | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 11 | 11 | 15 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 394 310***
Lanes: 0 0 3 0 1

West side (Signal=Split, Rights=Include):

| Final Vol: | Lanes: |
|---|---|
| 0 | 0 |
| | 0 |
| 0 | 0 |
| | 0 |
| 0 | 0 |

| | |
|---|---|
| Vol Cnt Date: | n/a |
| Cycle Time (sec): | 60 |
| Loss Time (sec): | 9 |
| Critical V/C: | 0.928 |
| Avg Crit Del (sec/veh): | 112.9 |
| Avg Delay (sec/veh): | 61.2 |
| LOS: | E |

East side (Signal=Split, Rights=Overlap):

| Lanes: | Final Vol: |
|---|---|
| 1 | 252 |
| 0 | |
| 0 | 0 |
| 0 | |
| 1 | 9*** |

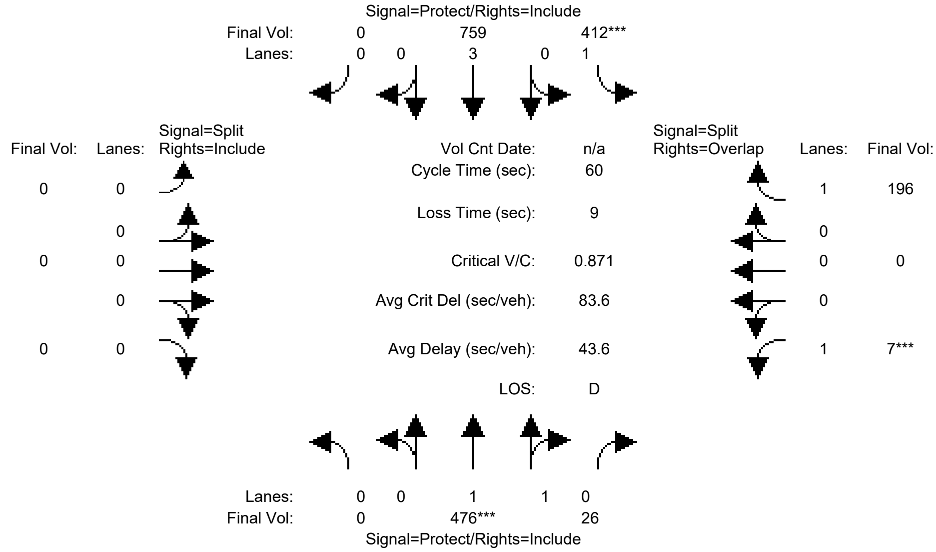
Lanes: 0 0 1 1 0
Final Vol: 0 320*** 9
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 320 | 9 | 310 | 394 | 0 | 0 | 0 | 0 | 9 | 0 | 252 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.95 | 0.05 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1189 | 33 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.27 | 0.27 | 0.51 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.46 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 14.3 | 14.3 | 26.7 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 36.7 |
| Volume/Cap: | 0.00 | 1.13 | 1.13 | 1.13 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.75 |
| Uniform Del: | 0.0 | 22.9 | 22.9 | 16.6 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 8.3 |
| IncremntDel: | 0.0 | 93.6 | 93.6 | 95.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 9.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 117 | 116.5 | 111.8 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 17.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 117 | 116.5 | 111.8 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 17.3 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 9 | 9 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #20: (50) East Bayshore Road and Donohoe Street




| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 476 | 26 | 412 | 759 | 0 | 0 | 0 | 0 | 7 | 0 | 196 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.90 | 0.10 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1708 | 93 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.28 | 0.28 | 0.45 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.24 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 15.6 | 15.6 | 25.4 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.4 |
| Volume/Cap: | 0.00 | 1.07 | 1.07 | 1.07 | 0.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.41 |
| Uniform Del: | 0.0 | 22.2 | 22.2 | 17.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 6.6 |
| IncremntDel: | 0.0 | 62.2 | 62.2 | 66.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 84.4 | 84.4 | 83.7 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 84.4 | 84.4 | 83.7 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.2 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 11 | 11 | 16 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap
Final Vol: 32 0 319***
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include (West approach)
Signal=Protect Rights=Include (East approach)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 57*** | 1 | Vol Cnt Date: | n/a | | 0 | 64 |
| | | Cycle Time (sec): | 60 | | | |
| | 0 | Loss Time (sec): | 9 | | 1 | |
| 204 | 1 | Critical V/C: | 0.373 | | 0 | 121*** |
| | 0 | Avg Crit Del (sec/veh): | 14.8 | | 0 | |
| 0 | 0 | Avg Delay (sec/veh): | 13.9 | | 0 | 0 |
| | | LOS: | B | | | |

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 319 | 0 | 32 | 57 | 204 | 0 | 0 | 121 | 64 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.93 | 0.93 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.65 | 0.35 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 1161 | 614 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.10 | 0.10 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 27.9 | 0.0 | 34.9 | 7.0 | 23.1 | 0.0 | 0.0 | 16.1 | 16.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.39 | 0.00 | 0.03 | 0.28 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 10.5 | 0.0 | 5.4 | 24.2 | 12.7 | 0.0 | 0.0 | 17.9 | 17.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.5 | 0.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 10.8 | 0.0 | 5.4 | 24.9 | 12.9 | 0.0 | 0.0 | 18.4 | 18.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 10.8 | 0.0 | 5.4 | 24.9 | 12.9 | 0.0 | 0.0 | 18.4 | 18.4 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 3 | 0 | 0 | 3 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap

Final Vol: 26 0 83***

Lanes: 1 0 0 0 1

Signal=Protect
Rights=Include

Final Vol: Lanes:

81*** 1

0

305 1

0

0 0

Vol Cnt Date: n/a

Cycle Time (sec): 75

Loss Time (sec): 9

Critical V/C: 0.336

Avg Crit Del (sec/veh): 14.7

Avg Delay (sec/veh): 10.7

LOS: B

Signal=Protect
Rights=Include

Lanes: Final Vol:

0 157

1

0 198***

0

0 0

Lanes: 0 0 0 0 0

Final Vol: 0 0 0

Signal=Split/Rights=Include

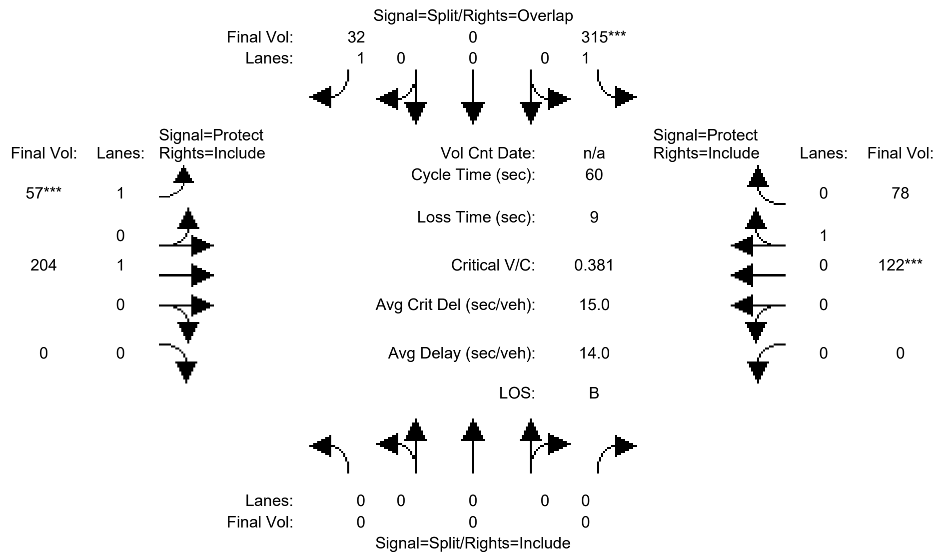
| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 83 | 0 | 26 | 81 | 305 | 0 | 0 | 198 | 157 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.56 | 0.44 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 976 | 774 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.02 | 0.05 | 0.16 | 0.00 | 0.00 | 0.20 | 0.20 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 10.5 | 0.0 | 20.7 | 10.2 | 55.5 | 0.0 | 0.0 | 45.3 | 45.3 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.06 | 0.34 | 0.22 | 0.00 | 0.00 | 0.34 | 0.34 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 29.1 | 0.0 | 20.0 | 29.3 | 3.0 | 0.0 | 0.0 | 7.4 | 7.4 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.1 | 0.8 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 29.9 | 0.0 | 20.0 | 30.1 | 3.1 | 0.0 | 0.0 | 7.6 | 7.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 29.9 | 0.0 | 20.0 | 30.1 | 3.1 | 0.0 | 0.0 | 7.6 | 7.6 |
| LOS by Move: | A | A | A | C | A | C | C | A | A | A | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #25: (54) East Bayshore Road and Clarke Avenue



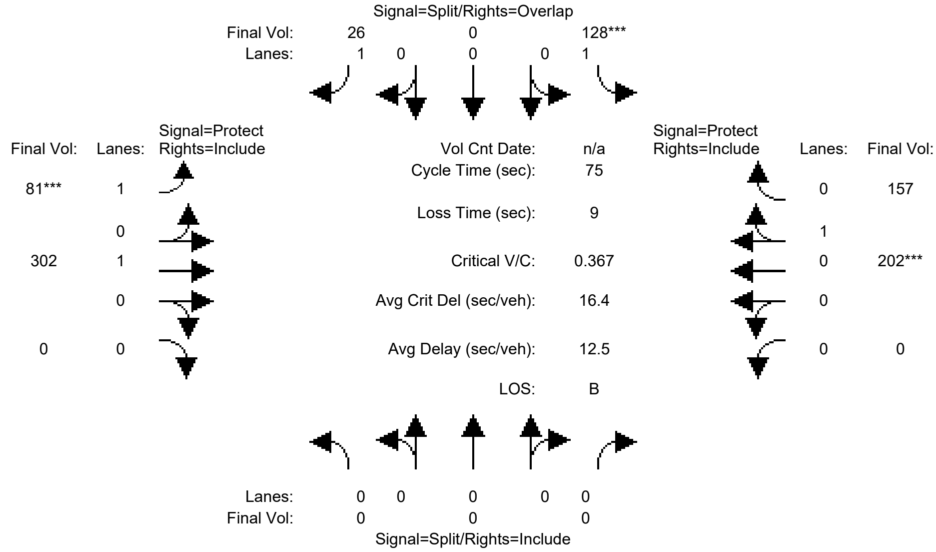

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 315 | 0 | 32 | 57 | 204 | 0 | 0 | 122 | 78 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.93 | 0.93 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.61 | 0.39 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 1076 | 688 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.11 | 0.11 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 26.9 | 0.0 | 33.9 | 7.0 | 24.1 | 0.0 | 0.0 | 17.1 | 17.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 0.04 | 0.28 | 0.27 | 0.00 | 0.00 | 0.40 | 0.40 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 11.1 | 0.0 | 5.8 | 24.2 | 12.0 | 0.0 | 0.0 | 17.3 | 17.3 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.5 | 0.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 11.5 | 0.0 | 5.8 | 24.9 | 12.2 | 0.0 | 0.0 | 17.8 | 17.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 11.5 | 0.0 | 5.8 | 24.9 | 12.2 | 0.0 | 0.0 | 17.8 | 17.8 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 3 | 0 | 0 | 3 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue




| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 128 | 0 | 26 | 81 | 302 | 0 | 0 | 202 | 157 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.56 | 0.44 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 986 | 766 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.02 | 0.05 | 0.16 | 0.00 | 0.00 | 0.20 | 0.20 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 14.8 | 0.0 | 24.1 | 9.4 | 51.2 | 0.0 | 0.0 | 41.9 | 41.9 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.05 | 0.37 | 0.24 | 0.00 | 0.00 | 0.37 | 0.37 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 17.5 | 30.1 | 4.5 | 0.0 | 0.0 | 9.2 | 9.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 1.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 26.7 | 0.0 | 17.6 | 31.1 | 4.6 | 0.0 | 0.0 | 9.4 | 9.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 26.7 | 0.0 | 17.6 | 31.1 | 4.6 | 0.0 | 0.0 | 9.4 | 9.4 |
| LOS by Move: | A | A | A | C | A | B | C | A | A | A | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

Signal=Split/Rights=Include
Final Vol: 62*** 0 524
Lanes: 0 0 1! 0 0

Signal=Protect Rights=Include (West / Eastbound approach)
Final Vol: 45***, Lanes: 1
Lanes: 0
Final Vol: 398, Lanes: 1
Lanes: 0
Final Vol: 0, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 80
Loss Time (sec): 9
Critical V/C: 0.635
Avg Crit Del (sec/veh): 22.3
Avg Delay (sec/veh): 20.9
LOS: C

Signal=Protect Rights=Include
Lanes: 0, Final Vol: 358
Lanes: 1
Lanes: 0, Final Vol: 81***
Lanes: 0
Lanes: 0, Final Vol: 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 398 | 0 | 0 | 81 | 358 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.18 | 0.82 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 351 | 1549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.21 | 0.00 | 0.00 | 0.23 | 0.23 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 36.6 | 0.0 | 36.6 | 7.0 | 34.4 | 0.0 | 0.0 | 27.4 | 27.4 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.67 | 0.00 | 0.67 | 0.27 | 0.49 | 0.00 | 0.00 | 0.67 | 0.67 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 17.0 | 0.0 | 17.0 | 34.1 | 16.4 | 0.0 | 0.0 | 22.5 | 22.5 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 2.1 | 0.9 | 0.5 | 0.0 | 0.0 | 2.8 | 2.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 19.1 | 0.0 | 19.1 | 35.0 | 16.9 | 0.0 | 0.0 | 25.3 | 25.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 19.1 | 0.0 | 19.1 | 35.0 | 16.9 | 0.0 | 0.0 | 25.3 | 25.3 |
| LOS by Move: | A | A | A | B | A | B | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 12 | 0 | 12 | 1 | 7 | 0 | 0 | 10 | 10 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

Signal=Split/Rights=Include
Final Vol: 80 0 463***
Lanes: 0 0 1! 0 0

| Final Vol: | Lanes: | Signal=Protect Rights=Include | | | Signal=Protect Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| 127*** | 1 | | Cycle Time (sec): | 80 | | 0 | 559 |
| | 0 | | Loss Time (sec): | 9 | | 1 | |
| 271 | 1 | | Critical V/C: | 0.890 | | 0 | 272*** |
| | 0 | | Avg Crit Del (sec/veh): | 37.5 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 33.1 | | 0 | 0 |
| | | | LOS: | C | | | |

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

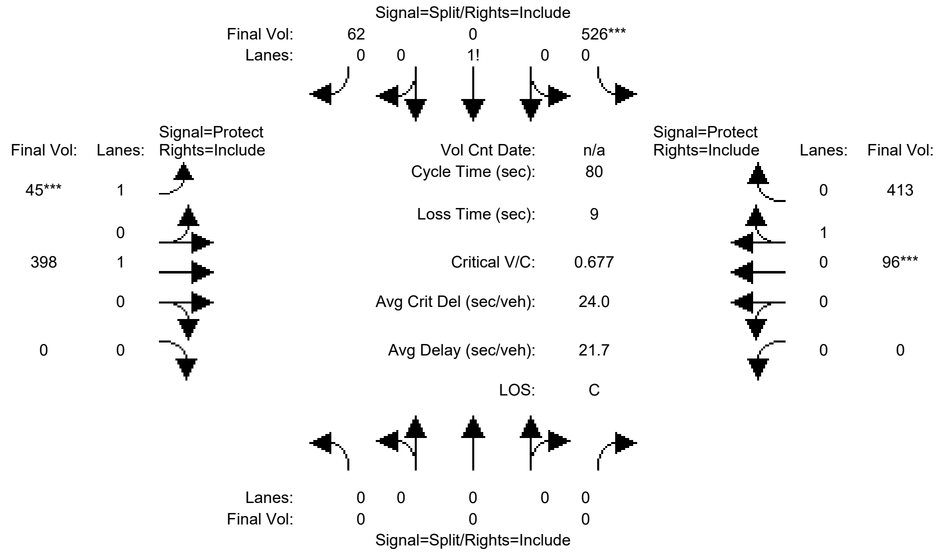
| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 463 | 0 | 80 | 127 | 271 | 0 | 0 | 272 | 559 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.15 | 1.00 | 1.00 | 0.00 | 0.00 | 0.33 | 0.67 |
| Final Sat.: | 0 | 0 | 0 | 1620 | 0 | 280 | 1900 | 1900 | 0 | 0 | 622 | 1278 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.29 | 0.07 | 0.14 | 0.00 | 0.00 | 0.44 | 0.44 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 25.3 | 0.0 | 25.3 | 7.0 | 45.7 | 0.0 | 0.0 | 38.7 | 38.7 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.90 | 0.76 | 0.25 | 0.00 | 0.00 | 0.90 | 0.90 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.2 | 0.0 | 26.2 | 35.7 | 8.6 | 0.0 | 0.0 | 18.9 | 18.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 17.1 | 0.0 | 17.1 | 18.7 | 0.1 | 0.0 | 0.0 | 12.2 | 12.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 43.3 | 0.0 | 43.3 | 54.4 | 8.7 | 0.0 | 0.0 | 31.1 | 31.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 43.3 | 0.0 | 43.3 | 54.4 | 8.7 | 0.0 | 0.0 | 31.1 | 31.1 |
| LOS by Move: | A | A | A | D | A | D | D | A | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 17 | 0 | 17 | 5 | 3 | 0 | 0 | 23 | 23 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road



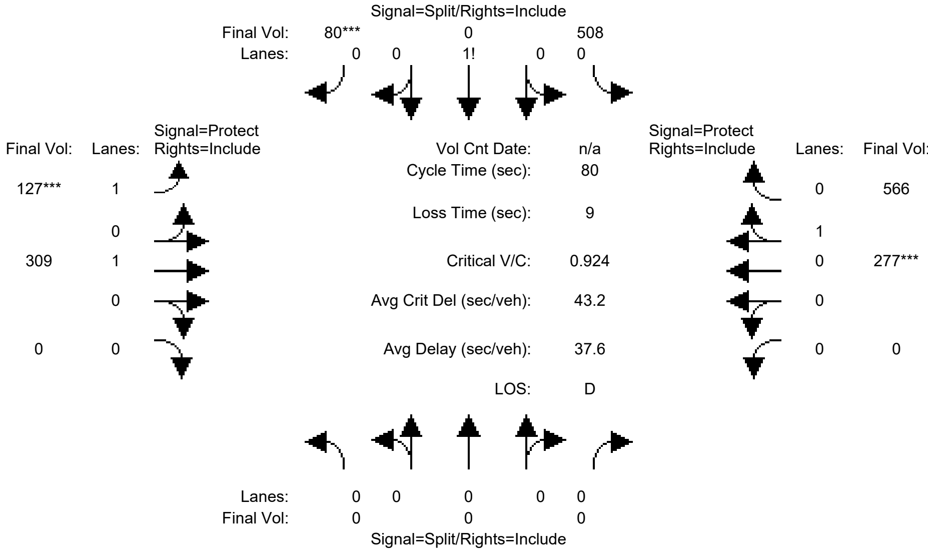

| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 526 | 0 | 62 | 45 | 398 | 0 | 0 | 96 | 413 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.19 | 0.81 |
| Final Sat.: | 0 | 0 | 0 | 1700 | 0 | 200 | 1900 | 1900 | 0 | 0 | 358 | 1542 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.21 | 0.00 | 0.00 | 0.27 | 0.27 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 34.3 | 0.0 | 34.3 | 7.0 | 36.7 | 0.0 | 0.0 | 29.7 | 29.7 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 | 0.72 | 0.27 | 0.46 | 0.00 | 0.00 | 0.72 | 0.72 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 18.9 | 0.0 | 18.9 | 34.1 | 14.8 | 0.0 | 0.0 | 21.6 | 21.6 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 3.2 | 0.0 | 3.2 | 0.9 | 0.4 | 0.0 | 0.0 | 3.7 | 3.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 22.1 | 0.0 | 22.1 | 35.0 | 15.2 | 0.0 | 0.0 | 25.3 | 25.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 22.1 | 0.0 | 22.1 | 35.0 | 15.2 | 0.0 | 0.0 | 25.3 | 25.3 |
| LOS by Move: | A | A | A | C | A | C | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 13 | 0 | 13 | 1 | 7 | 0 | 0 | 12 | 12 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road




| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 508 | 0 | 80 | 127 | 309 | 0 | 0 | 277 | 566 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.86 | 0.00 | 0.14 | 1.00 | 1.00 | 0.00 | 0.00 | 0.33 | 0.67 |
| Final Sat.: | 0 | 0 | 0 | 1641 | 0 | 259 | 1900 | 1900 | 0 | 0 | 624 | 1276 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.07 | 0.16 | 0.00 | 0.00 | 0.44 | 0.44 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 26.3 | 0.0 | 26.3 | 7.0 | 44.7 | 0.0 | 0.0 | 37.7 | 37.7 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 | 0.94 | 0.76 | 0.29 | 0.00 | 0.00 | 0.94 | 0.94 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 26.1 | 35.7 | 9.3 | 0.0 | 0.0 | 20.1 | 20.1 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 22.6 | 0.0 | 22.6 | 18.7 | 0.2 | 0.0 | 0.0 | 17.6 | 17.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 48.7 | 0.0 | 48.7 | 54.4 | 9.5 | 0.0 | 0.0 | 37.7 | 37.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 48.7 | 0.0 | 48.7 | 54.4 | 9.5 | 0.0 | 0.0 | 37.7 | 37.7 |
| LOS by Move: | A | A | A | D | A | D | D | A | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 19 | 0 | 19 | 5 | 4 | 0 | 0 | 25 | 25 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #32: (51) East Bayshore Road and Holland Street

Signal=Uncontrol/Rights=Include
Final Vol: 0 77 5
Lanes: 0 0 0 1 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | | 0 | 11 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.011 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 1.0 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 1.0 | | 0 | 3 |
| | | | LOS: | A | | | |

Lanes: 0 0 0 1 0
Final Vol: 0 59 0
Signal=Uncontrol/Rights=Include

```
Street Name:        East Bayshore Road                Holland Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0   59     0     5   77     0     0    0     0     3    0    11
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:      *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
ApproachLOS:         *                *                *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            141
Minor Approach Volume:          14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #32: (51) East Bayshore Road and Holland Street

Signal=Uncontrol/Rights=Include
Final Vol: 0 88 10
Lanes: 0 0 0 1 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | | 0 | 4 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.007 | | 1! | 0 |
| | 1 | | Avg Crit Del (sec/veh): | 0.4 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 0.4 | | 0 | 3 |
| | | | LOS: | A | | | |

Lanes: 0 0 0 1 0
Final Vol: 0 238 6
Signal=Uncontrol/Rights=Include

```
Street Name:        East Bayshore Road                Holland Street
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  238     6    10   88     0     0    0     0     3    0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx             10.0
ApproachLOS:        *                 *                 *                 A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            342
Minor Approach Volume:          7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #32: (51) East Bayshore Road and Holland Street

```
                              Signal=Uncontrol/Rights=Include
                   Final Vol:  0          77          5
                       Lanes:  0    0      0     1    0

            Signal=Stop                                  Signal=Stop
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:     n/a     Rights=Include   Lanes:  Final Vol:
                                       Cycle Time (sec): 100
    0         0                                                                     0        11
                                       Loss Time (sec):    0
              0                                                                     0
    0         0                        Critical V/C:     0.011                      1!        0
              0                        Avg Crit Del (sec/veh): 1.0                  0
    0         0                        Avg Delay (sec/veh):    1.0                  0         3
                                       LOS:               A

                       Lanes:  0    0      0     1    0
                   Final Vol:  0          59          0
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:        East Bayshore Road                 Holland Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   59     0     5   77     0     0    0     0     3    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx              8.8
ApproachLOS:          *                *                *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59    0     5   77    0     0    0    0     3    0   11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59    0     5   77    0     0    0    0     3    0   11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             141
Minor Approach Volume:           14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #32: (51) East Bayshore Road and Holland Street

Signal=Uncontrol/Rights=Include
Final Vol: 0 88 10
Lanes: 0 0 0 1 0

Signal=Stop
Final Vol: Lanes: Rights=Include
0 0
0
0 0
1
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.007
Avg Crit Del (sec/veh): 0.4
Avg Delay (sec/veh): 0.4
LOS: A

Signal=Stop
Rights=Include Lanes: Final Vol:
0 4
0
1! 0
0
0 3

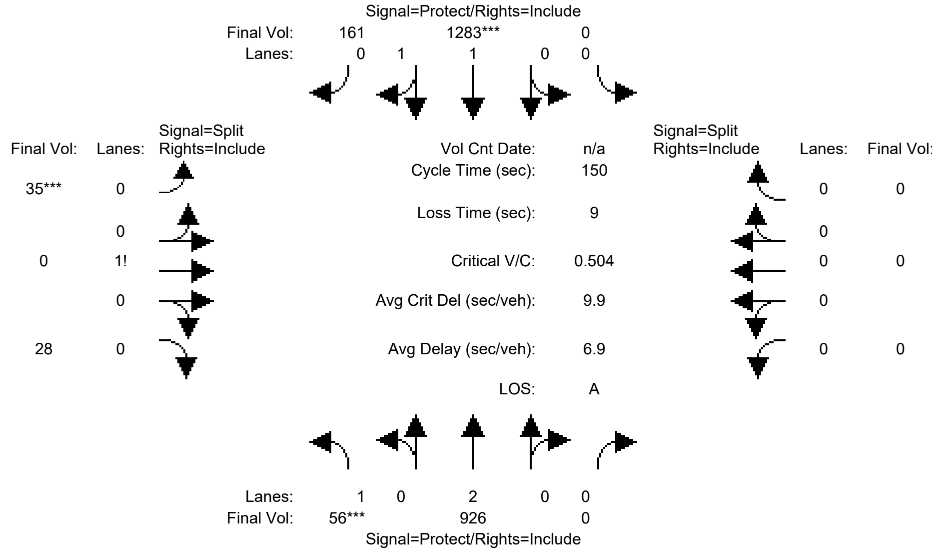
Lanes: 0 0 0 1 0
Final Vol: 0 238 6
Signal=Uncontrol/Rights=Include

```
Street Name:        East Bayshore Road                  Holland Street
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  238     6    10   88     0     0    0     0     3    0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx             10.0
ApproachLOS:          *                 *                 *                 A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0     0     3    0     4
ApproachDel:    xxxxxx          xxxxxx          xxxxxx            10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:              342
Minor Approach Volume:            7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive




| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 56 | 926 | 0 | 0 | 1283 | 161 | 35 | 0 | 28 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.91 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.56 | 0.00 | 0.44 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3153 | 396 | 965 | 0 | 772 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.26 | 0.00 | 0.00 | 0.41 | 0.41 | 0.04 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 9.2 | 130 | 0.0 | 0.0 | 121 | 121.0 | 10.8 | 0.0 | 10.8 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.50 | 0.30 | 0.00 | 0.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 68.2 | 1.8 | 0.0 | 0.0 | 4.7 | 4.7 | 67.0 | 0.0 | 67.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 3.7 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 3.3 | 0.0 | 3.3 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 71.9 | 1.8 | 0.0 | 0.0 | 4.9 | 4.9 | 70.3 | 0.0 | 70.3 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 71.9 | 1.8 | 0.0 | 0.0 | 4.9 | 4.9 | 70.3 | 0.0 | 70.3 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | A | A | E | A | E | A | A | A |
| HCM2kAvgQ: | 3 | 4 | 0 | 0 | 11 | 11 | 3 | 0 | 3 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 51 566 0***
Lanes: 0 1 1 0 0

Signal=Split
Rights=Include

Final Vol: Lanes:
89*** 0
0
0 1!
0
112 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.604
Avg Crit Del (sec/veh): 14.6
Avg Delay (sec/veh): 15.1
LOS: B

Signal=Split
Rights=Include
Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 19 1627*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 19 | 1627 | 0 | 0 | 566 | 51 | 89 | 0 | 112 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.90 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.83 | 0.17 | 0.44 | 0.00 | 0.56 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3272 | 295 | 761 | 0 | 958 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.45 | 0.00 | 0.00 | 0.17 | 0.17 | 0.12 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 23.8 | 112 | 0.0 | 0.0 | 88.2 | 88.2 | 29.0 | 0.0 | 29.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.07 | 0.60 | 0.00 | 0.00 | 0.29 | 0.29 | 0.60 | 0.00 | 0.60 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 53.7 | 8.8 | 0.0 | 0.0 | 15.4 | 15.4 | 55.2 | 0.0 | 55.2 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.1 | 0.4 | 0.0 | 0.0 | 0.1 | 0.1 | 3.1 | 0.0 | 3.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 53.8 | 9.2 | 0.0 | 0.0 | 15.5 | 15.5 | 58.4 | 0.0 | 58.4 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 53.8 | 9.2 | 0.0 | 0.0 | 15.5 | 15.5 | 58.4 | 0.0 | 58.4 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | A | A | A | B | B | E | A | E | A | A | A |
| HCM2kAvgQ: | 1 | 18 | 0 | 0 | 7 | 7 | 9 | 0 | 9 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 162 1290*** 0
Lanes: 0 1 1 0 0

Signal=Split
Rights=Include

| Final Vol: | Lanes: | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|
| 57*** | 0 | Vol Cnt Date: n/a | | 0 | 0 |
| | 0 | Cycle Time (sec): 150 | | 0 | |
| 0 | 1! | Loss Time (sec): 9 | | 0 | 0 |
| | 0 | Critical V/C: 0.518 | | 0 | |
| 36 | 0 | Avg Crit Del (sec/veh): 11.2 | | 0 | 0 |
| | | Avg Delay (sec/veh): 7.9 | | | |
| | | LOS: A | | | |

Signal=Split
Rights=Include

Lanes: 1 0 2 0 0
Final Vol: 44*** 1065 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 44 | 1065 | 0 | 0 | 1290 | 162 | 57 | 0 | 36 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.92 | 1.00 | 0.92 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.61 | 0.00 | 0.39 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3153 | 396 | 1071 | 0 | 676 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.30 | 0.00 | 0.00 | 0.41 | 0.41 | 0.05 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 7.1 | 126 | 0.0 | 0.0 | 119 | 118.5 | 15.4 | 0.0 | 15.4 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.52 | 0.35 | 0.00 | 0.00 | 0.52 | 0.52 | 0.52 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 69.8 | 2.8 | 0.0 | 0.0 | 5.6 | 5.6 | 63.8 | 0.0 | 63.8 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 5.5 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 2.6 | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 75.3 | 2.9 | 0.0 | 0.0 | 5.8 | 5.8 | 66.4 | 0.0 | 66.4 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 75.3 | 2.9 | 0.0 | 0.0 | 5.8 | 5.8 | 66.4 | 0.0 | 66.4 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | A | A | E | A | E | A | A | A |
| HCM2kAvgQ: | 3 | 6 | 0 | 0 | 12 | 12 | 5 | 0 | 5 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 47 733 0***
Lanes: 0 1 1 0 0

| Final Vol: | Lanes: | Signal=Split Rights=Include | | | Signal=Split Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 94 | 0 | | Vol Cnt Date: | n/a | | 0 | 0 |
| | | | Cycle Time (sec): | 150 | | | |
| | 0 | | Loss Time (sec): | 9 | | 0 | |
| 0 | 1! | | Critical V/C: | 0.619 | | 0 | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 16.2 | | 0 | |
| 131*** | 0 | | Avg Delay (sec/veh): | 16.5 | | 0 | 0 |
| | | | LOS: | B | | | |

Lanes: 1 0 2 0 0
Final Vol: 35 1627*** 0
Signal=Protect/Rights=Include

```
Street Name:        University Avenue                 Kavanaugh Drive
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10     0     0   10    10    10    0    10     0    0     0
Y+R:         4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     35 1627     0     0  733    47    94    0   131     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  35 1627     0     0  733    47    94    0   131     0    0     0
Added Vol:     0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  35 1627     0     0  733    47    94    0   131     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   35 1627     0     0  733    47    94    0   131     0    0     0
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  35 1627     0     0  733    47    94    0   131     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  35 1627     0     0  733    47    94    0   131     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 0.95  1.00  1.00 0.94  0.94  0.90 1.00  0.90  1.00 1.00  1.00
Lanes:       1.00 2.00  0.00  0.00 1.88  0.12  0.42 0.00  0.58  0.00 0.00  0.00
Final Sat.:  1805 3610     0     0 3362   216   716    0   998     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.45  0.00  0.00 0.22  0.22  0.13 0.00  0.13  0.00 0.00  0.00
Crit Moves:       ****        ****                            ****
Green Time:  19.3  109   0.0   0.0 90.0  90.0  31.8  0.0  31.8   0.0  0.0   0.0
Volume/Cap:  0.15 0.62  0.00  0.00 0.36  0.36  0.62 0.00  0.62  0.00 0.00  0.00
Uniform Del: 58.1 10.1   0.0   0.0 15.4  15.4  53.6  0.0  53.6   0.0  0.0   0.0
IncremntDel:  0.3  0.5   0.0   0.0  0.1   0.1   3.2  0.0   3.2   0.0  0.0   0.0
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay Adj:   1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Delay/Veh:   58.4 10.6   0.0   0.0 15.5  15.5  56.9  0.0  56.9   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  58.4 10.6   0.0   0.0 15.5  15.5  56.9  0.0  56.9   0.0  0.0   0.0
LOS by Move:    E    B     A     A    B     B     E    A     E     A    A     A
HCM2kAvgQ:      1   19     0     0    9     9    10    0    10     0    0     0
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #45: (43) University/Donohoe

Signal=Protect/Rights=Include
Final Vol: 85 789 19***
Lanes: 0 1 1 0 1

Signal=Split Rights=Include (West approach)
Final Vol: 5, 61, 451***
Lanes: 1, 0, 1, 0, 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.091
Avg Crit Del (sec/veh): 141.6
Avg Delay (sec/veh): 115.7
LOS: F

Signal=Split Rights=Include (East approach)
Lanes: 1, 1, 0, 1, 1
Final Vol: 409, 498***, 582

Lanes: 2 0 2 0 1
Final Vol: 115 397 450***
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 115 | 397 | 450 | 19 | 789 | 85 | 5 | 61 | 451 | 582 | 498 | 409 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.73 | 0.73 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.81 | 0.19 | 1.00 | 1.00 | 1.00 | 1.56 | 1.34 | 1.10 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2520 | 271 | 1417 | 1492 | 1268 | 2084 | 1783 | 1465 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.14 | 0.35 | 0.01 | 0.31 | 0.31 | 0.00 | 0.04 | 0.36 | 0.28 | 0.28 | 0.28 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 10.0 | 45.9 | 45.9 | 10.0 | 45.9 | 45.9 | 46.0 | 46.0 | 46.0 | 36.1 | 36.1 | 36.1 |
| Volume/Cap: | 0.63 | 0.46 | 1.16 | 0.20 | 1.02 | 1.02 | 0.01 | 0.13 | 1.16 | 1.16 | 1.16 | 1.16 |
| Uniform Del: | 68.2 | 42.0 | 52.1 | 66.2 | 52.1 | 52.1 | 36.2 | 37.6 | 52.0 | 56.9 | 56.9 | 56.9 |
| IncremntDel: | 6.7 | 0.4 | 97.0 | 1.1 | 36.8 | 36.8 | 0.0 | 0.1 | 97.0 | 81.1 | 81.1 | 81.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 74.9 | 42.4 | 149.1 | 67.3 | 88.9 | 88.9 | 36.2 | 37.7 | 149.0 | 138.0 | 138 | 138.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 74.9 | 42.4 | 149.1 | 67.3 | 88.9 | 88.9 | 36.2 | 37.7 | 149.0 | 138.0 | 138 | 138.0 |
| LOS by Move: | E | D | F | E | F | F | D | D | F | F | F | F |
| HCM2kAvgQ: | 4 | 8 | 31 | 1 | 27 | 27 | 0 | 2 | 31 | 27 | 27 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #45: (43) University/Donohoe

Signal=Protect/Rights=Include
Final Vol: 116 750 44***
Lanes: 0 1 1 0 1

Signal=Split
Final Vol: Lanes: Rights=Include
8 1
0
152 1
0
194*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.046
Avg Crit Del (sec/veh): 111.5
Avg Delay (sec/veh): 78.4
LOS: E

Signal=Split
Rights=Include Lanes: Final Vol:
1 458***
1
0 699
1
1 358

Lanes: 2 0 2 0 1
Final Vol: 293 659 714***
Signal=Protect/Rights=Include

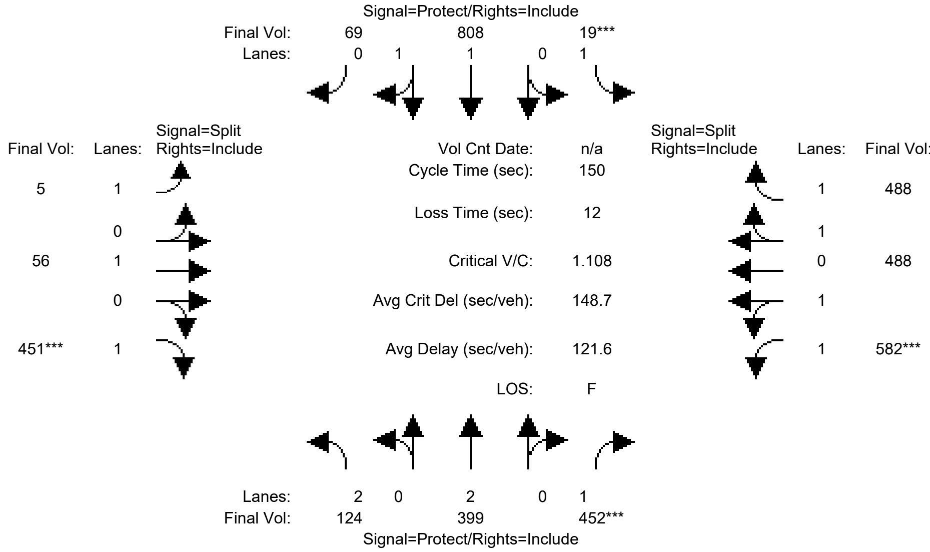
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 293 | 659 | 714 | 44 | 750 | 116 | 8 | 152 | 194 | 358 | 699 | 458 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.79 | 0.79 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.73 | 0.27 | 1.00 | 1.00 | 1.00 | 1.00 | 1.81 | 1.19 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 2589 | 400 | 1525 | 1606 | 1365 | 1439 | 2608 | 1709 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.22 | 0.52 | 0.03 | 0.29 | 0.29 | 0.01 | 0.09 | 0.14 | 0.25 | 0.27 | 0.27 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 20.8 | 71.8 | 71.8 | 10.0 | 60.9 | 60.9 | 19.5 | 19.5 | 19.5 | 36.8 | 36.8 | 36.8 |
| Volume/Cap: | 0.71 | 0.45 | 1.09 | 0.43 | 0.71 | 0.71 | 0.04 | 0.73 | 1.09 | 1.02 | 1.09 | 1.09 |
| Uniform Del: | 61.7 | 26.0 | 39.1 | 67.3 | 37.2 | 37.2 | 57.1 | 62.7 | 65.3 | 56.6 | 56.6 | 56.6 |
| IncremntDel: | 5.8 | 0.2 | 63.6 | 2.9 | 2.0 | 2.0 | 0.1 | 12.2 | 94.9 | 27.2 | 54.0 | 54.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 67.6 | 26.3 | 102.7 | 70.2 | 39.3 | 39.3 | 57.2 | 74.9 | 160.1 | 83.8 | 111 | 110.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 67.6 | 26.3 | 102.7 | 70.2 | 39.3 | 39.3 | 57.2 | 74.9 | 160.1 | 83.8 | 111 | 110.7 |
| LOS by Move: | E | C | F | E | D | D | E | E | F | F | F | F |
| HCM2kAvgQ: | 8 | 10 | 44 | 2 | 18 | 18 | 0 | 8 | 14 | 23 | 27 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #45: (43) University/Donohoe



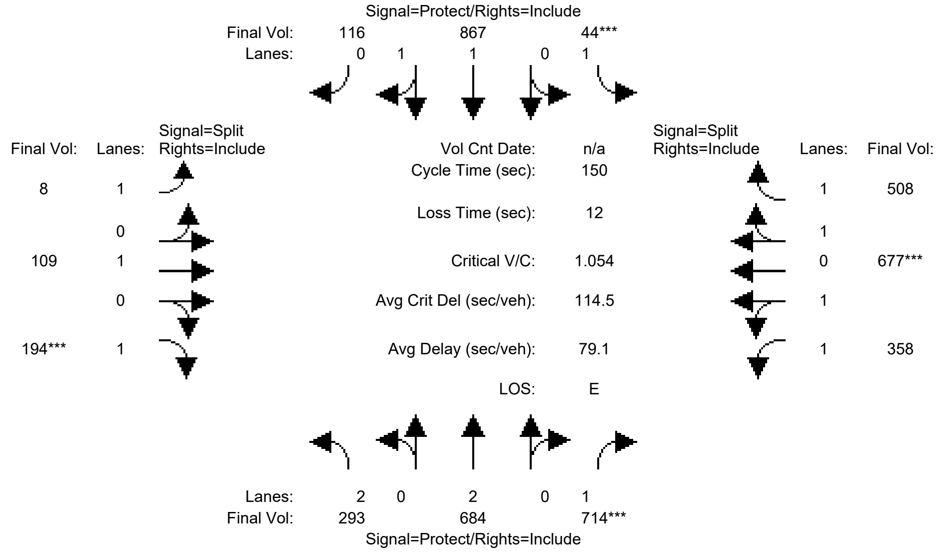

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 124 | 399 | 452 | 19 | 808 | 69 | 5 | 56 | 451 | 582 | 488 | 488 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.74 | 0.74 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.84 | 0.16 | 1.00 | 1.00 | 1.00 | 1.50 | 1.25 | 1.25 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2580 | 220 | 1417 | 1492 | 1268 | 1981 | 1661 | 1661 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.14 | 0.36 | 0.01 | 0.31 | 0.31 | 0.00 | 0.04 | 0.36 | 0.29 | 0.29 | 0.29 |
| Crit Moves: | | | **** | **** | | | | | **** | **** | | |
| Green Time: | 10.0 | 45.4 | 45.4 | 10.0 | 45.4 | 45.4 | 45.3 | 45.3 | 45.3 | 37.4 | 37.4 | 37.4 |
| Volume/Cap: | 0.68 | 0.47 | 1.18 | 0.20 | 1.04 | 1.04 | 0.01 | 0.12 | 1.18 | 1.18 | 1.18 | 1.18 |
| Uniform Del: | 68.4 | 42.5 | 52.3 | 66.2 | 52.3 | 52.3 | 36.7 | 38.0 | 52.4 | 56.3 | 56.3 | 56.3 |
| IncremntDel: | 9.7 | 0.4 | 104.4 | 1.1 | 40.5 | 40.5 | 0.0 | 0.1 | 104.4 | 88.7 | 88.7 | 88.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 78.1 | 42.9 | 156.7 | 67.3 | 92.8 | 92.8 | 36.7 | 38.1 | 156.8 | 145.0 | 145 | 145.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 78.1 | 42.9 | 156.7 | 67.3 | 92.8 | 92.8 | 36.7 | 38.1 | 156.8 | 145.0 | 145 | 145.0 |
| LOS by Move: | E | D | F | E | F | F | D | D | F | F | F | F |
| HCM2kAvgQ: | 4 | 8 | 32 | 1 | 28 | 28 | 0 | 2 | 32 | 29 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #45: (43) University/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 293 | 684 | 714 | 44 | 867 | 116 | 8 | 109 | 194 | 358 | 677 | 508 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.79 | 0.79 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 1.76 | 0.24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.71 | 1.29 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 2642 | 353 | 1525 | 1606 | 1365 | 1435 | 2459 | 1845 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.22 | 0.52 | 0.03 | 0.33 | 0.33 | 0.01 | 0.07 | 0.14 | 0.25 | 0.28 | 0.28 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 18.8 | 71.2 | 71.2 | 10.0 | 62.4 | 62.4 | 19.3 | 19.3 | 19.3 | 37.5 | 37.5 | 37.5 |
| Volume/Cap: | 0.79 | 0.47 | 1.10 | 0.43 | 0.79 | 0.79 | 0.04 | 0.53 | 1.10 | 1.00 | 1.10 | 1.10 |
| Uniform Del: | 63.7 | 26.7 | 39.4 | 67.3 | 38.1 | 38.1 | 57.2 | 61.0 | 65.3 | 56.3 | 56.3 | 56.3 |
| IncremntDel: | 10.8 | 0.2 | 66.7 | 2.9 | 3.5 | 3.5 | 0.1 | 2.5 | 97.9 | 22.7 | 57.2 | 57.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 74.5 | 26.9 | 106.1 | 70.2 | 41.6 | 41.6 | 57.3 | 63.6 | 163.2 | 78.9 | 113 | 113.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 74.5 | 26.9 | 106.1 | 70.2 | 41.6 | 41.6 | 57.3 | 63.6 | 163.2 | 78.9 | 113 | 113.5 |
| LOS by Move: | E | C | F | E | D | D | E | E | F | E | F | F |
| HCM2kAvgQ: | 9 | 11 | 44 | 2 | 22 | 22 | 0 | 5 | 14 | 23 | 27 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include

Final Vol: 39*** 0 0
Lanes: 1 0 0 0 1

| Final Vol: | Lanes: | Signal=Protect Rights=Include | | | Signal=Protect Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 120 | | | |
| 0*** | 0 | | | | | 0 | 36 |
| | | | Loss Time (sec): | 12 | | | |
| | 0 | | | | | 1 | |
| 466 | 2 | | Critical V/C: | 0.987 | | 2 | 827*** |
| | 0 | | Avg Crit Del (sec/veh): | 83.4 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 64.5 | | 0 | 0 |
| | | | LOS: | E | | | |

Lanes: 2 0 1 0 1
Final Vol: 582 106 303***
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 582 | 106 | 303 | 0 | 0 | 39 | 0 | 466 | 0 | 0 | 827 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.39 | 0.13 | 0.44 | 0.00 | 0.00 | 0.06 | 0.00 | 0.30 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 50.7 | 50.7 | 50.7 | 0.0 | 0.0 | 12.0 | 0.0 | 45.3 | 0.0 | 0.0 | 45.3 | 45.3 |
| Volume/Cap: | 0.92 | 0.31 | 1.04 | 0.00 | 0.00 | 0.57 | 0.00 | 0.80 | 0.00 | 0.00 | 1.04 | 1.04 |
| Uniform Del: | 32.7 | 23.0 | 34.6 | 0.0 | 0.0 | 51.5 | 0.0 | 33.4 | 0.0 | 0.0 | 37.4 | 37.4 |
| IncremntDel: | 18.9 | 0.5 | 63.3 | 0.0 | 0.0 | 10.5 | 0.0 | 7.8 | 0.0 | 0.0 | 41.9 | 41.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.6 | 23.5 | 97.9 | 0.0 | 0.0 | 62.0 | 0.0 | 41.2 | 0.0 | 0.0 | 79.2 | 79.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.6 | 23.5 | 97.9 | 0.0 | 0.0 | 62.0 | 0.0 | 41.2 | 0.0 | 0.0 | 79.2 | 79.2 |
| LOS by Move: | D | C | F | A | A | E | A | D | A | A | E | E |
| HCM2kAvgQ: | 14 | 3 | 17 | 0 | 0 | 2 | 0 | 10 | 0 | 0 | 18 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

## Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include
Final Vol: 89*** 0 11
Lanes: 1 0 0 0 1

Signal=Permit Rights=Include
Final Vol: Lanes:
0 0
0
875*** 2
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.442
Avg Crit Del (sec/veh): 250.3
Avg Delay (sec/veh): 145.7
LOS: F

Signal=Permit Rights=Include
Lanes: Final Vol:
0 18
1
2 746
0
0 0

Lanes: 2 0 1 0 1
Final Vol: 757 24 620***
Signal=Split/Rights=Include

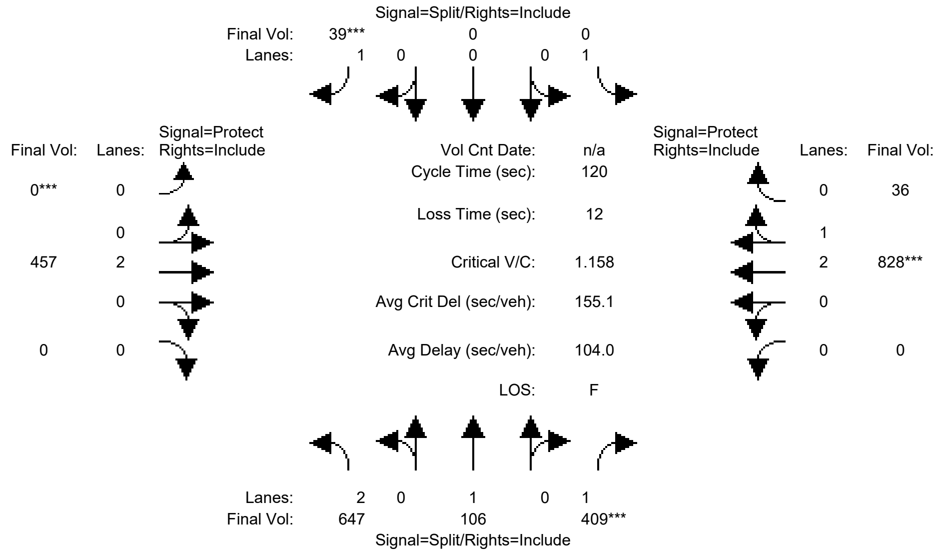
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 757 | 24 | 620 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 746 | 18 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.93 | 0.07 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2648 | 64 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.41 | 0.02 | 0.73 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.28 | 0.28 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 60.8 | 60.8 | 60.8 | 8.7 | 0.0 | 8.7 | 0.0 | 38.4 | 0.0 | 0.0 | 38.4 | 38.4 |
| Volume/Cap: | 0.81 | 0.05 | 1.44 | 0.16 | 0.00 | 1.44 | 0.00 | 1.44 | 0.00 | 0.00 | 0.88 | 0.88 |
| Uniform Del: | 24.8 | 14.9 | 29.6 | 52.2 | 0.0 | 55.6 | 0.0 | 40.8 | 0.0 | 0.0 | 38.6 | 38.6 |
| IncremntDel: | 5.5 | 0.0 | 211.8 | 1.1 | 0.0 | 269.2 | 0.0 | 208 | 0.0 | 0.0 | 10.3 | 10.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 30.3 | 15.0 | 241.3 | 53.3 | 0.0 | 324.9 | 0.0 | 249 | 0.0 | 0.0 | 48.9 | 48.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 30.3 | 15.0 | 241.3 | 53.3 | 0.0 | 324.9 | 0.0 | 249 | 0.0 | 0.0 | 48.9 | 48.9 |
| LOS by Move: | C | B | F | D | A | F | A | F | A | A | D | D |
| HCM2kAvgQ: | 14 | 0 | 47 | 1 | 0 | 8 | 0 | 36 | 0 | 0 | 13 | 13 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #46: (44) Capitol/Donohoe



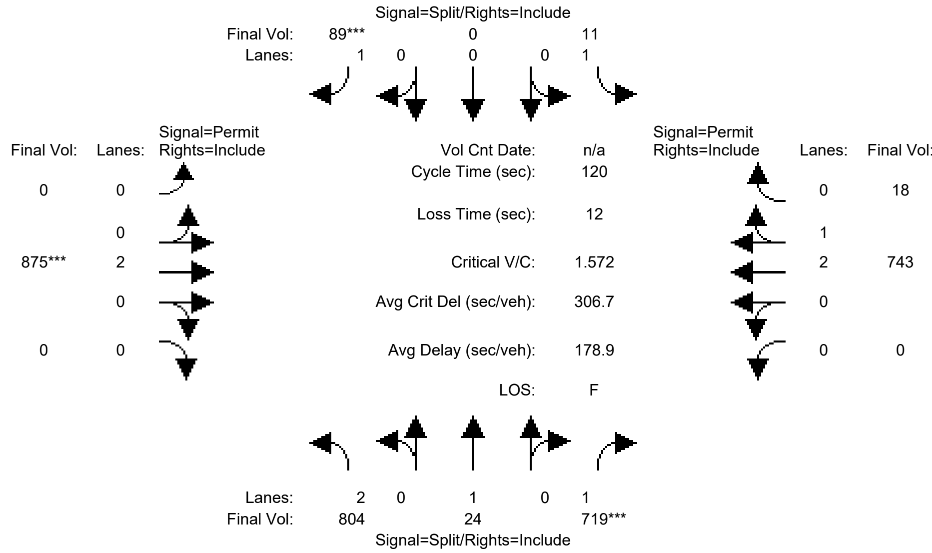

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 647 | 106 | 409 | 0 | 0 | 39 | 0 | 457 | 0 | 0 | 828 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.43 | 0.13 | 0.59 | 0.00 | 0.00 | 0.06 | 0.00 | 0.30 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 57.8 | 57.8 | 57.8 | 0.0 | 0.0 | 12.0 | 0.0 | 38.2 | 0.0 | 0.0 | 38.2 | 38.2 |
| Volume/Cap: | 0.90 | 0.27 | 1.23 | 0.00 | 0.00 | 0.57 | 0.00 | 0.93 | 0.00 | 0.00 | 1.23 | 1.23 |
| Uniform Del: | 28.4 | 18.6 | 31.1 | 0.0 | 0.0 | 51.5 | 0.0 | 39.6 | 0.0 | 0.0 | 40.9 | 40.9 |
| IncremntDel: | 14.2 | 0.4 | 127.9 | 0.0 | 0.0 | 10.5 | 0.0 | 24.5 | 0.0 | 0.0 | 117 | 116.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 42.6 | 18.9 | 159.0 | 0.0 | 0.0 | 62.0 | 0.0 | 64.1 | 0.0 | 0.0 | 157 | 157.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 42.6 | 18.9 | 159.0 | 0.0 | 0.0 | 62.0 | 0.0 | 64.1 | 0.0 | 0.0 | 157 | 157.5 |
| LOS by Move: | D | B | F | A | A | E | A | E | A | A | F | F |
| HCM2kAvgQ: | 15 | 2 | 27 | 0 | 0 | 2 | 0 | 12 | 0 | 0 | 22 | 22 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #46: (44) Capitol/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 804 | 24 | 719 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 743 | 18 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.93 | 0.07 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2648 | 64 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.44 | 0.02 | 0.85 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.28 | 0.28 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 64.7 | 64.7 | 64.7 | 8.0 | 0.0 | 8.0 | 0.0 | 35.2 | 0.0 | 0.0 | 35.2 | 35.2 |
| Volume/Cap: | 0.81 | 0.04 | 1.57 | 0.17 | 0.00 | 1.57 | 0.00 | 1.57 | 0.00 | 0.00 | 0.96 | 0.96 |
| Uniform Del: | 22.6 | 13.0 | 27.6 | 52.9 | 0.0 | 56.0 | 0.0 | 42.4 | 0.0 | 0.0 | 41.6 | 41.6 |
| IncremntDel: | 5.1 | 0.0 | 267.7 | 1.3 | 0.0 | 326.2 | 0.0 | 266 | 0.0 | 0.0 | 21.6 | 21.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 27.7 | 13.1 | 295.4 | 54.2 | 0.0 | 382.2 | 0.0 | 308 | 0.0 | 0.0 | 63.2 | 63.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 27.7 | 13.1 | 295.4 | 54.2 | 0.0 | 382.2 | 0.0 | 308 | 0.0 | 0.0 | 63.2 | 63.2 |
| LOS by Move: | C | B | F | D | A | F | A | F | A | A | E | E |
| HCM2kAvgQ: | 15 | 0 | 59 | 1 | 0 | 9 | 0 | 39 | 0 | 0 | 14 | 14 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 385*** 0 165
Lanes: 1 0 0 1 0

Signal=Protect
Final Vol: Lanes: Rights=Include
205*** 1
0
614 3
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 0.680
Avg Crit Del (sec/veh): 44.2
Avg Delay (sec/veh): 35.6
LOS: D

Signal=Protect
Rights=Include Lanes: Final Vol:
0 48
1
1 549***
0
0 0

Lanes: 1 1 0 0 1
Final Vol: 1 1*** 1
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 165 | 0 | 385 | 205 | 614 | 0 | 0 | 549 | 48 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.85 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.84 | 0.16 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 0 | 2788 | 244 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.28 | 0.13 | 0.14 | 0.00 | 0.00 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 45.4 | 0.0 | 45.4 | 21.6 | 53.6 | 0.0 | 0.0 | 31.9 | 31.9 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.28 | 0.00 | 0.74 | 0.74 | 0.31 | 0.00 | 0.00 | 0.74 | 0.74 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 25.9 | 0.0 | 32.2 | 46.5 | 21.4 | 0.0 | 0.0 | 40.3 | 40.3 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 5.6 | 10.2 | 0.1 | 0.0 | 0.0 | 3.7 | 3.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 26.2 | 0.0 | 37.8 | 56.7 | 21.5 | 0.0 | 0.0 | 44.0 | 44.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 26.2 | 0.0 | 37.8 | 56.7 | 21.5 | 0.0 | 0.0 | 44.0 | 44.0 |
| LOS by Move: | D | D | D | C | A | D | E | C | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 14 | 9 | 5 | 0 | 0 | 12 | 12 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 90*** 0 82
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (West approach)
Final Vol: Lanes:
472*** 1
0
941 3
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 0.900
Avg Crit Del (sec/veh): 63.9
Avg Delay (sec/veh): 40.8
LOS: D

Signal=Protect Rights=Include (East approach)
Lanes: Final Vol:
0 113
1
1 472***
0
0 0

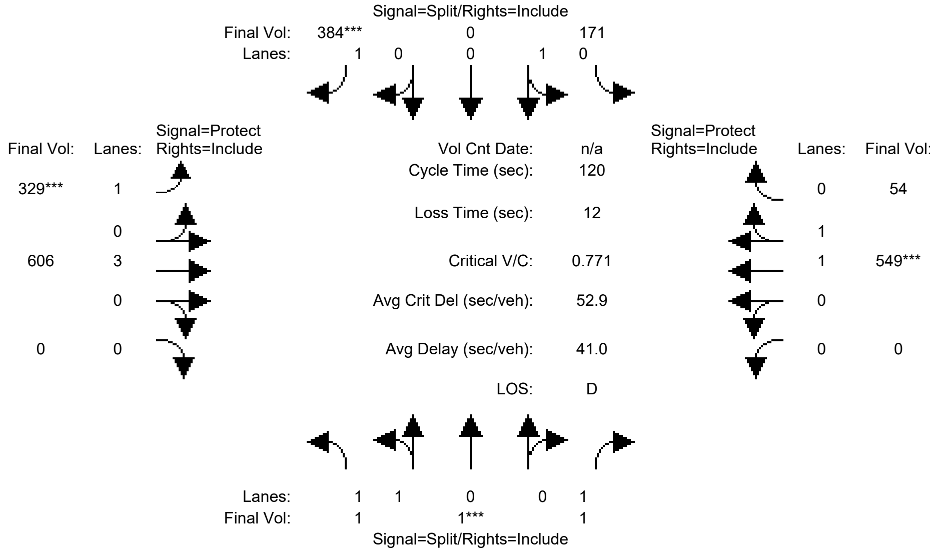
Lanes: 1 1 0 0 1
Final Vol: 80 15*** 39
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 82 | 0 | 90 | 472 | 941 | 0 | 0 | 472 | 113 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.61 | 0.39 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1782 | 427 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.07 | 0.00 | 0.09 | 0.42 | 0.29 | 0.00 | 0.00 | 0.26 | 0.26 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 11.4 | 0.0 | 11.4 | 53.5 | 87.6 | 0.0 | 0.0 | 34.1 | 34.1 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.76 | 0.00 | 0.93 | 0.93 | 0.39 | 0.00 | 0.00 | 0.93 | 0.93 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 53.0 | 0.0 | 53.9 | 31.5 | 6.1 | 0.0 | 0.0 | 41.8 | 41.8 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 26.1 | 0.0 | 69.4 | 24.1 | 0.1 | 0.0 | 0.0 | 20.7 | 20.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 79.0 | 0.0 | 123.3 | 55.6 | 6.2 | 0.0 | 0.0 | 62.5 | 62.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 79.0 | 0.0 | 123.3 | 55.6 | 6.2 | 0.0 | 0.0 | 62.5 | 62.5 |
| LOS by Move: | E | E | E | E | A | F | E | A | A | A | E | E |
| HCM2kAvgQ: | 3 | 3 | 2 | 5 | 0 | 6 | 21 | 5 | 0 | 0 | 15 | 15 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #47: (45) Cooley/Donohoe



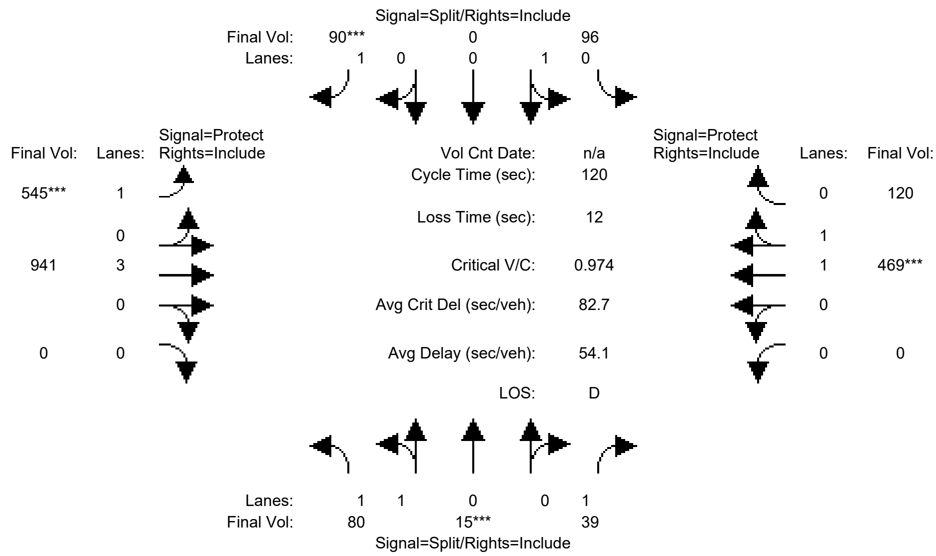

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 171 | 0 | 384 | 329 | 606 | 0 | 0 | 549 | 54 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.85 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.82 | 0.18 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 0 | 2757 | 271 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.28 | 0.21 | 0.14 | 0.00 | 0.00 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 39.9 | 0.0 | 39.9 | 30.6 | 59.1 | 0.0 | 0.0 | 28.4 | 28.4 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.33 | 0.00 | 0.84 | 0.84 | 0.28 | 0.00 | 0.00 | 0.84 | 0.84 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 30.0 | 0.0 | 37.1 | 42.4 | 17.9 | 0.0 | 0.0 | 43.6 | 43.6 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 13.1 | 14.9 | 0.1 | 0.0 | 0.0 | 8.8 | 8.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 30.4 | 0.0 | 50.1 | 57.3 | 18.0 | 0.0 | 0.0 | 52.4 | 52.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 30.4 | 0.0 | 50.1 | 57.3 | 18.0 | 0.0 | 0.0 | 52.4 | 52.4 |
| LOS by Move: | D | D | D | C | A | D | E | B | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 5 | 0 | 16 | 14 | 5 | 0 | 0 | 14 | 14 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #47: (45) Cooley/Donohoe



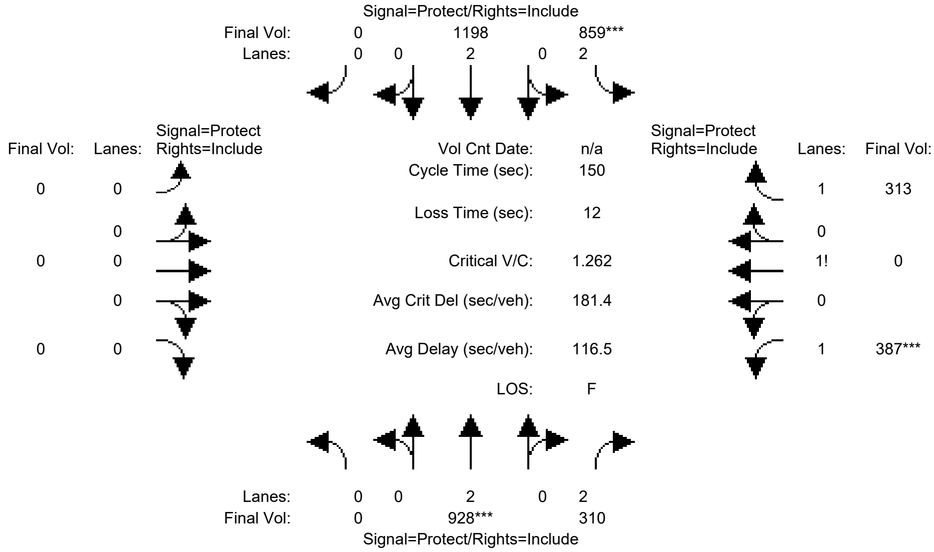

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 96 | 0 | 90 | 545 | 941 | 0 | 0 | 469 | 120 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.59 | 0.41 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1755 | 449 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.08 | 0.00 | 0.09 | 0.48 | 0.29 | 0.00 | 0.00 | 0.27 | 0.27 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 10.5 | 0.0 | 10.5 | 56.8 | 88.5 | 0.0 | 0.0 | 31.7 | 31.7 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.96 | 0.00 | 1.01 | 1.01 | 0.39 | 0.00 | 0.00 | 1.01 | 1.01 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 54.6 | 0.0 | 54.8 | 31.6 | 5.8 | 0.0 | 0.0 | 44.2 | 44.2 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 78.2 | 0.0 | 98.8 | 41.8 | 0.1 | 0.0 | 0.0 | 40.4 | 40.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 132.8 | 0.0 | 153.5 | 73.4 | 5.9 | 0.0 | 0.0 | 84.5 | 84.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 132.8 | 0.0 | 153.5 | 73.4 | 5.9 | 0.0 | 0.0 | 84.5 | 84.5 |
| LOS by Move: | E | E | E | F | A | F | E | A | A | A | F | F |
| HCM2kAvgQ: | 3 | 3 | 2 | 6 | 0 | 6 | 27 | 5 | 0 | 0 | 17 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #48: (46) University/US 101 SB Ramps



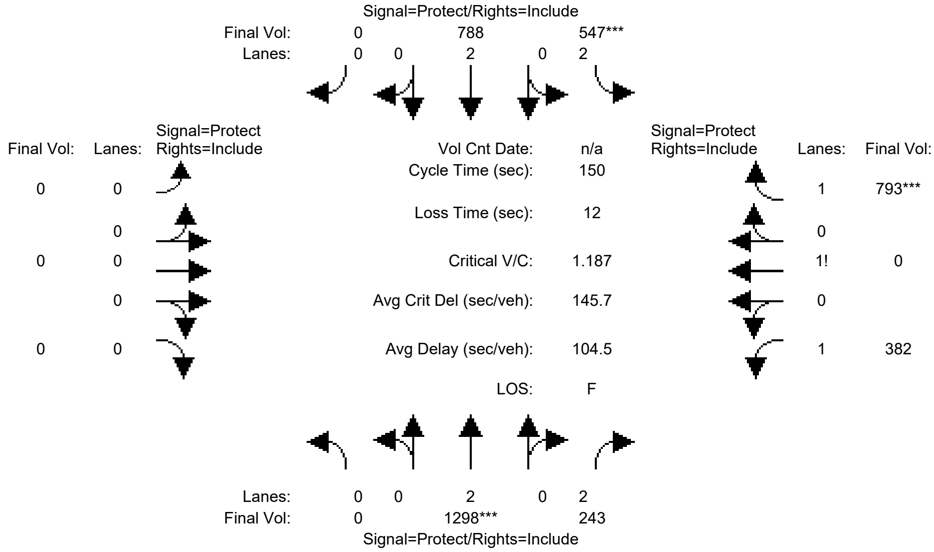

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 928 | 310 | 859 | 1198 | 0 | 0 | 0 | 0 | 387 | 0 | 313 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.55 | 0.00 | 1.45 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1492 | 0 | 1390 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.46 | 0.20 | 0.44 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 54.8 | 54.8 | 52.3 | 107 | 0.0 | 0.0 | 0.0 | 0.0 | 30.8 | 0.0 | 30.8 |
| Volume/Cap: | 0.00 | 1.26 | 0.54 | 1.26 | 0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 1.26 | 0.00 | 1.10 |
| Uniform Del: | 0.0 | 47.6 | 37.5 | 48.8 | 15.1 | 0.0 | 0.0 | 0.0 | 0.0 | 59.6 | 0.0 | 59.6 |
| IncremntDel: | 0.0 | 129 | 1.0 | 129.6 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 132.0 | 0.0 | 64.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 176 | 38.5 | 178.5 | 19.5 | 0.0 | 0.0 | 0.0 | 0.0 | 191.6 | 0.0 | 124.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 176 | 38.5 | 178.5 | 19.5 | 0.0 | 0.0 | 0.0 | 0.0 | 191.6 | 0.0 | 124.1 |
| LOS by Move: | A | F | D | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 37 | 7 | 34 | 23 | 0 | 0 | 0 | 0 | 20 | 0 | 16 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #48: (46) University/US 101 SB Ramps



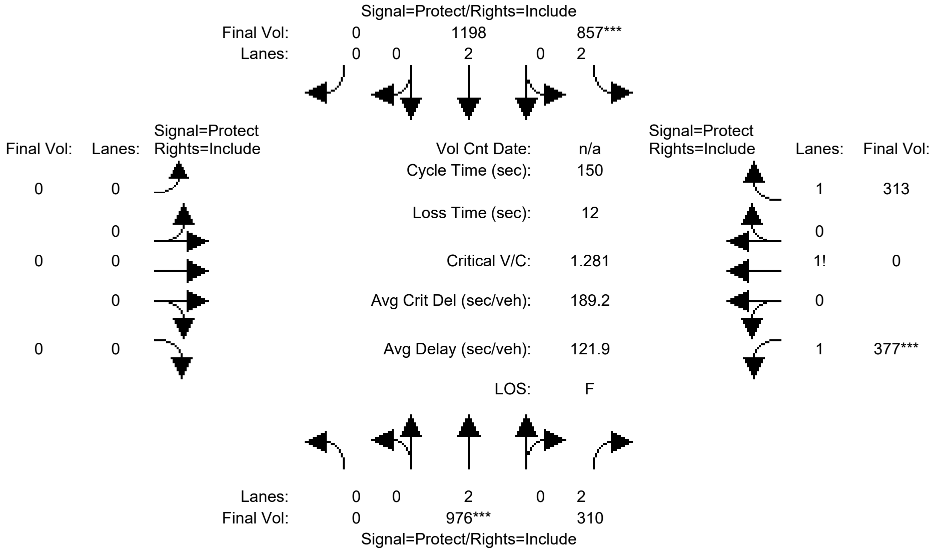

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1298 | 243 | 547 | 788 | 0 | 0 | 0 | 0 | 382 | 0 | 793 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.65 | 0.73 | 0.65 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.33 | 0.00 | 1.67 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1626 | 0 | 2055 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.49 | 0.12 | 0.21 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 0.00 | 0.39 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 62.2 | 62.2 | 27.0 | 89.3 | 0.0 | 0.0 | 0.0 | 0.0 | 48.7 | 0.0 | 48.7 |
| Volume/Cap: | 0.00 | 1.19 | 0.28 | 1.19 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 | 1.19 |
| Uniform Del: | 0.0 | 43.9 | 29.1 | 61.5 | 17.5 | 0.0 | 0.0 | 0.0 | 0.0 | 44.7 | 0.0 | 50.6 |
| IncremntDel: | 0.0 | 93.7 | 0.2 | 104.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 0.0 | 94.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 138 | 29.3 | 165.8 | 17.8 | 0.0 | 0.0 | 0.0 | 0.0 | 46.3 | 0.0 | 145.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 138 | 29.3 | 165.8 | 17.8 | 0.0 | 0.0 | 0.0 | 0.0 | 46.3 | 0.0 | 145.2 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 47 | 4 | 21 | 11 | 0 | 0 | 0 | 0 | 13 | 0 | 33 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #48: (46) University/US 101 SB Ramps



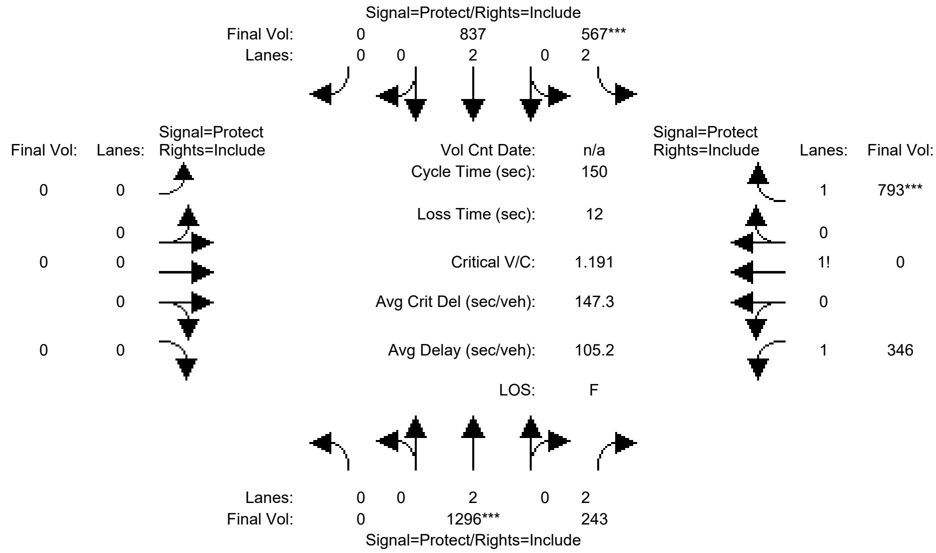

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 976 | 310 | 857 | 1198 | 0 | 0 | 0 | 0 | 377 | 0 | 313 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.55 | 0.00 | 1.45 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1484 | 0 | 1395 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.49 | 0.20 | 0.44 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.00 | 0.22 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 56.8 | 56.8 | 51.4 | 108 | 0.0 | 0.0 | 0.0 | 0.0 | 29.7 | 0.0 | 29.7 |
| Volume/Cap: | 0.00 | 1.28 | 0.52 | 1.28 | 0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 1.28 | 0.00 | 1.13 |
| Uniform Del: | 0.0 | 46.6 | 36.0 | 49.3 | 14.4 | 0.0 | 0.0 | 0.0 | 0.0 | 60.1 | 0.0 | 60.1 |
| IncremntDel: | 0.0 | 137 | 0.8 | 137.8 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 140.3 | 0.0 | 78.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 183 | 36.8 | 187.1 | 18.4 | 0.0 | 0.0 | 0.0 | 0.0 | 200.5 | 0.0 | 138.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 183 | 36.8 | 187.1 | 18.4 | 0.0 | 0.0 | 0.0 | 0.0 | 200.5 | 0.0 | 138.6 |
| LOS by Move: | A | F | D | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 39 | 7 | 34 | 22 | 0 | 0 | 0 | 0 | 20 | 0 | 16 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #48: (46) University/US 101 SB Ramps



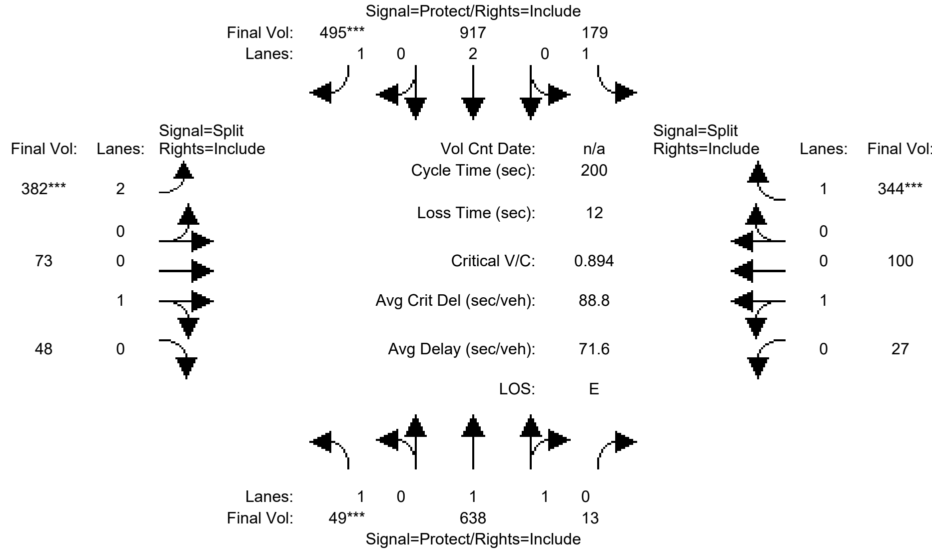

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1296 | 243 | 567 | 837 | 0 | 0 | 0 | 0 | 346 | 0 | 793 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.30 | 0.00 | 1.70 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1596 | 0 | 2076 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.49 | 0.12 | 0.22 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 61.9 | 61.9 | 27.9 | 89.9 | 0.0 | 0.0 | 0.0 | 0.0 | 48.1 | 0.0 | 48.1 |
| Volume/Cap: | 0.00 | 1.19 | 0.28 | 1.19 | 0.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.68 | 0.00 | 1.19 |
| Uniform Del: | 0.0 | 44.0 | 29.3 | 61.0 | 17.6 | 0.0 | 0.0 | 0.0 | 0.0 | 44.2 | 0.0 | 50.9 |
| IncremntDel: | 0.0 | 95.2 | 0.2 | 105.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 96.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 139 | 29.5 | 166.1 | 18.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.3 | 0.0 | 147.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 139 | 29.5 | 166.1 | 18.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.3 | 0.0 | 147.3 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 47 | 4 | 22 | 12 | 0 | 0 | 0 | 0 | 11 | 0 | 33 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #49: (47) University/Woodland




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 49 | 638 | 13 | 179 | 917 | 495 | 382 | 73 | 48 | 27 | 100 | 344 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 | 0.66 | 0.72 | 0.73 | 0.73 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 1.00 | 2.00 | 1.00 | 2.00 | 0.60 | 0.40 | 0.21 | 0.79 | 1.00 |
| Final Sat.: | 1408 | 2751 | 56 | 1408 | 2816 | 1260 | 2731 | 840 | 553 | 312 | 1154 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.23 | 0.23 | 0.13 | 0.33 | 0.39 | 0.14 | 0.09 | 0.09 | 0.09 | 0.09 | 0.27 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.8 | 61.8 | 61.8 | 33.9 | 87.9 | 87.9 | 31.3 | 31.3 | 31.3 | 61.1 | 61.1 | 61.1 |
| Volume/Cap: | 0.89 | 0.75 | 0.75 | 0.75 | 0.74 | 0.89 | 0.89 | 0.56 | 0.56 | 0.28 | 0.28 | 0.89 |
| Uniform Del: | 95.7 | 62.2 | 62.2 | 79.0 | 46.6 | 51.8 | 82.7 | 77.9 | 77.9 | 52.8 | 52.8 | 66.4 |
| IncremntDel: | 83.7 | 3.7 | 3.7 | 12.5 | 2.4 | 16.9 | 20.7 | 3.1 | 3.1 | 0.4 | 0.4 | 22.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 179.4 | 65.9 | 65.9 | 91.5 | 49.0 | 68.7 | 103.4 | 81.1 | 81.1 | 53.2 | 53.2 | 88.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 179.4 | 65.9 | 65.9 | 91.5 | 49.0 | 68.7 | 103.4 | 81.1 | 81.1 | 53.2 | 53.2 | 88.8 |
| LOS by Move: | F | E | E | F | D | E | F | F | F | D | D | F |
| HCM2kAvgQ: | 5 | 20 | 20 | 12 | 25 | 30 | 14 | 7 | 7 | 6 | 6 | 23 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 394 570 219***
Lanes: 1 0 2 0 1

Signal=Split
Final Vol: Lanes: Rights=Include
488*** 2
0
73 0
1
40 0

Vol Cnt Date: n/a
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 1.602
Avg Crit Del (sec/veh): 363.0
Avg Delay (sec/veh): 272.9
LOS: F

Signal=Split
Rights=Include Lanes: Final Vol:
1 360***
0
0 54
1
0 18

Lanes: 1 0 1 1 0
Final Vol: 36 665*** 7
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 36 | 665 | 7 | 219 | 570 | 394 | 488 | 73 | 40 | 18 | 54 | 360 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.65 | 0.35 | 0.25 | 0.75 | 1.00 |
| Final Sat.: | 803 | 1588 | 17 | 803 | 1606 | 719 | 1558 | 517 | 283 | 209 | 627 | 719 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.42 | 0.27 | 0.35 | 0.55 | 0.31 | 0.14 | 0.14 | 0.09 | 0.09 | 0.50 |
| Crit Moves: | | **** | | **** | | | **** | | | | | **** |
| Green Time: | 6.5 | 52.3 | 52.3 | 34.0 | 79.8 | 79.8 | 39.1 | 39.1 | 39.1 | 62.6 | 62.6 | 62.6 |
| Volume/Cap: | 1.37 | 1.60 | 1.60 | 1.60 | 0.89 | 1.37 | 1.60 | 0.72 | 0.72 | 0.28 | 0.28 | 1.60 |
| Uniform Del: | 96.7 | 73.9 | 73.9 | 83.0 | 56.0 | 60.1 | 80.4 | 75.3 | 75.3 | 51.7 | 51.7 | 68.7 |
| IncremntDel: | 306.7 | 282 | 281.7 | 302.1 | 14.4 | 188.8 | 285.6 | 15.2 | 15.2 | 0.6 | 0.6 | 290.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 403.4 | 356 | 355.5 | 385.1 | 70.4 | 248.9 | 366.1 | 90.5 | 90.5 | 52.3 | 52.3 | 359.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 403.4 | 356 | 355.5 | 385.1 | 70.4 | 248.9 | 366.1 | 90.5 | 90.5 | 52.3 | 52.3 | 359.3 |
| LOS by Move: | F | F | F | F | E | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 5 | 39 | 39 | 25 | 20 | 38 | 28 | 8 | 8 | 3 | 3 | 39 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 494*** 913 187
Lanes: 1 0 2 0 1

Signal=Split Rights=Include (West approach)
Final Vol: / Lanes:
382*** 2
0
73 0
1
47 0

Vol Cnt Date: n/a
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 0.894
Avg Crit Del (sec/veh): 88.9
Avg Delay (sec/veh): 71.9
LOS: E

Signal=Split Rights=Include (East approach)
Lanes: / Final Vol:
1 345***
0
0 100
1
0 27

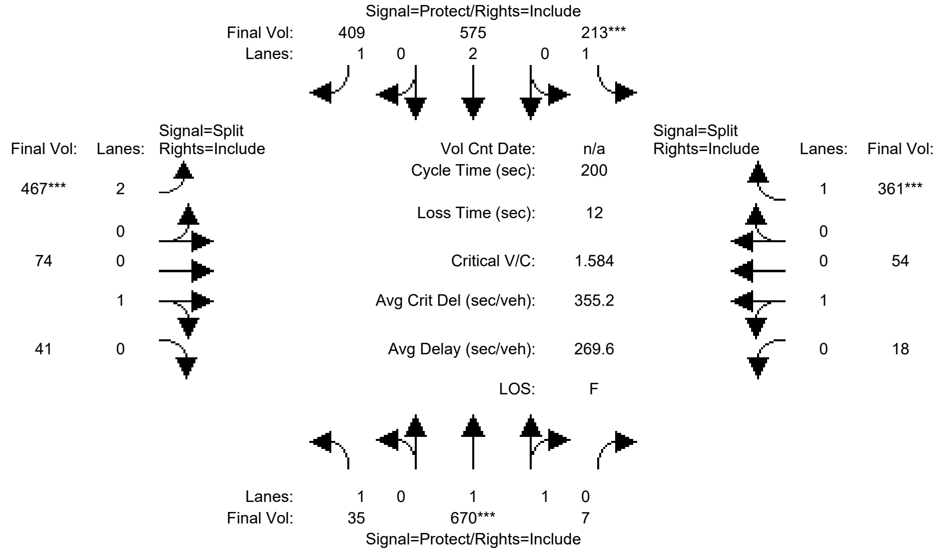
Lanes: 1 0 1 1 0
Final Vol: 49*** 636 13
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 49 | 636 | 13 | 187 | 913 | 494 | 382 | 73 | 47 | 27 | 100 | 345 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.74 | 0.74 | 0.66 | 0.72 | 0.73 | 0.73 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 1.00 | 2.00 | 1.00 | 2.00 | 0.61 | 0.39 | 0.21 | 0.79 | 1.00 |
| Final Sat.: | 1408 | 2751 | 56 | 1408 | 2816 | 1260 | 2731 | 848 | 546 | 312 | 1154 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.23 | 0.23 | 0.13 | 0.32 | 0.39 | 0.14 | 0.09 | 0.09 | 0.09 | 0.09 | 0.27 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.8 | 60.6 | 60.6 | 34.8 | 87.7 | 87.7 | 31.3 | 31.3 | 31.3 | 61.2 | 61.2 | 61.2 |
| Volume/Cap: | 0.89 | 0.76 | 0.76 | 0.76 | 0.74 | 0.89 | 0.89 | 0.55 | 0.55 | 0.28 | 0.28 | 0.89 |
| Uniform Del: | 95.7 | 63.2 | 63.2 | 78.6 | 46.7 | 51.9 | 82.7 | 77.9 | 77.9 | 52.7 | 52.7 | 66.3 |
| IncremntDel: | 83.7 | 4.1 | 4.1 | 13.2 | 2.4 | 16.9 | 20.7 | 3.0 | 3.0 | 0.3 | 0.3 | 22.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 179.4 | 67.3 | 67.3 | 91.8 | 49.1 | 68.8 | 103.4 | 80.9 | 80.9 | 53.0 | 53.0 | 88.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 179.4 | 67.3 | 67.3 | 91.8 | 49.1 | 68.8 | 103.4 | 80.9 | 80.9 | 53.0 | 53.0 | 88.6 |
| LOS by Move: | F | E | E | F | D | E | F | F | F | D | D | F |
| HCM2kAvgQ: | 5 | 20 | 20 | 12 | 25 | 30 | 14 | 7 | 7 | 6 | 6 | 23 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #49: (47) University/Woodland




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 35 | 670 | 7 | 213 | 575 | 409 | 467 | 74 | 41 | 18 | 54 | 361 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.64 | 0.36 | 0.25 | 0.75 | 1.00 |
| Final Sat.: | 803 | 1588 | 17 | 803 | 1606 | 719 | 1558 | 515 | 285 | 209 | 627 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.42 | 0.27 | 0.36 | 0.57 | 0.30 | 0.14 | 0.14 | 0.09 | 0.09 | 0.50 |
| Crit Moves: | | **** | | **** | | | **** | | | | | **** |
| Green Time: | 6.2 | 53.3 | 53.3 | 33.5 | 80.6 | 80.6 | 37.8 | 37.8 | 37.8 | 63.4 | 63.4 | 63.4 |
| Volume/Cap: | 1.41 | 1.58 | 1.58 | 1.58 | 0.89 | 1.41 | 1.58 | 0.76 | 0.76 | 0.27 | 0.27 | 1.58 |
| Uniform Del: | 96.9 | 73.4 | 73.4 | 83.3 | 55.5 | 59.7 | 81.1 | 76.8 | 76.8 | 51.0 | 51.0 | 68.3 |
| IncremntDel: | 326.9 | 274 | 273.8 | 295.2 | 14.2 | 205.0 | 278.5 | 19.9 | 19.9 | 0.6 | 0.6 | 282.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 423.9 | 347 | 347.2 | 378.4 | 69.7 | 264.7 | 359.5 | 96.6 | 96.6 | 51.6 | 51.6 | 351.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 423.9 | 347 | 347.2 | 378.4 | 69.7 | 264.7 | 359.5 | 96.6 | 96.6 | 51.6 | 51.6 | 351.0 |
| LOS by Move: | F | F | F | F | E | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 5 | 39 | 39 | 24 | 20 | 41 | 27 | 8 | 8 | 3 | 3 | 39 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

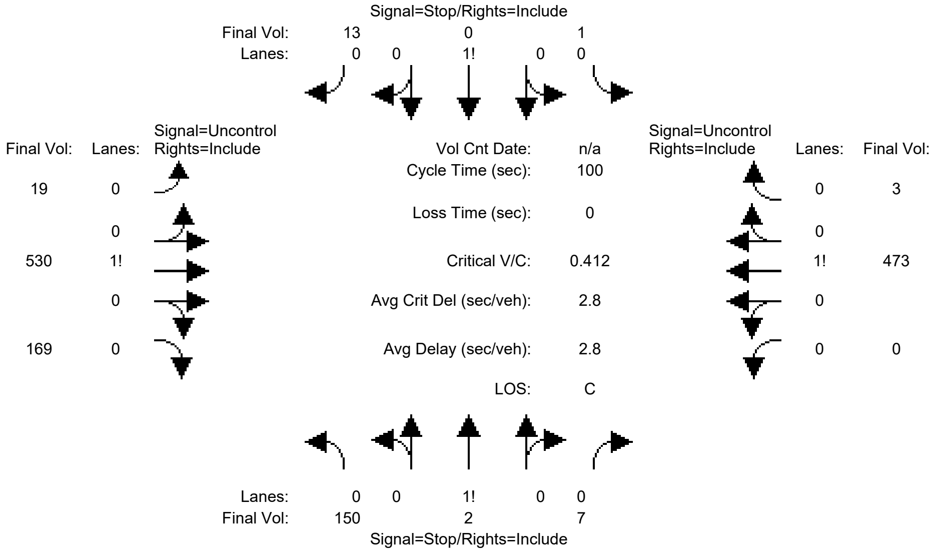
```
                         Signal=Stop/Rights=Include
          Final Vol:    49          1          2
              Lanes:     0    0     1!    0    0

             Signal=Uncontrol                              Signal=Uncontrol
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:    n/a    Rights=Include    Lanes:  Final Vol:
                                  Cycle Time (sec):    100
   6          0                                                                  0        2
                                   Loss Time (sec):      0
              0                                                                  0
 482          1!                      Critical V/C:  0.313                       1!     419
              0                 Avg Crit Del (sec/veh):  2.7                     0
  49          0                    Avg Delay (sec/veh):  2.7                     0        3
                                               LOS:      C

              Lanes:     0    0     1!    0    0
          Final Vol:   128          2          5
                         Signal=Stop/Rights=Include
```

```
Street Name:          Saratoga Avenue                   Newbridge Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     128    2     5     2    1    49     6  482    49     3  419     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  128    2     5     2    1    49     6  482    49     3  419     2
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  128    2     5     2    1    49     6  482    49     3  419     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   128    2     5     2    1    49     6  482    49     3  419     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  128    2     5     2    1    49     6  482    49     3  419     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  970  946   507   948  969   420   421 xxxx xxxxx   531 xxxx xxxxx
Potent Cap.:  235  264   570   243  256   638  1149 xxxx xxxxx  1047 xxxx xxxxx
Move Cap.:    215  262   570   238  253   638  1149 xxxx xxxxx  1047 xxxx xxxxx
Total Cap:    409  434 xxxxx   431  426 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.31 0.00  0.01  0.00 0.00  0.08  0.01 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx   8.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  414 xxxxx  xxxx  620 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  1.4 xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 17.9 xxxxx xxxxx 11.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:      17.9              11.3             xxxxxx            xxxxxx
ApproachLOS:         C                 B                  *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  128    2     5     2    1    49     6  482    49     3  419     2
ApproachDel:      17.9             11.3            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.7]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=135]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1148]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=52]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1148]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  128    2     5     2    1    49     6  482    49     3  419     2
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            961
Minor Approach Volume:          135
Minor Approach Volume Threshold: 230
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street




```
Street Name:          Saratoga Avenue                  Newbridge Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     150    2     7     1    0    13    19  530   169     0  473     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  150    2     7     1    0    13    19  530   169     0  473     3
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  150    2     7     1    0    13    19  530   169     0  473     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   150    2     7     1    0    13    19  530   169     0  473     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  150    2     7     1    0    13    19  530   169     0  473     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1134 1129   615  1132 1212   475   476 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  182  206   495   182  184   594  1097 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    175  202   495   176  181   594  1097 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    364  376 xxxxx   366  354 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.41 0.01  0.01  0.00 0.00  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  368 xxxxx  xxxx  569 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  2.1 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 22.0 xxxxx xxxxx 11.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:      22.0             11.5            xxxxxx            xxxxxx
ApproachLOS:         C                B                 *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:  150    2     7     1    0    13    19  530   169     0  473     3
ApproachDel:      22.0             11.5            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=159]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1367]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1367]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:  150    2     7     1    0    13    19  530   169     0  473     3
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1194
Minor Approach Volume:           159
Minor Approach Volume Threshold: 172
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

Signal=Stop/Rights=Include
Final Vol: 49 1 2
Lanes: 0 0 1! 0 0

Westbound side (Signal=Uncontrol, Rights=Include): Final Vol / Lanes: 6 / 0; 0; 436 / 1!; 0; 49 / 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.387
Avg Crit Del (sec/veh): 3.6
Avg Delay (sec/veh): 3.6
LOS: C

Eastbound side (Signal=Uncontrol, Rights=Include): Lanes / Final Vol: 0 / 2; 0; 1! / 365; 0; 0 / 3

Lanes: 0 0 1! 0 0
Final Vol: 172 1 5
Signal=Stop/Rights=Include

```
Street Name:         Saratoga Avenue                  Newbridge Street
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     172    1     5     2    1    49     6  436    49     3  365     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  172    1     5     2    1    49     6  436    49     3  365     2
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  172    1     5     2    1    49     6  436    49     3  365     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   172    1     5     2    1    49     6  436    49     3  365     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  172    1     5     2    1    49     6  436    49     3  365     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  870  846   461   848  869   366   367 xxxx xxxxx   485 xxxx xxxxx
Potent Cap.:  274  302   605   284  292   684  1203 xxxx xxxxx  1088 xxxx xxxxx
Move Cap.:    252  299   605   279  290   684  1203 xxxx xxxxx  1088 xxxx xxxxx
Total Cap:    444  464 xxxxx   467  455 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.39 0.00  0.01  0.00 0.00  0.07  0.00 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2WayQ95thQ:  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx   8.3 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  448 xxxxx  xxxx  665 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  1.9 xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 18.2 xxxxx xxxxx 10.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:      18.2             10.9            xxxxxx            xxxxxx
ApproachLOS:         C                B                 *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  172    1     5     2    1    49     6  436    49     3  365     2
ApproachDel:      18.2             10.9           xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=178]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1091]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=52]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1091]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  172    1     5     2    1    49     6  436    49     3  365     2
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             861
Minor Approach Volume:           178
Minor Approach Volume Threshold: 259
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

```
                         Signal=Stop/Rights=Include
          Final Vol:   13          0          1
             Lanes:     0    0     1!    0    0

                Signal=Uncontrol                          Signal=Uncontrol
Final Vol: Lanes: Rights=Include    Vol Cnt Date:       n/a    Rights=Include   Lanes:  Final Vol:
                                    Cycle Time (sec):   100
   19        0                                                                     0        3
                                    Loss Time (sec):      0
             0                                                                     0
  550        1!                     Critical V/C:     0.388                       1!      445
             0                      Avg Crit Del (sec/veh): 2.8                    0
  110        0                      Avg Delay (sec/veh):    2.8                    0        0
                                    LOS:                  C

             Lanes:     0    0     1!    0    0
          Final Vol:  145          3          7
                         Signal=Stop/Rights=Include
```

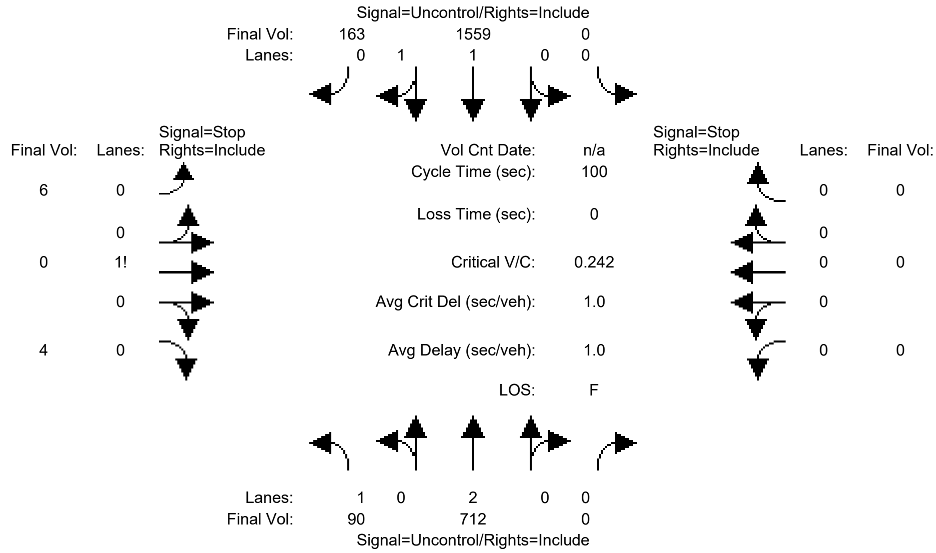
```
Street Name:         Saratoga Avenue                  Newbridge Street
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     145    3     7    1     0    13   19  550   110     0  445     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  145    3     7    1     0    13   19  550   110     0  445     3
Added Vol:      0    0     0    0     0     0    0    0     0     0    0     0
PasserByVol:    0    0     0    0     0     0    0    0     0     0    0     0
Initial Fut:  145    3     7    1     0    13   19  550   110     0  445     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   145    3     7    1     0    13   19  550   110     0  445     3
Reduct Vol:     0    0     0    0     0     0    0    0     0     0    0     0
FinalVolume:  145    3     7    1     0    13   19  550   110     0  445     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2  7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3  3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1096 1091   605  1095 1145   447   448 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  193  217   501   193  201   616  1123 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    186  213   501   186  198   616  1123 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    374  384 xxxxx   374  371 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.39 0.01  0.01  0.00 0.00  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  378 xxxxx  xxxx  589 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  1.9 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 21.0 xxxxx xxxxx 11.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    B     *     *    *     *     *    *     *
ApproachDel:      21.0             11.3             xxxxxx           xxxxxx
ApproachLOS:         C                B                *                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:  145    3     7     1    0    13    19  550   110     0  445     3
ApproachDel:      21.0             11.3            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=155]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1296]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1296]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:  145    3     7     1    0    13    19  550   110     0  445     3
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1127
Minor Approach Volume:          155
Minor Approach Volume Threshold: 188
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #300: (37) University Ave & Adams Dr




| Street Name: | University Ave | | | | | | Adams Dr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 90 | 712 | 0 | 0 | 1559 | 163 | 6 | 0 | 4 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 90 | 712 | 0 | 0 | 1559 | 163 | 6 | 0 | 4 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 90 | 712 | 0 | 0 | 1559 | 163 | 6 | 0 | 4 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 90 | 712 | 0 | 0 | 1559 | 163 | 6 | 0 | 4 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 90 | 712 | 0 | 0 | 1559 | 163 | 6 | 0 | 4 | 0 | 0 | 0 |
| **Critical Gap Module:** | | | | | | | | | | | | |
| Critical Gp: | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | 6.5 | 6.9 | xxxxx | xxxx | xxxxx |
| FollowUpTim: | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | 4.0 | 3.3 | xxxxx | xxxx | xxxxx |
| **Capacity Module:** | | | | | | | | | | | | |
| Cnflict Vol: | 1722 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 2177 | 2533 | 861 | xxxx | xxxx | xxxxx |
| Potent Cap.: | 372 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 41 | 28 | 303 | xxxx | xxxx | xxxxx |
| Move Cap.: | 372 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 33 | 21 | 303 | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.24 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.18 | 0.00 | 0.01 | xxxx | xxxx | xxxx |
| **Level Of Service Module:** | | | | | | | | | | | | |
| 2Way95thQ: | 0.9 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | 17.7 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | C | * | * | * | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | 51 | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 0.6 | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 91.5 | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | F | * | * | * | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | 91.5 | | | xxxxxx | |
| ApproachLOS: | | * | | | * | | | F | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

******************************************************************************

Intersection #300 (37) University Ave & Adams Dr

******************************************************************************

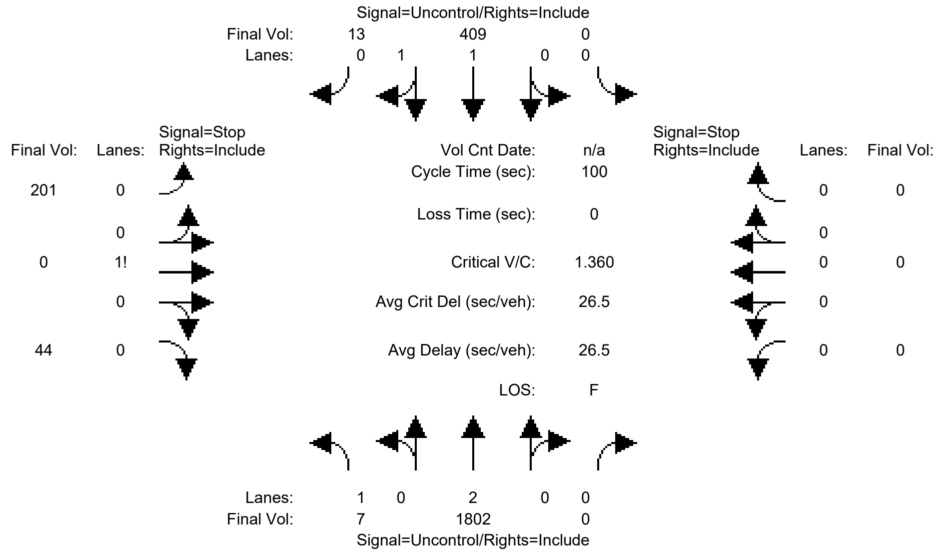
Future Volume Alternative: Peak Hour Warrant NOT Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  712     0     0 1559   163     6    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx              91.5            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2534]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  712     0     0 1559   163     6    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            2524
Minor Approach Volume:          10
Minor Approach Volume Threshold: -34 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #300: (37) University Ave & Adams Dr




```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       7 1802     0     0  409    13   201    0    44     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    7 1802     0     0  409    13   201    0    44     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    7 1802     0     0  409    13   201    0    44     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     7 1802     0     0  409    13   201    0    44     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    7 1802     0     0  409    13   201    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  422 xxxx xxxxx  xxxx xxxx xxxxx  1331 2232   211  xxxx xxxx xxxxx
Potent Cap.: 1148 xxxx xxxxx  xxxx xxxx xxxxx   149   43   801  xxxx xxxx xxxxx
Move Cap.:   1148 xxxx xxxxx  xxxx xxxx xxxxx   148   43   801  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  1.36 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  173 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 15.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  267 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx            xxxxxx            267.2            xxxxxx
ApproachLOS:          *                 *                F                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:    7 1802     0     0  409    13   201    0    44     0    0     0
ApproachDel:    xxxxxx           xxxxxx             267.2           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=18.2]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=245]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2476]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:    7 1802     0     0  409    13   201    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            2231
Minor Approach Volume:          245
Minor Approach Volume Threshold: 8 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #300: (37) University Ave & Adams Dr

Signal=Uncontrol/Rights=Include
Final Vol: 176 1559 0
Lanes: 0 1 1 0 0

Signal=Stop Rights=Include (West approach)
Final Vol: 11 / 0 / 4
Lanes: 0 0 1! 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.326
Avg Crit Del (sec/veh): 1.4
Avg Delay (sec/veh): 1.4
LOS: F

Signal=Stop Rights=Include (East approach)
Lanes: 0 0 0 0 0
Final Vol: 0 / 0 / 0

Lanes: 1 0 2 0 0
Final Vol: 90 667 0
Signal=Uncontrol/Rights=Include

| Street Name: | University Ave | | | | | | Adams Dr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 90 | 667 | 0 | 0 | 1559 | 176 | 11 | 0 | 4 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 90 | 667 | 0 | 0 | 1559 | 176 | 11 | 0 | 4 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 90 | 667 | 0 | 0 | 1559 | 176 | 11 | 0 | 4 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 90 | 667 | 0 | 0 | 1559 | 176 | 11 | 0 | 4 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 90 | 667 | 0 | 0 | 1559 | 176 | 11 | 0 | 4 | 0 | 0 | 0 |
| **Critical Gap Module:** | | | | | | | | | | | | |
| Critical Gp: | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | 6.5 | 6.9 | xxxxx | xxxx | xxxxx |
| FollowUpTim: | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | 4.0 | 3.3 | xxxxx | xxxx | xxxxx |
| **Capacity Module:** | | | | | | | | | | | | |
| Cnflict Vol: | 1735 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 2161 | 2494 | 868 | xxxx | xxxx | xxxxx |
| Potent Cap.: | 368 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 42 | 29 | 300 | xxxx | xxxx | xxxxx |
| Move Cap.: | 368 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 34 | 22 | 300 | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.24 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.33 | 0.00 | 0.01 | xxxx | xxxx | xxxx |
| **Level Of Service Module:** | | | | | | | | | | | | |
| 2Way95thQ: | 0.9 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | 17.9 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | C | * | * | * | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | 44 | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 1.2 | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 124 | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | F | * | * | * | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | 123.6 | | | xxxxxx | |
| ApproachLOS: | | * | | | * | | | F | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

*********************************************************************************

Intersection #300 (37) University Ave & Adams Dr

*********************************************************************************

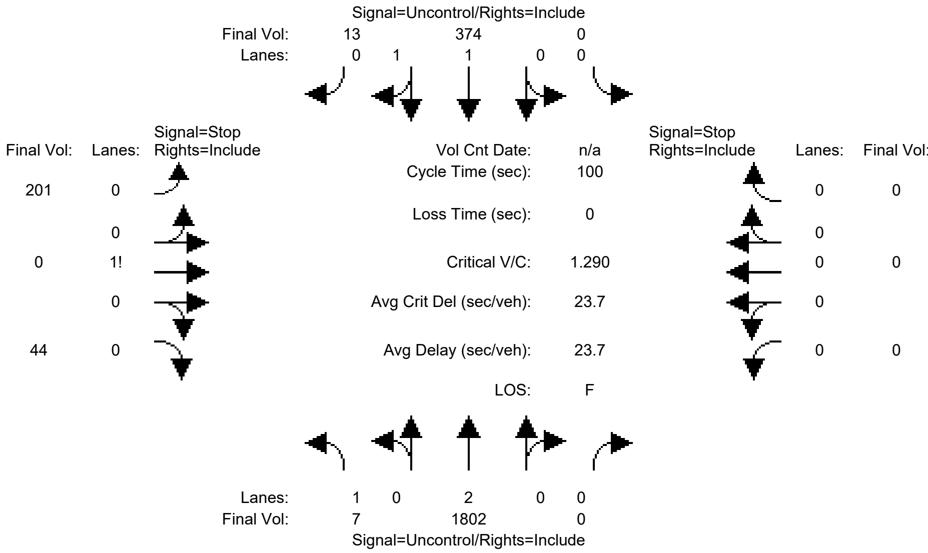
Future Volume Alternative: Peak Hour Warrant NOT Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:   90  667     0     0 1559   176    11    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx            123.6           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2507]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:   90  667     0     0 1559   176    11    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2492
Minor Approach Volume:           15
Minor Approach Volume Threshold: -30 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #300: (37) University Ave & Adams Dr




| Street Name: | University Ave | | | | | | Adams Dr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 7 | 1802 | 0 | 0 | 374 | 13 | 201 | 0 | 44 | 0 | 0 | 0 |
| **Critical Gap Module:** | | | | | | | | | | | | |
| Critical Gp: | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | 6.5 | 6.9 | xxxxx | xxxx | xxxxx |
| FollowUpTim: | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | 4.0 | 3.3 | xxxxx | xxxx | xxxxx |
| **Capacity Module:** | | | | | | | | | | | | |
| Cnflict Vol: | 387 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1296 | 2197 | 194 | xxxx | xxxx | xxxxx |
| Potent Cap.: | 1183 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 157 | 46 | 822 | xxxx | xxxx | xxxxx |
| Move Cap.: | 1183 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 156 | 45 | 822 | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.01 | xxxx | xxxx | xxxx | xxxx | xxxx | 1.29 | 0.00 | 0.05 | xxxx | xxxx | xxxx |
| **Level Of Service Module:** | | | | | | | | | | | | |
| 2Way95thQ: | 0.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | 8.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | A | * | * | * | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | 182 | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 14.3 | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 236 | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | F | * | * | * | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | 235.8 | | | xxxxxx | |
| ApproachLOS: | | * | | | * | | | F | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

********************************************************************************

Intersection #300 (37) University Ave & Adams Dr

********************************************************************************

Future Volume Alternative: Peak Hour Warrant Met

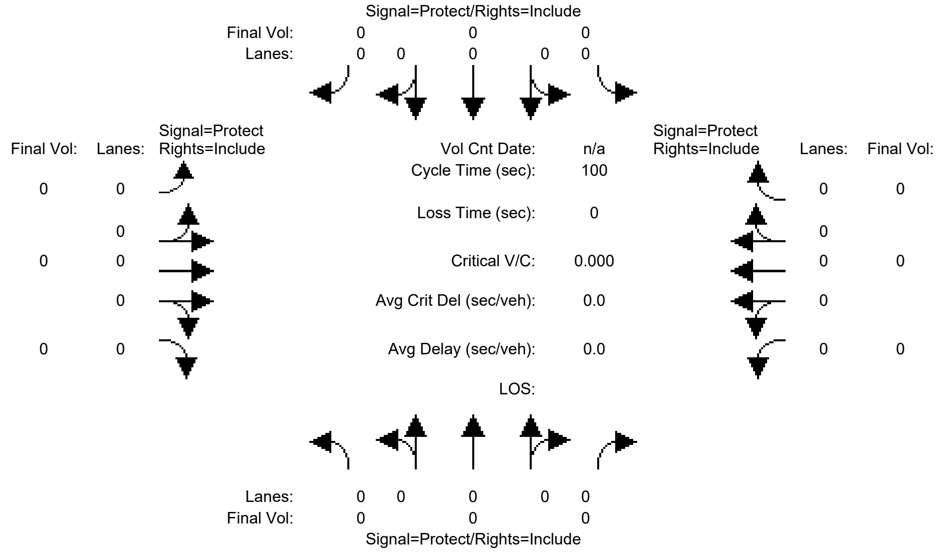
 

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   201    0    44     0    0     0
ApproachDel:    xxxxxx           xxxxxx             235.8           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=16.0]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=245]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2441]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   201    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2196
Minor Approach Volume:           245
Minor Approach Volume Threshold: 14 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)




| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)

Signal=Protect/Rights=Include
Final Vol: 0 0 0
Lanes: 0 0 0 0 0

Signal=Protect
Rights=Include
Final Vol: 0 0 0
Lanes: 0 0 0 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.000
Avg Crit Del (sec/veh): 0.0
Avg Delay (sec/veh): 0.0
LOS:

Signal=Protect
Rights=Include
Lanes: 0 0 0 0 0
Final Vol: 0 0 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Protect/Rights=Include

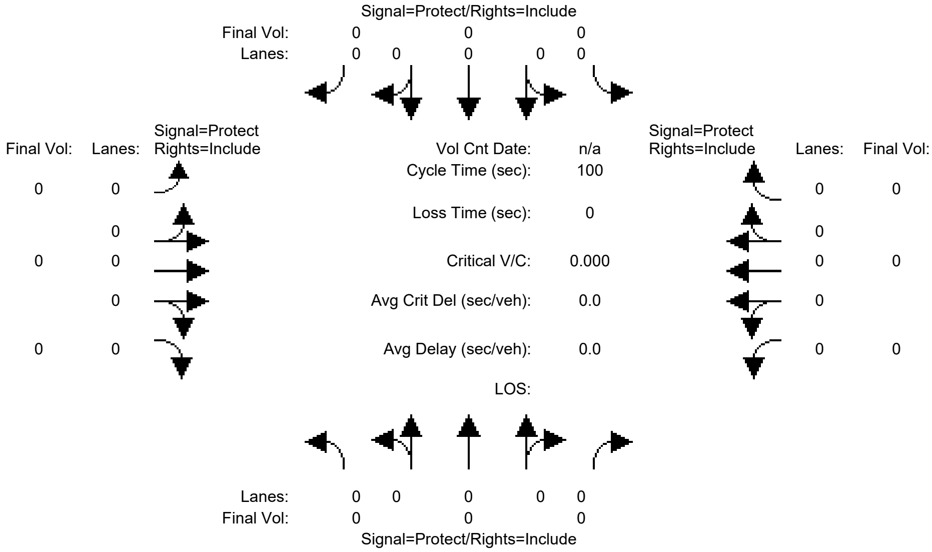
| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



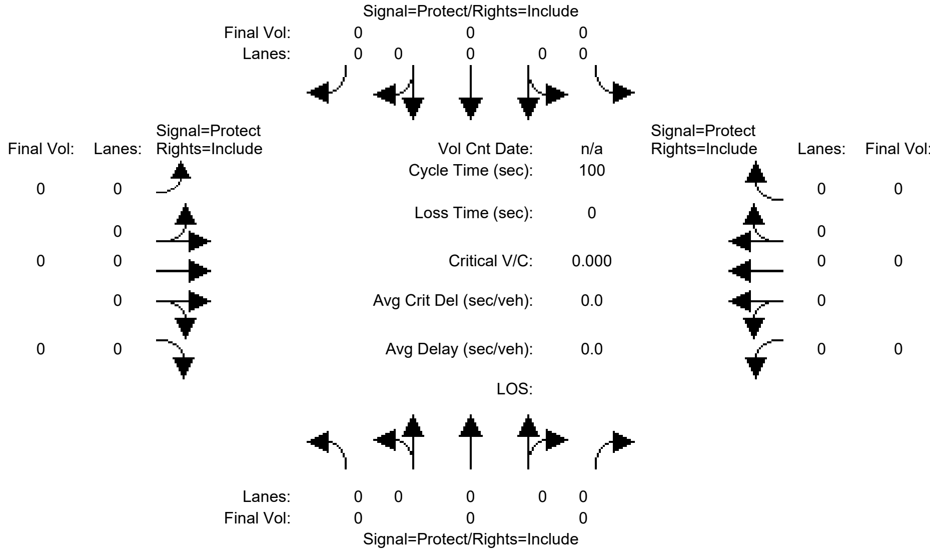

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



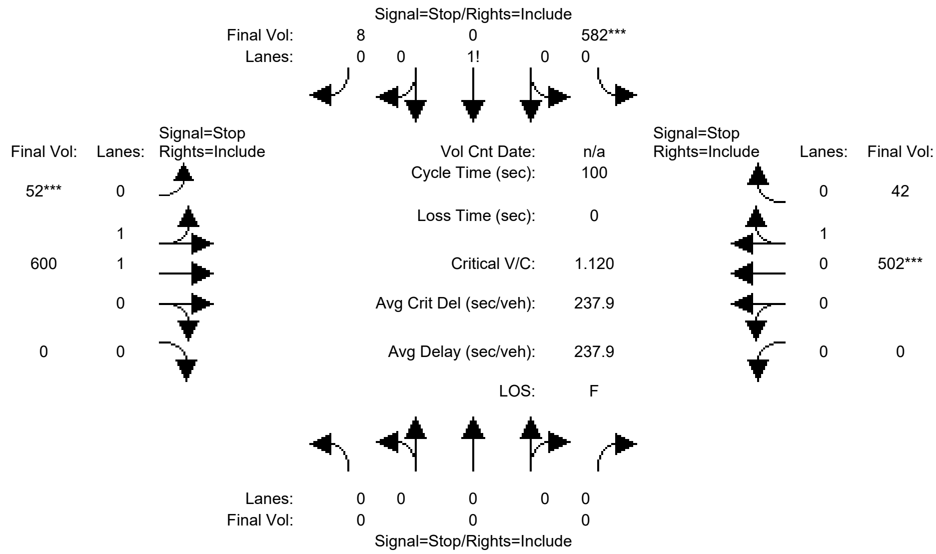

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCE Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MLF Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FinalVolume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | | | | | | | | | | | |
| Green Time: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | | | | | | | | | | | | |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 582 | 0 | 8 | 52 | 600 | 0 | 0 | 502 | 42 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.01 | 0.16 | 1.84 | 0.00 | 0.00 | 0.92 | 0.08 |
| Final Sat.: | 0 | 0 | 0 | 520 | 0 | 7 | 76 | 886 | 0 | 0 | 489 | 41 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 1.12 | xxxx | 1.12 | 0.68 | 0.68 | xxxx | xxxx | 1.03 | 1.03 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 101.3 | 0.0 | 101.3 | 24.8 | 24.5 | 0.0 | 0.0 | 71.9 | 71.9 |
| Delay Adj: | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 374.7 | 0.0 | 374.7 | 91.8 | 90.6 | 0.0 | 0.0 | 266 | 266.0 |
| LOS by Move: | * | * | * | F | * | F | F | F | * | * | F | F |
| ApproachDel: | | xxxxxx | | | 101.3 | | | 24.5 | | | 71.9 | |
| Delay Adj: | | xxxxx | | | 3.70 | | | 3.70 | | | 3.70 | |
| ApprAdjDel: | | xxxxxx | | | 374.7 | | | 90.7 | | | 266.0 | |
| LOS by Appr: | | * | | | F | | | F | | | F | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 13.4 | 13.4 | 13.4 | 1.9 | 1.9 | 0.0 | 9.1 | 9.1 | 9.1 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

*****************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

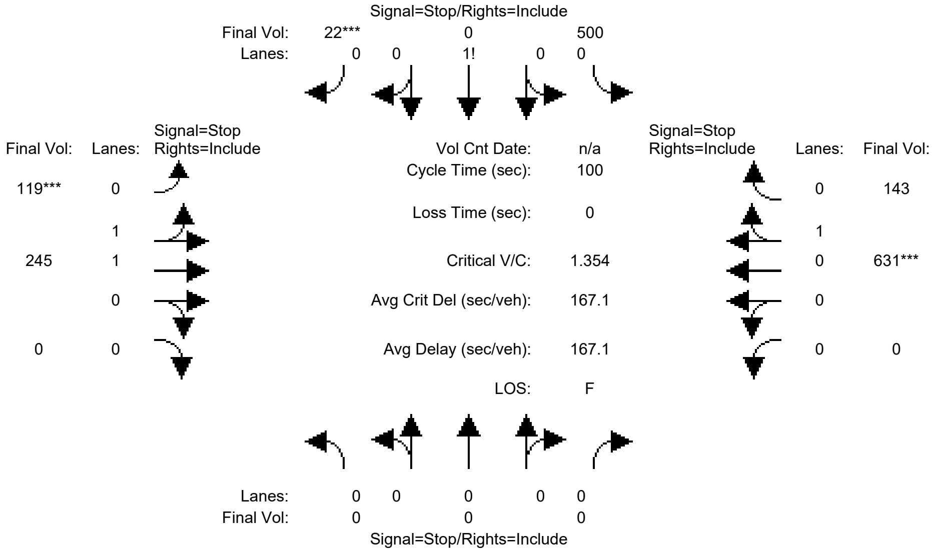
*****************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  1  0  0   0  0  0  1  0
Initial Vol:    0    0     0   582    0     8    52  600     0     0  502    42
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1196
Minor Approach Volume:          590
Minor Approach Volume Threshold: 223
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




```
Street Name:        East Bayshore Road                Euclid Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0    0     0  500    0    22  119  245     0    0  631   143
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0    0     0  500    0    22  119  245     0    0  631   143
Added Vol:     0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   0    0     0  500    0    22  119  245     0    0  631   143
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    0    0     0  500    0    22  119  245     0    0  631   143
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0  500    0    22  119  245     0    0  631   143
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   0    0     0  500    0    22  119  245     0    0  631   143
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.96 0.00  0.04  0.65 1.35  0.00  0.00 0.82  0.18
Final Sat.:    0    0     0  529    0    23  303  644     0    0  466   106
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.95 xxxx  0.95  0.39 0.38  xxxx  xxxx 1.35  1.35
Crit Moves:                              ****  ****                   ****
Delay/Veh:    0.0  0.0   0.0  51.0  0.0  51.0  15.0 14.4   0.0   0.0  190 189.9
Delay Adj:   1.55 1.55  1.55  1.55 1.55  1.55  1.55 1.55  1.55  1.55 1.55  1.55
AdjDel/Veh:   0.0  0.0   0.0  79.1  0.0  79.1  23.3 22.4   0.0   0.0  294 294.3
LOS by Move:    *    *     *     F    *     F     C    C     *     *    F     F
ApproachDel:    xxxxxx             51.0              14.6             189.9
Delay Adj:       xxxxx             1.55              1.55              1.55
ApprAdjDel:     xxxxxx             79.1              22.7             294.3
LOS by Appr:         *                F                 C                 F
AllWayAvgQ:   0.0  0.0   0.0   6.4  6.4   6.4   0.6  0.6   0.0  28.7 28.7  28.7
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

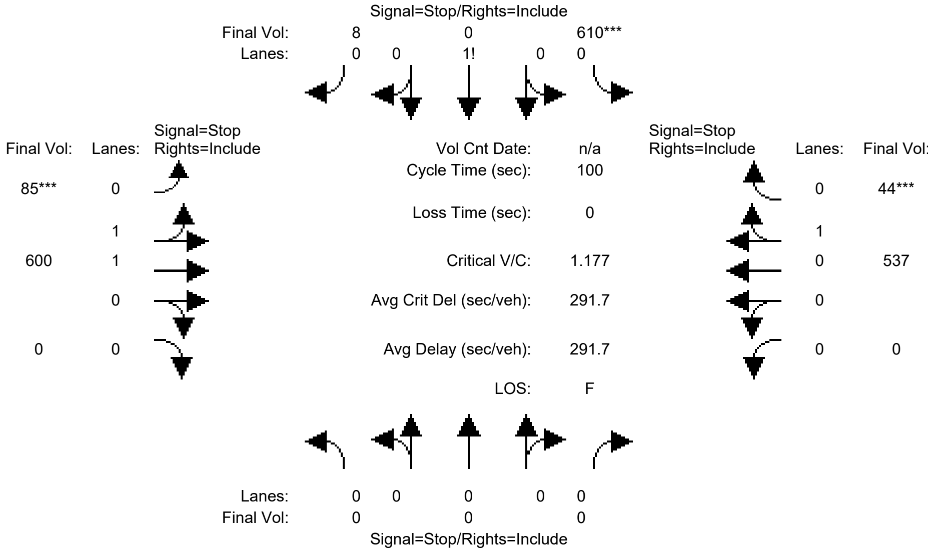
 

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   500    0    22   119  245     0     0  631   143
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1138
Minor Approach Volume:          522
Minor Approach Volume Threshold: 240
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Project AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 610 | 0 | 8 | 85 | 600 | 0 | 0 | 537 | 44 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.01 | 0.25 | 1.75 | 0.00 | 0.00 | 0.92 | 0.08 |
| Final Sat.: | 0 | 0 | 0 | 518 | 0 | 7 | 118 | 841 | 0 | 0 | 488 | 40 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 1.18 | xxxx | 1.18 | 0.72 | 0.71 | xxxx | xxxx | 1.10 | 1.10 |
| Crit Moves: | | | | **** | | | **** | | | | | **** |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 121.8 | 0.0 | 121.8 | 27.4 | 26.7 | 0.0 | 0.0 | 94.5 | 94.5 |
| Delay Adj: | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 450.8 | 0.0 | 450.8 | 101.3 | 98.9 | 0.0 | 0.0 | 350 | 349.6 |
| LOS by Move: | * | * | * | F | * | F | F | F | * | * | F | F |
| ApproachDel: | xxxxxx | | | 121.8 | | | 26.8 | | | 94.5 | | |
| Delay Adj: | xxxxx | | | 3.70 | | | 3.70 | | | 3.70 | | |
| ApprAdjDel: | xxxxxx | | | 450.8 | | | 99.2 | | | 349.6 | | |
| LOS by Appr: | * | | | F | | | F | | | F | | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 16.3 | 16.3 | 16.3 | 2.3 | 2.2 | 0.0 | 12.4 | 12.4 | 12.4 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

******************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

******************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   610    0     8    85  600     0     0  537    44
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1266
Minor Approach Volume:           618
Minor Approach Volume Threshold: 204
--------------------------------------------------------------------------------
```

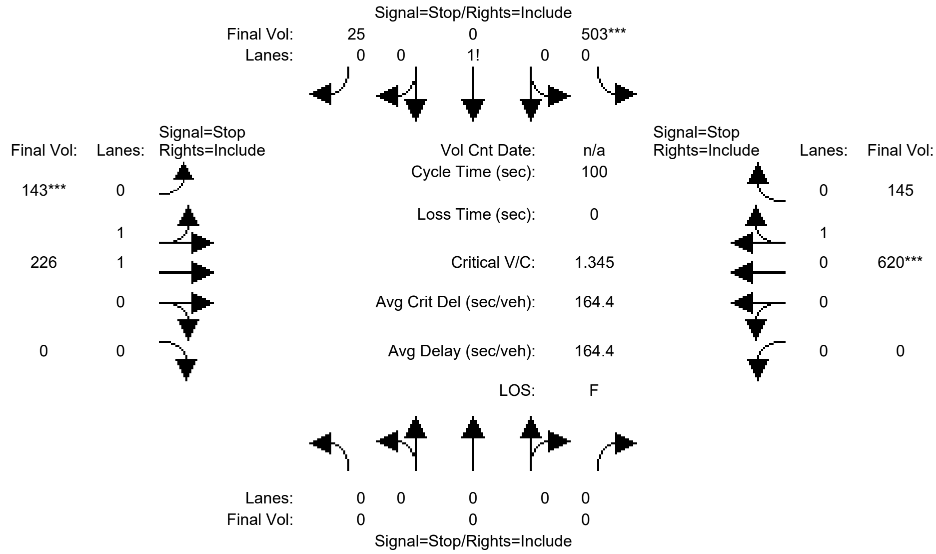
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Project PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 503 | 0 | 25 | 143 | 226 | 0 | 0 | 620 | 145 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 | 0.05 | 0.78 | 1.22 | 0.00 | 0.00 | 0.81 | 0.19 |
| Final Sat.: | 0 | 0 | 0 | 525 | 0 | 26 | 356 | 587 | 0 | 0 | 461 | 108 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 0.96 | xxxx | 0.96 | 0.40 | 0.38 | xxxx | xxxx | 1.35 | 1.35 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 53.5 | 0.0 | 53.5 | 15.4 | 14.6 | 0.0 | 0.0 | 186 | 186.3 |
| Delay Adj: | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 82.9 | 0.0 | 82.9 | 23.9 | 22.6 | 0.0 | 0.0 | 289 | 288.8 |
| LOS by Move: | * | * | * | F | * | F | C | C | * | * | F | F |
| ApproachDel: | | xxxxxx | | | 53.5 | | | 14.9 | | | 186.3 | |
| Delay Adj: | | xxxxx | | | 1.55 | | | 1.55 | | | 1.55 | |
| ApprAdjDel: | | xxxxxx | | | 82.9 | | | 23.1 | | | 288.8 | |
| LOS by Appr: | | * | | | F | | | C | | | F | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 6.7 | 6.7 | 6.7 | 0.6 | 0.6 | 0.0 | 28.0 | 28.0 | 28.0 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

********************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

********************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   503    0    25   143  226     0     0  620   145
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1134
Minor Approach Volume:           528
Minor Approach Volume Threshold: 242
--------------------------------------------------------------------------------
```

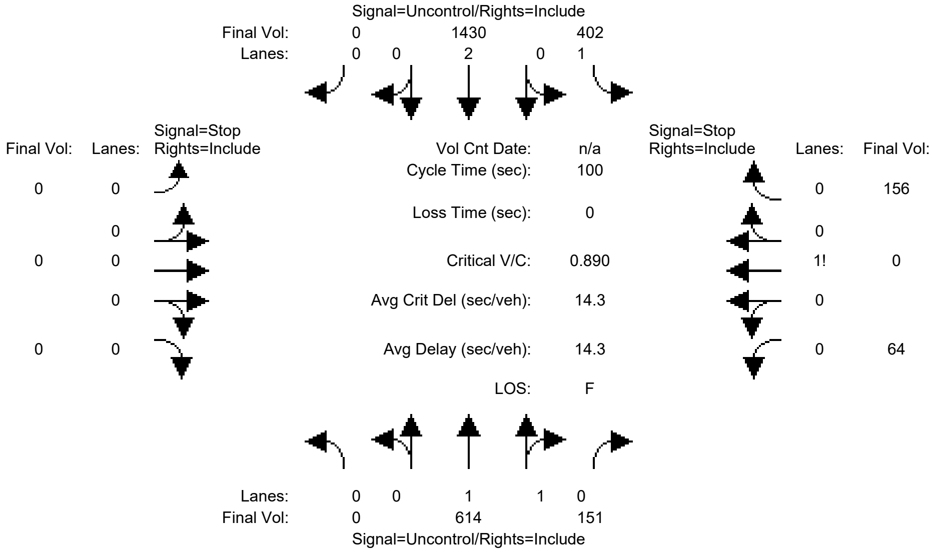
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative AM

Intersection #8: (36) University Avenue and Purdue Avenue




```
Street Name:        University Avenue                   Purdue Avenue
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  614   151   402 1430     0     0    0     0    64    0   156
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  614   151   402 1430     0     0    0     0    64    0   156
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  614   151   402 1430     0     0    0     0    64    0   156
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  614   151   402 1430     0     0    0     0    64    0   156
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0  614   151   402 1430     0     0    0     0    64    0   156
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   765 xxxx xxxxx  xxxx xxxx xxxxx  2209 2924   383
Potent Cap.: xxxx xxxx xxxxx   837 xxxx xxxxx  xxxx xxxx xxxxx    38   15   616
Move Cap.:   xxxx xxxx xxxxx   837 xxxx xxxxx  xxxx xxxx xxxxx    23    8   616
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    19    8 xxxxx    72   35 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.48 xxxx  xxxx  xxxx xxxx  xxxx  0.89 0.00  0.25
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   2.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  13.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     B    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  192 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  159 xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            159.2
ApproachLOS:         *                *                *                F
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   151   402 1430    0     0    0     0    64    0   156
ApproachDel:    xxxxxx           xxxxxx           xxxxxx           159.2
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=9.7]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=220]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2817]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   151   402 1430    0     0    0     0    64    0   156
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2597
Minor Approach Volume:           220
Minor Approach Volume Threshold: -44 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative PM

Intersection #8: (36) University Avenue and Purdue Avenue

```
                              Signal=Uncontrol/Rights=Include
                 Final Vol:    0          437          176
                     Lanes:    0    0      2      0    1

              Signal=Stop                                         Signal=Stop
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:      n/a    Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):    100
   0          0                                                                       0       284
                                       Loss Time (sec):     0
              0                                                                       0
   0          0                           Critical V/C:   1.167                       1!       0
              0                   Avg Crit Del (sec/veh):  81.6                       0
   0          0                       Avg Delay (sec/veh):  81.6                      0       105
                                                   LOS:      F

                     Lanes:    0    0      1      1    0
                 Final Vol:    0          1695         12
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:        University Avenue                    Purdue Avenue
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0 1695     12   176  437      0     0    0      0   105    0    284
Growth Adj:  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
Initial Bse:    0 1695     12   176  437      0     0    0      0   105    0    284
Added Vol:      0    0      0     0    0      0     0    0      0     0    0      0
PasserByVol:    0    0      0     0    0      0     0    0      0     0    0      0
Initial Fut:    0 1695     12   176  437      0     0    0      0   105    0    284
User Adj:    1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
PHF Adj:     1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
PHF Volume:     0 1695     12   176  437      0     0    0      0   105    0    284
Reduct Vol:     0    0      0     0    0      0     0    0      0     0    0      0
FinalVolume:    0 1695     12   176  437      0     0    0      0   105    0    284
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5    6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0    3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1707 xxxx xxxxx  xxxx xxxx xxxxx  2272 2490    854
Potent Cap.: xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    34   29    302
Move Cap.:   xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    21   15    302
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx     0    0 xxxxx    90   85 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.48 xxxx  xxxx  xxxx xxxx  xxxx  1.17 0.00  0.94
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   2.5 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  23.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  185 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 30.4 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  557 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            557.3
ApproachLOS:         *                *                *                F
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695    12   176  437     0     0    0     0   105    0   284
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            557.3
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=60.2]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=389]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2709]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695    12   176  437     0     0    0     0   105    0   284
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            2320
Minor Approach Volume:          389
Minor Approach Volume Threshold: -5 [less than minimum of 100]
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project AM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 1430 359
Lanes: 0 0 2 0 1

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | | 0 | 188 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.943 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 19.7 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 19.7 | | 0 | 79 |
| | | | LOS: | F | | | |

Lanes: 0 0 1 1 0
Final Vol: 0 614 190
Signal=Uncontrol/Rights=Include

```
Street Name:        University Avenue                    Purdue Avenue
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  614   190   359 1430     0     0    0     0    79    0   188
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  614   190   359 1430     0     0    0     0    79    0   188
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  614   190   359 1430     0     0    0     0    79    0   188
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  614   190   359 1430     0     0    0     0    79    0   188
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0  614   190   359 1430     0     0    0     0    79    0   188
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   804 xxxx xxxxx  xxxx xxxx xxxxx  2142 2857   402
Potent Cap.: xxxx xxxx xxxxx   809 xxxx xxxxx  xxxx xxxx xxxxx    42   17   598
Move Cap.:   xxxx xxxx xxxxx   809 xxxx xxxxx  xxxx xxxx xxxxx    27    9   598
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    22   22 xxxxx    84   41 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.44 xxxx  xxxx  xxxx xxxx  xxxx  0.94 0.00  0.31
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   2.3 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  12.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     B    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  212 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 14.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  194 xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:    xxxxxx            xxxxxx            xxxxxx            193.5
ApproachLOS:         *                 *                 *                F
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   190   359 1430     0     0     0     0    79     0   188
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            193.5
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=14.4]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=267]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2860]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   190   359 1430     0     0     0     0    79     0   188
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2593
Minor Approach Volume:           267
Minor Approach Volume Threshold: -43 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project PM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 437 192
Lanes: 0 0 2 0 1

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 100 | | 0 | 255 |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 0 | | Critical V/C: | 1.972 | | 1! | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 136.9 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 136.9 | | 0 | 168 |
| | | | LOS: | F | | | |

Lanes: 0 0 1 1 0
Final Vol: 0 1695 23
Signal=Uncontrol/Rights=Include

```
Street Name:        University Avenue                   Purdue Avenue
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0 1695    23   192  437     0     0    0     0   168    0   255
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0 1695    23   192  437     0     0    0     0   168    0   255
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0 1695    23   192  437     0     0    0     0   168    0   255
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0 1695    23   192  437     0     0    0     0   168    0   255
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0 1695    23   192  437     0     0    0     0   168    0   255
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1718 xxxx xxxxx  xxxx xxxx xxxxx  2309 2528   859
Potent Cap.: xxxx xxxx xxxxx   360 xxxx xxxxx  xxxx xxxx xxxxx    32   27   300
Move Cap.:   xxxx xxxx xxxxx   360 xxxx xxxxx  xxxx xxxx xxxxx    19   13   300
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx     0    0 xxxxx    85   79 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.53 xxxx  xxxx  xxxx xxxx  xxxx  1.97 0.00  0.85
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   3.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  25.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     D    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  150 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 38.3 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  885 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:    xxxxxx            xxxxxx            xxxxxx            885.0
ApproachLOS:         *                 *                 *                F
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695    23   192  437     0     0    0     0   168    0   255
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            885.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=104.0]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=423]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2770]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0 1695    23   192  437     0     0    0     0   168    0   255
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2347
Minor Approach Volume:           423
Minor Approach Volume Threshold: -9 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 339 1184*** 0
Lanes: 0 1 1 0 0

| Final Vol: | Lanes: | Signal=Split Rights=Overlap | | | Signal=Split Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| 138*** | 1 | | Cycle Time (sec): | 150 | | 0 | 0 |
| | 0 | | Loss Time (sec): | 9 | | 0 | |
| 0 | 0 | | Critical V/C: | 0.683 | | 0 | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 27.7 | | 0 | |
| 55 | 1 | | Avg Delay (sec/veh): | 21.1 | | 0 | 0 |
| | | | LOS: | C | | | |

Lanes: 1 0 2 0 0
Final Vol: 233*** 733 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 233 | 733 | 0 | 0 | 1184 | 339 | 138 | 0 | 55 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.55 | 0.45 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2714 | 777 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.13 | 0.20 | 0.00 | 0.00 | 0.44 | 0.44 | 0.08 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 28.4 | 124 | 0.0 | 0.0 | 95.8 | 95.8 | 16.8 | 0.0 | 45.2 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.68 | 0.25 | 0.00 | 0.00 | 0.68 | 0.68 | 0.68 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 56.6 | 2.8 | 0.0 | 0.0 | 17.3 | 17.3 | 64.0 | 0.0 | 37.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 5.6 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 9.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 62.2 | 2.8 | 0.0 | 0.0 | 18.2 | 18.2 | 73.3 | 0.0 | 38.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 62.2 | 2.8 | 0.0 | 0.0 | 18.2 | 18.2 | 73.3 | 0.0 | 38.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | B | B | E | A | D | A | A | A |
| HCM2kAvgQ: | 11 | 4 | 0 | 0 | 23 | 23 | 7 | 0 | 2 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 93 464 0***
Lanes: 0 1 1 0 0

Signal=Split Rights=Overlap
Final Vol: Lanes:
190 1
0
0 0
0
350*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.648
Avg Crit Del (sec/veh): 18.0
Avg Delay (sec/veh): 21.3
LOS: C

Signal=Split Rights=Include
Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 52 1522*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 52 | 1522 | 0 | 0 | 464 | 93 | 190 | 0 | 350 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.67 | 0.33 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2932 | 588 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.42 | 0.00 | 0.00 | 0.16 | 0.16 | 0.11 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 22.9 | 100 | 0.0 | 0.0 | 77.6 | 77.6 | 40.5 | 0.0 | 63.4 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.19 | 0.63 | 0.00 | 0.00 | 0.31 | 0.31 | 0.39 | 0.00 | 0.51 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 55.5 | 14.1 | 0.0 | 0.0 | 20.8 | 20.8 | 44.6 | 0.0 | 31.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.3 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 | 0.5 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 55.8 | 14.7 | 0.0 | 0.0 | 20.9 | 20.9 | 45.2 | 0.0 | 32.6 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 55.8 | 14.7 | 0.0 | 0.0 | 20.9 | 20.9 | 45.2 | 0.0 | 32.6 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | D | A | C | A | A | A |
| HCM2kAvgQ: | 2 | 21 | 0 | 0 | 7 | 7 | 7 | 0 | 12 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 329 1184*** 0
Lanes: 0 1 1 0 0

Signal=Split
Rights=Overlap

Final Vol: Lanes:
182*** 1
0
0 0
0
128 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.928
Avg Crit Del (sec/veh): 57.0
Avg Delay (sec/veh): 43.1
LOS: D

Signal=Split
Rights=Include

Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 610*** 733 0
Signal=Protect/Rights=Include

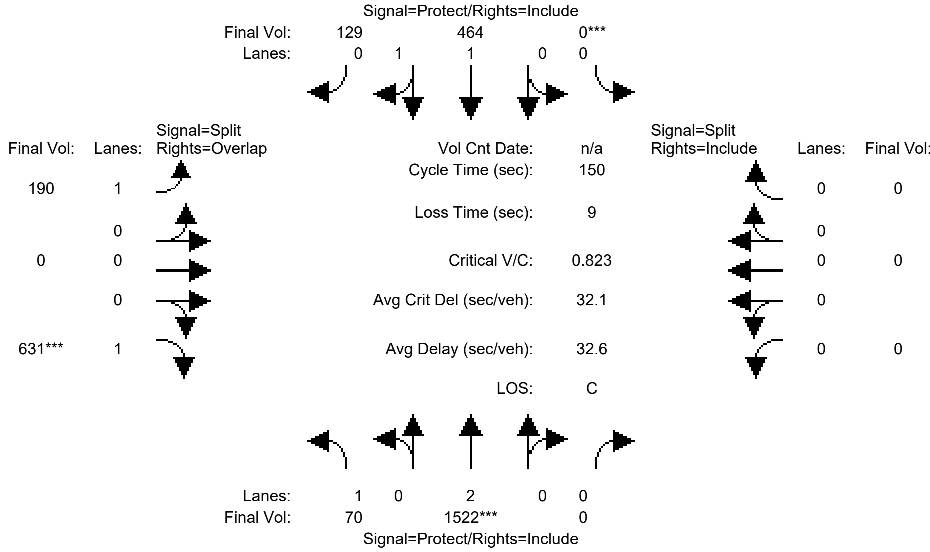
| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 610 | 733 | 0 | 0 | 1184 | 329 | 182 | 0 | 128 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.57 | 0.43 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2732 | 759 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.34 | 0.20 | 0.00 | 0.00 | 0.43 | 0.43 | 0.10 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 54.6 | 125 | 0.0 | 0.0 | 70.1 | 70.1 | 16.3 | 0.0 | 70.9 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.93 | 0.24 | 0.00 | 0.00 | 0.93 | 0.93 | 0.93 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 45.8 | 2.7 | 0.0 | 0.0 | 37.6 | 37.6 | 66.3 | 0.0 | 22.6 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 19.5 | 0.0 | 0.0 | 0.0 | 9.7 | 9.7 | 44.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 65.3 | 2.7 | 0.0 | 0.0 | 47.3 | 47.3 | 110.5 | 0.0 | 22.7 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 65.3 | 2.7 | 0.0 | 0.0 | 47.3 | 47.3 | 110.5 | 0.0 | 22.7 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | D | D | F | A | C | A | A | A |
| HCM2kAvgQ: | 31 | 4 | 0 | 0 | 38 | 38 | 11 | 0 | 3 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #9: (38) University Avenue and O'Brien Drive



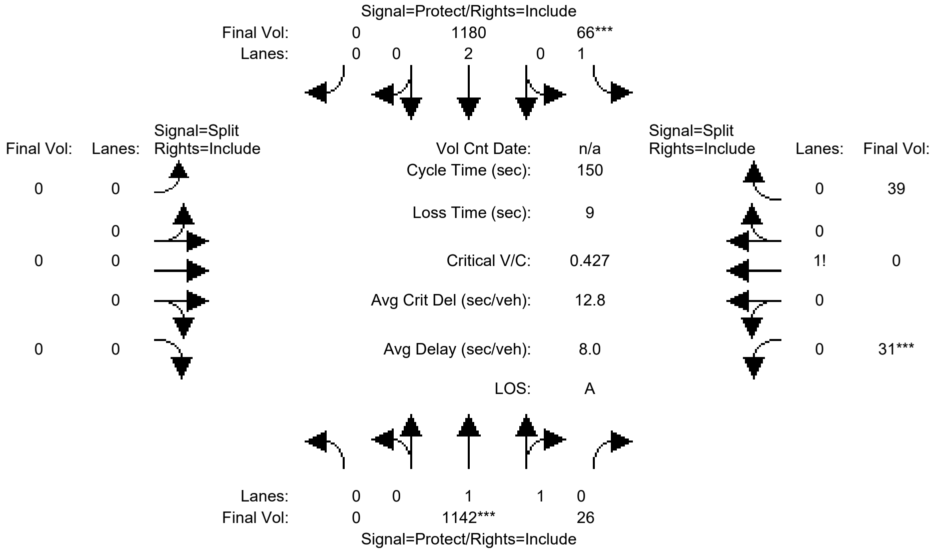

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 70 | 1522 | 0 | 0 | 464 | 129 | 190 | 0 | 631 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.56 | 0.44 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2731 | 759 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.00 | 0.00 | 0.17 | 0.17 | 0.11 | 0.00 | 0.39 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 16.7 | 77.6 | 0.0 | 0.0 | 60.9 | 60.9 | 63.4 | 0.0 | 80.1 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.35 | 0.81 | 0.00 | 0.00 | 0.42 | 0.42 | 0.25 | 0.00 | 0.73 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 61.6 | 30.2 | 0.0 | 0.0 | 31.9 | 31.9 | 28.0 | 0.0 | 26.7 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 1.0 | 2.9 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.0 | 3.2 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 62.6 | 33.0 | 0.0 | 0.0 | 32.1 | 32.1 | 28.1 | 0.0 | 30.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 62.6 | 33.0 | 0.0 | 0.0 | 32.1 | 32.1 | 28.1 | 0.0 | 30.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | C | A | A | C | C | C | A | C | A | A | A |
| HCM2kAvgQ: | 3 | 32 | 0 | 0 | 10 | 10 | 5 | 0 | 23 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]



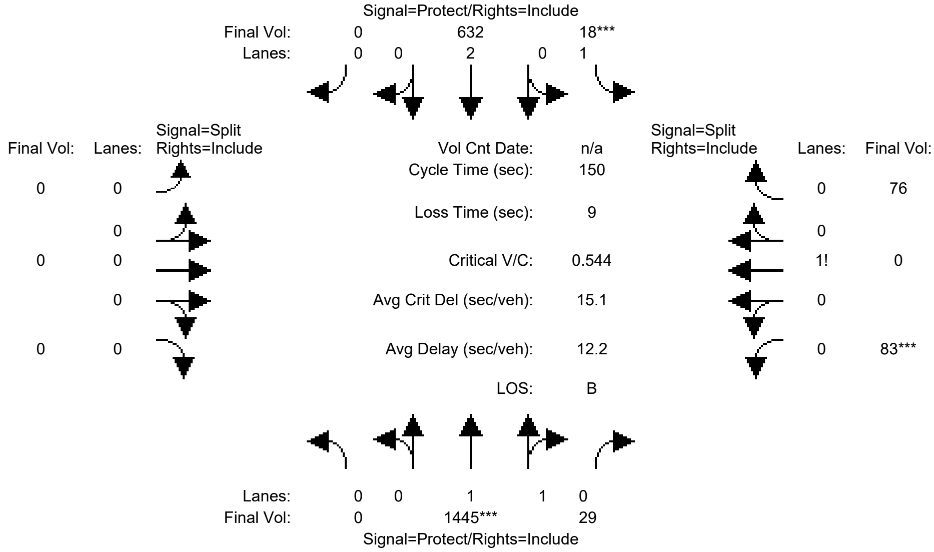

| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1142 | 26 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.56 |
| Final Sat.: | 0 | 3519 | 80 | 1805 | 3610 | 0 | 0 | 0 | 0 | 761 | 0 | 958 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.32 | 0.32 | 0.04 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.04 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 114 | 113.9 | 12.8 | 127 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 14.3 |
| Volume/Cap: | 0.00 | 0.43 | 0.43 | 0.43 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 0.43 | 0.00 | 0.43 |
| Uniform Del: | 0.0 | 6.4 | 6.4 | 65.1 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 64.0 | 0.0 | 64.0 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 1.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 6.5 | 6.5 | 67.0 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.8 | 0.0 | 65.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 6.5 | 6.5 | 67.0 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.8 | 0.0 | 65.8 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 10 | 10 | 3 | 7 | 0 | 0 | 0 | 0 | 3 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]



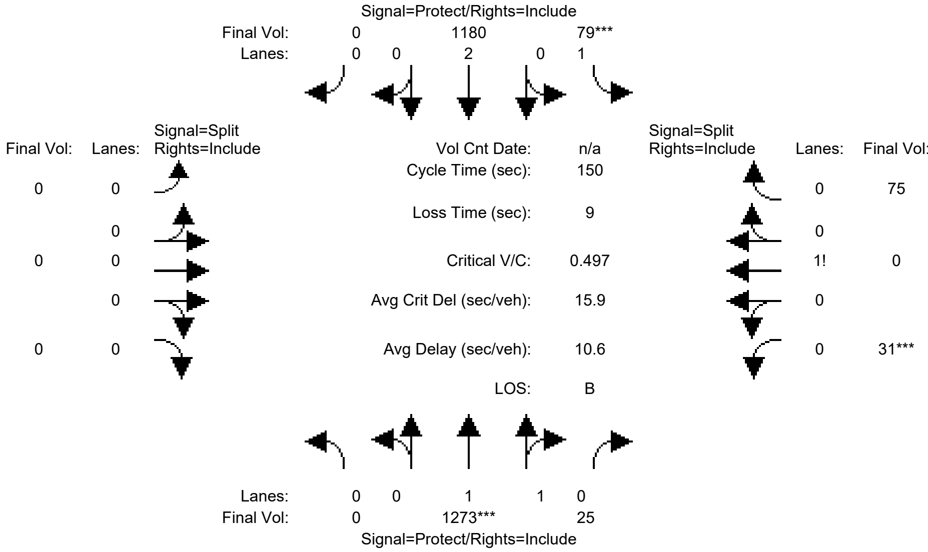

| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 83 | 0 | 76 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.91 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.52 | 0.00 | 0.48 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 904 | 0 | 828 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.09 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 109 | 109.5 | 7.0 | 116 | 0.0 | 0.0 | 0.0 | 0.0 | 24.5 | 0.0 | 24.5 |
| Volume/Cap: | 0.00 | 0.56 | 0.56 | 0.21 | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.56 | 0.00 | 0.56 |
| Uniform Del: | 0.0 | 9.3 | 9.3 | 68.8 | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 57.8 | 0.0 | 57.8 |
| IncremntDel: | 0.0 | 0.3 | 0.3 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 2.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 9.6 | 9.6 | 70.1 | 4.6 | 0.0 | 0.0 | 0.0 | 0.0 | 60.3 | 0.0 | 60.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 9.6 | 9.6 | 70.1 | 4.6 | 0.0 | 0.0 | 0.0 | 0.0 | 60.3 | 0.0 | 60.3 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 16 | 16 | 1 | 4 | 0 | 0 | 0 | 0 | 7 | 0 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]




| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.71 |
| Final Sat.: | 0 | 3530 | 69 | 1805 | 3610 | 0 | 0 | 0 | 0 | 495 | 0 | 1198 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.36 | 0.36 | 0.04 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.06 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 109 | 108.9 | 13.2 | 122 | 0.0 | 0.0 | 0.0 | 0.0 | 18.9 | 0.0 | 18.9 |
| Volume/Cap: | 0.00 | 0.50 | 0.50 | 0.50 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 | 0.50 |
| Uniform Del: | 0.0 | 8.8 | 8.8 | 65.2 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 61.1 | 0.0 | 61.1 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 2.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 9.0 | 9.0 | 67.7 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.9 | 0.0 | 62.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 9.0 | 9.0 | 67.7 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.9 | 0.0 | 62.9 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 13 | 13 | 4 | 8 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

```
                         Signal=Protect/Rights=Include
              Final Vol:    0          697          24***
                  Lanes:    0    0      2       0   1

                Signal=Split                                   Signal=Split
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:     n/a   Rights=Include   Lanes:  Final Vol:
                                     Cycle Time (sec):    150
    0          0                                                                   0        131
                                      Loss Time (sec):      9
               0                                                                   0
    0          0                         Critical V/C:  0.582                      1!         0
               0                  Avg Crit Del (sec/veh):  19.2                     0
    0          0                      Avg Delay (sec/veh):  15.6                    0        82***
                                                  LOS:      B

                  Lanes:    0    0      1       1   0
              Final Vol:    0        1445***        29
                         Signal=Protect/Rights=Include
```

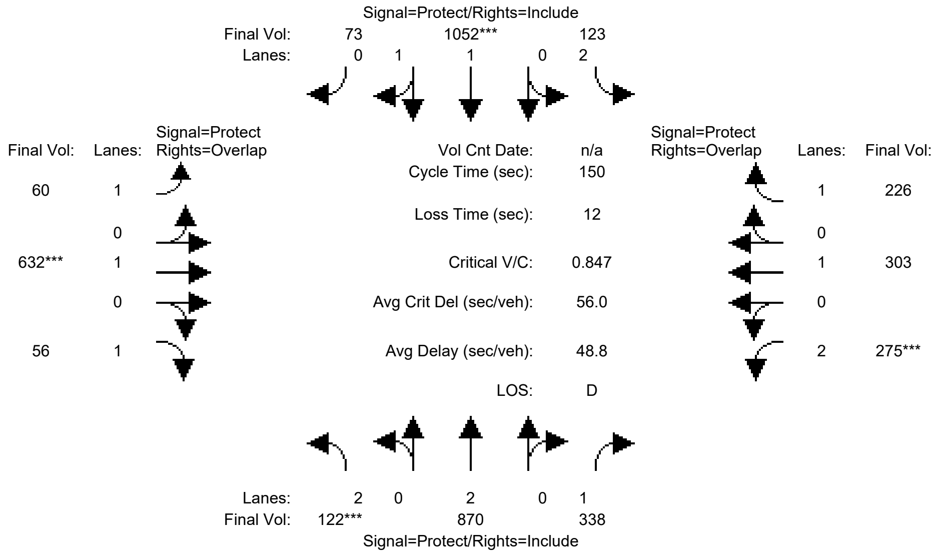
| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 24 | 697 | 0 | 0 | 0 | 0 | 82 | 0 | 131 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.38 | 0.00 | 0.62 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 658 | 0 | 1051 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.12 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 103 | 102.7 | 7.0 | 110 | 0.0 | 0.0 | 0.0 | 0.0 | 31.3 | 0.0 | 31.3 |
| Volume/Cap: | 0.00 | 0.60 | 0.60 | 0.28 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.00 | 0.60 |
| Uniform Del: | 0.0 | 12.6 | 12.6 | 69.1 | 6.7 | 0.0 | 0.0 | 0.0 | 0.0 | 53.7 | 0.0 | 53.7 |
| IncremntDel: | 0.0 | 0.4 | 0.4 | 1.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 2.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 13.0 | 13.0 | 70.9 | 6.8 | 0.0 | 0.0 | 0.0 | 0.0 | 56.5 | 0.0 | 56.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 13.0 | 13.0 | 70.9 | 6.8 | 0.0 | 0.0 | 0.0 | 0.0 | 56.5 | 0.0 | 56.5 |
| LOS by Move: | A | B | B | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 19 | 19 | 1 | 5 | 0 | 0 | 0 | 0 | 9 | 0 | 9 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #11: (40) University Avenue and Bay Road



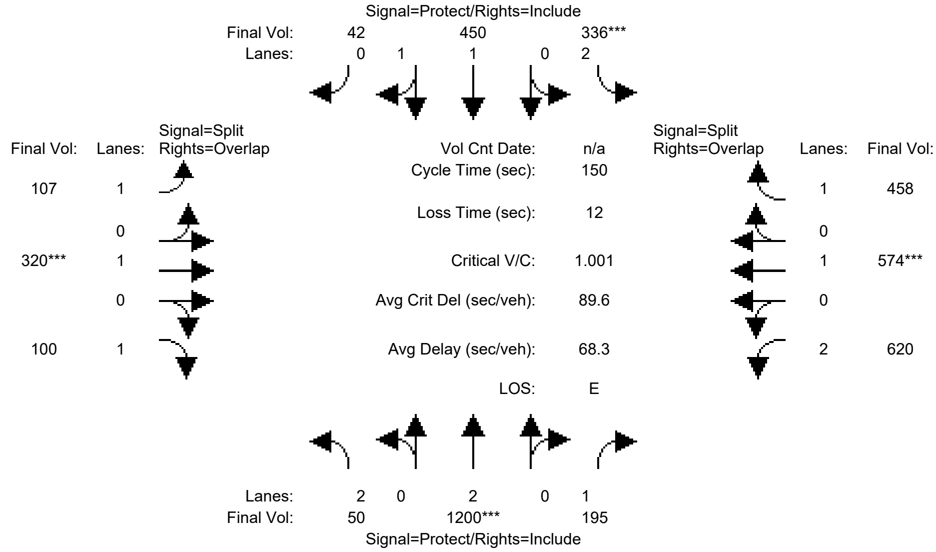

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 122 | 870 | 338 | 123 | 1052 | 73 | 60 | 632 | 56 | 275 | 303 | 226 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.87 | 0.13 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3245 | 225 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.25 | 0.22 | 0.04 | 0.32 | 0.32 | 0.03 | 0.34 | 0.04 | 0.08 | 0.16 | 0.14 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |
| Green Time: | 7.0 | 54.0 | 54.0 | 10.1 | 57.1 | 57.1 | 16.5 | 59.8 | 66.8 | 14.1 | 57.4 | 67.6 |
| Volume/Cap: | 0.77 | 0.69 | 0.60 | 0.53 | 0.85 | 0.85 | 0.31 | 0.85 | 0.08 | 0.85 | 0.43 | 0.32 |
| Uniform Del: | 70.7 | 40.9 | 39.2 | 67.6 | 42.6 | 42.6 | 61.5 | 41.1 | 23.9 | 66.9 | 34.1 | 26.4 |
| IncremntDel: | 20.1 | 1.6 | 1.8 | 2.5 | 5.5 | 5.5 | 0.9 | 9.3 | 0.0 | 19.0 | 0.4 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 90.8 | 42.5 | 41.0 | 70.1 | 48.1 | 48.1 | 62.4 | 50.4 | 24.0 | 85.9 | 34.5 | 26.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.8 | 42.5 | 41.0 | 70.1 | 48.1 | 48.1 | 62.4 | 50.4 | 24.0 | 85.9 | 34.5 | 26.7 |
| LOS by Move: | F | D | D | E | D | D | E | D | C | F | C | C |
| HCM2kAvgQ: | 4 | 18 | 13 | 4 | 27 | 27 | 3 | 28 | 1 | 9 | 10 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #11: (40) University Avenue and Bay Road



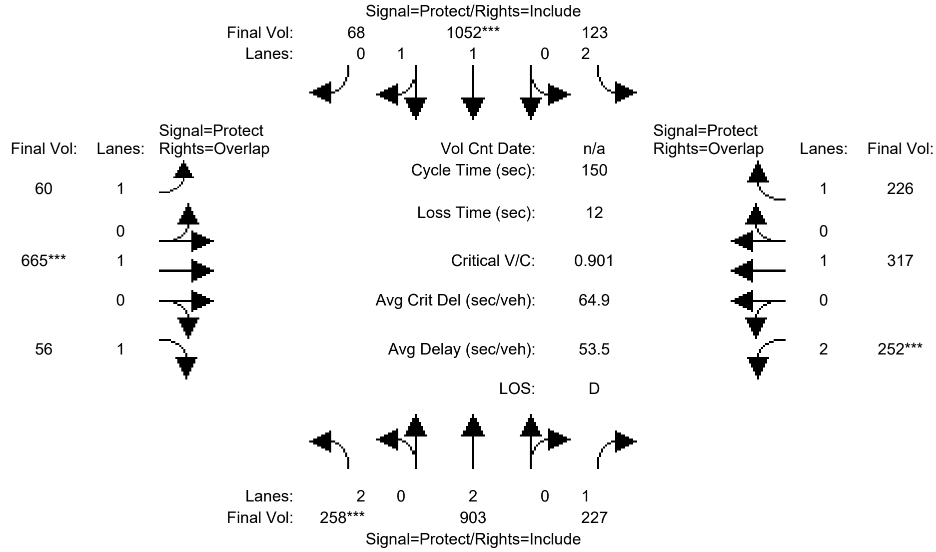

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 50 | 1200 | 195 | 336 | 450 | 42 | 107 | 320 | 100 | 620 | 574 | 458 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3164 | 295 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.34 | 0.12 | 0.10 | 0.14 | 0.14 | 0.06 | 0.17 | 0.06 | 0.18 | 0.31 | 0.29 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 16.3 | 51.3 | 51.3 | 14.8 | 49.8 | 49.8 | 25.7 | 25.7 | 42.1 | 46.2 | 46.2 | 61.0 |
| Volume/Cap: | 0.14 | 1.00 | 0.36 | 1.00 | 0.43 | 0.43 | 0.35 | 1.00 | 0.23 | 0.59 | 1.00 | 0.71 |
| Uniform Del: | 60.5 | 49.4 | 37.1 | 67.6 | 39.1 | 39.1 | 54.8 | 62.1 | 41.4 | 43.9 | 51.9 | 37.2 |
| IncremntDel: | 0.2 | 26.3 | 0.4 | 49.5 | 0.3 | 0.3 | 0.7 | 50.7 | 0.3 | 0.9 | 37.9 | 3.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 60.6 | 75.7 | 37.5 | 117.1 | 39.3 | 39.3 | 55.5 | 113 | 41.7 | 44.7 | 89.8 | 40.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 60.6 | 75.7 | 37.5 | 117.1 | 39.3 | 39.3 | 55.5 | 113 | 41.7 | 44.7 | 89.8 | 40.9 |
| LOS by Move: | E | E | D | F | D | D | E | F | D | D | F | D |
| HCM2kAvgQ: | 1 | 35 | 7 | 12 | 9 | 9 | 4 | 20 | 3 | 13 | 32 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #11: (40) University Avenue and Bay Road



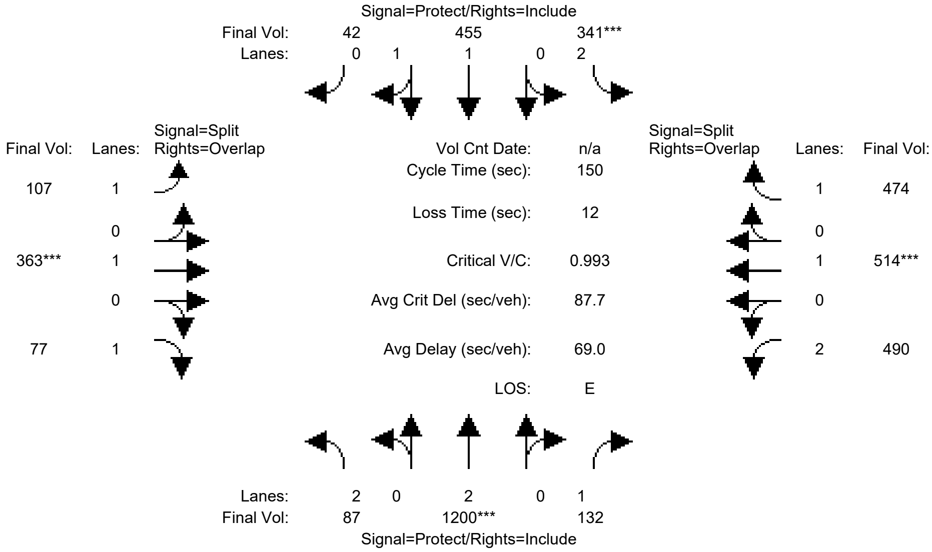

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 258 | 903 | 227 | 123 | 1052 | 68 | 60 | 665 | 56 | 252 | 317 | 226 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.88 | 0.12 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3263 | 211 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.26 | 0.14 | 0.04 | 0.32 | 0.32 | 0.03 | 0.36 | 0.04 | 0.07 | 0.17 | 0.14 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |
| Green Time: | 12.6 | 56.1 | 56.1 | 10.2 | 53.7 | 53.7 | 15.4 | 59.5 | 72.1 | 12.2 | 56.3 | 66.4 |
| Volume/Cap: | 0.90 | 0.69 | 0.39 | 0.53 | 0.90 | 0.90 | 0.33 | 0.90 | 0.07 | 0.90 | 0.45 | 0.32 |
| Uniform Del: | 68.1 | 39.6 | 34.3 | 67.6 | 45.6 | 45.6 | 62.5 | 42.5 | 21.0 | 68.3 | 35.3 | 27.2 |
| IncremntDel: | 29.1 | 1.6 | 0.4 | 2.4 | 9.2 | 9.2 | 1.1 | 14.2 | 0.0 | 29.6 | 0.5 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 97.2 | 41.1 | 34.8 | 70.0 | 54.8 | 54.8 | 63.6 | 56.7 | 21.0 | 97.9 | 35.8 | 27.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 97.2 | 41.1 | 34.8 | 70.0 | 54.8 | 54.8 | 63.6 | 56.7 | 21.0 | 97.9 | 35.8 | 27.4 |
| LOS by Move: | F | D | C | E | D | D | E | E | C | F | D | C |
| HCM2kAvgQ: | 9 | 19 | 8 | 4 | 29 | 29 | 3 | 32 | 1 | 9 | 11 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #11: (40) University Avenue and Bay Road



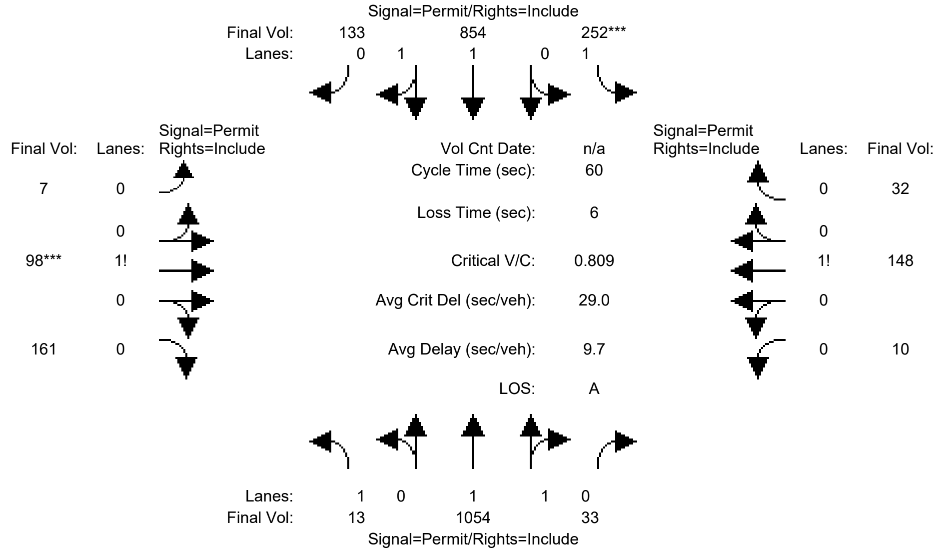

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 87 | 1200 | 132 | 341 | 455 | 42 | 107 | 363 | 77 | 490 | 514 | 474 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3167 | 292 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.34 | 0.08 | 0.10 | 0.14 | 0.14 | 0.06 | 0.19 | 0.05 | 0.14 | 0.28 | 0.30 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 16.4 | 51.7 | 51.7 | 15.1 | 50.5 | 50.5 | 29.4 | 29.4 | 45.8 | 41.7 | 41.7 | 56.8 |
| Volume/Cap: | 0.23 | 0.99 | 0.24 | 0.99 | 0.43 | 0.43 | 0.31 | 0.99 | 0.16 | 0.51 | 0.99 | 0.79 |
| Uniform Del: | 61.1 | 49.0 | 35.2 | 67.4 | 38.6 | 38.6 | 51.6 | 60.2 | 38.0 | 45.6 | 54.0 | 41.3 |
| IncremntDel: | 0.3 | 24.1 | 0.2 | 46.6 | 0.3 | 0.3 | 0.5 | 45.1 | 0.2 | 0.5 | 37.7 | 7.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 61.4 | 73.1 | 35.4 | 114.0 | 38.8 | 38.8 | 52.1 | 105 | 38.2 | 46.1 | 91.7 | 48.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.4 | 73.1 | 35.4 | 114.0 | 38.8 | 38.8 | 52.1 | 105 | 38.2 | 46.1 | 91.7 | 48.3 |
| LOS by Move: | E | E | D | F | D | D | D | F | D | D | F | D |
| HCM2kAvgQ: | 2 | 35 | 4 | 12 | 9 | 9 | 4 | 22 | 3 | 10 | 29 | 21 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #12: (41) University Avenue and Runnymede Street




| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 13 | 1054 | 33 | 252 | 854 | 133 | 7 | 98 | 161 | 10 | 148 | 32 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.26 | 0.95 | 0.95 | 0.23 | 0.93 | 0.93 | 0.91 | 0.91 | 0.91 | 0.95 | 0.95 | 0.95 |
| Lanes: | 1.00 | 1.94 | 0.06 | 1.00 | 1.73 | 0.27 | 0.03 | 0.37 | 0.60 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 500 | 3486 | 109 | 439 | 3061 | 477 | 46 | 637 | 1047 | 95 | 1403 | 303 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.30 | 0.30 | 0.57 | 0.28 | 0.28 | 0.15 | 0.15 | 0.15 | 0.11 | 0.11 | 0.11 |
| Crit Moves: | | | | **** | | | | **** | | | | |
| Green Time: | 42.6 | 42.6 | 42.6 | 42.6 | 42.6 | 42.6 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 |
| Volume/Cap: | 0.04 | 0.43 | 0.43 | 0.81 | 0.39 | 0.39 | 0.81 | 0.81 | 0.81 | 0.56 | 0.56 | 0.56 |
| Uniform Del: | 2.6 | 3.6 | 3.6 | 5.9 | 3.5 | 3.5 | 23.3 | 23.3 | 23.3 | 22.0 | 22.0 | 22.0 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 14.5 | 0.1 | 0.1 | 13.8 | 13.8 | 13.8 | 2.0 | 2.0 | 2.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.6 | 3.7 | 3.7 | 20.4 | 3.6 | 3.6 | 37.1 | 37.1 | 37.1 | 24.0 | 24.0 | 24.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.6 | 3.7 | 3.7 | 20.4 | 3.6 | 3.6 | 37.1 | 37.1 | 37.1 | 24.0 | 24.0 | 24.0 |
| LOS by Move: | A | A | A | C | A | A | D | D | D | C | C | C |
| HCM2kAvgQ: | 0 | 5 | 5 | 6 | 4 | 4 | 7 | 7 | 7 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 21 948 41
Lanes: 0 1 1 0 1

| Final Vol: | Lanes: | Signal=Permit Rights=Include | | | Signal=Permit Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| 10 | 0 | | Cycle Time (sec): | 60 | | 0 | 121 |
| | 0 | | Loss Time (sec): | 6 | | 0 | |
| 71 | 1! | | Critical V/C: | 0.590 | | 1! | 137*** |
| | 0 | | Avg Crit Del (sec/veh): | 16.6 | | 0 | |
| 30 | 0 | | Avg Delay (sec/veh): | 8.9 | | 0 | 40 |
| | | | LOS: | A | | | |

Lanes: 1 0 1 1 0
Final Vol: 166*** 1115 64
Signal=Permit/Rights=Include

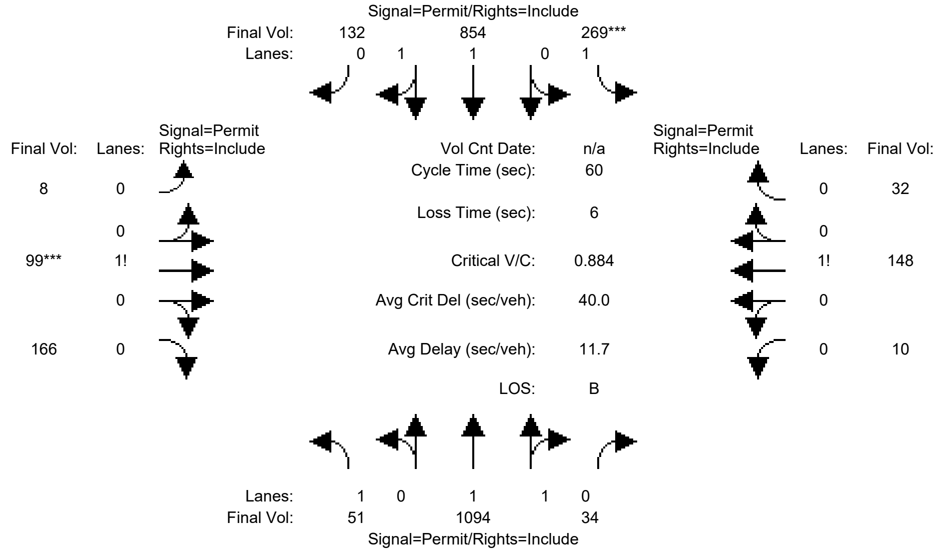
| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 166 | 1115 | 64 | 41 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.25 | 0.94 | 0.94 | 0.18 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.90 | 0.90 | 0.90 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.96 | 0.04 | 0.09 | 0.64 | 0.27 | 0.13 | 0.46 | 0.41 |
| Final Sat.: | 466 | 3387 | 194 | 336 | 3521 | 78 | 159 | 1132 | 478 | 229 | 786 | 694 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.36 | 0.33 | 0.33 | 0.12 | 0.27 | 0.27 | 0.06 | 0.06 | 0.06 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | **** | | | | | | | | | | **** | |
| Green Time: | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 |
| Volume/Cap: | 0.59 | 0.54 | 0.54 | 0.20 | 0.45 | 0.45 | 0.21 | 0.21 | 0.21 | 0.59 | 0.59 | 0.59 |
| Uniform Del: | 7.3 | 7.0 | 7.0 | 5.3 | 6.4 | 6.4 | 15.9 | 15.9 | 15.9 | 18.0 | 18.0 | 18.0 |
| IncremntDel: | 3.3 | 0.3 | 0.3 | 0.5 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 1.8 | 1.8 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 10.6 | 7.3 | 7.3 | 5.8 | 6.6 | 6.6 | 16.1 | 16.1 | 16.1 | 19.9 | 19.9 | 19.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 10.6 | 7.3 | 7.3 | 5.8 | 6.6 | 6.6 | 16.1 | 16.1 | 16.1 | 19.9 | 19.9 | 19.9 |
| LOS by Move: | B | A | A | A | A | A | B | B | B | B | B | B |
| HCM2kAvgQ: | 3 | 7 | 7 | 1 | 5 | 5 | 2 | 2 | 2 | 6 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #12: (41) University Avenue and Runnymede Street




| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 51 | 1094 | 34 | 269 | 854 | 132 | 8 | 99 | 166 | 10 | 148 | 32 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.27 | 0.95 | 0.95 | 0.22 | 0.93 | 0.93 | 0.91 | 0.91 | 0.91 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 1.94 | 0.06 | 1.00 | 1.73 | 0.27 | 0.03 | 0.36 | 0.61 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 505 | 3487 | 108 | 422 | 3064 | 474 | 51 | 628 | 1053 | 93 | 1382 | 299 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.31 | 0.31 | 0.64 | 0.28 | 0.28 | 0.16 | 0.16 | 0.16 | 0.11 | 0.11 | 0.11 |
| Crit Moves: | | | | **** | | | | **** | | | | |
| Green Time: | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 |
| Volume/Cap: | 0.14 | 0.43 | 0.43 | 0.88 | 0.39 | 0.39 | 0.88 | 0.88 | 0.88 | 0.60 | 0.60 | 0.60 |
| Uniform Del: | 2.6 | 3.4 | 3.4 | 6.4 | 3.2 | 3.2 | 24.0 | 24.0 | 24.0 | 22.7 | 22.7 | 22.7 |
| IncremntDel: | 0.2 | 0.1 | 0.1 | 24.8 | 0.1 | 0.1 | 24.5 | 24.5 | 24.5 | 3.2 | 3.2 | 3.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.8 | 3.5 | 3.5 | 31.2 | 3.3 | 3.3 | 48.6 | 48.6 | 48.6 | 25.9 | 25.9 | 25.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.8 | 3.5 | 3.5 | 31.2 | 3.3 | 3.3 | 48.6 | 48.6 | 48.6 | 25.9 | 25.9 | 25.9 |
| LOS by Move: | A | A | A | C | A | A | D | D | D | C | C | C |
| HCM2kAvgQ: | 0 | 5 | 5 | 7 | 4 | 4 | 8 | 8 | 8 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 21 958 45
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (Eastbound)
Final Vol: / Lanes:
11 0
0
74 1!
0
56 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 6
Critical V/C: 0.692
Avg Crit Del (sec/veh): 20.2
Avg Delay (sec/veh): 8.9
LOS: A

Signal=Permit Rights=Include (Westbound)
Lanes: / Final Vol:
0 121
0
1! 143***
0
0 40

Lanes: 1 0 1 1 0
Final Vol: 212*** 1115 64
Signal=Permit/Rights=Include

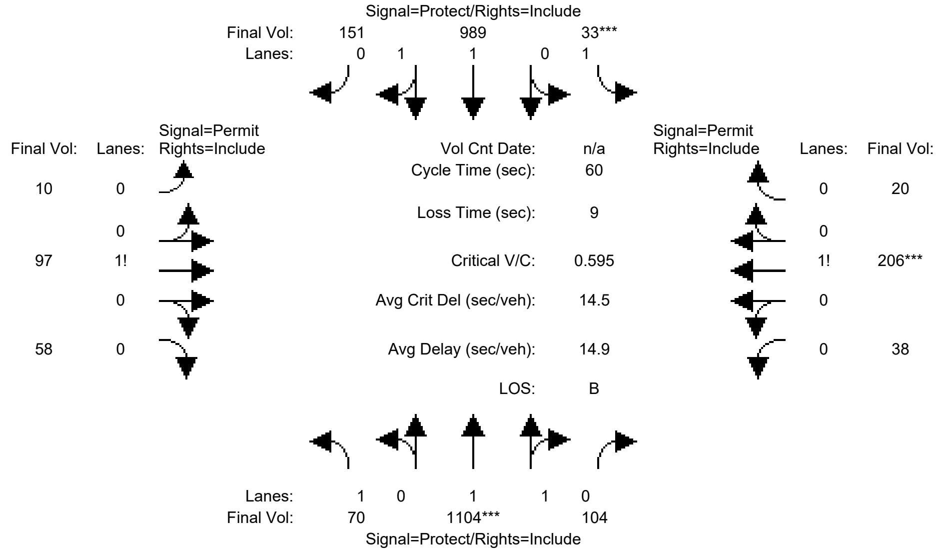
| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 212 | 1115 | 64 | 45 | 958 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.25 | 0.94 | 0.94 | 0.19 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.96 | 0.04 | 0.08 | 0.52 | 0.40 | 0.13 | 0.47 | 0.40 |
| Final Sat.: | 477 | 3387 | 194 | 357 | 3522 | 77 | 137 | 919 | 695 | 224 | 801 | 677 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.44 | 0.33 | 0.33 | 0.13 | 0.27 | 0.27 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 | 0.18 |
| Crit Moves: | **** | | | | | | | | | | **** | |
| Green Time: | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 |
| Volume/Cap: | 0.69 | 0.51 | 0.51 | 0.20 | 0.42 | 0.42 | 0.31 | 0.31 | 0.31 | 0.69 | 0.69 | 0.69 |
| Uniform Del: | 6.9 | 5.7 | 5.7 | 4.4 | 5.3 | 5.3 | 18.0 | 18.0 | 18.0 | 20.1 | 20.1 | 20.1 |
| IncremntDel: | 6.7 | 0.2 | 0.2 | 0.4 | 0.1 | 0.1 | 0.4 | 0.4 | 0.4 | 4.7 | 4.7 | 4.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 13.6 | 5.9 | 5.9 | 4.8 | 5.4 | 5.4 | 18.4 | 18.4 | 18.4 | 24.8 | 24.8 | 24.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 13.6 | 5.9 | 5.9 | 4.8 | 5.4 | 5.4 | 18.4 | 18.4 | 18.4 | 24.8 | 24.8 | 24.8 |
| LOS by Move: | B | A | A | A | A | A | B | B | B | C | C | C |
| HCM2kAvgQ: | 4 | 7 | 7 | 1 | 5 | 5 | 2 | 2 | 2 | 7 | 7 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #13: (42) University Avenue and Bell Street




| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 70 | 1104 | 104 | 33 | 989 | 151 | 10 | 97 | 58 | 38 | 206 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.94 | 0.94 | 0.95 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 |
| Lanes: | 1.00 | 1.83 | 0.17 | 1.00 | 1.74 | 0.26 | 0.06 | 0.59 | 0.35 | 0.14 | 0.78 | 0.08 |
| Final Sat.: | 1805 | 3256 | 307 | 1805 | 3069 | 469 | 108 | 1044 | 624 | 257 | 1391 | 135 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.34 | 0.34 | 0.02 | 0.32 | 0.32 | 0.09 | 0.09 | 0.09 | 0.15 | 0.15 | 0.15 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 10.0 | 30.6 | 30.6 | 7.0 | 27.6 | 27.6 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 |
| Volume/Cap: | 0.23 | 0.66 | 0.66 | 0.16 | 0.70 | 0.70 | 0.42 | 0.42 | 0.42 | 0.66 | 0.66 | 0.66 |
| Uniform Del: | 21.7 | 10.9 | 10.9 | 23.8 | 12.9 | 12.9 | 20.0 | 20.0 | 20.0 | 21.3 | 21.3 | 21.3 |
| IncremntDel: | 0.4 | 0.9 | 0.9 | 0.3 | 1.4 | 1.4 | 0.7 | 0.7 | 0.7 | 4.2 | 4.2 | 4.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 22.1 | 11.8 | 11.8 | 24.2 | 14.3 | 14.3 | 20.7 | 20.7 | 20.7 | 25.5 | 25.5 | 25.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 22.1 | 11.8 | 11.8 | 24.2 | 14.3 | 14.3 | 20.7 | 20.7 | 20.7 | 25.5 | 25.5 | 25.5 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 10 | 10 | 1 | 10 | 10 | 3 | 3 | 3 | 6 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 212 819 48***
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (East Bound)
Final Vol: 14, 187, 63
Lanes: 0, 0, 1!, 0, 0

Signal=Permit Rights=Include (West Bound)
Lanes: 0, 0, 1!, 0, 0
Final Vol: 23, 385***, 88

Vol Cnt Date: n/a
Cycle Time (sec): 75
Loss Time (sec): 9
Critical V/C: 0.839
Avg Crit Del (sec/veh): 30.6
Avg Delay (sec/veh): 26.4
LOS: C

Lanes: 1 0 1 1 0
Final Vol: 75 1285*** 176
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1285 | 176 | 48 | 819 | 212 | 14 | 187 | 63 | 88 | 385 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.87 | 0.87 | 0.87 |
| Lanes: | 1.00 | 1.76 | 0.24 | 1.00 | 1.59 | 0.41 | 0.05 | 0.71 | 0.24 | 0.18 | 0.77 | 0.05 |
| Final Sat.: | 1805 | 3118 | 427 | 1805 | 2779 | 719 | 95 | 1270 | 428 | 294 | 1286 | 77 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.41 | 0.41 | 0.03 | 0.29 | 0.29 | 0.15 | 0.15 | 0.15 | 0.30 | 0.30 | 0.30 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 9.9 | 34.2 | 34.2 | 7.0 | 31.3 | 31.3 | 24.8 | 24.8 | 24.8 | 24.8 | 24.8 | 24.8 |
| Volume/Cap: | 0.31 | 0.90 | 0.90 | 0.28 | 0.71 | 0.71 | 0.44 | 0.44 | 0.44 | 0.90 | 0.90 | 0.90 |
| Uniform Del: | 29.5 | 18.9 | 18.9 | 31.7 | 18.1 | 18.1 | 19.7 | 19.7 | 19.7 | 24.0 | 24.0 | 24.0 |
| IncremntDel: | 0.8 | 7.6 | 7.6 | 0.9 | 1.6 | 1.6 | 0.5 | 0.5 | 0.5 | 18.4 | 18.4 | 18.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 30.2 | 26.5 | 26.5 | 32.6 | 19.7 | 19.7 | 20.2 | 20.2 | 20.2 | 42.4 | 42.4 | 42.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 30.2 | 26.5 | 26.5 | 32.6 | 19.7 | 19.7 | 20.2 | 20.2 | 20.2 | 42.4 | 42.4 | 42.4 |
| LOS by Move: | C | C | C | C | B | B | C | C | C | D | D | D |
| HCM2kAvgQ: | 2 | 21 | 21 | 1 | 12 | 12 | 5 | 5 | 5 | 15 | 15 | 15 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 144 985 33***
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (Eastbound)
Final Vol: 11, Lanes: 0
Lanes: 0
Final Vol: 125, Lanes: 1!
Lanes: 0
Final Vol: 60, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.662
Avg Crit Del (sec/veh): 16.5
Avg Delay (sec/veh): 16.2
LOS: B

Signal=Permit Rights=Include (Westbound)
Lanes: 0, Final Vol: 20
Lanes: 0
Lanes: 1!, Final Vol: 243***
Lanes: 0
Lanes: 0, Final Vol: 40

Lanes: 1 0 1 1 0
Final Vol: 76 1179*** 150
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 76 | 1179 | 150 | 33 | 985 | 144 | 11 | 125 | 60 | 40 | 243 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Lanes: | 1.00 | 1.77 | 0.23 | 1.00 | 1.74 | 0.26 | 0.06 | 0.64 | 0.30 | 0.13 | 0.80 | 0.07 |
| Final Sat.: | 1805 | 3148 | 401 | 1805 | 3090 | 452 | 100 | 1137 | 546 | 235 | 1428 | 118 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.37 | 0.37 | 0.02 | 0.32 | 0.32 | 0.11 | 0.11 | 0.11 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 10.0 | 30.3 | 30.3 | 7.0 | 27.3 | 27.3 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 |
| Volume/Cap: | 0.25 | 0.74 | 0.74 | 0.16 | 0.70 | 0.70 | 0.48 | 0.48 | 0.48 | 0.74 | 0.74 | 0.74 |
| Uniform Del: | 21.8 | 11.8 | 11.8 | 23.8 | 13.1 | 13.1 | 20.0 | 20.0 | 20.0 | 21.5 | 21.5 | 21.5 |
| IncremntDel: | 0.4 | 1.7 | 1.7 | 0.3 | 1.4 | 1.4 | 0.9 | 0.9 | 0.9 | 7.2 | 7.2 | 7.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 22.2 | 13.5 | 13.5 | 24.2 | 14.5 | 14.5 | 20.9 | 20.9 | 20.9 | 28.7 | 28.7 | 28.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 22.2 | 13.5 | 13.5 | 24.2 | 14.5 | 14.5 | 20.9 | 20.9 | 20.9 | 28.7 | 28.7 | 28.7 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 12 | 12 | 1 | 10 | 10 | 4 | 4 | 4 | 7 | 7 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 192 873 48***
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (Westbound: Signal=Permit Rights=Include)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 14 | 0 | | Vol Cnt Date: | n/a | 0 | 23 |
| | 0 | | Cycle Time (sec): | 75 | 0 | |
| 212 | 1! | | Loss Time (sec): | 9 | 1! | 404*** |
| | 0 | | Critical V/C: | 0.908 | 0 | |
| 59 | 0 | | Avg Crit Del (sec/veh): | 44.0 | 0 | 109 |
| | | | Avg Delay (sec/veh): | 34.8 | | |
| | | | LOS: | C | | |

Lanes: 1 0 1 1 0
Final Vol: 75 1343*** 189
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1343 | 189 | 48 | 873 | 192 | 14 | 212 | 59 | 109 | 404 | 23 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.92 | 0.92 | 0.95 | 0.95 | 0.95 | 0.83 | 0.83 | 0.83 |
| Lanes: | 1.00 | 1.75 | 0.25 | 1.00 | 1.64 | 0.36 | 0.05 | 0.74 | 0.21 | 0.20 | 0.76 | 0.04 |
| Final Sat.: | 1805 | 3108 | 437 | 1805 | 2879 | 633 | 88 | 1339 | 373 | 320 | 1186 | 68 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.43 | 0.43 | 0.03 | 0.30 | 0.30 | 0.16 | 0.16 | 0.16 | 0.34 | 0.34 | 0.34 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 9.4 | 33.0 | 33.0 | 7.0 | 30.6 | 30.6 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| Volume/Cap: | 0.33 | 0.98 | 0.98 | 0.28 | 0.74 | 0.74 | 0.46 | 0.46 | 0.46 | 0.98 | 0.98 | 0.98 |
| Uniform Del: | 29.9 | 20.7 | 20.7 | 31.7 | 18.9 | 18.9 | 19.0 | 19.0 | 19.0 | 24.3 | 24.3 | 24.3 |
| IncremntDel: | 0.9 | 18.7 | 18.7 | 0.9 | 2.2 | 2.2 | 0.5 | 0.5 | 0.5 | 33.9 | 33.9 | 33.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 30.8 | 39.4 | 39.4 | 32.6 | 21.0 | 21.0 | 19.5 | 19.5 | 19.5 | 58.2 | 58.2 | 58.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 30.8 | 39.4 | 39.4 | 32.6 | 21.0 | 21.0 | 19.5 | 19.5 | 19.5 | 58.2 | 58.2 | 58.2 |
| LOS by Move: | C | D | D | C | C | C | B | B | B | E | E | E |
| HCM2kAvgQ: | 2 | 26 | 26 | 1 | 13 | 13 | 5 | 5 | 5 | 19 | 19 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 438 353***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include (Eastbound)
Final Vol: 0, Lanes: 0
Lanes: 0
Final Vol: 0, Lanes: 0
Lanes: 0
Final Vol: 0, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.998
Avg Crit Del (sec/veh): 145.2
Avg Delay (sec/veh): 75.9
LOS: E

Signal=Split Rights=Overlap (Westbound)
Lanes: 1, Final Vol: 278
Lanes: 0
Lanes: 0, Final Vol: 0
Lanes: 0
Lanes: 1, Final Vol: 9***

Lanes: 0 0 1 1 0
Final Vol: 0 307*** 9
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 307 | 9 | 353 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 278 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 35 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.58 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.51 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 12.7 | 12.7 | 28.3 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 38.3 |
| Volume/Cap: | 0.00 | 1.22 | 1.22 | 1.22 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.79 |
| Uniform Del: | 0.0 | 23.6 | 23.6 | 15.9 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 8.0 |
| IncremntDel: | 0.0 | 129 | 128.7 | 126.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 11.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 152 | 152.3 | 142.0 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 19.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 152 | 152.3 | 142.0 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 19.7 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 10 | 10 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 754 449***
Lanes: 0 0 3 0 1

Signal=Split
Rights=Include
Final Vol: Lanes:
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.962
Avg Crit Del (sec/veh): 124.1
Avg Delay (sec/veh): 66.4
LOS: E

Signal=Split
Rights=Overlap
Lanes: Final Vol:
1 212
0
0 0
0
1 7***

Lanes: 0 0 1 1 0
Final Vol: 0 543*** 26
Signal=Protect/Rights=Include

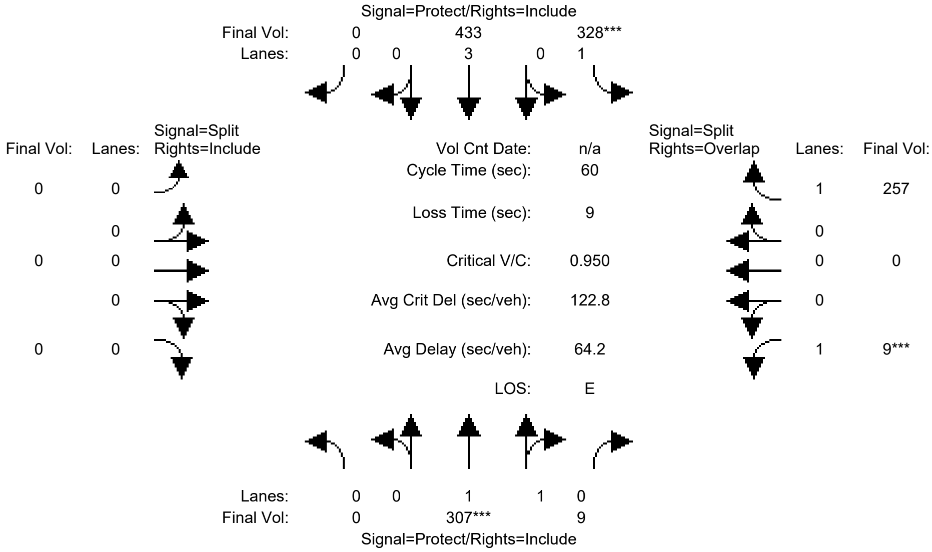
| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 543 | 26 | 449 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 212 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.91 | 0.09 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1721 | 82 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.32 | 0.32 | 0.49 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.26 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 16.0 | 16.0 | 25.0 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.0 |
| Volume/Cap: | 0.00 | 1.19 | 1.19 | 1.19 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.45 |
| Uniform Del: | 0.0 | 22.0 | 22.0 | 17.5 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 7.0 |
| IncremntDel: | 0.0 | 103 | 102.9 | 107.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 125 | 124.9 | 124.6 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 125 | 124.9 | 124.6 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.7 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 15 | 15 | 21 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #20: (50) East Bayshore Road and Donohoe Street

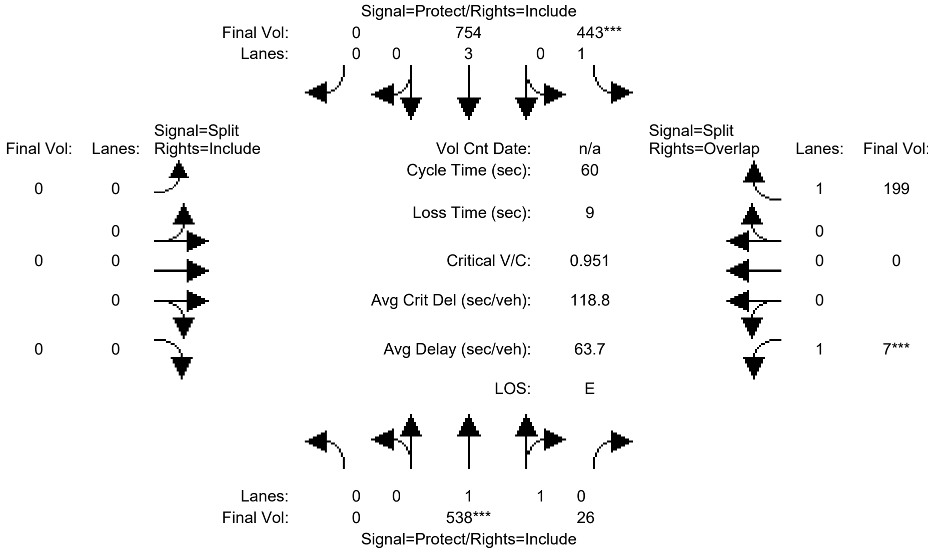



| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 35 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.53 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.47 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 13.4 | 13.4 | 27.6 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 37.6 |
| Volume/Cap: | 0.00 | 1.16 | 1.16 | 1.16 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.75 |
| Uniform Del: | 0.0 | 23.3 | 23.3 | 16.2 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.8 |
| IncremntDel: | 0.0 | 105 | 105.0 | 104.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 8.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 128 | 128.4 | 120.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 128 | 128.4 | 120.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.5 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 9 | 9 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #20: (50) East Bayshore Road and Donohoe Street



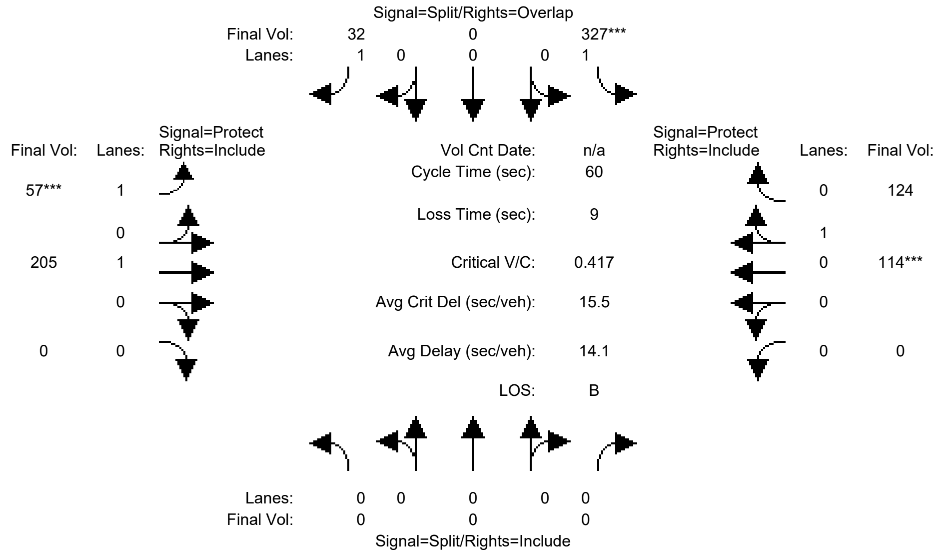

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 538 | 26 | 443 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.91 | 0.09 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1720 | 83 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.31 | 0.31 | 0.49 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.24 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 16.0 | 16.0 | 25.0 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.0 |
| Volume/Cap: | 0.00 | 1.17 | 1.17 | 1.17 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.42 |
| Uniform Del: | 0.0 | 22.0 | 22.0 | 17.5 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 6.9 |
| IncremntDel: | 0.0 | 97.5 | 97.5 | 101.9 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 120 | 119.5 | 119.4 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 120 | 119.5 | 119.4 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.5 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 14 | 14 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #25: (54) East Bayshore Road and Clarke Avenue




| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.91 | 0.91 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.48 | 0.52 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 829 | 902 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.14 | 0.14 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 25.2 | 0.0 | 32.2 | 7.0 | 25.8 | 0.0 | 0.0 | 18.8 | 18.8 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.04 | 0.28 | 0.26 | 0.00 | 0.00 | 0.44 | 0.44 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 12.4 | 0.0 | 6.6 | 24.2 | 11.0 | 0.0 | 0.0 | 16.4 | 16.4 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.6 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 6.6 | 24.9 | 11.1 | 0.0 | 0.0 | 17.0 | 17.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 6.6 | 24.9 | 11.1 | 0.0 | 0.0 | 17.0 | 17.0 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 3 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap
Final Vol: 26 0 182***
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include
Final Vol: 81*** Lanes: 1
Lanes: 0
Final Vol: 325 Lanes: 1
Lanes: 0
Final Vol: 0 Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 75
Loss Time (sec): 9
Critical V/C: 0.415
Avg Crit Del (sec/veh): 17.6
Avg Delay (sec/veh): 13.9
LOS: B

Signal=Protect Rights=Include
Lanes: 0 Final Vol: 173
Lanes: 1
Lanes: 0 Final Vol: 205***
Lanes: 0
Lanes: 0 Final Vol: 0

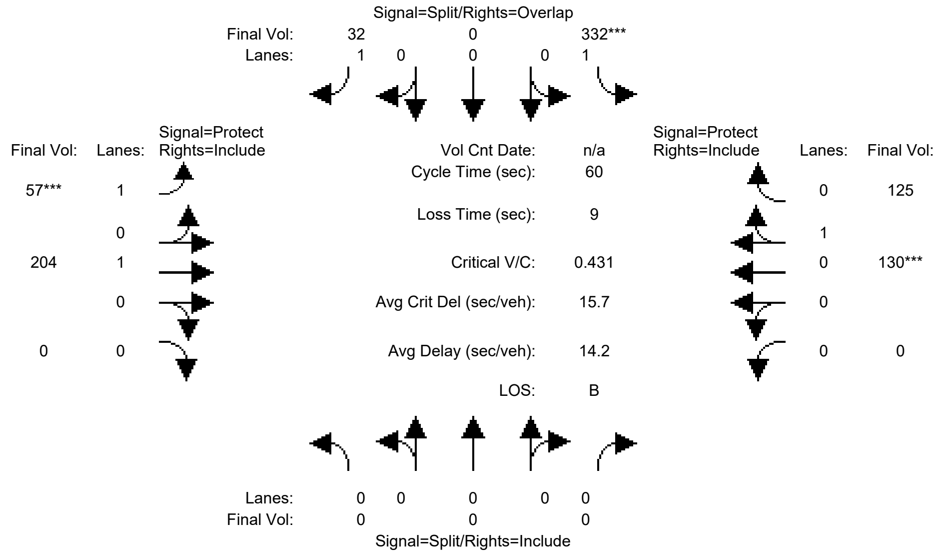
Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 173 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.54 | 0.46 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 947 | 799 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.02 | 0.05 | 0.17 | 0.00 | 0.00 | 0.22 | 0.22 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 18.6 | 0.0 | 26.9 | 8.3 | 47.4 | 0.0 | 0.0 | 39.1 | 39.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.41 | 0.00 | 0.05 | 0.41 | 0.28 | 0.00 | 0.00 | 0.41 | 0.41 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.6 | 0.0 | 15.7 | 31.1 | 6.2 | 0.0 | 0.0 | 11.0 | 11.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 1.4 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 24.3 | 0.0 | 15.7 | 32.5 | 6.3 | 0.0 | 0.0 | 11.3 | 11.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 24.3 | 0.0 | 15.7 | 32.5 | 6.3 | 0.0 | 0.0 | 11.3 | 11.3 |
| LOS by Move: | A | A | A | C | A | B | C | A | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 3 | 0 | 0 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #25: (54) East Bayshore Road and Clarke Avenue




| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 332 | 0 | 32 | 57 | 204 | 0 | 0 | 130 | 125 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.51 | 0.49 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 887 | 853 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.15 | 0.15 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 24.7 | 0.0 | 31.7 | 7.0 | 26.3 | 0.0 | 0.0 | 19.3 | 19.3 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.46 | 0.00 | 0.04 | 0.28 | 0.25 | 0.00 | 0.00 | 0.46 | 0.46 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 6.8 | 24.2 | 10.6 | 0.0 | 0.0 | 16.2 | 16.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.6 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 13.2 | 0.0 | 6.8 | 24.9 | 10.8 | 0.0 | 0.0 | 16.8 | 16.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 13.2 | 0.0 | 6.8 | 24.9 | 10.8 | 0.0 | 0.0 | 16.8 | 16.8 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 2 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap
Final Vol: 26 0 190***
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include
Final Vol: 81*** / 340 / 0
Lanes: 1 / 0 / 1 / 0 / 0

Vol Cnt Date: n/a
Cycle Time (sec): 75
Loss Time (sec): 9
Critical V/C: 0.422
Avg Crit Del (sec/veh): 17.8
Avg Delay (sec/veh): 14.0
LOS: B

Signal=Protect Rights=Include
Lanes: 0 / 1 / 0 / 0 / 0
Final Vol: 172 / 209*** / 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 172 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.55 | 0.45 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 959 | 789 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.02 | 0.05 | 0.18 | 0.00 | 0.00 | 0.22 | 0.22 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 19.1 | 0.0 | 27.2 | 8.1 | 46.9 | 0.0 | 0.0 | 38.8 | 38.8 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.42 | 0.00 | 0.05 | 0.42 | 0.29 | 0.00 | 0.00 | 0.42 | 0.42 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.3 | 0.0 | 15.5 | 31.2 | 6.4 | 0.0 | 0.0 | 11.2 | 11.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 1.5 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 24.0 | 0.0 | 15.5 | 32.7 | 6.6 | 0.0 | 0.0 | 11.5 | 11.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 24.0 | 0.0 | 15.5 | 32.7 | 6.6 | 0.0 | 0.0 | 11.5 | 11.5 |
| LOS by Move: | A | A | A | C | A | B | C | A | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 4 | 0 | 0 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

Signal=Split/Rights=Include
Final Vol: 62*** 0 524
Lanes: 0 0 1! 0 0

Signal=Protect Rights=Include (East Bound) — Final Vol: 45***, 0, 413, 0, 0; Lanes: 1, 0, 1, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 80
Loss Time (sec): 9
Critical V/C: 0.778
Avg Crit Del (sec/veh): 29.6
Avg Delay (sec/veh): 25.4
LOS: C

Signal=Protect Rights=Include (West Bound) — Lanes: 0, 1, 0, 0, 0; Final Vol: 547, 134***, 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

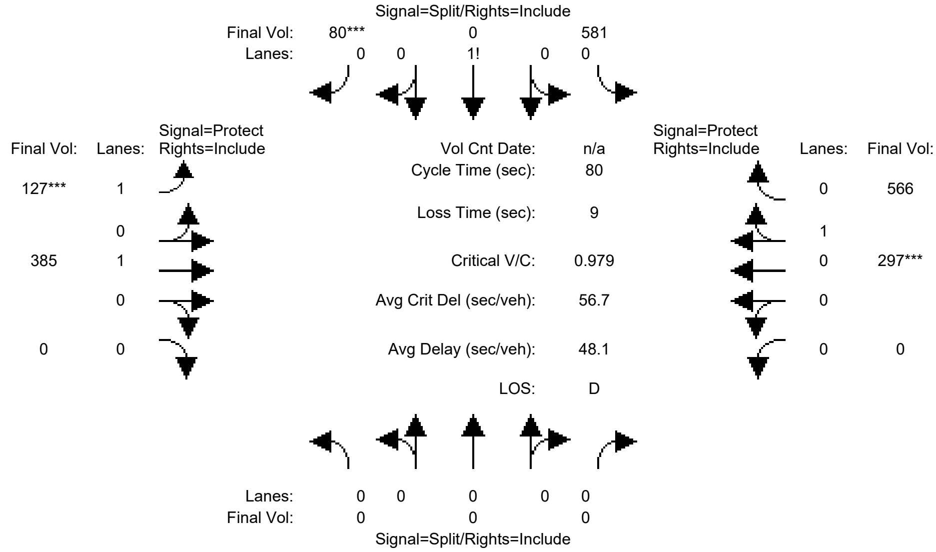
| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.20 | 0.80 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 374 | 1526 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.22 | 0.00 | 0.00 | 0.36 | 0.36 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 29.6 | 0.0 | 29.6 | 7.0 | 41.4 | 0.0 | 0.0 | 34.4 | 34.4 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.83 | 0.00 | 0.83 | 0.27 | 0.42 | 0.00 | 0.00 | 0.83 | 0.83 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.0 | 0.0 | 23.0 | 34.1 | 11.9 | 0.0 | 0.0 | 20.3 | 20.3 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 8.5 | 0.0 | 8.5 | 0.9 | 0.3 | 0.0 | 0.0 | 7.4 | 7.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 31.4 | 0.0 | 31.4 | 35.0 | 12.2 | 0.0 | 0.0 | 27.6 | 27.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 31.4 | 0.0 | 31.4 | 35.0 | 12.2 | 0.0 | 0.0 | 27.6 | 27.6 |
| LOS by Move: | A | A | A | C | A | C | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 16 | 0 | 16 | 1 | 6 | 0 | 0 | 17 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road



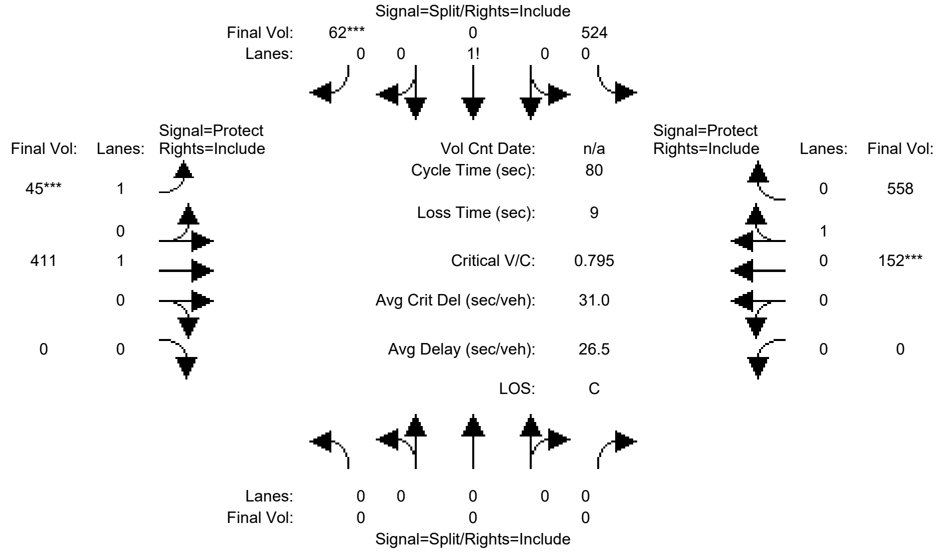

| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 566 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.34 | 0.66 |
| Final Sat.: | 0 | 0 | 0 | 1670 | 0 | 230 | 1900 | 1900 | 0 | 0 | 654 | 1246 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | 0.07 | 0.20 | 0.00 | 0.00 | 0.45 | 0.45 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 27.8 | 0.0 | 27.8 | 7.0 | 43.2 | 0.0 | 0.0 | 36.2 | 36.2 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.76 | 0.37 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 26.1 | 35.7 | 10.6 | 0.0 | 0.0 | 21.9 | 21.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 35.7 | 0.0 | 35.7 | 18.7 | 0.2 | 0.0 | 0.0 | 31.3 | 31.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 61.8 | 0.0 | 61.8 | 54.4 | 10.8 | 0.0 | 0.0 | 53.2 | 53.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 61.8 | 0.0 | 61.8 | 54.4 | 10.8 | 0.0 | 0.0 | 53.2 | 53.2 |
| LOS by Move: | A | A | A | E | A | E | D | B | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 24 | 0 | 24 | 5 | 6 | 0 | 0 | 30 | 30 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road



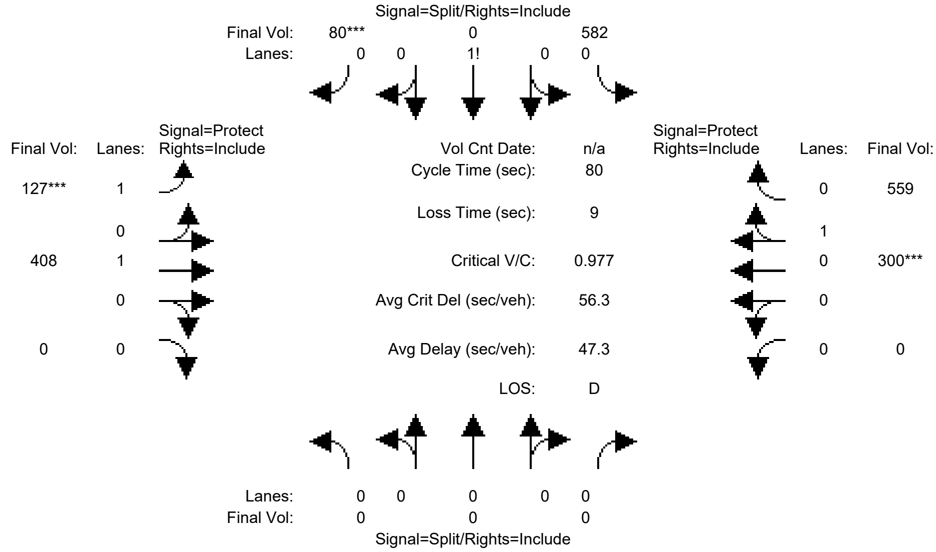

| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 152 | 558 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.21 | 0.79 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 407 | 1493 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.22 | 0.00 | 0.00 | 0.37 | 0.37 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 28.9 | 0.0 | 28.9 | 7.0 | 42.1 | 0.0 | 0.0 | 35.1 | 35.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.85 | 0.27 | 0.41 | 0.00 | 0.00 | 0.85 | 0.85 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.6 | 0.0 | 23.6 | 34.1 | 11.5 | 0.0 | 0.0 | 20.2 | 20.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 10.1 | 0.0 | 10.1 | 0.9 | 0.3 | 0.0 | 0.0 | 8.5 | 8.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 33.6 | 0.0 | 33.6 | 35.0 | 11.8 | 0.0 | 0.0 | 28.6 | 28.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 33.6 | 0.0 | 33.6 | 35.0 | 11.8 | 0.0 | 0.0 | 28.6 | 28.6 |
| LOS by Move: | A | A | A | C | A | C | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 16 | 0 | 16 | 1 | 6 | 0 | 0 | 19 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road



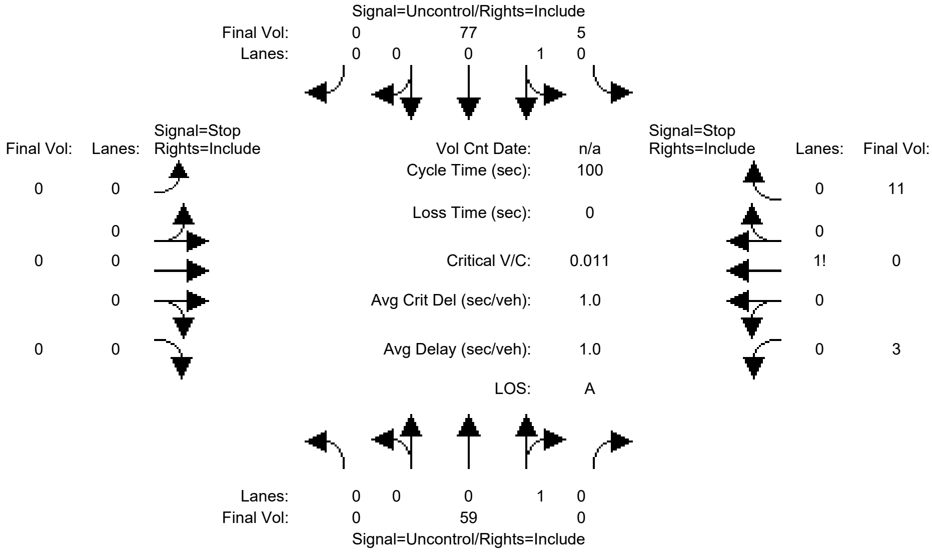

| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 300 | 559 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.35 | 0.65 |
| Final Sat.: | 0 | 0 | 0 | 1670 | 0 | 230 | 1900 | 1900 | 0 | 0 | 664 | 1236 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | 0.07 | 0.21 | 0.00 | 0.00 | 0.45 | 0.45 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 27.9 | 0.0 | 27.9 | 7.0 | 43.1 | 0.0 | 0.0 | 36.1 | 36.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.76 | 0.40 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 26.1 | 35.7 | 10.8 | 0.0 | 0.0 | 21.9 | 21.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 35.2 | 0.0 | 35.2 | 18.7 | 0.3 | 0.0 | 0.0 | 30.9 | 30.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 61.2 | 0.0 | 61.2 | 54.4 | 11.1 | 0.0 | 0.0 | 52.8 | 52.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 61.2 | 0.0 | 61.2 | 54.4 | 11.1 | 0.0 | 0.0 | 52.8 | 52.8 |
| LOS by Move: | A | A | A | E | A | E | D | B | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 24 | 0 | 24 | 5 | 6 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative AM

Intersection #32: (51) East Bayshore Road and Holland Street



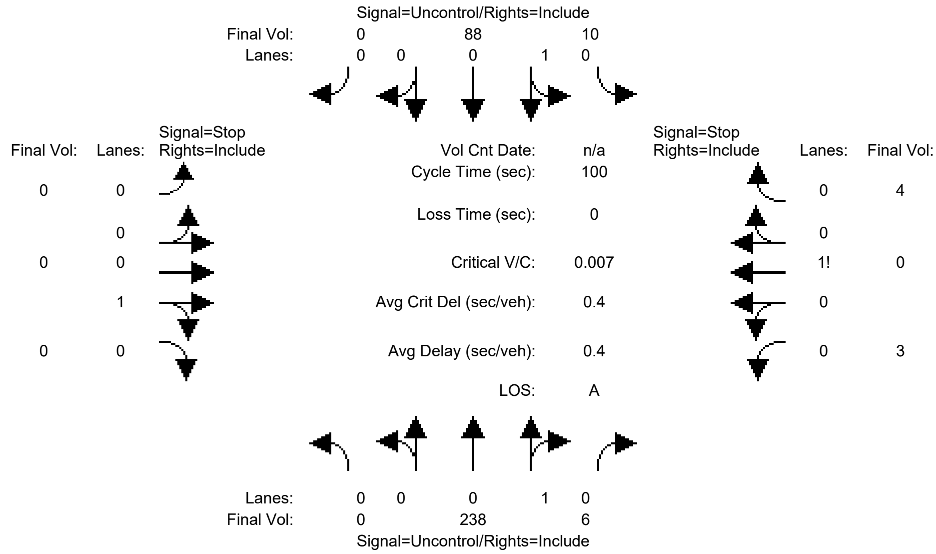

```
Street Name:          East Bayshore Road                 Holland Street
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   59     0     5   77     0     0    0     0     3    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx             8.8
ApproachLOS:          *                 *                 *                 A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             141
Minor Approach Volume:           14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative PM

Intersection #32: (51) East Bayshore Road and Holland Street



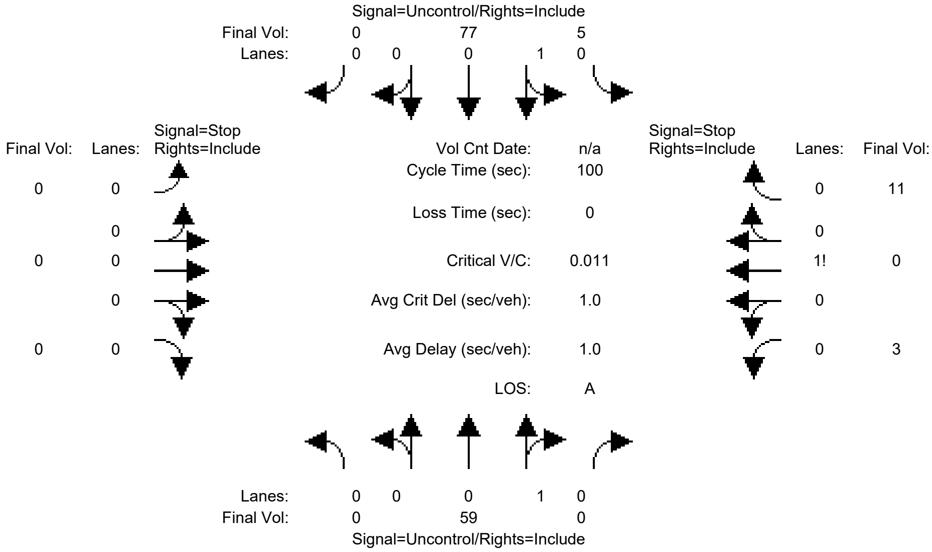

```
Street Name:        East Bayshore Road                Holland Street
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  238     6    10   88     0     0    0     0     3    0     4
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *    A     *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:      *    *     *    A     *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             10.0
ApproachLOS:        *                *                *                 A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             342
Minor Approach Volume:           7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project AM

Intersection #32: (51) East Bayshore Road and Holland Street

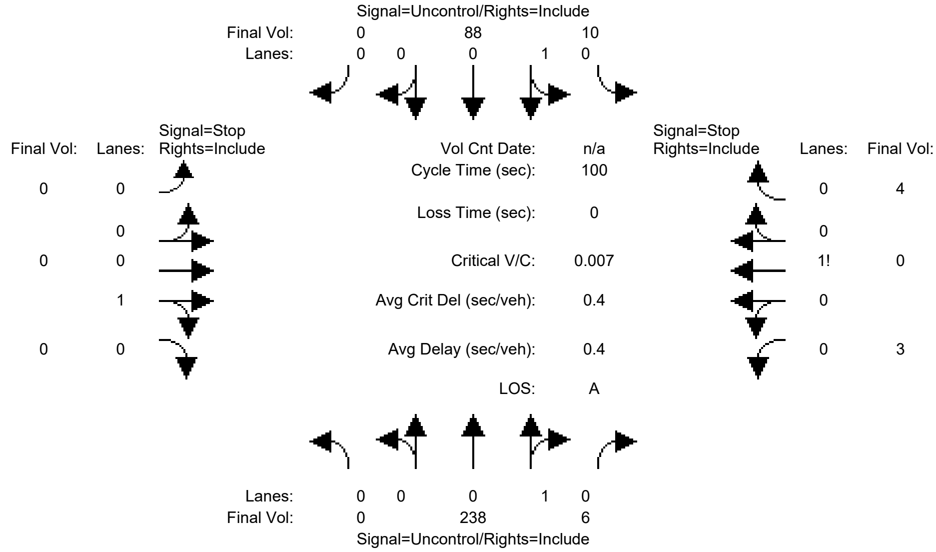



```
Street Name:        East Bayshore Road                 Holland Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0   59     0     5   77     0     0    0     0     3    0    11
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:      *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx               8.8
ApproachLOS:          *                 *                 *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             141
Minor Approach Volume:           14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project PM

Intersection #32: (51) East Bayshore Road and Holland Street



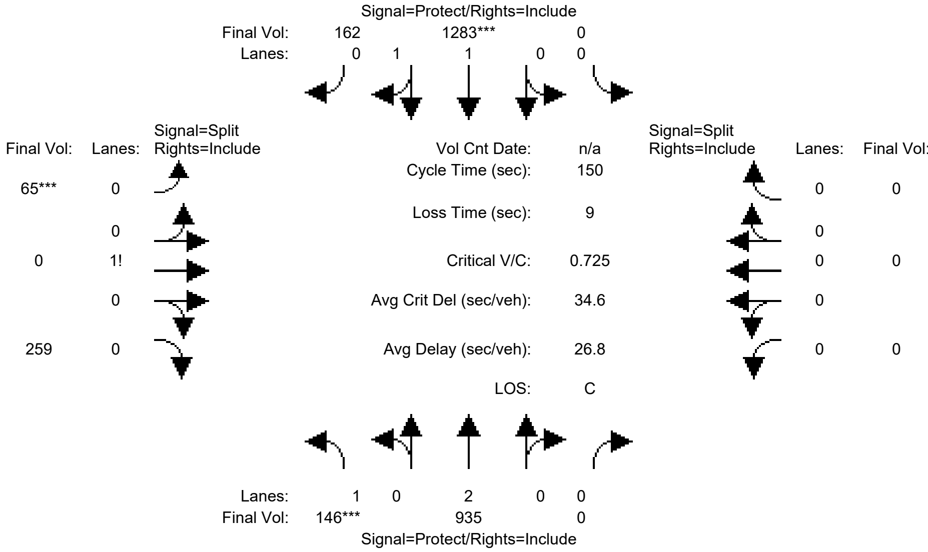

```
Street Name:          East Bayshore Road                  Holland Street
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  238     6    10   88     0     0    0     0     3    0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             10.0
ApproachLOS:        *                *                *                 A
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
*********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
*********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238     6    10   88     0     0    0     0     3    0     4
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            342
Minor Approach Volume:          7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive



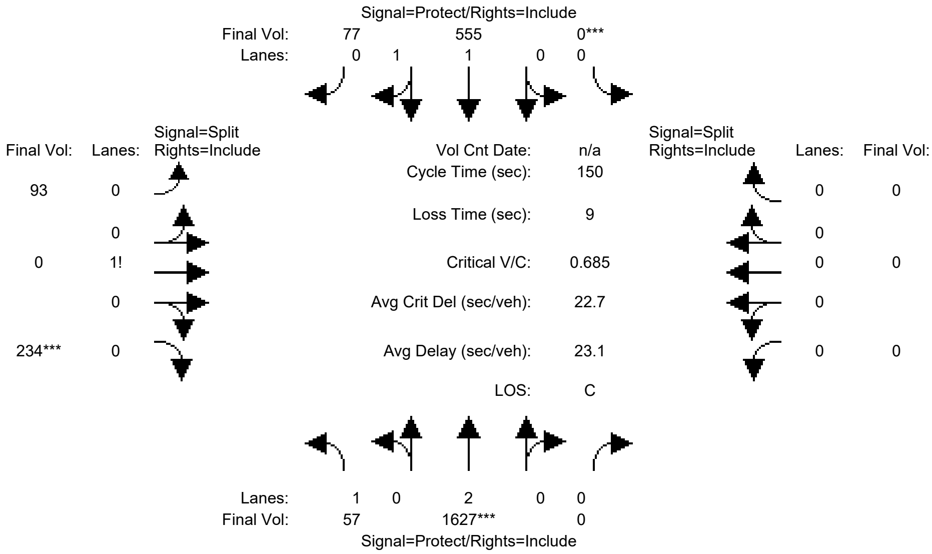

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 146 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 259 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.88 | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.20 | 0.00 | 0.80 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3151 | 398 | 337 | 0 | 1341 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.26 | 0.00 | 0.00 | 0.41 | 0.41 | 0.19 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 16.7 | 101 | 0.0 | 0.0 | 84.3 | 84.3 | 40.0 | 0.0 | 40.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.72 | 0.38 | 0.00 | 0.00 | 0.72 | 0.72 | 0.72 | 0.00 | 0.72 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 64.4 | 10.8 | 0.0 | 0.0 | 24.3 | 24.3 | 50.0 | 0.0 | 50.0 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 12.3 | 0.1 | 0.0 | 0.0 | 1.4 | 1.4 | 5.8 | 0.0 | 5.8 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 76.7 | 10.9 | 0.0 | 0.0 | 25.6 | 25.6 | 55.8 | 0.0 | 55.8 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 76.7 | 10.9 | 0.0 | 0.0 | 25.6 | 25.6 | 55.8 | 0.0 | 55.8 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | E | A | E | A | A | A |
| HCM2kAvgQ: | 8 | 10 | 0 | 0 | 26 | 26 | 15 | 0 | 15 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive



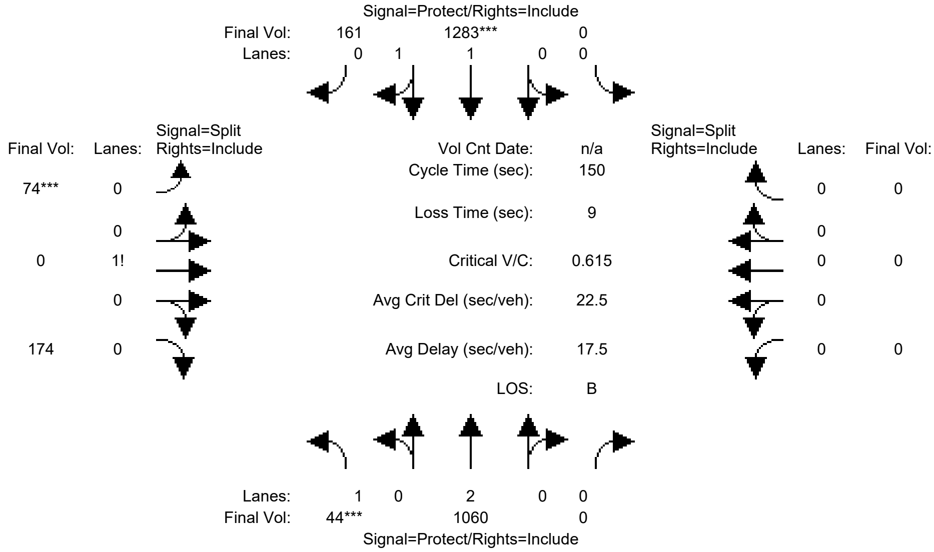

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 57 | 1627 | 0 | 0 | 555 | 77 | 93 | 0 | 234 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.76 | 0.24 | 0.28 | 0.00 | 0.72 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3113 | 432 | 481 | 0 | 1211 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.45 | 0.00 | 0.00 | 0.18 | 0.18 | 0.19 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 20.5 | 98.7 | 0.0 | 0.0 | 78.2 | 78.2 | 42.3 | 0.0 | 42.3 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.23 | 0.69 | 0.00 | 0.00 | 0.34 | 0.34 | 0.69 | 0.00 | 0.69 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 57.7 | 16.0 | 0.0 | 0.0 | 20.9 | 20.9 | 47.9 | 0.0 | 47.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.5 | 0.8 | 0.0 | 0.0 | 0.1 | 0.1 | 4.1 | 0.0 | 4.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 58.2 | 16.8 | 0.0 | 0.0 | 21.0 | 21.0 | 52.0 | 0.0 | 52.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 58.2 | 16.8 | 0.0 | 0.0 | 21.0 | 21.0 | 52.0 | 0.0 | 52.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | D | A | D | A | A | A |
| HCM2kAvgQ: | 2 | 24 | 0 | 0 | 9 | 9 | 14 | 0 | 14 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive



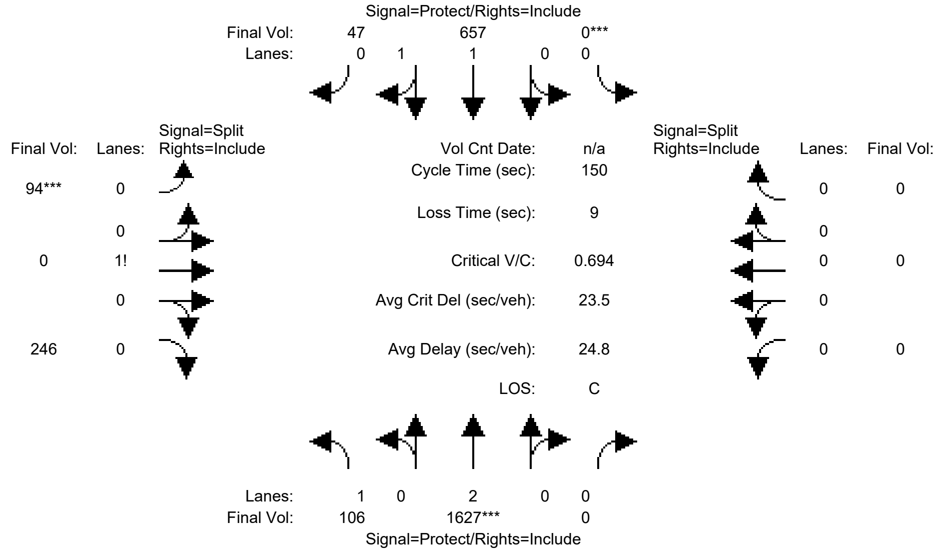

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.30 | 0.00 | 0.70 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3153 | 396 | 505 | 0 | 1188 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.29 | 0.00 | 0.00 | 0.41 | 0.41 | 0.15 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 7.0 | 106 | 0.0 | 0.0 | 98.5 | 98.5 | 35.5 | 0.0 | 35.5 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.52 | 0.42 | 0.00 | 0.00 | 0.62 | 0.62 | 0.62 | 0.00 | 0.62 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 69.9 | 9.3 | 0.0 | 0.0 | 14.9 | 14.9 | 51.2 | 0.0 | 51.2 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 5.8 | 0.1 | 0.0 | 0.0 | 0.5 | 0.5 | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 75.7 | 9.4 | 0.0 | 0.0 | 15.4 | 15.4 | 54.2 | 0.0 | 54.2 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 75.7 | 9.4 | 0.0 | 0.0 | 15.4 | 15.4 | 54.2 | 0.0 | 54.2 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | B | B | D | A | D | A | A | A |
| HCM2kAvgQ: | 3 | 10 | 0 | 0 | 20 | 20 | 11 | 0 | 11 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive




| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 106 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 246 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.87 | 0.13 | 0.28 | 0.00 | 0.72 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3335 | 239 | 467 | 0 | 1223 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.45 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 22.4 | 97.5 | 0.0 | 0.0 | 75.1 | 75.1 | 43.5 | 0.0 | 43.5 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.39 | 0.69 | 0.00 | 0.00 | 0.39 | 0.39 | 0.69 | 0.00 | 0.69 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 57.7 | 16.7 | 0.0 | 0.0 | 23.3 | 23.3 | 47.3 | 0.0 | 47.3 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 1.0 | 0.9 | 0.0 | 0.0 | 0.1 | 0.1 | 4.3 | 0.0 | 4.3 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 58.6 | 17.7 | 0.0 | 0.0 | 23.4 | 23.4 | 51.6 | 0.0 | 51.6 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 58.6 | 17.7 | 0.0 | 0.0 | 23.4 | 23.4 | 51.6 | 0.0 | 51.6 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | D | A | D | A | A | A |
| HCM2kAvgQ: | 5 | 25 | 0 | 0 | 10 | 10 | 15 | 0 | 15 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #45: (43) University/Donohoe

Signal=Protect/Rights=Include
Final Vol: 69 860 19***
Lanes: 1 0 2 0 1

Signal=Split
Rights=Include

Final Vol: 5, Lanes: 1
Lanes: 0
Final Vol: 56, Lanes: 1
Lanes: 0
Final Vol: 451***, Lanes: 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.144
Avg Crit Del (sec/veh): 163.8
Avg Delay (sec/veh): 129.6
LOS: F

Signal=Split
Rights=Include

Lanes: 1, Final Vol: 538
Lanes: 1
Lanes: 0, Final Vol: 553***
Lanes: 1
Lanes: 1, Final Vol: 582

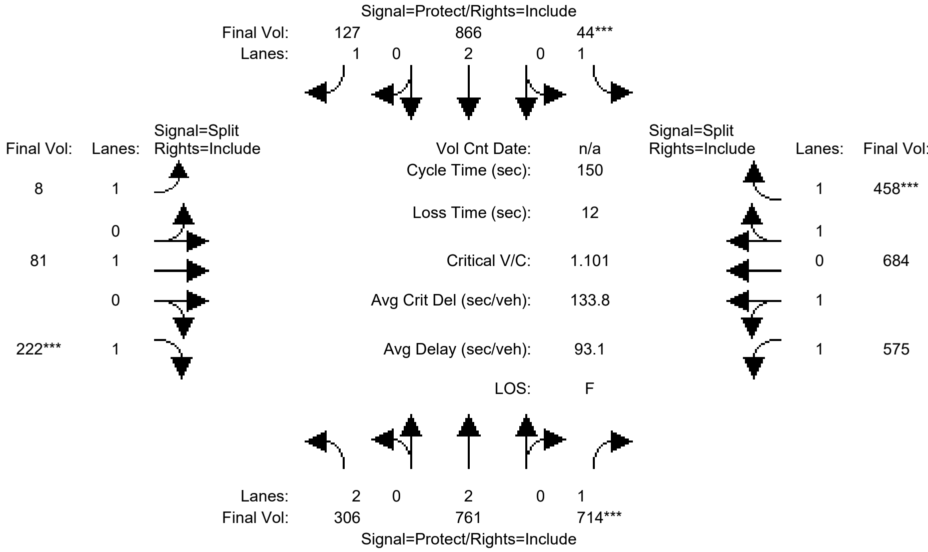
Lanes: 2 0 2 0 1
Final Vol: 211 590 466***
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 211 | 590 | 466 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 553 | 538 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.75 | 0.67 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.39 | 1.32 | 1.29 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2834 | 1268 | 1417 | 1492 | 1268 | 1845 | 1753 | 1706 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.21 | 0.37 | 0.01 | 0.30 | 0.05 | 0.00 | 0.04 | 0.36 | 0.32 | 0.32 | 0.32 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 11.2 | 45.3 | 45.3 | 10.0 | 44.1 | 44.1 | 43.8 | 43.8 | 43.8 | 38.9 | 38.9 | 38.9 |
| Volume/Cap: | 1.03 | 0.69 | 1.22 | 0.20 | 1.03 | 0.18 | 0.01 | 0.13 | 1.22 | 1.22 | 1.22 | 1.22 |
| Uniform Del: | 69.4 | 46.2 | 52.4 | 66.2 | 52.9 | 39.5 | 37.7 | 39.0 | 53.1 | 55.6 | 55.6 | 55.6 |
| IncremntDel: | 71.4 | 2.4 | 119.4 | 1.1 | 39.5 | 0.2 | 0.0 | 0.1 | 120.0 | 104.6 | 105 | 104.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 140.8 | 48.6 | 171.7 | 67.3 | 92.5 | 39.8 | 37.7 | 39.2 | 173.0 | 160.2 | 160 | 160.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 140.8 | 48.6 | 171.7 | 67.3 | 92.5 | 39.8 | 37.7 | 39.2 | 173.0 | 160.2 | 160 | 160.2 |
| LOS by Move: | F | D | F | E | F | D | D | D | F | F | F | F |
| HCM2kAvgQ: | 8 | 13 | 34 | 1 | 27 | 2 | 0 | 2 | 33 | 32 | 32 | 32 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #45: (43) University/Donohoe



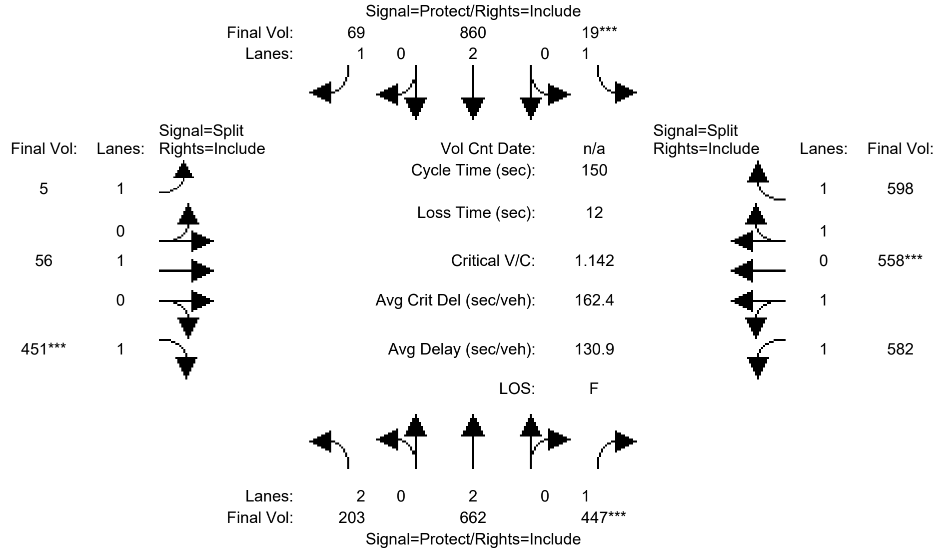

| Approach: | North Bound L | North Bound T | North Bound R | South Bound L | South Bound T | South Bound R | East Bound L | East Bound T | East Bound R | West Bound L | West Bound T | West Bound R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 306 | 761 | 714 | 44 | 866 | 127 | 8 | 81 | 222 | 575 | 684 | 458 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.80 | 0.72 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.34 | 1.59 | 1.07 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 3050 | 1365 | 1525 | 1606 | 1365 | 1930 | 2296 | 1537 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.25 | 0.52 | 0.03 | 0.28 | 0.09 | 0.01 | 0.05 | 0.16 | 0.30 | 0.30 | 0.30 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 20.8 | 68.1 | 68.1 | 10.0 | 57.2 | 57.2 | 21.2 | 21.2 | 21.2 | 38.8 | 38.8 | 38.8 |
| Volume/Cap: | 0.74 | 0.55 | 1.15 | 0.43 | 0.74 | 0.24 | 0.04 | 0.36 | 1.15 | 1.15 | 1.15 | 1.15 |
| Uniform Del: | 62.0 | 29.8 | 41.0 | 67.3 | 40.1 | 31.6 | 55.6 | 58.3 | 64.4 | 55.6 | 55.6 | 55.6 |
| IncremntDel: | 7.2 | 0.5 | 86.3 | 2.9 | 2.6 | 0.2 | 0.1 | 1.0 | 112.1 | 77.0 | 77.0 | 77.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 69.2 | 30.3 | 127.2 | 70.2 | 42.7 | 31.9 | 55.7 | 59.2 | 176.5 | 132.6 | 133 | 132.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 69.2 | 30.3 | 127.2 | 70.2 | 42.7 | 31.9 | 55.7 | 59.2 | 176.5 | 132.6 | 133 | 132.6 |
| LOS by Move: | E | C | F | E | D | C | E | E | F | F | F | F |
| HCM2kAvgQ: | 9 | 13 | 47 | 2 | 19 | 4 | 0 | 4 | 17 | 31 | 31 | 31 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #45: (43) University/Donohoe



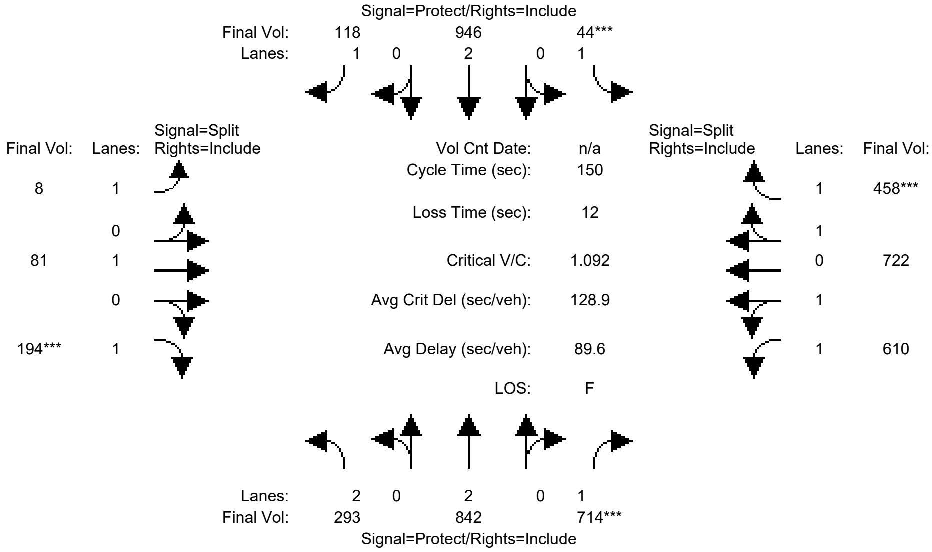

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 203 | 662 | 447 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 558 | 598 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.75 | 0.67 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.34 | 1.28 | 1.38 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2834 | 1268 | 1417 | 1492 | 1268 | 1770 | 1697 | 1819 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.23 | 0.35 | 0.01 | 0.30 | 0.05 | 0.00 | 0.04 | 0.36 | 0.33 | 0.33 | 0.33 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 10.5 | 43.5 | 43.5 | 10.0 | 43.0 | 43.0 | 43.9 | 43.9 | 43.9 | 40.6 | 40.6 | 40.6 |
| Volume/Cap: | 1.06 | 0.81 | 1.22 | 0.20 | 1.06 | 0.19 | 0.01 | 0.13 | 1.22 | 1.22 | 1.22 | 1.22 |
| Uniform Del: | 69.8 | 49.3 | 53.2 | 66.2 | 53.5 | 40.3 | 37.7 | 39.0 | 53.0 | 54.7 | 54.7 | 54.7 |
| IncremntDel: | 81.0 | 5.8 | 119.3 | 1.1 | 47.9 | 0.3 | 0.0 | 0.1 | 119.1 | 103.5 | 104 | 103.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 150.8 | 55.2 | 172.6 | 67.3 | 101 | 40.6 | 37.7 | 39.1 | 172.2 | 158.2 | 158 | 158.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 150.8 | 55.2 | 172.6 | 67.3 | 101 | 40.6 | 37.7 | 39.1 | 172.2 | 158.2 | 158 | 158.2 |
| LOS by Move: | F | E | F | E | F | D | D | D | F | F | F | F |
| HCM2kAvgQ: | 8 | 17 | 33 | 1 | 28 | 2 | 0 | 2 | 33 | 33 | 33 | 33 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #45: (43) University/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 293 | 842 | 714 | 44 | 946 | 118 | 8 | 81 | 194 | 610 | 722 | 458 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.80 | 0.72 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.36 | 1.62 | 1.02 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 3050 | 1365 | 1525 | 1606 | 1365 | 1966 | 2327 | 1476 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.28 | 0.52 | 0.03 | 0.31 | 0.09 | 0.01 | 0.05 | 0.14 | 0.31 | 0.31 | 0.31 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 19.0 | 68.6 | 68.6 | 10.0 | 59.6 | 59.6 | 18.7 | 18.7 | 18.7 | 40.7 | 40.7 | 40.7 |
| Volume/Cap: | 0.78 | 0.60 | 1.14 | 0.43 | 0.78 | 0.22 | 0.04 | 0.41 | 1.14 | 1.14 | 1.14 | 1.14 |
| Uniform Del: | 63.5 | 30.5 | 40.7 | 67.3 | 39.5 | 29.8 | 57.8 | 60.6 | 65.7 | 54.6 | 54.6 | 54.6 |
| IncremntDel: | 10.1 | 0.8 | 82.5 | 2.9 | 3.3 | 0.2 | 0.1 | 1.3 | 112.9 | 72.6 | 72.6 | 72.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 73.5 | 31.2 | 123.1 | 70.2 | 42.8 | 30.0 | 57.9 | 61.9 | 178.5 | 127.3 | 127 | 127.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 73.5 | 31.2 | 123.1 | 70.2 | 42.8 | 30.0 | 57.9 | 61.9 | 178.5 | 127.3 | 127 | 127.3 |
| LOS by Move: | E | C | F | E | D | C | E | E | F | F | F | F |
| HCM2kAvgQ: | 9 | 15 | 46 | 2 | 21 | 4 | 0 | 4 | 15 | 32 | 32 | 32 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include
Final Vol: 39*** 0 0
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include (West approach)
Final Vol: / Lanes:
0*** 0
0
435 2
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.592
Avg Crit Del (sec/veh): 363.3
Avg Delay (sec/veh): 235.7
LOS: F

Signal=Protect Rights=Include (East approach)
Lanes: / Final Vol:
0 36
1
2 827***
0
0 0

Lanes: 2 0 1 0 1
Final Vol: 871 106 679***
Signal=Split/Rights=Include

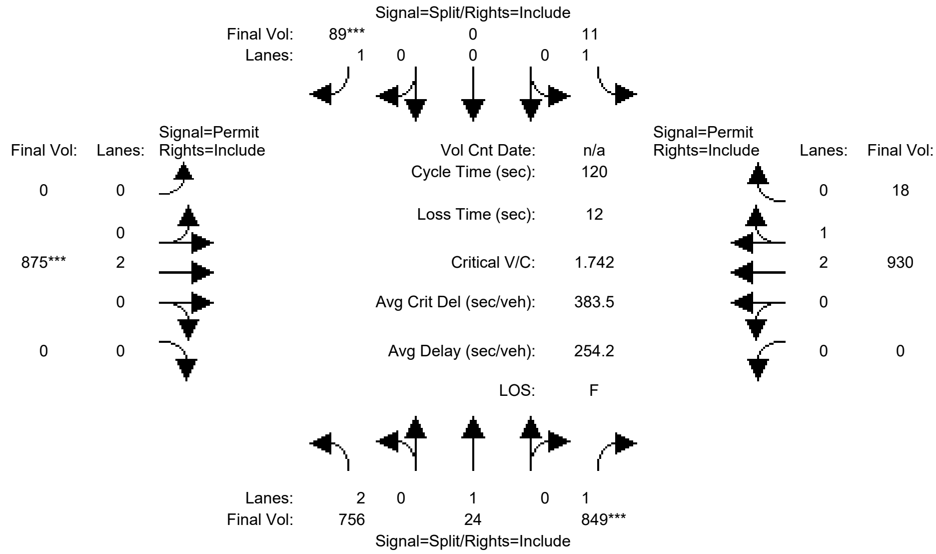
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 871 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.58 | 0.13 | 0.98 | 0.00 | 0.00 | 0.06 | 0.00 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 68.7 | 68.7 | 68.7 | 0.0 | 0.0 | 12.0 | 0.0 | 27.3 | 0.0 | 0.0 | 27.3 | 27.3 |
| Volume/Cap: | 1.02 | 0.23 | 1.72 | 0.00 | 0.00 | 0.57 | 0.00 | 1.24 | 0.00 | 0.00 | 1.72 | 1.72 |
| Uniform Del: | 25.7 | 12.6 | 25.7 | 0.0 | 0.0 | 51.5 | 0.0 | 46.3 | 0.0 | 0.0 | 46.3 | 46.3 |
| IncremntDel: | 35.4 | 0.3 | 334.9 | 0.0 | 0.0 | 10.5 | 0.0 | 130 | 0.0 | 0.0 | 333 | 332.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 61.0 | 12.9 | 360.6 | 0.0 | 0.0 | 62.0 | 0.0 | 176 | 0.0 | 0.0 | 379 | 379.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.0 | 12.9 | 360.6 | 0.0 | 0.0 | 62.0 | 0.0 | 176 | 0.0 | 0.0 | 379 | 379.0 |
| LOS by Move: | E | B | F | A | A | E | A | F | A | A | F | F |
| HCM2kAvgQ: | 23 | 2 | 60 | 0 | 0 | 2 | 0 | 16 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

## Intersection #46: (44) Capitol/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 756 | 24 | 849 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 930 | 18 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.94 | 0.06 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2663 | 52 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.41 | 0.02 | 1.00 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.35 | 0.35 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 68.4 | 68.4 | 68.4 | 8.0 | 0.0 | 8.0 | 0.0 | 31.6 | 0.0 | 0.0 | 31.6 | 31.6 |
| Volume/Cap: | 0.72 | 0.04 | 1.76 | 0.17 | 0.00 | 1.57 | 0.00 | 1.76 | 0.00 | 0.00 | 1.33 | 1.33 |
| Uniform Del: | 18.8 | 11.3 | 25.8 | 52.9 | 0.0 | 56.0 | 0.0 | 44.2 | 0.0 | 0.0 | 44.2 | 44.2 |
| IncremntDel: | 2.5 | 0.0 | 348.5 | 1.3 | 0.0 | 327.4 | 0.0 | 348 | 0.0 | 0.0 | 157 | 157.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 21.3 | 11.4 | 374.2 | 54.2 | 0.0 | 383.4 | 0.0 | 392 | 0.0 | 0.0 | 201 | 201.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 21.3 | 11.4 | 374.2 | 54.2 | 0.0 | 383.4 | 0.0 | 392 | 0.0 | 0.0 | 201 | 201.3 |
| LOS by Move: | C | B | F | D | A | F | A | F | A | A | F | F |
| HCM2kAvgQ: | 12 | 0 | 76 | 1 | 0 | 9 | 0 | 42 | 0 | 0 | 25 | 25 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include
Final Vol: 39*** 0 0
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include (East Bound): Final Vol: 0*** Lanes: 0; Lanes: 0; Final Vol: 435 Lanes: 2; Lanes: 0; Final Vol: 0 Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.750
Avg Crit Del (sec/veh): 440.5
Avg Delay (sec/veh): 288.5
LOS: F

Signal=Protect Rights=Include (West Bound): Lanes: 0 Final Vol: 36; Lanes: 1; Lanes: 2 Final Vol: 827***; Lanes: 0; Lanes: 0 Final Vol: 0

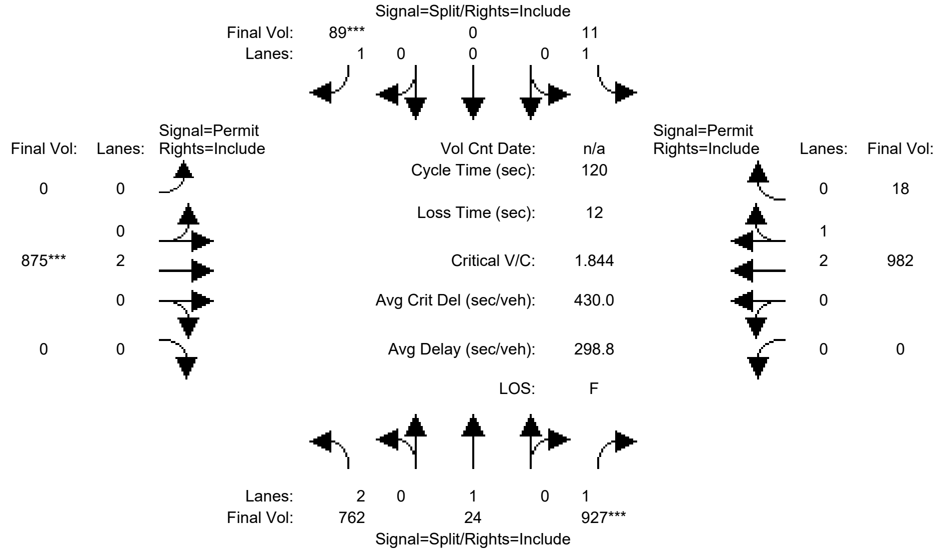
Lanes: 2 0 1 0 1
Final Vol: 959 106 777***
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 959 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.64 | 0.13 | 1.13 | 0.00 | 0.00 | 0.06 | 0.00 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 71.2 | 71.2 | 71.2 | 0.0 | 0.0 | 12.0 | 0.0 | 24.8 | 0.0 | 0.0 | 24.8 | 24.8 |
| Volume/Cap: | 1.08 | 0.22 | 1.90 | 0.00 | 0.00 | 0.57 | 0.00 | 1.37 | 0.00 | 0.00 | 1.90 | 1.90 |
| Uniform Del: | 24.4 | 11.4 | 24.4 | 0.0 | 0.0 | 51.5 | 0.0 | 47.6 | 0.0 | 0.0 | 47.6 | 47.6 |
| IncremntDel: | 54.4 | 0.2 | 413.4 | 0.0 | 0.0 | 10.5 | 0.0 | 184 | 0.0 | 0.0 | 412 | 412.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 78.8 | 11.6 | 437.8 | 0.0 | 0.0 | 62.0 | 0.0 | 232 | 0.0 | 0.0 | 460 | 460.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 78.8 | 11.6 | 437.8 | 0.0 | 0.0 | 62.0 | 0.0 | 232 | 0.0 | 0.0 | 460 | 460.1 |
| LOS by Move: | E | B | F | A | A | E | A | F | A | A | F | F |
| HCM2kAvgQ: | 27 | 2 | 74 | 0 | 0 | 2 | 0 | 18 | 0 | 0 | 31 | 31 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

## Intersection #46: (44) Capitol/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 762 | 24 | 927 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 982 | 18 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.95 | 0.05 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2666 | 49 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.41 | 0.02 | 1.09 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.37 | 0.37 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 70.3 | 70.3 | 70.3 | 8.0 | 0.0 | 8.0 | 0.0 | 29.7 | 0.0 | 0.0 | 29.7 | 29.7 |
| Volume/Cap: | 0.71 | 0.04 | 1.87 | 0.17 | 0.00 | 1.57 | 0.00 | 1.87 | 0.00 | 0.00 | 1.49 | 1.49 |
| Uniform Del: | 17.6 | 10.5 | 24.8 | 52.9 | 0.0 | 56.0 | 0.0 | 45.2 | 0.0 | 0.0 | 45.2 | 45.2 |
| IncremntDel: | 2.2 | 0.0 | 397.4 | 1.3 | 0.0 | 327.4 | 0.0 | 398 | 0.0 | 0.0 | 228 | 227.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 19.8 | 10.6 | 422.2 | 54.2 | 0.0 | 383.4 | 0.0 | 443 | 0.0 | 0.0 | 273 | 272.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 19.8 | 10.6 | 422.2 | 54.2 | 0.0 | 383.4 | 0.0 | 443 | 0.0 | 0.0 | 273 | 272.9 |
| LOS by Move: | B | B | F | D | A | F | A | F | A | A | F | F |
| HCM2kAvgQ: | 11 | 0 | 87 | 1 | 0 | 9 | 0 | 44 | 0 | 0 | 30 | 30 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 372*** 0 218
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (West approach)
Final Vol: 541***, Lanes: 1
Lanes: 0
Final Vol: 647, Lanes: 3
Lanes: 0
Final Vol: 0, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 0.917
Avg Crit Del (sec/veh): 83.4
Avg Delay (sec/veh): 68.2
LOS: E

Signal=Protect Rights=Include (East approach)
Lanes: 0, Final Vol: 59
Lanes: 1
Lanes: 1, Final Vol: 549***
Lanes: 0
Lanes: 0, Final Vol: 1

Lanes: 1 1 0 0 1
Final Vol: 1 1*** 1
Signal=Split/Rights=Include

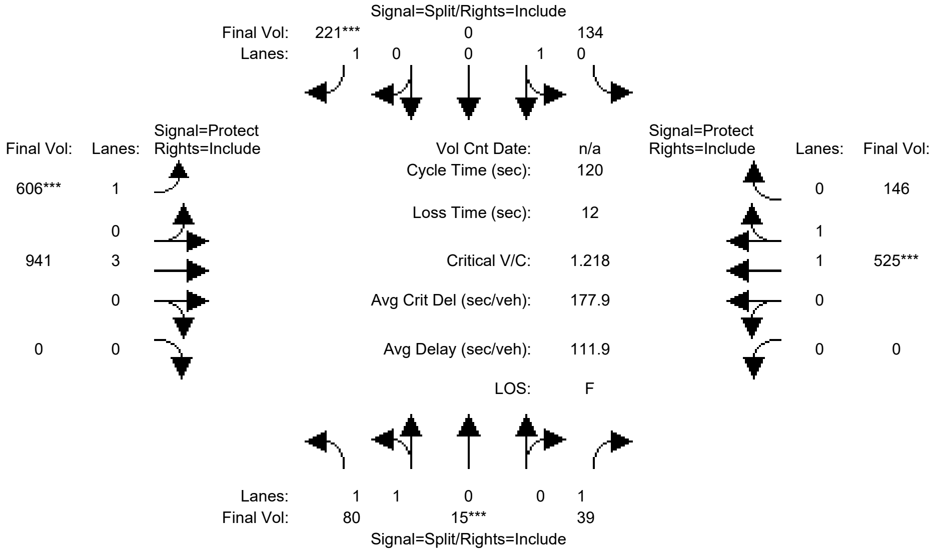
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 647 | 0 | 1 | 549 | 59 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.80 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.01 | 1.80 | 0.19 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 5 | 2725 | 293 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.27 | 0.35 | 0.15 | 0.00 | 0.20 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 32.5 | 0.0 | 32.5 | 42.3 | 28.0 | 0.0 | 38.5 | 24.2 | 24.2 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.52 | 0.00 | 1.00 | 1.00 | 0.63 | 0.00 | 0.63 | 1.00 | 1.00 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 37.2 | 0.0 | 43.7 | 38.8 | 41.3 | 0.0 | 34.7 | 47.9 | 47.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 1.2 | 0.0 | 46.7 | 38.7 | 1.3 | 0.0 | 1.3 | 36.5 | 36.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 38.4 | 0.0 | 90.4 | 77.6 | 42.6 | 0.0 | 36.0 | 84.4 | 84.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 38.4 | 0.0 | 90.4 | 77.6 | 42.6 | 0.0 | 36.0 | 84.4 | 84.4 |
| LOS by Move: | D | D | D | D | A | F | E | D | A | D | F | F |
| HCM2kAvgQ: | 0 | 0 | 0 | 7 | 0 | 19 | 26 | 9 | 0 | 11 | 17 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #47: (45) Cooley/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 134 | 0 | 221 | 606 | 941 | 0 | 0 | 525 | 146 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.56 | 0.44 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1721 | 479 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.12 | 0.00 | 0.22 | 0.53 | 0.29 | 0.00 | 0.00 | 0.31 | 0.31 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 20.4 | 0.0 | 20.4 | 50.0 | 78.6 | 0.0 | 0.0 | 28.6 | 28.6 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.69 | 0.00 | 1.28 | 1.28 | 0.44 | 0.00 | 0.00 | 1.28 | 1.28 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 46.9 | 0.0 | 49.8 | 35.0 | 10.0 | 0.0 | 0.0 | 45.7 | 45.7 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 10.3 | 0.0 | 162.5 | 141.1 | 0.1 | 0.0 | 0.0 | 140 | 139.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 57.2 | 0.0 | 212.3 | 176.1 | 10.2 | 0.0 | 0.0 | 185 | 185.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 57.2 | 0.0 | 212.3 | 176.1 | 10.2 | 0.0 | 0.0 | 185 | 185.4 |
| LOS by Move: | E | E | E | E | A | F | F | B | A | A | F | F |
| HCM2kAvgQ: | 3 | 3 | 2 | 6 | 0 | 16 | 40 | 6 | 0 | 0 | 25 | 25 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 372*** 0 266
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (Eastbound)
Final Vol: 667*** / Lanes: 1
Lanes: 0
Final Vol: 568 / Lanes: 3
Lanes: 0
Final Vol: 0 / Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.008
Avg Crit Del (sec/veh): 112.7
Avg Delay (sec/veh): 89.5
LOS: F

Signal=Protect Rights=Include (Westbound)
Lanes: 0 / Final Vol: 58
Lanes: 1
Lanes: 1 / Final Vol: 549***
Lanes: 0
Lanes: 0 / Final Vol: 1

Lanes: 1 1 0 0 1
Final Vol: 1 1*** 1
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 266 | 0 | 372 | 667 | 568 | 0 | 1 | 549 | 58 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.80 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.01 | 1.80 | 0.19 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 5 | 2732 | 289 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.27 | 0.43 | 0.13 | 0.00 | 0.20 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 29.6 | 0.0 | 29.6 | 47.5 | 27.1 | 0.0 | 42.3 | 21.9 | 21.9 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.70 | 0.00 | 1.10 | 1.10 | 0.57 | 0.00 | 0.57 | 1.10 | 1.10 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 41.2 | 0.0 | 45.2 | 36.3 | 41.3 | 0.0 | 31.5 | 49.0 | 49.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 5.8 | 0.0 | 78.2 | 66.6 | 0.8 | 0.0 | 0.7 | 68.2 | 68.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 47.0 | 0.0 | 123.4 | 102.8 | 42.1 | 0.0 | 32.2 | 117 | 117.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 47.0 | 0.0 | 123.4 | 102.8 | 42.1 | 0.0 | 32.2 | 117 | 117.2 |
| LOS by Move: | D | D | D | D | A | F | F | D | A | C | F | F |
| HCM2kAvgQ: | 0 | 0 | 0 | 10 | 0 | 22 | 36 | 7 | 0 | 10 | 19 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 295*** 0 163
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (East Bound) | Signal=Protect Rights=Include (West Bound)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 678*** | 1 | | Vol Cnt Date: | n/a | 0 | 150 |
| | 0 | | Cycle Time (sec): | 120 | 1 | |
| 941 | 3 | | Loss Time (sec): | 12 | 1 | 503*** |
| | 0 | | Critical V/C: | 1.361 | 0 | |
| 0 | 0 | | Avg Crit Del (sec/veh): | 241.6 | 0 | 0 |
| | | | Avg Delay (sec/veh): | 153.1 | | |
| | | | LOS: | F | | |

Lanes: 1 1 0 0 1
Final Vol: 80 15*** 39
Signal=Split/Rights=Include

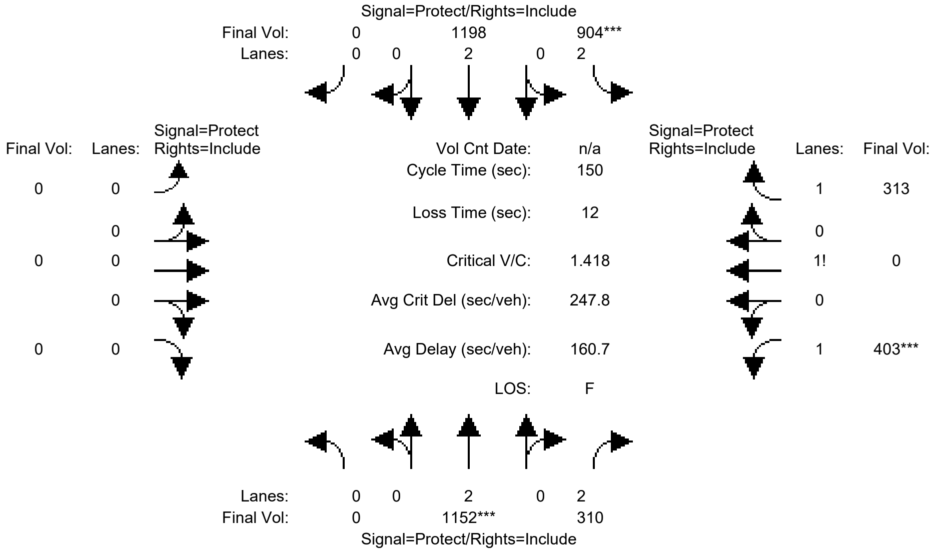
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 163 | 0 | 295 | 678 | 941 | 0 | 0 | 503 | 150 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.54 | 0.46 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1692 | 505 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.14 | 0.00 | 0.29 | 0.60 | 0.29 | 0.00 | 0.00 | 0.30 | 0.30 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 24.3 | 0.0 | 24.3 | 49.9 | 74.7 | 0.0 | 0.0 | 24.9 | 24.9 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.71 | 0.00 | 1.43 | 1.43 | 0.46 | 0.00 | 0.00 | 1.43 | 1.43 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 44.6 | 0.0 | 47.9 | 35.1 | 12.0 | 0.0 | 0.0 | 47.6 | 47.6 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 9.7 | 0.0 | 221.0 | 207.3 | 0.2 | 0.0 | 0.0 | 208 | 207.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 54.3 | 0.0 | 268.9 | 242.4 | 12.2 | 0.0 | 0.0 | 255 | 255.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 54.3 | 0.0 | 268.9 | 242.4 | 12.2 | 0.0 | 0.0 | 255 | 255.3 |
| LOS by Move: | E | E | E | D | A | F | F | B | A | A | F | F |
| HCM2kAvgQ: | 3 | 3 | 2 | 7 | 0 | 24 | 51 | 7 | 0 | 0 | 27 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #48: (46) University/US 101 SB Ramps



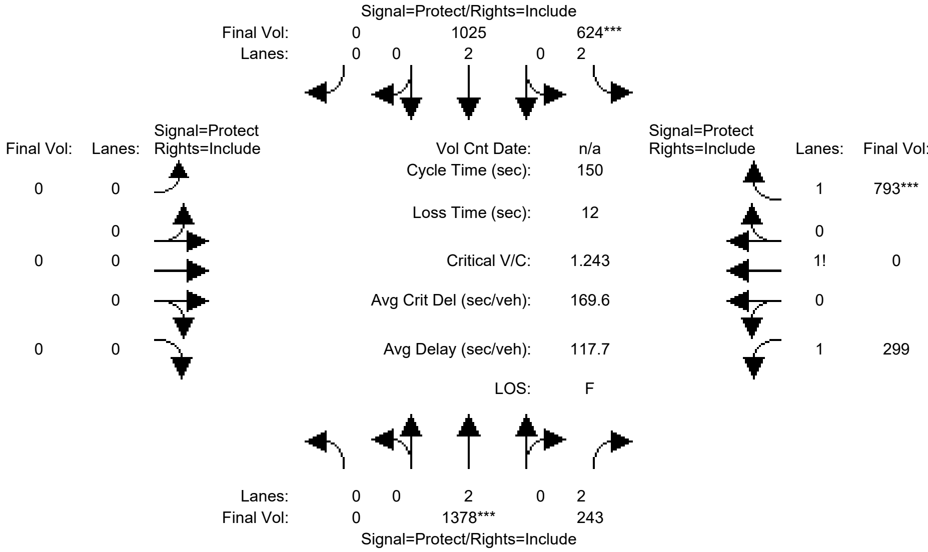

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1152 | 310 | 904 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.56 | 0.00 | 1.44 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1503 | 0 | 1382 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.57 | 0.20 | 0.46 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.27 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 60.6 | 60.6 | 49.0 | 110 | 0.0 | 0.0 | 0.0 | 0.0 | 28.4 | 0.0 | 28.4 |
| Volume/Cap: | 0.00 | 1.42 | 0.48 | 1.42 | 0.82 | 0.00 | 0.00 | 0.00 | 0.00 | 1.42 | 0.00 | 1.20 |
| Uniform Del: | 0.0 | 44.7 | 33.1 | 50.5 | 13.4 | 0.0 | 0.0 | 0.0 | 0.0 | 60.8 | 0.0 | 60.8 |
| IncremntDel: | 0.0 | 195 | 0.6 | 197.2 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 199.5 | 0.0 | 104.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 240 | 33.7 | 247.7 | 17.1 | 0.0 | 0.0 | 0.0 | 0.0 | 260.3 | 0.0 | 165.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 240 | 33.7 | 247.7 | 17.1 | 0.0 | 0.0 | 0.0 | 0.0 | 260.3 | 0.0 | 165.3 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 51 | 6 | 39 | 21 | 0 | 0 | 0 | 0 | 23 | 0 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #48: (46) University/US 101 SB Ramps



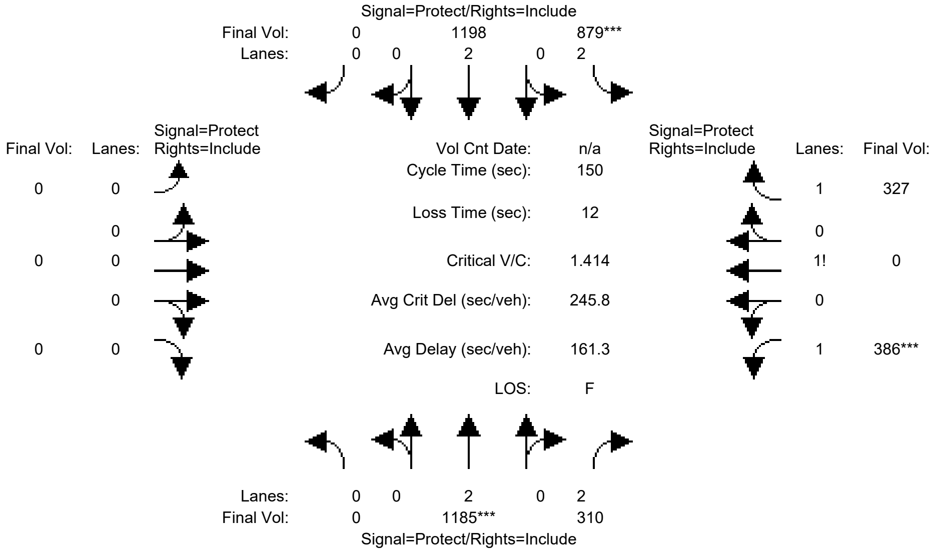

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1378 | 243 | 624 | 1025 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 0.00 | 1.73 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1552 | 0 | 2103 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.52 | 0.12 | 0.24 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 63.1 | 63.1 | 29.4 | 92.5 | 0.0 | 0.0 | 0.0 | 0.0 | 45.5 | 0.0 | 45.5 |
| Volume/Cap: | 0.00 | 1.24 | 0.28 | 1.24 | 0.63 | 0.00 | 0.00 | 0.00 | 0.00 | 0.64 | 0.00 | 1.24 |
| Uniform Del: | 0.0 | 43.5 | 28.5 | 60.3 | 18.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.1 | 0.0 | 52.3 |
| IncremntDel: | 0.0 | 117 | 0.2 | 125.6 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 119.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 161 | 28.7 | 185.8 | 18.8 | 0.0 | 0.0 | 0.0 | 0.0 | 45.9 | 0.0 | 171.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 161 | 28.7 | 185.8 | 18.8 | 0.0 | 0.0 | 0.0 | 0.0 | 45.9 | 0.0 | 171.5 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 52 | 4 | 25 | 16 | 0 | 0 | 0 | 0 | 10 | 0 | 34 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #48: (46) University/US 101 SB Ramps




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 327 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.54 | 0.00 | 1.46 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1479 | 0 | 1400 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.59 | 0.20 | 0.45 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 62.5 | 62.5 | 47.8 | 110 | 0.0 | 0.0 | 0.0 | 0.0 | 27.7 | 0.0 | 27.7 |
| Volume/Cap: | 0.00 | 1.41 | 0.47 | 1.41 | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 1.41 | 0.00 | 1.27 |
| Uniform Del: | 0.0 | 43.7 | 31.7 | 51.1 | 13.0 | 0.0 | 0.0 | 0.0 | 0.0 | 61.2 | 0.0 | 61.2 |
| IncremntDel: | 0.0 | 193 | 0.5 | 195.7 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 197.8 | 0.0 | 133.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 237 | 32.3 | 246.8 | 16.5 | 0.0 | 0.0 | 0.0 | 0.0 | 259.0 | 0.0 | 194.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 237 | 32.3 | 246.8 | 16.5 | 0.0 | 0.0 | 0.0 | 0.0 | 259.0 | 0.0 | 194.5 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 52 | 6 | 38 | 21 | 0 | 0 | 0 | 0 | 22 | 0 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #48: (46) University/US 101 SB Ramps

Signal=Protect/Rights=Include
Final Vol: 0 1081 634***
Lanes: 0 0 2 0 2

Final Vol: Lanes: Signal=Protect Rights=Include
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.259
Avg Crit Del (sec/veh): 176.3
Avg Delay (sec/veh): 121.3
LOS: F

Signal=Protect Rights=Include Lanes: Final Vol:
1 793***
0
1! 0
0
1 299

Lanes: 0 0 2 0 2
Final Vol: 0 1406*** 243
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1406 | 243 | 634 | 1081 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 0.00 | 1.73 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1552 | 0 | 2103 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.53 | 0.12 | 0.25 | 0.41 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 63.6 | 63.6 | 29.5 | 93.1 | 0.0 | 0.0 | 0.0 | 0.0 | 44.9 | 0.0 | 44.9 |
| Volume/Cap: | 0.00 | 1.26 | 0.28 | 1.26 | 0.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.64 | 0.00 | 1.26 |
| Uniform Del: | 0.0 | 43.2 | 28.2 | 60.2 | 18.3 | 0.0 | 0.0 | 0.0 | 0.0 | 45.6 | 0.0 | 52.5 |
| IncremntDel: | 0.0 | 124 | 0.2 | 132.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.0 | 126.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 167 | 28.4 | 192.3 | 19.3 | 0.0 | 0.0 | 0.0 | 0.0 | 46.5 | 0.0 | 178.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 167 | 28.4 | 192.3 | 19.3 | 0.0 | 0.0 | 0.0 | 0.0 | 46.5 | 0.0 | 178.6 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 54 | 4 | 25 | 17 | 0 | 0 | 0 | 0 | 10 | 0 | 35 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 511*** 931 181
Lanes: 1 0 2 0 2

Signal=Split
Rights=Include

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 493*** | 1 | | | | 1 | 316*** |
| | 0 | | | | 0 | |
| 89 | 0 | | | | 0 | 112 |
| | 1 | | | | 1 | |
| 53 | 0 | | | | 0 | 27 |

Signal=Split
Rights=Include

Vol Cnt Date: n/a
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 1.109
Avg Crit Del (sec/veh): 151.1
Avg Delay (sec/veh): 103.1
LOS: F

Lanes: 1 0 1 1 0
Final Vol: 51*** 687 15
Signal=Protect/Rights=Include

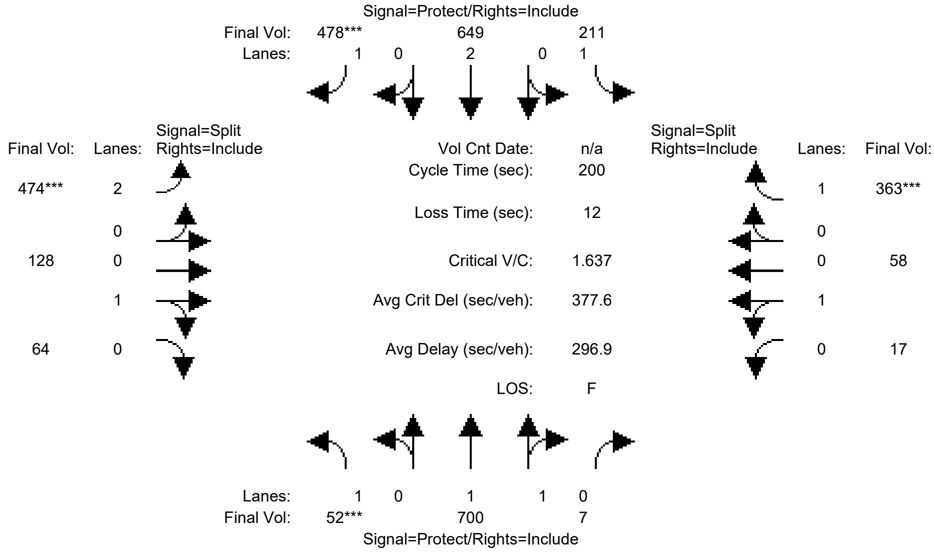
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 51 | 687 | 15 | 181 | 931 | 511 | 493 | 89 | 53 | 27 | 112 | 316 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.72 | 0.74 | 0.66 | 0.74 | 0.74 | 0.74 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 2.00 | 2.00 | 1.00 | 1.00 | 0.63 | 0.37 | 0.19 | 0.81 | 1.00 |
| Final Sat.: | 1408 | 2747 | 60 | 2731 | 2816 | 1260 | 1408 | 877 | 522 | 285 | 1182 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.25 | 0.25 | 0.07 | 0.33 | 0.41 | 0.35 | 0.10 | 0.10 | 0.09 | 0.09 | 0.25 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.0 | 63.2 | 63.2 | 16.7 | 72.9 | 72.9 | 63.0 | 63.0 | 63.0 | 45.1 | 45.1 | 45.1 |
| Volume/Cap: | 1.03 | 0.79 | 0.79 | 0.79 | 0.91 | 1.11 | 1.11 | 0.32 | 0.32 | 0.42 | 0.42 | 1.11 |
| Uniform Del: | 96.5 | 62.4 | 62.4 | 89.9 | 60.3 | 63.5 | 68.5 | 52.3 | 52.3 | 66.3 | 66.3 | 77.4 |
| IncremntDel: | 138.5 | 4.9 | 4.9 | 16.9 | 11.4 | 76.3 | 77.0 | 0.4 | 0.4 | 0.9 | 0.9 | 87.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 235.0 | 67.3 | 67.3 | 106.8 | 71.7 | 139.8 | 145.5 | 52.7 | 52.7 | 67.1 | 67.1 | 164.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 235.0 | 67.3 | 67.3 | 106.8 | 71.7 | 139.8 | 145.5 | 52.7 | 52.7 | 67.1 | 67.1 | 164.5 |
| LOS by Move: | F | E | E | F | E | F | F | D | D | E | E | F |
| HCM2kAvgQ: | 5 | 22 | 22 | 7 | 31 | 40 | 39 | 6 | 6 | 7 | 7 | 26 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #49: (47) University/Woodland




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 52 | 700 | 7 | 211 | 649 | 478 | 474 | 128 | 64 | 17 | 58 | 363 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.67 | 0.33 | 0.23 | 0.77 | 1.00 |
| Final Sat.: | 803 | 1589 | 16 | 803 | 1606 | 719 | 1558 | 535 | 268 | 190 | 647 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.44 | 0.44 | 0.26 | 0.40 | 0.67 | 0.30 | 0.24 | 0.24 | 0.09 | 0.09 | 0.51 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.9 | 55.8 | 55.8 | 33.3 | 81.2 | 81.2 | 37.2 | 37.2 | 37.2 | 61.7 | 61.7 | 61.7 |
| Volume/Cap: | 1.64 | 1.58 | 1.58 | 1.58 | 0.99 | 1.64 | 1.64 | 1.29 | 1.29 | 0.29 | 0.29 | 1.64 |
| Uniform Del: | 96.0 | 72.1 | 72.1 | 83.3 | 59.2 | 59.4 | 81.4 | 81.4 | 81.4 | 52.5 | 52.5 | 69.2 |
| IncremntDel: | 393.1 | 270 | 270.5 | 292.6 | 33.8 | 301.9 | 302.0 | 170 | 170.1 | 0.6 | 0.6 | 306.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 489.1 | 343 | 342.6 | 376.0 | 92.9 | 361.2 | 383.4 | 251 | 251.5 | 53.2 | 53.2 | 375.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 489.1 | 343 | 342.6 | 376.0 | 92.9 | 361.2 | 383.4 | 251 | 251.5 | 53.2 | 53.2 | 375.5 |
| LOS by Move: | F | F | F | F | F | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 7 | 40 | 40 | 24 | 25 | 52 | 28 | 19 | 19 | 4 | 4 | 40 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 512*** 913 198
Lanes: 1 0 2 0 2

Signal=Split
Rights=Include

Final Vol: Lanes:
543*** 1
0
76 0
1
52 0

Vol Cnt Date: n/a
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 1.149
Avg Crit Del (sec/veh): 165.2
Avg Delay (sec/veh): 112.2
LOS: F

Signal=Split
Rights=Include
Lanes: Final Vol:
1 319***
0
0 111
1
0 27

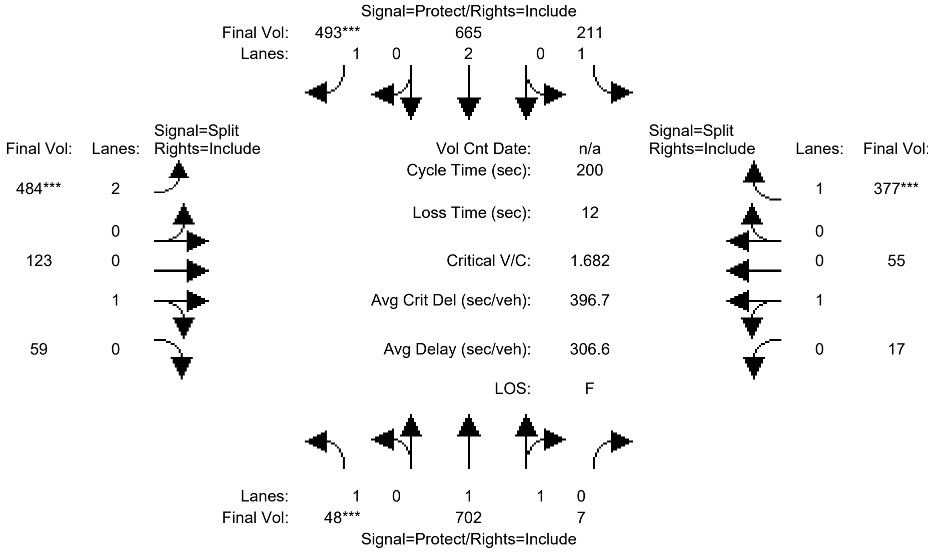
Lanes: 1 0 1 1 0
Final Vol: 49*** 690 15
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 49 | 690 | 15 | 198 | 913 | 512 | 543 | 76 | 52 | 27 | 111 | 319 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.72 | 0.74 | 0.66 | 0.74 | 0.73 | 0.73 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 2.00 | 2.00 | 1.00 | 1.00 | 0.59 | 0.41 | 0.20 | 0.80 | 1.00 |
| Final Sat.: | 1408 | 2748 | 60 | 2731 | 2816 | 1260 | 1408 | 826 | 565 | 287 | 1180 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.25 | 0.25 | 0.07 | 0.32 | 0.41 | 0.39 | 0.09 | 0.09 | 0.09 | 0.09 | 0.25 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.0 | 60.0 | 60.0 | 17.3 | 70.4 | 70.4 | 66.8 | 66.8 | 66.8 | 43.8 | 43.8 | 43.8 |
| Volume/Cap: | 0.99 | 0.84 | 0.84 | 0.84 | 0.92 | 1.16 | 1.16 | 0.28 | 0.28 | 0.43 | 0.43 | 1.16 |
| Uniform Del: | 96.5 | 65.4 | 65.4 | 89.9 | 62.2 | 64.8 | 66.6 | 48.9 | 48.9 | 67.3 | 67.3 | 78.1 |
| IncremntDel: | 126.0 | 7.3 | 7.3 | 22.1 | 13.5 | 92.6 | 91.5 | 0.3 | 0.3 | 0.9 | 0.9 | 102.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 222.5 | 72.7 | 72.7 | 112.0 | 75.7 | 157.4 | 158.1 | 49.2 | 49.2 | 68.2 | 68.2 | 180.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 222.5 | 72.7 | 72.7 | 112.0 | 75.7 | 157.4 | 158.1 | 49.2 | 49.2 | 68.2 | 68.2 | 180.8 |
| LOS by Move: | F | E | E | F | E | F | F | D | D | E | E | F |
| HCM2kAvgQ: | 5 | 23 | 23 | 8 | 31 | 42 | 44 | 6 | 6 | 7 | 7 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #49: (47) University/Woodland



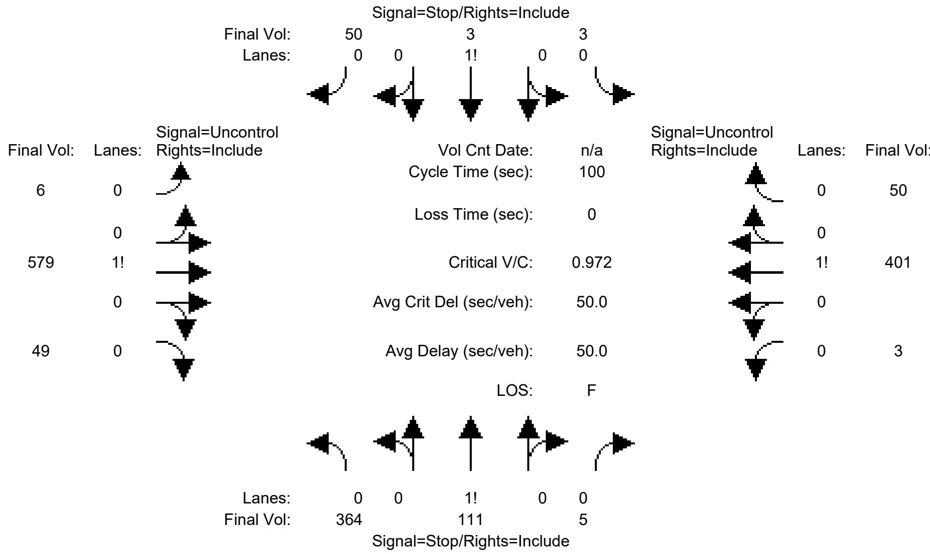

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 48 | 702 | 7 | 211 | 665 | 493 | 484 | 123 | 59 | 17 | 55 | 377 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.68 | 0.32 | 0.24 | 0.76 | 1.00 |
| Final Sat.: | 803 | 1589 | 16 | 803 | 1606 | 719 | 1558 | 543 | 261 | 197 | 638 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.44 | 0.44 | 0.26 | 0.41 | 0.69 | 0.31 | 0.23 | 0.23 | 0.09 | 0.09 | 0.52 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.1 | 55.6 | 55.6 | 33.1 | 81.6 | 81.6 | 36.9 | 36.9 | 36.9 | 62.4 | 62.4 | 62.4 |
| Volume/Cap: | 1.68 | 1.59 | 1.59 | 1.59 | 1.01 | 1.68 | 1.68 | 1.23 | 1.23 | 0.28 | 0.28 | 1.68 |
| Uniform Del: | 96.4 | 72.2 | 72.2 | 83.5 | 59.2 | 59.2 | 81.5 | 81.5 | 81.5 | 51.8 | 51.8 | 68.8 |
| IncremntDel: | 420.4 | 275 | 275.4 | 297.5 | 38.9 | 321.3 | 321.5 | 147 | 147.0 | 0.6 | 0.6 | 325.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 516.8 | 348 | 347.6 | 381.0 | 98.1 | 380.5 | 403.1 | 229 | 228.5 | 52.4 | 52.4 | 394.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 516.8 | 348 | 347.6 | 381.0 | 98.1 | 380.5 | 403.1 | 229 | 228.5 | 52.4 | 52.4 | 394.3 |
| LOS by Move: | F | F | F | F | F | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 7 | 40 | 40 | 24 | 26 | 55 | 29 | 17 | 17 | 3 | 3 | 42 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street




| Street Name: | Saratoga Avenue | | | | | | Newbridge Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |

Volume Module:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Vol: | 364 | 111 | 5 | 3 | 3 | 50 | 6 | 579 | 49 | 3 | 401 | 50 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 364 | 111 | 5 | 3 | 3 | 50 | 6 | 579 | 49 | 3 | 401 | 50 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 364 | 111 | 5 | 3 | 3 | 50 | 6 | 579 | 49 | 3 | 401 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 364 | 111 | 5 | 3 | 3 | 50 | 6 | 579 | 49 | 3 | 401 | 50 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 364 | 111 | 5 | 3 | 3 | 50 | 6 | 579 | 49 | 3 | 401 | 50 |

Critical Gap Module:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Critical Gp: | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | xxxx | xxxxx | 4.1 | xxxx | xxxxx |
| FollowUpTim: | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | xxxx | xxxxx | 2.2 | xxxx | xxxxx |

Capacity Module:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cnflict Vol: | 1074 | 1073 | 604 | 1106 | 1072 | 426 | 451 | xxxx | xxxxx | 628 | xxxx | xxxxx |
| Potent Cap.: | 199 | 222 | 502 | 190 | 222 | 633 | 1120 | xxxx | xxxxx | 964 | xxxx | xxxxx |
| Move Cap.: | 180 | 220 | 502 | 113 | 220 | 633 | 1120 | xxxx | xxxxx | 964 | xxxx | xxxxx |
| Total Cap: | 375 | 396 | xxxxx | 293 | 393 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.97 | 0.28 | 0.01 | 0.01 | 0.01 | 0.08 | 0.01 | xxxx | xxxx | 0.00 | xxxx | xxxx |

Level Of Service Module:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | 0.0 | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 8.2 | xxxx | xxxxx | 8.7 | xxxx | xxxxx |
| LOS by Move: | * | * | * | * | * | * | A | * | * | A | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | 380 | xxxxx | xxxx | 578 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | 21.0 | xxxxx | xxxxx | 0.3 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | 168 | xxxxx | xxxxx | 11.9 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | F | * | * | B | * | * | * | * | * | * | * |
| ApproachDel: | | 167.6 | | | 11.9 | | | xxxxxx | | | xxxxxx | |
| ApproachLOS: | | F | | | B | | | * | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

********************************************************************************

Intersection #52 (52) Saratoga Avenue and Newbridge Street

********************************************************************************

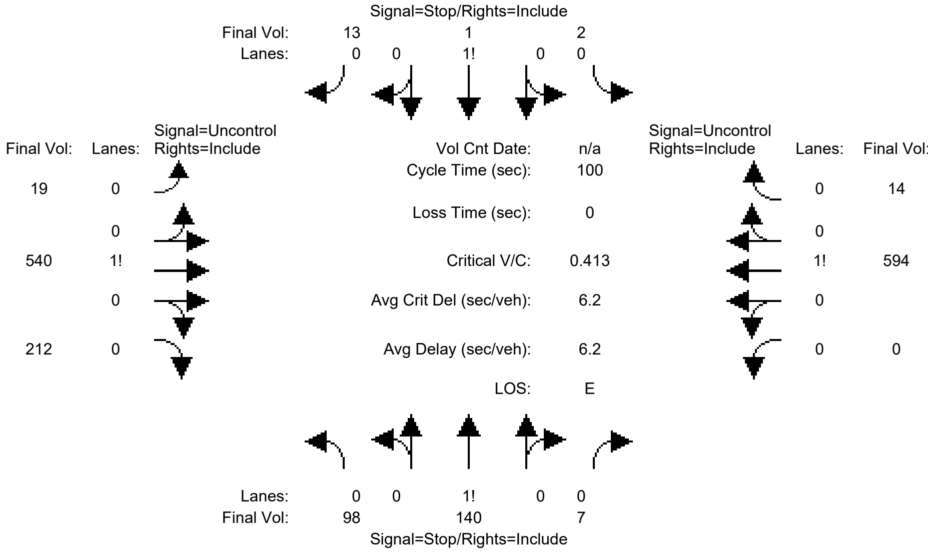
 

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  364  111     5     3    3    50     6  579    49     3  401    50
ApproachDel:     167.6              11.9            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=22.3]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=480]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1624]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=56]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1624]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  364  111     5     3    3    50     6  579    49     3  401    50
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1088
Minor Approach Volume:          480
Minor Approach Volume Threshold: 197
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street




| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Street Name: | Saratoga Avenue | | | | | | Newbridge Street | | | | | |
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 98 | 140 | 7 | 2 | 1 | 13 | 19 | 540 | 212 | 0 | 594 | 14 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 98 | 140 | 7 | 2 | 1 | 13 | 19 | 540 | 212 | 0 | 594 | 14 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 98 | 140 | 7 | 2 | 1 | 13 | 19 | 540 | 212 | 0 | 594 | 14 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 98 | 140 | 7 | 2 | 1 | 13 | 19 | 540 | 212 | 0 | 594 | 14 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 98 | 140 | 7 | 2 | 1 | 13 | 19 | 540 | 212 | 0 | 594 | 14 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| FollowUpTim: | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | 1292 | 1292 | 646 | 1359 | 1391 | 601 | 608 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Potent Cap.: | 141 | 165 | 475 | 127 | 143 | 504 | 980 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Move Cap.: | 135 | 161 | 475 | 32 | 141 | 504 | 980 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Total Cap: | 323 | 339 | xxxxx | 220 | 319 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Volume/Cap: | 0.30 | 0.41 | 0.01 | 0.01 | 0.00 | 0.03 | 0.02 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.1 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 8.7 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | * | * | * | * | * | * | A | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | 335 | xxxxx | xxxx | 421 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | 5.5 | xxxxx | xxxxx | 0.1 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | 40.0 | xxxxx | xxxxx | 13.9 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | E | * | * | B | * | * | * | * | * | * | * |
| ApproachDel: | | 40.0 | | | 13.9 | | | xxxxxx | | | xxxxxx | |
| ApproachLOS: | | E | | | B | | | * | | | * | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

*******************************************************************************

Intersection #52 (52) Saratoga Avenue and Newbridge Street

*******************************************************************************

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98  140    7     2    1    13    19  540   212     0  594    14
ApproachDel:      40.0             13.9            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.7]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=245]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1640]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=16]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1640]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98  140    7     2    1    13    19  540   212     0  594    14
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1379
Minor Approach Volume:          245
Minor Approach Volume Threshold: 134
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

Signal=Stop/Rights=Include
Final Vol: 49 1 2
Lanes: 0 0 1! 0 0

| Final Vol: | Lanes: | Signal=Uncontrol Rights=Include | | | Signal=Uncontrol Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 6 | 0 | | Vol Cnt Date: | n/a | | 0 | 62 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 576 | 1! | | Critical V/C: | 1.033 | | 1! | 361 |
| | 0 | | Avg Crit Del (sec/veh): | 59.8 | | 0 | |
| 49 | 0 | | Avg Delay (sec/veh): | 59.8 | | 0 | 3 |
| | | | LOS: | F | | | |

Lanes: 0 0 1! 0 0
Final Vol: 399 110 5
Signal=Stop/Rights=Include

```
Street Name:          Saratoga Avenue                  Newbridge Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     399  110     5     2    1    49     6  576    49     3  361    62
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  399  110     5     2    1    49     6  576    49     3  361    62
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  399  110     5     2    1    49     6  576    49     3  361    62
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   399  110     5     2    1    49     6  576    49     3  361    62
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  399  110     5     2    1    49     6  576    49     3  361    62
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1036 1042   601  1068 1035   392   423 xxxx xxxxx   625 xxxx xxxxx
Potent Cap.:  212  232   504   201  234   661  1147 xxxx xxxxx   966 xxxx xxxxx
Move Cap.:    194  230   504   124  232   661  1147 xxxx xxxxx   966 xxxx xxxxx
Total Cap:    386  403 xxxxx   299  400 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  1.03 0.27  0.01  0.01 0.00  0.07  0.01 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.2 xxxx xxxxx   8.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx  391 xxxxx  xxxx  624 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx 23.6 xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  188 xxxxx xxxxx 11.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F     *     *    B     *     *    *     *     *    *     *
ApproachDel:       187.6             11.3            xxxxxx            xxxxxx
ApproachLOS:         F                 B                *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  399  110     5     2    1    49     6  576    49     3  361    62
ApproachDel:     187.6              11.3           xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=26.8]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=514]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1623]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=52]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1623]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  399  110     5     2    1    49     6  576    49     3  361    62
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1057
Minor Approach Volume:           514
Minor Approach Volume Threshold: 205
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

```
                        Signal=Stop/Rights=Include
            Final Vol:  13          0          2
                Lanes:   0    0     1!     0   0

                 Signal=Uncontrol                          Signal=Uncontrol
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:   n/a     Rights=Include   Lanes:  Final Vol:
                                     Cycle Time (sec):  100
   19        0                                                                    0        20
                                      Loss Time (sec):   0
             0                                                                    0
  548        1!                          Critical V/C:  0.293                     1!      531
             0                      Avg Crit Del (sec/veh):  4.0                  0
  196        0                         Avg Delay (sec/veh):  4.0                  0        0
                                                    LOS:  D

                Lanes:   0    0     1!     0   0
            Final Vol:  99          95         7
                        Signal=Stop/Rights=Include
```

```
Street Name:         Saratoga Avenue                 Newbridge Street
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      99   95     7     2    0    13    19  548   196     0  531    20
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   99   95     7     2    0    13    19  548   196     0  531    20
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   99   95     7     2    0    13    19  548   196     0  531    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    99   95     7     2    0    13    19  548   196     0  531    20
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   99   95     7     2    0    13    19  548   196     0  531    20
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1232 1235   646  1276 1323   541   551 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  156  178   475   145  158   545  1029 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    150  175   475    80  155   545  1029 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    338  351 xxxxx   265  331 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.29 0.27  0.01  0.01 0.00  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx  348 xxxxx  xxxx  478 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  3.5 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 28.6 xxxxx xxxxx 12.8 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    D     *     *    B     *     *    *     *     *    *     *
ApproachDel:      28.6             12.8              xxxxxx            xxxxxx
ApproachLOS:         D                B                   *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   99   95     7     2    0    13    19  548   196     0  531    20
ApproachDel:      28.6             12.8            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=201]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1530]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1530]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   99   95     7     2    0    13    19  548   196     0  531    20
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1314
Minor Approach Volume:           201
Minor Approach Volume Threshold: 147
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative AM

Intersection #300: (37) University Ave & Adams Dr

Signal=Uncontrol/Rights=Include
Final Vol: 200 1559 1
Lanes: 0 1 1 0 0

| Final Vol: | Lanes: | Signal=Stop Rights=Include | | | Signal=Stop Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 16 | 0 | | Vol Cnt Date: | n/a | | 0 | 0 |
| | | | Cycle Time (sec): | 100 | | | |
| | 0 | | Loss Time (sec): | 0 | | 0 | |
| 0 | 1! | | Critical V/C: | 0.519 | | 0 | 0 |
| | 0 | | Avg Crit Del (sec/veh): | 2.0 | | 0 | |
| 4 | 0 | | Avg Delay (sec/veh): | 2.0 | | 0 | 0 |
| | | | LOS: | F | | | |

Lanes: 1 0 2 0 0
Final Vol: 90 746 0
Signal=Uncontrol/Rights=Include

```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       90  746     0      1 1559   200    16    0     4     0    0     0
Growth Adj:   1.00 1.00  1.00   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    90  746     0      1 1559   200    16    0     4     0    0     0
Added Vol:       0    0     0      0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0      0    0     0     0    0     0     0    0     0
Initial Fut:    90  746     0      1 1559   200    16    0     4     0    0     0
User Adj:     1.00 1.00  1.00   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     90  746     0      1 1559   200    16    0     4     0    0     0
Reduct Vol:      0    0     0      0    0     0     0    0     0     0    0     0
FinalVolume:    90  746     0      1 1559   200    16    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx    4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx    2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1759 xxxx xxxxx    746 xxxx xxxxx  2214 2587   880  xxxx xxxx xxxxx
Potent Cap.:  360 xxxx xxxxx    871 xxxx xxxxx    38   26   294  xxxx xxxx xxxxx
Move Cap.:    360 xxxx xxxxx    871 xxxx xxxxx    31   19   294  xxxx xxxx xxxxx
Volume/Cap:  0.25 xxxx  xxxx   0.00 xxxx  xxxx  0.52 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     1.0 xxxx xxxxx    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  18.3 xxxx xxxxx    9.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     C    *     *      A    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   38 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx  1.9 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx    9.1 xxxx xxxxx xxxxx  180 xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *      A    *     *     *    F     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            180.0           xxxxxx
ApproachLOS:         *                *                F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  746     0     1 1559   200    16    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx            180.0           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=20]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2616]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  746     0     1 1559   200    16    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2596
Minor Approach Volume:           20
Minor Approach Volume Threshold: -44 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative PM

Intersection #300: (37) University Ave & Adams Dr

Signal=Uncontrol/Rights=Include
Final Vol: 31 374 0
Lanes: 0 1 1 0 0

Signal=Stop Rights=Include
Final Vol: 229, 0, 44
Lanes: 0, 0, 1!, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 1.490
Avg Crit Del (sec/veh): 35.0
Avg Delay (sec/veh): 35.0
LOS: F

Signal=Stop Rights=Include
Lanes: 0, 0, 0, 0, 0
Final Vol: 0, 0, 0

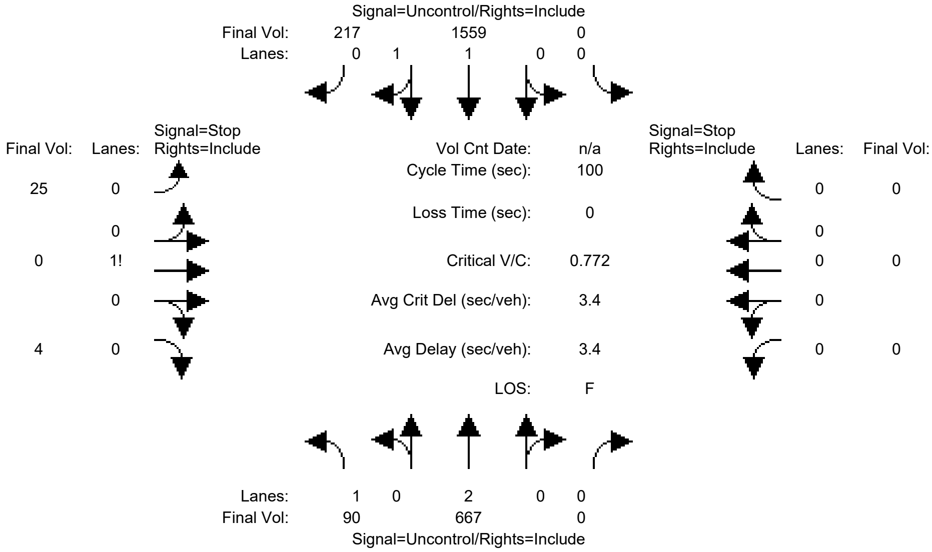
Lanes: 1 0 2 0 0
Final Vol: 7 1802 0
Signal=Uncontrol/Rights=Include

```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       7 1802     0     0  374    31   229    0    44     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    7 1802     0     0  374    31   229    0    44     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    7 1802     0     0  374    31   229    0    44     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     7 1802     0     0  374    31   229    0    44     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    7 1802     0     0  374    31   229    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  405 xxxx xxxxx  xxxx xxxx xxxxx  1305 2206   203  xxxx xxxx xxxxx
Potent Cap.: 1165 xxxx xxxxx  xxxx xxxx xxxxx   154   45   811  xxxx xxxx xxxxx
Move Cap.:   1165 xxxx xxxxx  xxxx xxxx xxxxx   154   45   811  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  1.49 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  177 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 17.8 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  318 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            318.3            xxxxxx
ApproachLOS:        *                *                F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    31   229    0    44     0    0     0
ApproachDel:    xxxxxx           xxxxxx           318.3            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=24.1]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=273]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2487]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    31   229    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            2214
Minor Approach Volume:          273
Minor Approach Volume Threshold: 11 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project AM

Intersection #300: (37) University Ave & Adams Dr




```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      90  667     0      0 1559   217    25    0     4     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   90  667     0      0 1559   217    25    0     4     0    0     0
Added Vol:      0    0     0      0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0      0    0     0     0    0     0     0    0     0
Initial Fut:   90  667     0      0 1559   217    25    0     4     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    90  667     0      0 1559   217    25    0     4     0    0     0
Reduct Vol:     0    0     0      0    0     0     0    0     0     0    0     0
FinalVolume:   90  667     0      0 1559   217    25    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1776 xxxx xxxxx  xxxx xxxx xxxxx  2181 2515   888  xxxx xxxx xxxxx
Potent Cap.:  355 xxxx xxxxx  xxxx xxxx xxxxx    40   29   291  xxxx xxxx xxxxx
Move Cap.:    355 xxxx xxxxx  xxxx xxxx xxxxx    32   21   291  xxxx xxxx xxxxx
Volume/Cap:  0.25 xxxx  xxxx  xxxx xxxx  xxxx  0.77 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    1.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del: 18.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    C    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   37 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.8 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  246 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            246.1            xxxxxx
ApproachLOS:          *                *                F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

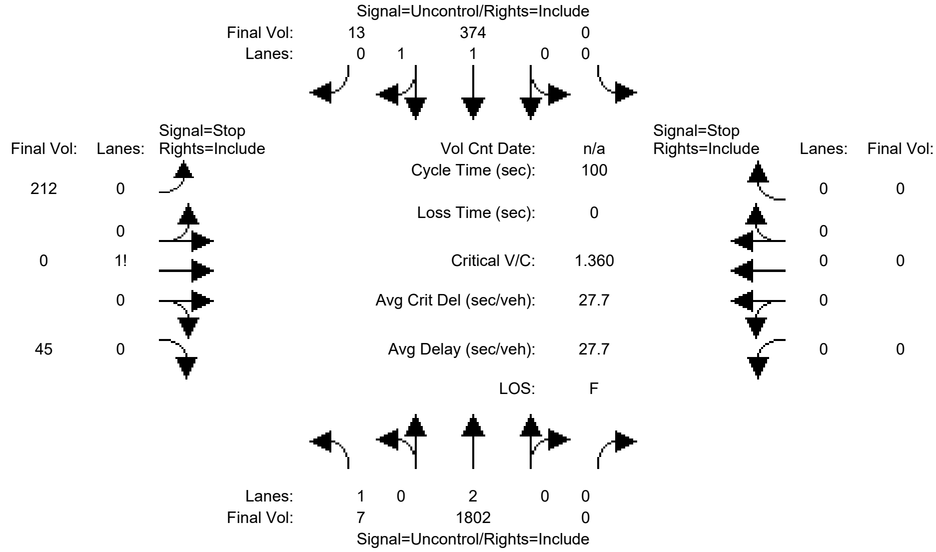
 

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   217    25    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx             246.1            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=29]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2562]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   217    25    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2533
Minor Approach Volume:           29
Minor Approach Volume Threshold: -35 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Project PM

Intersection #300: (37) University Ave & Adams Dr




```
Street Name:          University Ave                      Adams Dr
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       7 1802     0     0  374    13   212     0    45     0     0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    7 1802     0     0  374    13   212     0    45     0     0     0
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:    7 1802     0     0  374    13   212     0    45     0     0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     7 1802     0     0  374    13   212     0    45     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:    7 1802     0     0  374    13   212     0    45     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  387 xxxx xxxxx  xxxx xxxx xxxxx  1296 2197   194  xxxx xxxx xxxxx
Potent Cap.: 1183 xxxx xxxxx  xxxx xxxx xxxxx   157   46   822  xxxx xxxx xxxxx
Move Cap.:   1183 xxxx xxxxx  xxxx xxxx xxxxx   156   45   822  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  1.36 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  182 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 15.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  264 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            264.3            xxxxxx
ApproachLOS:          *                *                F                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802    0     0  374    13   212    0    45     0    0     0
ApproachDel:    xxxxxx          xxxxxx            264.3           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=18.9]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=257]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2453]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802    0     0  374    13   212    0    45     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2196
Minor Approach Volume:           257
Minor Approach Volume Threshold: 14 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)

Signal=Protect/Rights=Include
Final Vol: 0 1430 402***
Lanes: 0 0 2 0 1

Signal=Protect
Rights=Include

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 0 | 0 | Vol Cnt Date: | n/a | | 0 | 156 |
| | | Cycle Time (sec): | 150 | | | |
| | 0 | Loss Time (sec): | 9 | | 0 | |
| 0 | 0 | Critical V/C: | 0.608 | | 1! | 0 |
| | 0 | Avg Crit Del (sec/veh): | 42.8 | | 0 | |
| 0 | 0 | Avg Delay (sec/veh): | 25.9 | | 0 | 64*** |
| | | LOS: | C | | | |

Signal=Protect
Rights=Include

Lanes: 0 0 1 1 0
Final Vol: 0 614*** 151
Signal=Protect/Rights=Include

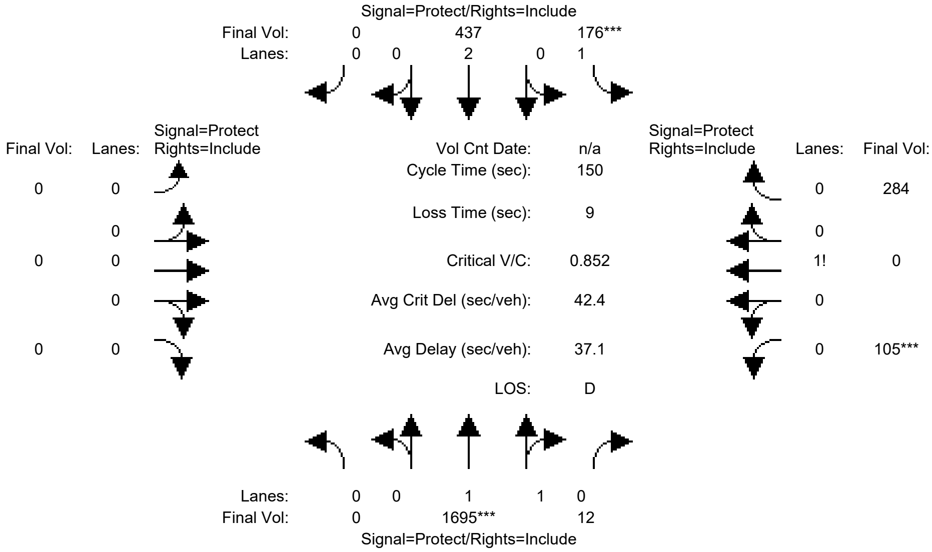
| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.61 | 0.39 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.71 |
| Final Sat.: | 0 | 2811 | 691 | 1805 | 3610 | 0 | 0 | 0 | 0 | 493 | 0 | 1201 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.22 | 0.22 | 0.22 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.13 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 53.9 | 53.9 | 55.0 | 109 | 0.0 | 0.0 | 0.0 | 0.0 | 32.1 | 0.0 | 32.1 |
| Volume/Cap: | 0.00 | 0.61 | 0.61 | 0.61 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.61 | 0.00 | 0.61 |
| Uniform Del: | 0.0 | 39.4 | 39.4 | 38.7 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 53.3 | 0.0 | 53.3 |
| IncremntDel: | 0.0 | 0.9 | 0.9 | 1.6 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 40.2 | 40.2 | 40.3 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 56.2 | 0.0 | 56.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 40.2 | 40.2 | 40.3 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 56.2 | 0.0 | 56.2 |
| LOS by Move: | A | D | D | D | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



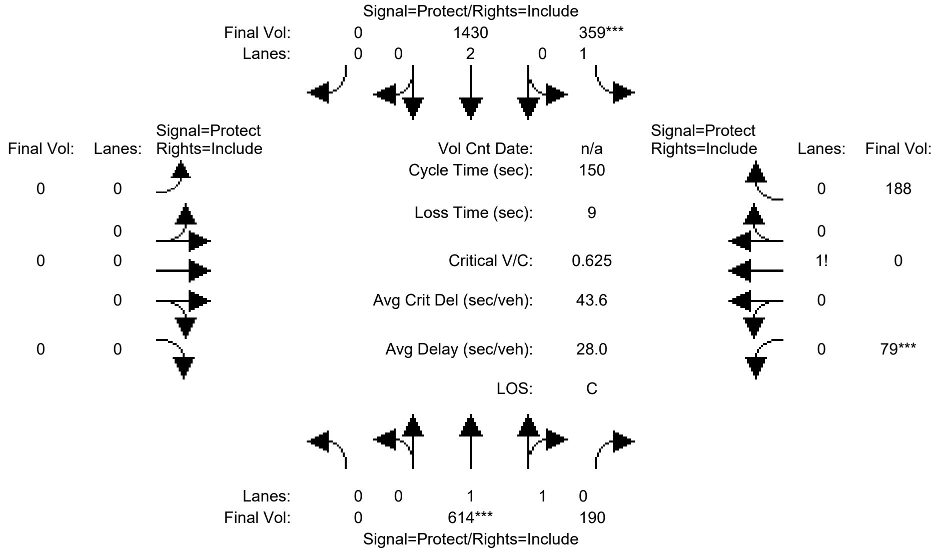

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1695 | 12 | 176 | 437 | 0 | 0 | 0 | 0 | 105 | 0 | 284 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.99 | 0.01 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.27 | 0.00 | 0.73 |
| Final Sat.: | 0 | 3581 | 25 | 1805 | 3610 | 0 | 0 | 0 | 0 | 456 | 0 | 1234 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.47 | 0.47 | 0.10 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 83.3 | 83.3 | 17.2 | 100 | 0.0 | 0.0 | 0.0 | 0.0 | 40.5 | 0.0 | 40.5 |
| Volume/Cap: | 0.00 | 0.85 | 0.85 | 0.85 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.85 |
| Uniform Del: | 0.0 | 28.1 | 28.1 | 65.2 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 51.9 | 0.0 | 51.9 |
| IncremntDel: | 0.0 | 3.7 | 3.7 | 27.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 14.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 31.9 | 31.9 | 92.4 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 66.2 | 0.0 | 66.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 31.9 | 31.9 | 92.4 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 66.2 | 0.0 | 66.2 |
| LOS by Move: | A | C | C | F | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 36 | 36 | 10 | 4 | 0 | 0 | 0 | 0 | 19 | 0 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



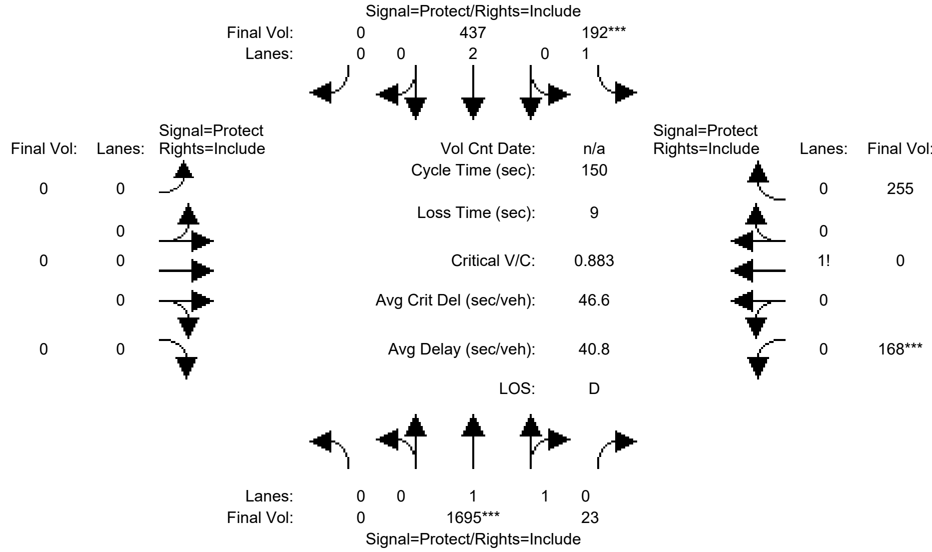

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.53 | 0.47 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.70 |
| Final Sat.: | 0 | 2660 | 823 | 1805 | 3610 | 0 | 0 | 0 | 0 | 501 | 0 | 1193 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.23 | 0.23 | 0.20 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.16 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 55.4 | 55.4 | 47.7 | 103 | 0.0 | 0.0 | 0.0 | 0.0 | 37.8 | 0.0 | 37.8 |
| Volume/Cap: | 0.00 | 0.62 | 0.62 | 0.62 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 | 0.00 | 0.62 |
| Uniform Del: | 0.0 | 38.8 | 38.8 | 43.5 | 12.1 | 0.0 | 0.0 | 0.0 | 0.0 | 49.8 | 0.0 | 49.8 |
| IncremntDel: | 0.0 | 1.0 | 1.0 | 2.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 0.0 | 2.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 39.7 | 39.7 | 45.7 | 12.4 | 0.0 | 0.0 | 0.0 | 0.0 | 52.7 | 0.0 | 52.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 39.7 | 39.7 | 45.7 | 12.4 | 0.0 | 0.0 | 0.0 | 0.0 | 52.7 | 0.0 | 52.7 |
| LOS by Move: | A | D | D | D | B | A | A | A | A | D | A | D |
| HCM2kAvgQ: | 0 | 16 | 16 | 14 | 18 | 0 | 0 | 0 | 0 | 11 | 0 | 11 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Project PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)



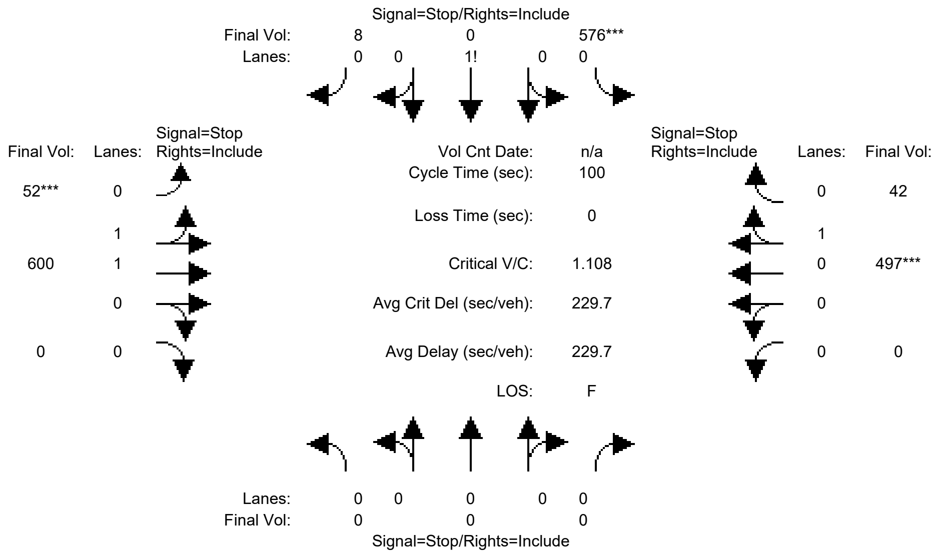

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1695 | 23 | 192 | 437 | 0 | 0 | 0 | 0 | 168 | 0 | 255 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.97 | 0.03 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 0.60 |
| Final Sat.: | 0 | 3555 | 48 | 1805 | 3610 | 0 | 0 | 0 | 0 | 680 | 0 | 1033 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.48 | 0.48 | 0.11 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.00 | 0.25 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 81.0 | 81.0 | 18.1 | 99.1 | 0.0 | 0.0 | 0.0 | 0.0 | 41.9 | 0.0 | 41.9 |
| Volume/Cap: | 0.00 | 0.88 | 0.88 | 0.88 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.88 |
| Uniform Del: | 0.0 | 30.3 | 30.3 | 64.9 | 9.8 | 0.0 | 0.0 | 0.0 | 0.0 | 51.7 | 0.0 | 51.7 |
| IncremntDel: | 0.0 | 5.2 | 5.2 | 31.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 | 0.0 | 17.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 35.5 | 35.5 | 96.7 | 9.9 | 0.0 | 0.0 | 0.0 | 0.0 | 69.0 | 0.0 | 69.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 35.5 | 35.5 | 96.7 | 9.9 | 0.0 | 0.0 | 0.0 | 0.0 | 69.0 | 0.0 | 69.0 |
| LOS by Move: | A | D | D | F | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 39 | 39 | 11 | 4 | 0 | 0 | 0 | 0 | 21 | 0 | 21 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 576 | 0 | 8 | 52 | 600 | 0 | 0 | 497 | 42 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.01 | 0.16 | 1.84 | 0.00 | 0.00 | 0.92 | 0.08 |
| Final Sat.: | 0 | 0 | 0 | 520 | 0 | 7 | 76 | 886 | 0 | 0 | 489 | 41 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 1.11 | xxxx | 1.11 | 0.68 | 0.68 | xxxx | xxxx | 1.02 | 1.02 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 97.4 | 0.0 | 97.4 | 24.8 | 24.5 | 0.0 | 0.0 | 69.3 | 69.3 |
| Delay Adj: | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 360.4 | 0.0 | 360.4 | 91.8 | 90.6 | 0.0 | 0.0 | 256 | 256.4 |
| LOS by Move: | * | * | * | F | * | F | F | F | * | * | F | F |
| ApproachDel: | xxxxxx | | | 97.4 | | | 24.5 | | | 69.3 | | |
| Delay Adj: | xxxxx | | | 3.70 | | | 3.70 | | | 3.70 | | |
| ApprAdjDel: | xxxxxx | | | 360.4 | | | 90.7 | | | 256.4 | | |
| LOS by Appr: | * | | | F | | | F | | | F | | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 12.8 | 12.8 | 12.8 | 1.9 | 1.9 | 0.0 | 8.8 | 8.8 | 8.8 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

********************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

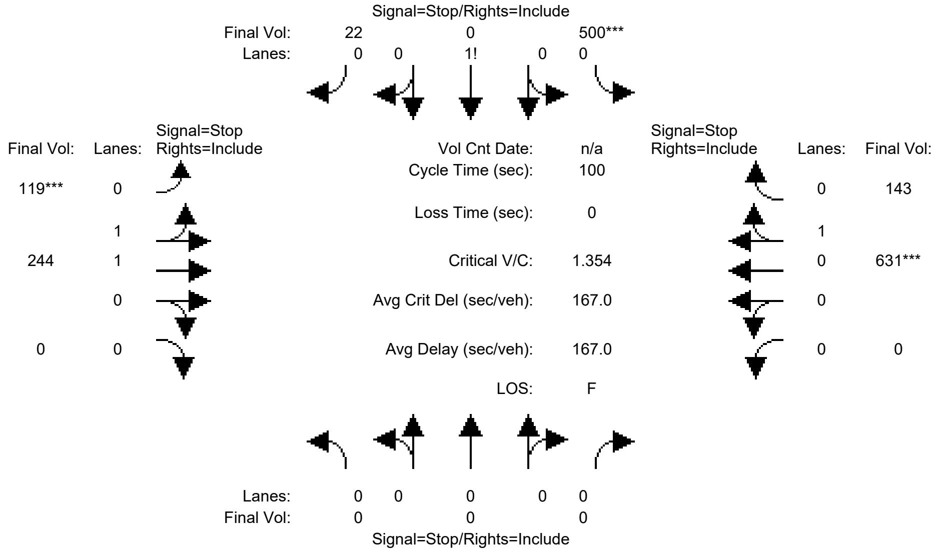
********************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   576    0     8    52  600     0     0  497    42
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1191
Minor Approach Volume:           584
Minor Approach Volume Threshold: 225
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 500 | 0 | 22 | 119 | 244 | 0 | 0 | 631 | 143 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 | 0.04 | 0.66 | 1.34 | 0.00 | 0.00 | 0.82 | 0.18 |
| Final Sat.: | 0 | 0 | 0 | 529 | 0 | 23 | 304 | 643 | 0 | 0 | 466 | 106 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 0.95 | xxxx | 0.95 | 0.39 | 0.38 | xxxx | xxxx | 1.35 | 1.35 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 51.0 | 0.0 | 51.0 | 15.0 | 14.4 | 0.0 | 0.0 | 190 | 189.7 |
| Delay Adj: | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 79.0 | 0.0 | 79.0 | 23.3 | 22.3 | 0.0 | 0.0 | 294 | 294.1 |
| LOS by Move: | * | * | * | F | * | F | C | C | * | * | F | F |
| ApproachDel: | | xxxxxx | | | 51.0 | | | 14.6 | | | 189.7 | |
| Delay Adj: | | xxxxx | | | 1.55 | | | 1.55 | | | 1.55 | |
| ApprAdjDel: | | xxxxxx | | | 79.0 | | | 22.7 | | | 294.1 | |
| LOS by Appr: | | * | | | F | | | C | | | F | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 6.4 | 6.4 | 6.4 | 0.6 | 0.6 | 0.0 | 28.7 | 28.7 | 28.7 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

********************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

********************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   500    0    22   119  244     0     0  631   143
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1137
Minor Approach Volume:           522
Minor Approach Volume Threshold: 241
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #5: (53) East Bayshore Road and Euclid AVenue

```
                          Signal=Stop/Rights=Include
          Final Vol:      6         0         608***
              Lanes:      0    0    1!    0   0

             Signal=Stop                          Signal=Stop
Final Vol: Lanes: Rights=Include  Vol Cnt Date:  n/a  Rights=Include  Lanes:  Final Vol:
                               Cycle Time (sec): 100
 85***      0                                                          0       43
                               Loss Time (sec):    0
            1                                                          1
 600        1                  Critical V/C:    1.170                  0       515***
            0                  Avg Crit Del (sec/veh): 272.1           0
  0         0                  Avg Delay (sec/veh):    272.1           0       0
                               LOS:                F

              Lanes:      0    0    0     0   0
          Final Vol:      0         0         0
                          Signal=Stop/Rights=Include
```

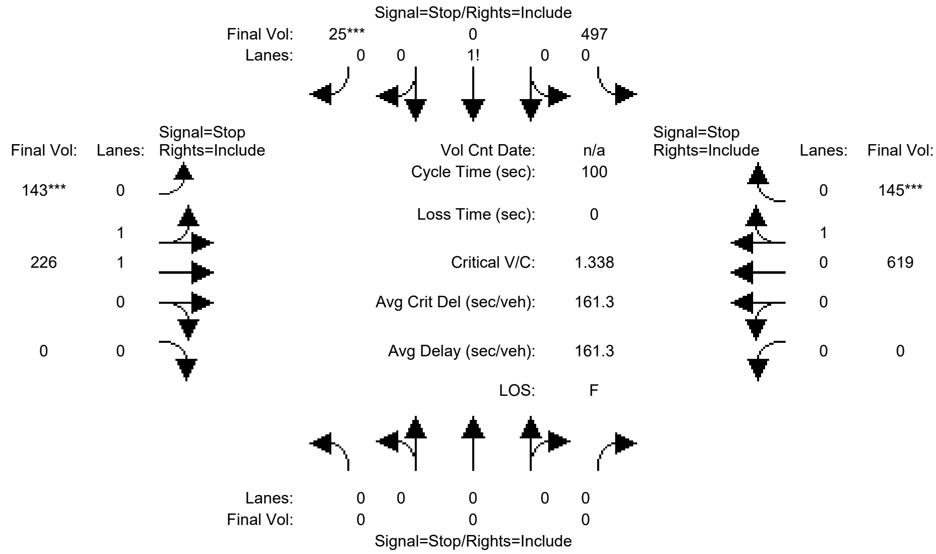
```
Street Name:          East Bayshore Road                  Euclid Avenue
Approach:       North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   608    0     6    85  600     0     0  515    43
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   608    0     6    85  600     0     0  515    43
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0   608    0     6    85  600     0     0  515    43
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   608    0     6    85  600     0     0  515    43
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   608    0     6    85  600     0     0  515    43
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   608    0     6    85  600     0     0  515    43
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.99 0.00  0.01  0.25 1.75  0.00  0.00 0.92  0.08
Final Sat.:     0    0     0   520    0     5   118  841     0     0  488    41
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  1.17 xxxx  1.17  0.72 0.71  xxxx  xxxx 1.06  1.06
Crit Moves:                   ****             ****                   ****
Delay/Veh:    0.0  0.0   0.0 119.2  0.0 119.2  27.4 26.7   0.0   0.0 80.7  80.7
Delay Adj:   3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70  3.70 3.70  3.70
AdjDel/Veh:   0.0  0.0   0.0 441.0  0.0 441.0 101.3 98.9   0.0   0.0  299 298.6
LOS by Move:    *    *     *     F    *     F     F    F     *     *    F     F
ApproachDel:    xxxxxx           119.2             26.8              80.7
Delay Adj:       xxxxx            3.70             3.70              3.70
ApprAdjDel:     xxxxxx           441.0             99.2             298.6
LOS by Appr:        *                F                F                 F
AllWayAvgQ:   0.0  0.0   0.0  15.9 15.9  15.9   2.3  2.2   0.0  10.4 10.4  10.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 (53) East Bayshore Road and Euclid AVenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   608    0     6    85  600     0     0  515    43
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1243
Minor Approach Volume:           614
Minor Approach Volume Threshold: 210
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #5: (53) East Bayshore Road and Euclid AVenue




| Street Name: | East Bayshore Road | | | | | | Euclid Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 497 | 0 | 25 | 143 | 226 | 0 | 0 | 619 | 145 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 | 0.05 | 0.78 | 1.22 | 0.00 | 0.00 | 0.81 | 0.19 |
| Final Sat.: | 0 | 0 | 0 | 525 | 0 | 26 | 357 | 587 | 0 | 0 | 463 | 108 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | xxxx | xxxx | xxxx | 0.95 | xxxx | 0.95 | 0.40 | 0.38 | xxxx | xxxx | 1.34 | 1.34 |
| Crit Moves: | | | | | | **** | **** | | | | | **** |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 51.2 | 0.0 | 51.2 | 15.3 | 14.5 | 0.0 | 0.0 | 183 | 183.3 |
| Delay Adj: | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 79.3 | 0.0 | 79.3 | 23.7 | 22.5 | 0.0 | 0.0 | 284 | 284.1 |
| LOS by Move: | * | * | * | F | * | F | C | C | * | * | F | F |
| ApproachDel: | | xxxxxx | | | 51.2 | | | 14.8 | | | 183.3 | |
| Delay Adj: | | xxxxx | | | 1.55 | | | 1.55 | | | 1.55 | |
| ApprAdjDel: | | xxxxxx | | | 79.3 | | | 23.0 | | | 284.1 | |
| LOS by Appr: | | * | | | F | | | C | | | F | |
| AllWayAvgQ: | 0.0 | 0.0 | 0.0 | 6.4 | 6.4 | 6.4 | 0.6 | 0.6 | 0.0 | 27.6 | 27.6 | 27.6 |

Note: Queue reported is the number of cars per lane.

Peak Hour Volume Signal Warrant Report [Urban]

*******************************************************************************

Intersection #5 (53) East Bayshore Road and Euclid AVenue

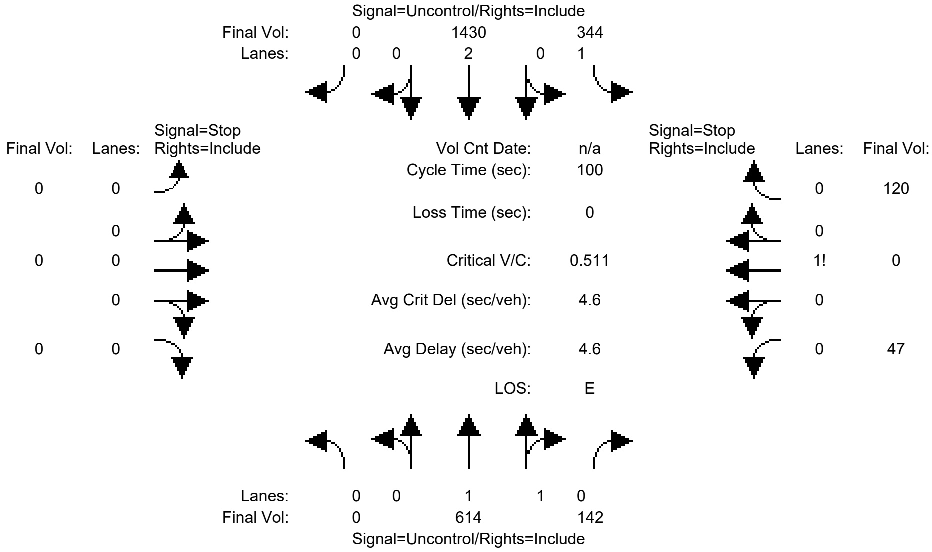
*******************************************************************************

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  1  0  0    0  0  0  1  0
Initial Vol:    0    0     0   497    0    25   143  226     0     0  619   145
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1133
Minor Approach Volume:           522
Minor Approach Volume Threshold: 242
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #8: (36) University Avenue and Purdue Avenue

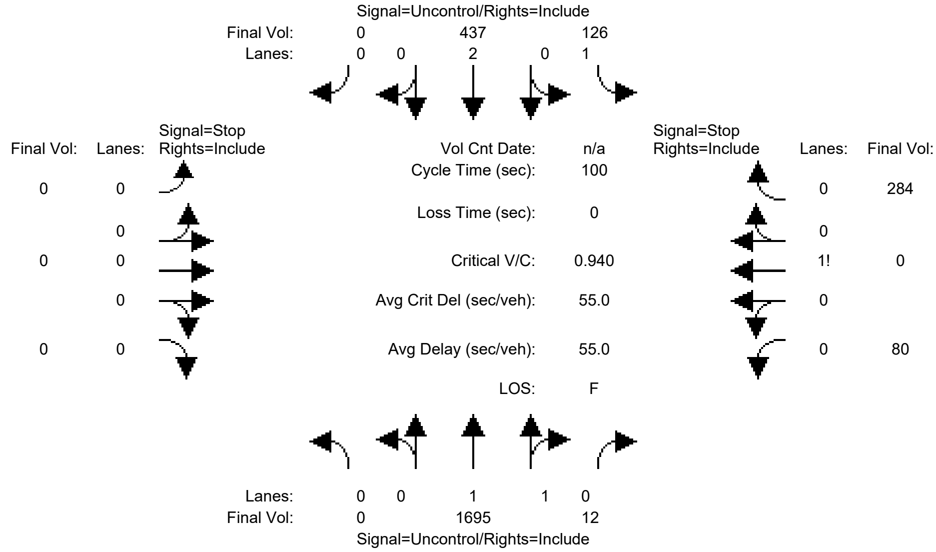



```
Street Name:        University Avenue                  Purdue Avenue
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  614   142   344 1430     0     0    0     0    47    0   120
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  614   142   344 1430     0     0    0     0    47    0   120
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  614   142   344 1430     0     0    0     0    47    0   120
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  614   142   344 1430     0     0    0     0    47    0   120
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  614   142   344 1430     0     0    0     0    47    0   120
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   756 xxxx xxxxx  xxxx xxxx xxxxx  2088 2803   378
Potent Cap.: xxxx xxxx xxxxx   844 xxxx xxxxx  xxxx xxxx xxxxx    45   18   620
Move Cap.:   xxxx xxxx xxxxx   844 xxxx xxxxx  xxxx xxxx xxxxx    31   11   620
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx    26   32 xxxxx    92   45 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.41 xxxx  xxxx  xxxx xxxx  xxxx  0.51 0.00  0.19
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   2.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  12.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  237 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  4.7 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 49.8 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    E     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              49.8
ApproachLOS:         *                *                *                 E
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614   142   344 1430     0     0     0     0    47     0   120
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             49.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=167]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2697]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0  614   142   344 1430     0     0     0     0    47     0   120
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            2530
Minor Approach Volume:          167
Minor Approach Volume Threshold: -35 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #8: (36) University Avenue and Purdue Avenue




```
Street Name:        University Avenue                  Purdue Avenue
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0 1695    12   126  437     0     0    0     0    80    0   284
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0 1695    12   126  437     0     0    0     0    80    0   284
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0 1695    12   126  437     0     0    0     0    80    0   284
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0 1695    12   126  437     0     0    0     0    80    0   284
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0 1695    12   126  437     0     0    0     0    80    0   284
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1707 xxxx xxxxx  xxxx xxxx xxxxx  2172 2390   854
Potent Cap.: xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    40   33   302
Move Cap.:   xxxx xxxx xxxxx   364 xxxx xxxxx  xxxx xxxx xxxxx    29   22   302
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx     0    0 xxxxx   100   97 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.35 xxxx  xxxx  xxxx xxxx  xxxx  0.80 0.00  0.94
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   1.5 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  20.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  209 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 24.8 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  391 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx           391.1
ApproachLOS:         *                 *                 *                F
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695   12   126  437    0     0    0     0    80    0   284
ApproachDel:    xxxxxx          xxxxxx          xxxxxx             391.1
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=39.5]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=364]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2634]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695   12   126  437    0     0    0     0    80    0   284
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2270
Minor Approach Volume:           364
Minor Approach Volume Threshold: 2 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #8: (36) University Avenue and Purdue Avenue

Signal=Uncontrol/Rights=Include
Final Vol: 0 1430 337
Lanes: 0 0 2 0 1

Signal=Stop Rights=Include (West approach) — Final Vol: 0, 0, 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.780
Avg Crit Del (sec/veh): 12.8
Avg Delay (sec/veh): 12.8
LOS: F

Signal=Stop Rights=Include (East approach) — Lanes: 0, 0, 1!, 0, 0; Final Vol: 180, 0, 73

Lanes: 0 0 1 1 0
Final Vol: 0 614 160
Signal=Uncontrol/Rights=Include

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 160 | 337 | 1430 | 0 | 0 | 0 | 0 | 73 | 0 | 180 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 160 | 337 | 1430 | 0 | 0 | 0 | 0 | 73 | 0 | 180 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 160 | 337 | 1430 | 0 | 0 | 0 | 0 | 73 | 0 | 180 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 160 | 337 | 1430 | 0 | 0 | 0 | 0 | 73 | 0 | 180 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 0 | 614 | 160 | 337 | 1430 | 0 | 0 | 0 | 0 | 73 | 0 | 180 |
| **Critical Gap Module:** | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | 4.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | 6.5 | 6.9 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | 4.0 | 3.3 |
| **Capacity Module:** | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | 774 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 2083 | 2798 | 387 |
| Potent Cap.: | xxxx | xxxx | xxxxx | 831 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 46 | 18 | 611 |
| Move Cap.: | xxxx | xxxx | xxxxx | 831 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 31 | 11 | 611 |
| Total Cap: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 26 | 32 | xxxxx | 94 | 46 | xxxxx |
| Volume/Cap: | xxxx | xxxx | xxxx | 0.41 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.78 | 0.00 | 0.29 |
| **Level Of Service Module:** | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | 2.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | 12.3 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | * | * | * | B | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | 235 | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 10.9 | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 125 | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | F | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | xxxxxx | | | 124.8 | |
| ApproachLOS: | | * | | | * | | | * | | | F | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

Intersection #8 (36) University Avenue and Purdue Avenue

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   160   337 1430     0     0    0     0    73    0   180
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            124.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=8.8]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=253]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2794]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0   1  0  2  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0  614   160   337 1430     0     0    0     0    73    0   180
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2541
Minor Approach Volume:           253
Minor Approach Volume Threshold: -36 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #8: (36) University Avenue and Purdue Avenue

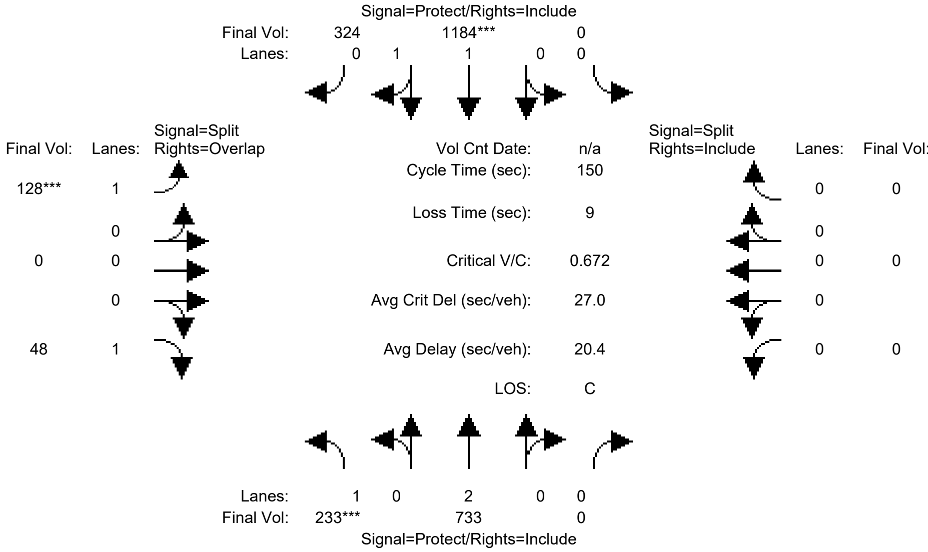
```
                              Signal=Uncontrol/Rights=Include
                   Final Vol:    0         437          167
                       Lanes:    0    0     2      0     1

             Signal=Stop                                        Signal=Stop
Final Vol:  Lanes:  Rights=Include    Vol Cnt Date:      n/a    Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):  100
   0          0                                                                    0       254
                                      Loss Time (sec):     0
              0                                                                    0
   0          0                       Critical V/C:    1.620                       1!        0
              0                       Avg Crit Del (sec/veh): 108.1                0
   0          0                       Avg Delay (sec/veh):    108.1                0       148
                                      LOS:                 F

                       Lanes:    0    0     1      1     0
                   Final Vol:    0         1695          22
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:         University Avenue                  Purdue Avenue
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0 1695    22   167  437     0     0    0     0   148    0   254
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0 1695    22   167  437     0     0    0     0   148    0   254
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0 1695    22   167  437     0     0    0     0   148    0   254
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0 1695    22   167  437     0     0    0     0   148    0   254
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0 1695    22   167  437     0     0    0     0   148    0   254
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1717 xxxx xxxxx  xxxx xxxx xxxxx  2259 2477   859
Potent Cap.: xxxx xxxx xxxxx   361 xxxx xxxxx  xxxx xxxx xxxxx    35   29   300
Move Cap.:   xxxx xxxx xxxxx   361 xxxx xxxxx  xxxx xxxx xxxxx    22   16   300
Total Cap:   xxxx xxxx xxxxx  xxxx xxxx xxxxx     0    0 xxxxx    91   87 xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.46 xxxx  xxxx  xxxx xxxx  xxxx  1.62 0.00  0.85
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   2.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  23.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  163 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 34.3 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  722 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           722.5
ApproachLOS:          *                *                *                F
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695    22   167  437     0     0    0     0   148    0   254
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            722.5
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=80.7]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=402]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2723]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #8 (36) University Avenue and Purdue Avenue
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  1  0    1  0  2  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0 1695    22   167  437     0     0    0     0   148    0   254
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2321
Minor Approach Volume:           402
Minor Approach Volume Threshold: -5 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #9: (38) University Avenue and O'Brien Drive




| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 233 | 733 | 0 | 0 | 1184 | 324 | 128 | 0 | 48 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.57 | 0.43 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2744 | 751 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.13 | 0.20 | 0.00 | 0.00 | 0.43 | 0.43 | 0.07 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 28.8 | 125 | 0.0 | 0.0 | 96.3 | 96.3 | 15.8 | 0.0 | 44.7 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.67 | 0.24 | 0.00 | 0.00 | 0.67 | 0.67 | 0.67 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 56.2 | 2.6 | 0.0 | 0.0 | 16.9 | 16.9 | 64.6 | 0.0 | 38.1 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 5.1 | 0.0 | 0.0 | 0.0 | 0.8 | 0.8 | 9.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 61.3 | 2.6 | 0.0 | 0.0 | 17.7 | 17.7 | 73.6 | 0.0 | 38.2 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.3 | 2.6 | 0.0 | 0.0 | 17.7 | 17.7 | 73.6 | 0.0 | 38.2 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | B | B | E | A | D | A | A | A |
| HCM2kAvgQ: | 11 | 4 | 0 | 0 | 23 | 23 | 7 | 0 | 2 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 68 464 0***
Lanes: 0 1 1 0 0

Signal=Split Rights=Overlap
Final Vol: Lanes:
190 1
0
0 0
0
321*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.629
Avg Crit Del (sec/veh): 16.3
Avg Delay (sec/veh): 20.1
LOS: C

Signal=Split Rights=Include
Lanes: Final Vol:
0 0
0
0 0
0
0 0

Lanes: 1 0 2 0 0
Final Vol: 52 1522*** 0
Signal=Protect/Rights=Include

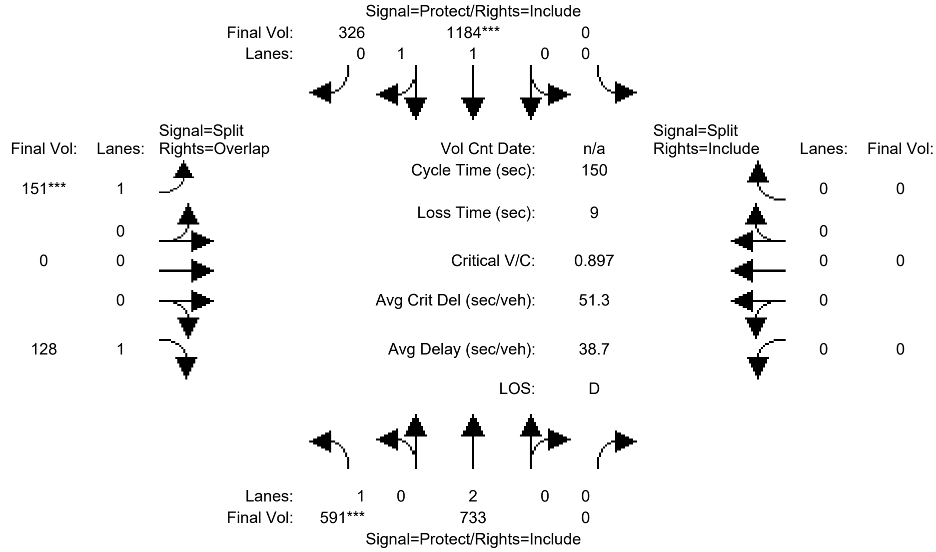
| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 52 | 1522 | 0 | 0 | 464 | 68 | 190 | 0 | 321 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.74 | 0.26 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3089 | 453 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.42 | 0.00 | 0.00 | 0.15 | 0.15 | 0.11 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 24.6 | 104 | 0.0 | 0.0 | 79.1 | 79.1 | 37.4 | 0.0 | 61.9 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.18 | 0.61 | 0.00 | 0.00 | 0.29 | 0.29 | 0.42 | 0.00 | 0.48 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 54.0 | 12.4 | 0.0 | 0.0 | 19.7 | 19.7 | 47.3 | 0.0 | 32.3 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.3 | 0.4 | 0.0 | 0.0 | 0.1 | 0.1 | 0.6 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 54.3 | 12.8 | 0.0 | 0.0 | 19.8 | 19.8 | 47.9 | 0.0 | 32.8 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 54.3 | 12.8 | 0.0 | 0.0 | 19.8 | 19.8 | 47.9 | 0.0 | 32.8 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | D | B | A | A | B | B | D | A | C | A | A | A |
| HCM2kAvgQ: | 2 | 19 | 0 | 0 | 7 | 7 | 7 | 0 | 11 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #9: (38) University Avenue and O'Brien Drive




| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 591 | 733 | 0 | 0 | 1184 | 326 | 151 | 0 | 128 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.57 | 0.43 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2740 | 754 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.33 | 0.20 | 0.00 | 0.00 | 0.43 | 0.43 | 0.08 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 54.8 | 127 | 0.0 | 0.0 | 72.3 | 72.3 | 14.0 | 0.0 | 68.7 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.90 | 0.24 | 0.00 | 0.00 | 0.90 | 0.90 | 0.90 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 45.0 | 2.2 | 0.0 | 0.0 | 35.5 | 35.5 | 67.3 | 0.0 | 23.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 15.0 | 0.0 | 0.0 | 0.0 | 6.8 | 6.8 | 41.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 60.0 | 2.3 | 0.0 | 0.0 | 42.3 | 42.3 | 108.5 | 0.0 | 24.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 60.0 | 2.3 | 0.0 | 0.0 | 42.3 | 42.3 | 108.5 | 0.0 | 24.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | D | D | F | A | C | A | A | A |
| HCM2kAvgQ: | 29 | 3 | 0 | 0 | 36 | 36 | 10 | 0 | 3 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #9: (38) University Avenue and O'Brien Drive

Signal=Protect/Rights=Include
Final Vol: 109 464 0***
Lanes: 0 1 1 0 0

Signal=Split
Rights=Overlap

| Final Vol: | Lanes: |
|---|---|
| 189 | 1 |
| | 0 |
| 0 | 0 |
| | 0 |
| 604*** | 1 |

| | |
|---|---|
| Vol Cnt Date: | n/a |
| Cycle Time (sec): | 150 |
| Loss Time (sec): | 9 |
| Critical V/C: | 0.805 |
| Avg Crit Del (sec/veh): | 30.7 |
| Avg Delay (sec/veh): | 31.4 |
| LOS: | C |

Signal=Split
Rights=Include

| Lanes: | Final Vol: |
|---|---|
| 0 | 0 |
| 0 | |
| 0 | 0 |
| 0 | |
| 0 | 0 |

Lanes: 1 0 2 0 0
Final Vol: 70 1522*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | O'Brien Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 70 | 1522 | 0 | 0 | 464 | 109 | 189 | 0 | 604 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.92 | 0.92 | 0.95 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.62 | 0.38 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 2841 | 667 | 1805 | 0 | 1615 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.00 | 0.00 | 0.16 | 0.16 | 0.10 | 0.00 | 0.37 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | **** | | | |
| Green Time: | 17.6 | 79.4 | 0.0 | 0.0 | 61.7 | 61.7 | 61.6 | 0.0 | 79.3 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.33 | 0.80 | 0.00 | 0.00 | 0.40 | 0.40 | 0.25 | 0.00 | 0.71 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 60.8 | 28.7 | 0.0 | 0.0 | 31.0 | 31.0 | 29.1 | 0.0 | 26.6 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.9 | 2.4 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.0 | 2.8 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 61.7 | 31.2 | 0.0 | 0.0 | 31.2 | 31.2 | 29.3 | 0.0 | 29.4 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.7 | 31.2 | 0.0 | 0.0 | 31.2 | 31.2 | 29.3 | 0.0 | 29.4 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | C | A | A | C | C | C | A | C | A | A | A |
| HCM2kAvgQ: | 3 | 31 | 0 | 0 | 9 | 9 | 6 | 0 | 21 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

Signal=Protect/Rights=Include
Final Vol: 0 1180 66***
Lanes: 0 0 2 0 1

Westbound/Eastbound approaches:

Signal=Split Rights=Include (East Bound): Final Vol: 0, 0, 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.427
Avg Crit Del (sec/veh): 12.8
Avg Delay (sec/veh): 8.0
LOS: A

Signal=Split Rights=Include (West Bound): Lanes: 0, 0, 1!, 0, 0; Final Vol: 39, 0, 31***

Lanes: 0 0 1 1 0
Final Vol: 0 1142*** 25
Signal=Protect/Rights=Include

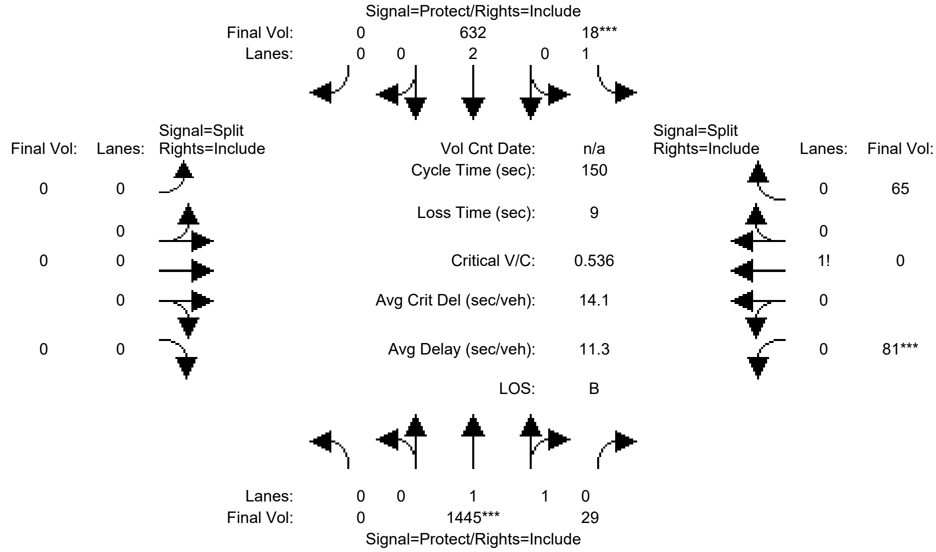
| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1142 | 25 | 66 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 39 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.56 |
| Final Sat.: | 0 | 3522 | 77 | 1805 | 3610 | 0 | 0 | 0 | 0 | 761 | 0 | 958 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.32 | 0.32 | 0.04 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.04 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 114 | 113.9 | 12.8 | 127 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 14.3 |
| Volume/Cap: | 0.00 | 0.43 | 0.43 | 0.43 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 0.43 | 0.00 | 0.43 |
| Uniform Del: | 0.0 | 6.4 | 6.4 | 65.1 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 64.0 | 0.0 | 64.0 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 1.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 6.6 | 6.6 | 67.0 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.8 | 0.0 | 65.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 6.6 | 6.6 | 67.0 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 65.8 | 0.0 | 65.8 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 10 | 10 | 3 | 7 | 0 | 0 | 0 | 0 | 3 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]



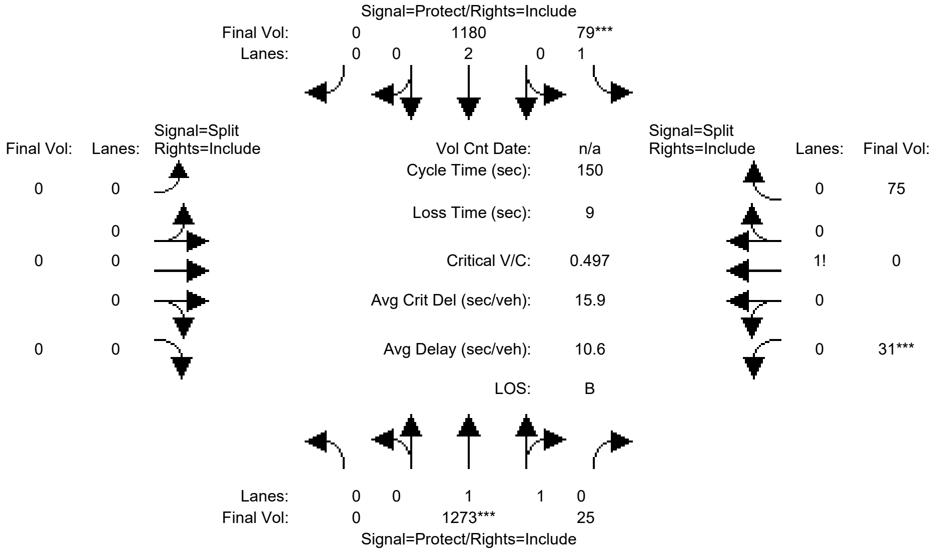

| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 18 | 632 | 0 | 0 | 0 | 0 | 81 | 0 | 65 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 0.91 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 | 0.45 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 964 | 0 | 774 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.08 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 111 | 111.2 | 7.0 | 118 | 0.0 | 0.0 | 0.0 | 0.0 | 22.8 | 0.0 | 22.8 |
| Volume/Cap: | 0.00 | 0.55 | 0.55 | 0.21 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 | 0.55 |
| Uniform Del: | 0.0 | 8.5 | 8.5 | 68.8 | 4.1 | 0.0 | 0.0 | 0.0 | 0.0 | 58.9 | 0.0 | 58.9 |
| IncremntDel: | 0.0 | 0.3 | 0.3 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 2.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 8.8 | 8.8 | 70.1 | 4.1 | 0.0 | 0.0 | 0.0 | 0.0 | 61.4 | 0.0 | 61.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 8.8 | 8.8 | 70.1 | 4.1 | 0.0 | 0.0 | 0.0 | 0.0 | 61.4 | 0.0 | 61.4 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 15 | 15 | 1 | 4 | 0 | 0 | 0 | 0 | 7 | 0 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]




| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1273 | 25 | 79 | 1180 | 0 | 0 | 0 | 0 | 31 | 0 | 75 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.71 |
| Final Sat.: | 0 | 3530 | 69 | 1805 | 3610 | 0 | 0 | 0 | 0 | 495 | 0 | 1198 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.36 | 0.36 | 0.04 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.06 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 109 | 108.9 | 13.2 | 122 | 0.0 | 0.0 | 0.0 | 0.0 | 18.9 | 0.0 | 18.9 |
| Volume/Cap: | 0.00 | 0.50 | 0.50 | 0.50 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 | 0.50 |
| Uniform Del: | 0.0 | 8.8 | 8.8 | 65.2 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 61.1 | 0.0 | 61.1 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 2.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 9.0 | 9.0 | 67.7 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.9 | 0.0 | 62.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 9.0 | 9.0 | 67.7 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 62.9 | 0.0 | 62.9 |
| LOS by Move: | A | A | A | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 13 | 13 | 4 | 8 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #10: (39.1) University Avenue and Notre Dame Avenue [**** SIGN SAYS NO RT M-F 3-8PM]

Signal=Protect/Rights=Include
Final Vol: 0 697 19***
Lanes: 0 0 2 0 1

Westbound (left side): Signal=Split, Rights=Include

| Final Vol: | Lanes: |
|---|---|
| 0 | 0 |
| | 0 |
| 0 | 0 |
| | 0 |
| 0 | 0 |

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.572
Avg Crit Del (sec/veh): 18.2
Avg Delay (sec/veh): 14.8
LOS: B

Signal=Split
Rights=Include

| Lanes: | Final Vol: |
|---|---|
| 0 | 120 |
| 0 | |
| 1! | 0 |
| 0 | |
| 0 | 81*** |

Lanes: 0 0 1 1 0
Final Vol: 0 1445*** 29
Signal=Protect/Rights=Include

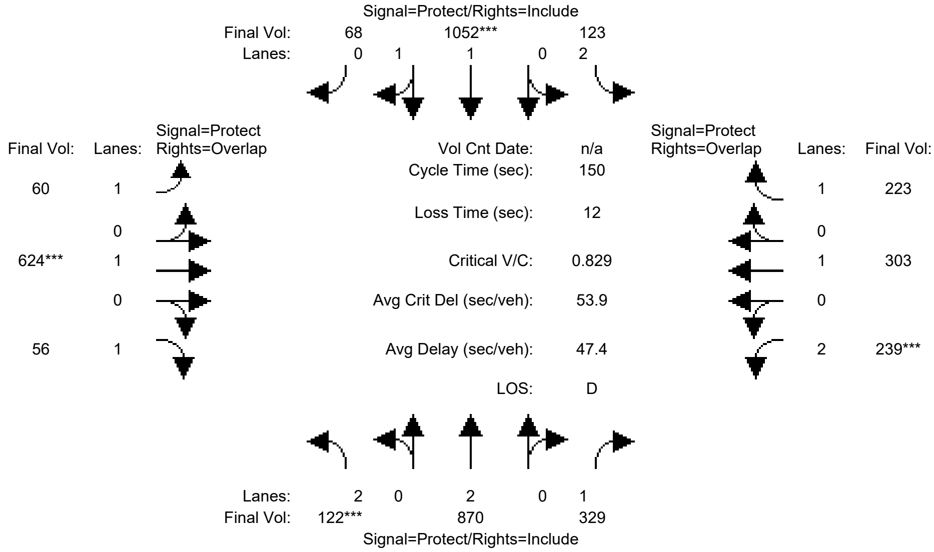
| Street Name: | University Avenue | | | | | | Notre Dame Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 10 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1445 | 29 | 19 | 697 | 0 | 0 | 0 | 0 | 81 | 0 | 120 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.90 |
| Lanes: | 0.00 | 1.96 | 0.04 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 0.60 |
| Final Sat.: | 0 | 3528 | 71 | 1805 | 3610 | 0 | 0 | 0 | 0 | 690 | 0 | 1022 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.41 | 0.41 | 0.01 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.12 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 104 | 104.1 | 7.0 | 111 | 0.0 | 0.0 | 0.0 | 0.0 | 29.9 | 0.0 | 29.9 |
| Volume/Cap: | 0.00 | 0.59 | 0.59 | 0.23 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.59 | 0.00 | 0.59 |
| Uniform Del: | 0.0 | 11.9 | 11.9 | 68.9 | 6.2 | 0.0 | 0.0 | 0.0 | 0.0 | 54.5 | 0.0 | 54.5 |
| IncremntDel: | 0.0 | 0.4 | 0.4 | 1.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 | 0.0 | 2.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 12.3 | 12.3 | 70.3 | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 | 57.2 | 0.0 | 57.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 12.3 | 12.3 | 70.3 | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 | 57.2 | 0.0 | 57.2 |
| LOS by Move: | A | B | B | E | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 18 | 18 | 1 | 5 | 0 | 0 | 0 | 0 | 9 | 0 | 9 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #11: (40) University Avenue and Bay Road




| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 122 | 870 | 329 | 123 | 1052 | 68 | 60 | 624 | 56 | 239 | 303 | 223 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.88 | 0.12 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3263 | 211 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.25 | 0.21 | 0.04 | 0.32 | 0.32 | 0.03 | 0.34 | 0.04 | 0.07 | 0.16 | 0.14 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |
| Green Time: | 7.0 | 54.8 | 54.8 | 10.3 | 58.1 | 58.1 | 16.3 | 60.4 | 67.4 | 12.5 | 56.7 | 67.0 |
| Volume/Cap: | 0.77 | 0.68 | 0.57 | 0.53 | 0.83 | 0.83 | 0.31 | 0.83 | 0.08 | 0.83 | 0.43 | 0.32 |
| Uniform Del: | 70.7 | 40.2 | 38.2 | 67.5 | 41.6 | 41.6 | 61.7 | 40.3 | 23.6 | 67.7 | 34.7 | 26.8 |
| IncremntDel: | 20.1 | 1.5 | 1.4 | 2.2 | 4.6 | 4.6 | 0.9 | 7.9 | 0.0 | 18.4 | 0.4 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 90.8 | 41.7 | 39.7 | 69.7 | 46.2 | 46.2 | 62.7 | 48.2 | 23.6 | 86.1 | 35.1 | 27.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.8 | 41.7 | 39.7 | 69.7 | 46.2 | 46.2 | 62.7 | 48.2 | 23.6 | 86.1 | 35.1 | 27.0 |
| LOS by Move: | F | D | D | E | D | D | E | D | C | F | D | C |
| HCM2kAvgQ: | 4 | 18 | 12 | 4 | 26 | 26 | 3 | 27 | 1 | 8 | 10 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #11: (40) University Avenue and Bay Road

Signal=Protect/Rights=Include
Final Vol: 42 450 323***
Lanes: 0 1 1 0 2

Signal=Split
Rights=Overlap

| Final Vol: | Lanes: | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|
| 107 | 1 | Vol Cnt Date: | n/a | 1 | 448 |
| | | Cycle Time (sec): | 150 | | |
| | 0 | Loss Time (sec): | 12 | 0 | |
| 312*** | 1 | Critical V/C: | 0.973 | 1 | 541*** |
| | 0 | Avg Crit Del (sec/veh): | 81.6 | 0 | |
| 96 | 1 | Avg Delay (sec/veh): | 64.0 | 2 | 611 |
| | | LOS: | E | | |

Signal=Split
Rights=Overlap

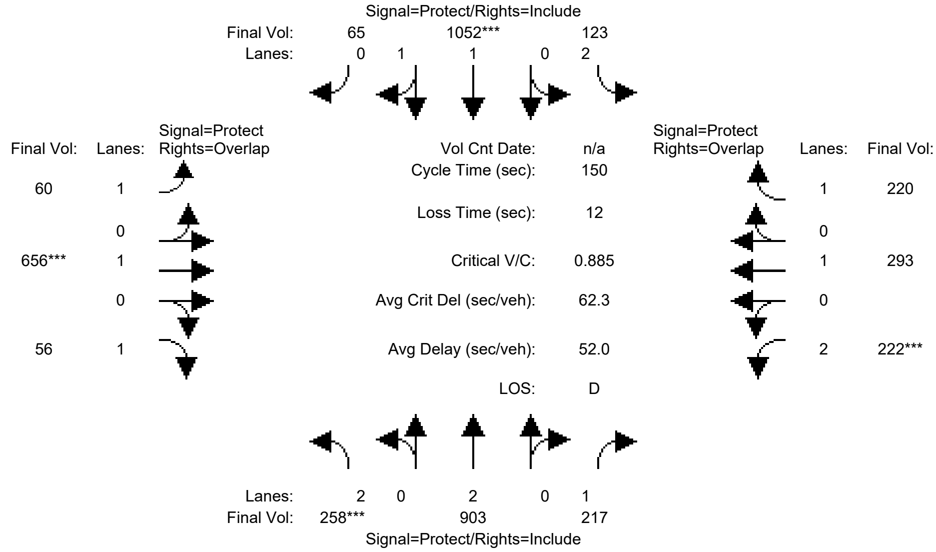
Lanes: 2 0 2 0 1
Final Vol: 50 1200*** 195
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 50 | 1200 | 195 | 323 | 450 | 42 | 107 | 312 | 96 | 611 | 541 | 448 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3164 | 295 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.34 | 0.12 | 0.09 | 0.14 | 0.14 | 0.06 | 0.17 | 0.06 | 0.18 | 0.29 | 0.28 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 16.7 | 52.8 | 52.8 | 14.6 | 50.7 | 50.7 | 25.8 | 25.8 | 42.5 | 44.8 | 44.8 | 59.4 |
| Volume/Cap: | 0.13 | 0.97 | 0.35 | 0.97 | 0.42 | 0.42 | 0.35 | 0.97 | 0.21 | 0.60 | 0.97 | 0.71 |
| Uniform Del: | 60.2 | 47.9 | 36.0 | 67.5 | 38.3 | 38.3 | 54.7 | 61.7 | 41.0 | 44.9 | 52.0 | 38.1 |
| IncremntDel: | 0.2 | 19.5 | 0.4 | 42.1 | 0.2 | 0.2 | 0.7 | 42.9 | 0.2 | 1.0 | 31.3 | 3.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 60.3 | 67.4 | 36.4 | 109.5 | 38.5 | 38.5 | 55.4 | 105 | 41.3 | 45.9 | 83.3 | 42.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 60.3 | 67.4 | 36.4 | 109.5 | 38.5 | 38.5 | 55.4 | 105 | 41.3 | 45.9 | 83.3 | 42.1 |
| LOS by Move: | E | E | D | F | D | D | E | F | D | D | F | D |
| HCM2kAvgQ: | 1 | 34 | 7 | 11 | 9 | 9 | 4 | 19 | 3 | 13 | 30 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #11: (40) University Avenue and Bay Road



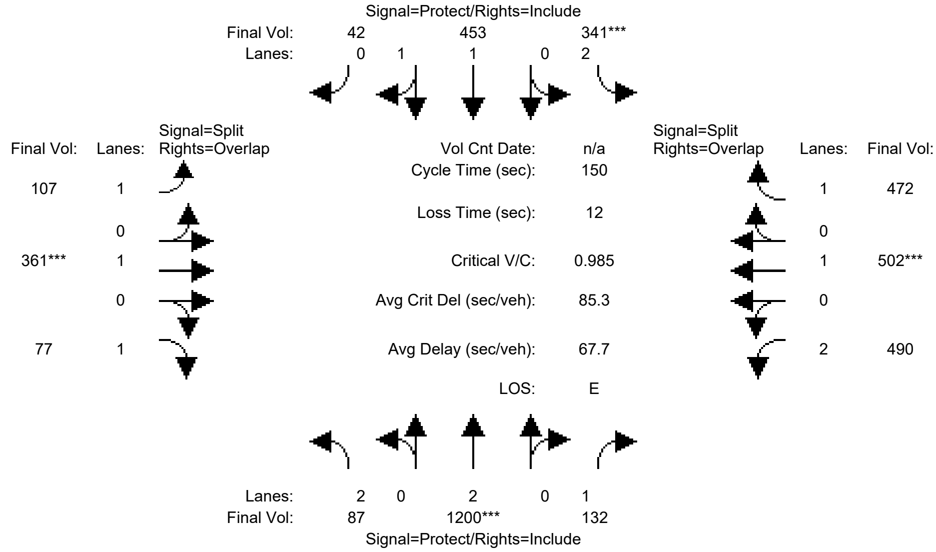

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 258 | 903 | 217 | 123 | 1052 | 65 | 60 | 656 | 56 | 222 | 293 | 220 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.88 | 0.12 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3272 | 202 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.26 | 0.14 | 0.04 | 0.32 | 0.32 | 0.03 | 0.35 | 0.04 | 0.06 | 0.16 | 0.14 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |
| Green Time: | 12.9 | 57.0 | 57.0 | 10.3 | 54.5 | 54.5 | 16.2 | 59.7 | 72.6 | 11.0 | 54.5 | 64.8 |
| Volume/Cap: | 0.89 | 0.68 | 0.36 | 0.53 | 0.89 | 0.89 | 0.31 | 0.89 | 0.07 | 0.89 | 0.43 | 0.32 |
| Uniform Del: | 67.8 | 38.8 | 33.5 | 67.5 | 44.8 | 44.8 | 61.8 | 42.0 | 20.7 | 68.9 | 36.1 | 28.1 |
| IncremntDel: | 25.9 | 1.4 | 0.4 | 2.2 | 7.8 | 7.8 | 1.0 | 12.3 | 0.0 | 29.0 | 0.4 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 93.7 | 40.2 | 33.8 | 69.7 | 52.6 | 52.6 | 62.8 | 54.3 | 20.8 | 97.9 | 36.5 | 28.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 93.7 | 40.2 | 33.8 | 69.7 | 52.6 | 52.6 | 62.8 | 54.3 | 20.8 | 97.9 | 36.5 | 28.4 |
| LOS by Move: | F | D | C | E | D | D | E | D | C | F | D | C |
| HCM2kAvgQ: | 9 | 19 | 7 | 4 | 28 | 28 | 3 | 31 | 1 | 8 | 10 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

## Intersection #11: (40) University Avenue and Bay Road



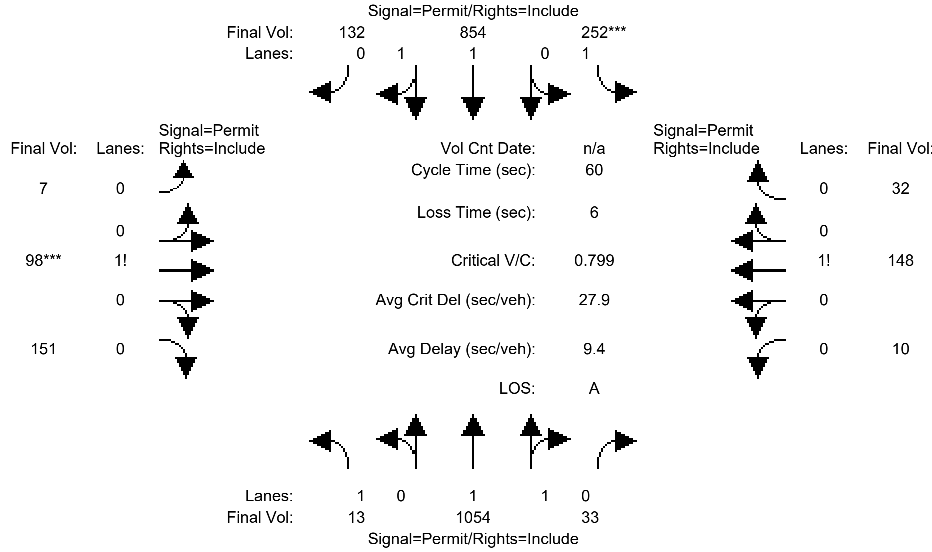

| Street Name: | University Avenue | | | | | | Bay Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 | 7 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 87 | 1200 | 132 | 341 | 453 | 42 | 107 | 361 | 77 | 490 | 502 | 472 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.89 | 0.92 | 0.83 | 0.89 | 0.91 | 0.91 | 0.93 | 0.98 | 0.83 | 0.90 | 0.98 | 0.83 |
| Lanes: | 2.00 | 2.00 | 1.00 | 2.00 | 1.83 | 0.17 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 |
| Final Sat.: | 3400 | 3505 | 1568 | 3400 | 3166 | 294 | 1769 | 1862 | 1583 | 3432 | 1862 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.34 | 0.08 | 0.10 | 0.14 | 0.14 | 0.06 | 0.19 | 0.05 | 0.14 | 0.27 | 0.30 |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |
| Green Time: | 16.6 | 52.1 | 52.1 | 15.3 | 50.8 | 50.8 | 29.5 | 29.5 | 46.1 | 41.1 | 41.1 | 56.3 |
| Volume/Cap: | 0.23 | 0.98 | 0.24 | 0.98 | 0.42 | 0.42 | 0.31 | 0.98 | 0.16 | 0.52 | 0.98 | 0.79 |
| Uniform Del: | 60.9 | 48.5 | 34.9 | 67.2 | 38.3 | 38.3 | 51.5 | 60.0 | 37.8 | 46.1 | 54.2 | 41.7 |
| IncremntDel: | 0.3 | 22.1 | 0.2 | 44.1 | 0.2 | 0.2 | 0.5 | 42.8 | 0.2 | 0.5 | 35.8 | 7.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 61.2 | 70.6 | 35.1 | 111.4 | 38.5 | 38.5 | 52.0 | 103 | 38.0 | 46.7 | 90.0 | 48.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.2 | 70.6 | 35.1 | 111.4 | 38.5 | 38.5 | 52.0 | 103 | 38.0 | 46.7 | 90.0 | 48.9 |
| LOS by Move: | E | E | D | F | D | D | D | F | D | D | F | D |
| HCM2kAvgQ: | 2 | 34 | 4 | 12 | 9 | 9 | 4 | 21 | 3 | 10 | 28 | 21 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #12: (41) University Avenue and Runnymede Street




| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 13 | 1054 | 33 | 252 | 854 | 132 | 7 | 98 | 151 | 10 | 148 | 32 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.27 | 0.95 | 0.95 | 0.23 | 0.93 | 0.93 | 0.91 | 0.91 | 0.91 | 0.95 | 0.95 | 0.95 |
| Lanes: | 1.00 | 1.94 | 0.06 | 1.00 | 1.73 | 0.27 | 0.03 | 0.38 | 0.59 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 504 | 3486 | 109 | 441 | 3064 | 474 | 47 | 664 | 1024 | 95 | 1403 | 303 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.30 | 0.30 | 0.57 | 0.28 | 0.28 | 0.15 | 0.15 | 0.15 | 0.11 | 0.11 | 0.11 |
| Crit Moves: | | | | **** | | | | **** | | | | |
| Green Time: | 42.9 | 42.9 | 42.9 | 42.9 | 42.9 | 42.9 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 |
| Volume/Cap: | 0.04 | 0.42 | 0.42 | 0.80 | 0.39 | 0.39 | 0.80 | 0.80 | 0.80 | 0.57 | 0.57 | 0.57 |
| Uniform Del: | 2.5 | 3.5 | 3.5 | 5.7 | 3.4 | 3.4 | 23.4 | 23.4 | 23.4 | 22.3 | 22.3 | 22.3 |
| IncremntDel: | 0.0 | 0.1 | 0.1 | 13.4 | 0.1 | 0.1 | 13.2 | 13.2 | 13.2 | 2.4 | 2.4 | 2.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.5 | 3.6 | 3.6 | 19.1 | 3.5 | 3.5 | 36.6 | 36.6 | 36.6 | 24.7 | 24.7 | 24.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.5 | 3.6 | 3.6 | 19.1 | 3.5 | 3.5 | 36.6 | 36.6 | 36.6 | 24.7 | 24.7 | 24.7 |
| LOS by Move: | A | A | A | B | A | A | D | D | D | C | C | C |
| HCM2kAvgQ: | 0 | 5 | 5 | 6 | 4 | 4 | 7 | 7 | 7 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #12: (41) University Avenue and Runnymede Street

Signal=Permit/Rights=Include
Final Vol: 21 948 38
Lanes: 0 1 1 0 1

Signal=Permit Rights=Include (West/Eastbound approach)
Final Vol: 10, Lanes: 0
Lanes: 0
Final Vol: 71, Lanes: 1!
Lanes: 0
Final Vol: 30, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 6
Critical V/C: 0.590
Avg Crit Del (sec/veh): 16.6
Avg Delay (sec/veh): 8.9
LOS: A

Signal=Permit Rights=Include
Lanes: 0, Final Vol: 121
Lanes: 0
Lanes: 1!, Final Vol: 137***
Lanes: 0
Lanes: 0, Final Vol: 40

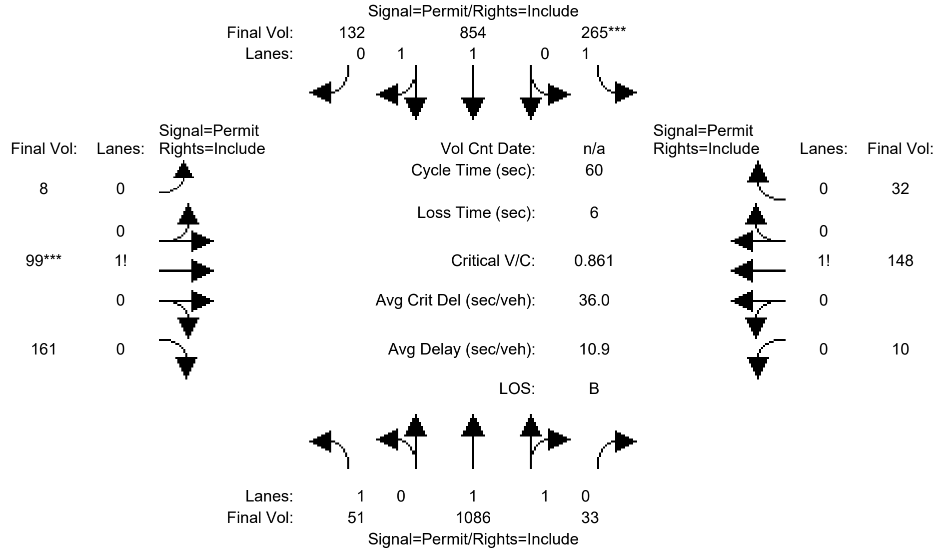
Lanes: 1 0 1 1 0
Final Vol: 166*** 1115 64
Signal=Permit/Rights=Include

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 166 | 1115 | 64 | 38 | 948 | 21 | 10 | 71 | 30 | 40 | 137 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.25 | 0.94 | 0.94 | 0.18 | 0.95 | 0.95 | 0.93 | 0.93 | 0.93 | 0.90 | 0.90 | 0.90 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.96 | 0.04 | 0.09 | 0.64 | 0.27 | 0.13 | 0.46 | 0.41 |
| Final Sat.: | 466 | 3387 | 194 | 336 | 3521 | 78 | 159 | 1132 | 478 | 229 | 786 | 694 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.36 | 0.33 | 0.33 | 0.11 | 0.27 | 0.27 | 0.06 | 0.06 | 0.06 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | **** | | | | | | | | | | **** | |
| Green Time: | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 | 17.7 |
| Volume/Cap: | 0.59 | 0.54 | 0.54 | 0.19 | 0.45 | 0.45 | 0.21 | 0.21 | 0.21 | 0.59 | 0.59 | 0.59 |
| Uniform Del: | 7.3 | 7.0 | 7.0 | 5.3 | 6.4 | 6.4 | 15.9 | 15.9 | 15.9 | 18.0 | 18.0 | 18.0 |
| IncremntDel: | 3.3 | 0.3 | 0.3 | 0.4 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 1.8 | 1.8 | 1.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 10.6 | 7.3 | 7.3 | 5.7 | 6.6 | 6.6 | 16.1 | 16.1 | 16.1 | 19.9 | 19.9 | 19.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 10.6 | 7.3 | 7.3 | 5.7 | 6.6 | 6.6 | 16.1 | 16.1 | 16.1 | 19.9 | 19.9 | 19.9 |
| LOS by Move: | B | A | A | A | A | A | B | B | B | B | B | B |
| HCM2kAvgQ: | 3 | 7 | 7 | 1 | 5 | 5 | 2 | 2 | 2 | 6 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #12: (41) University Avenue and Runnymede Street



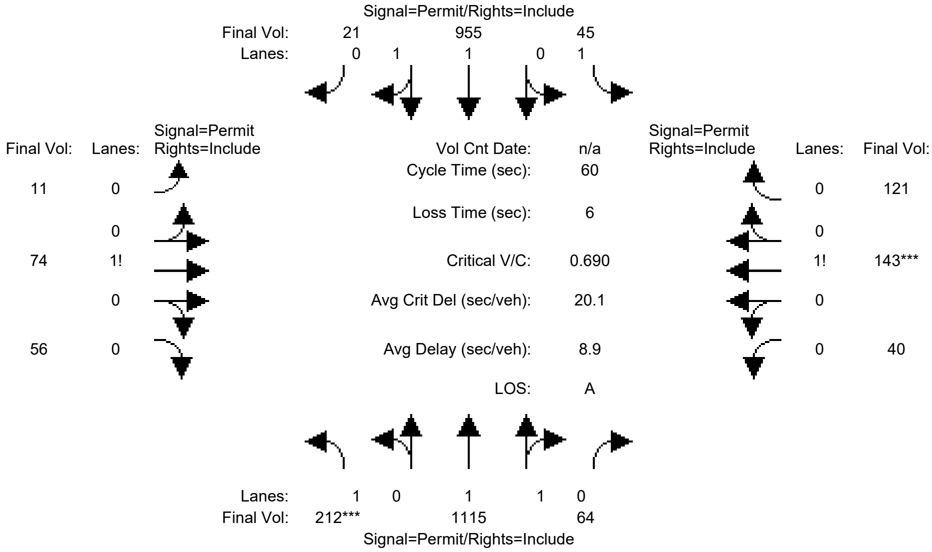

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 51 | 1086 | 33 | 265 | 854 | 132 | 8 | 99 | 161 | 10 | 148 | 32 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.27 | 0.95 | 0.95 | 0.23 | 0.93 | 0.93 | 0.91 | 0.91 | 0.91 | 0.94 | 0.94 | 0.94 |
| Lanes: | 1.00 | 1.94 | 0.06 | 1.00 | 1.73 | 0.27 | 0.03 | 0.37 | 0.60 | 0.05 | 0.78 | 0.17 |
| Final Sat.: | 505 | 3490 | 106 | 428 | 3064 | 474 | 52 | 640 | 1041 | 94 | 1388 | 300 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.31 | 0.31 | 0.62 | 0.28 | 0.28 | 0.15 | 0.15 | 0.15 | 0.11 | 0.11 | 0.11 |
| Crit Moves: | | | | **** | | | | **** | | | | |
| Green Time: | 43.2 | 43.2 | 43.2 | 43.2 | 43.2 | 43.2 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| Volume/Cap: | 0.14 | 0.43 | 0.43 | 0.86 | 0.39 | 0.39 | 0.86 | 0.86 | 0.86 | 0.59 | 0.59 | 0.59 |
| Uniform Del: | 2.6 | 3.4 | 3.4 | 6.2 | 3.3 | 3.3 | 23.9 | 23.9 | 23.9 | 22.6 | 22.6 | 22.6 |
| IncremntDel: | 0.2 | 0.1 | 0.1 | 21.0 | 0.1 | 0.1 | 20.8 | 20.8 | 20.8 | 3.0 | 3.0 | 3.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 2.8 | 3.5 | 3.5 | 27.2 | 3.4 | 3.4 | 44.7 | 44.7 | 44.7 | 25.6 | 25.6 | 25.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 2.8 | 3.5 | 3.5 | 27.2 | 3.4 | 3.4 | 44.7 | 44.7 | 44.7 | 25.6 | 25.6 | 25.6 |
| LOS by Move: | A | A | A | C | A | A | D | D | D | C | C | C |
| HCM2kAvgQ: | 0 | 5 | 5 | 7 | 4 | 4 | 8 | 8 | 8 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #12: (41) University Avenue and Runnymede Street



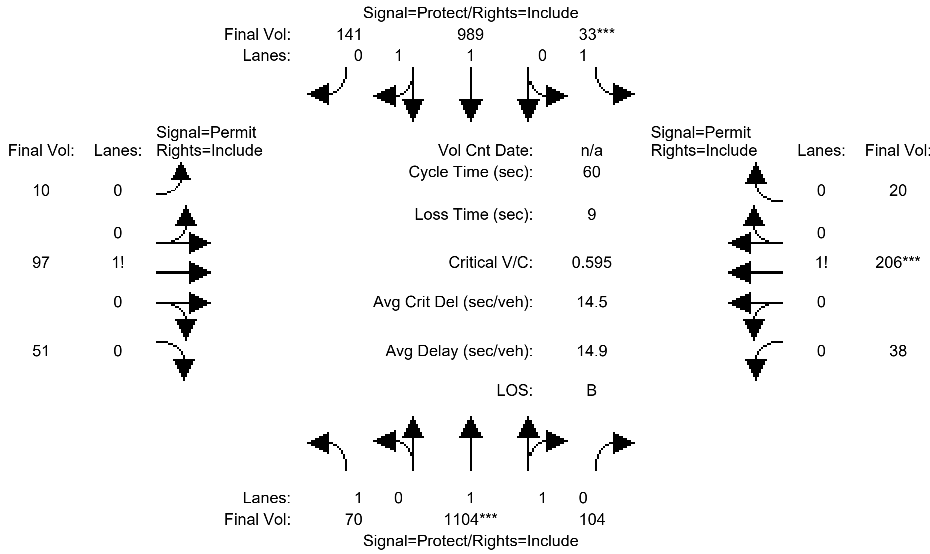

| Street Name: | University Avenue | | | | | | Runnymede Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 212 | 1115 | 64 | 45 | 955 | 21 | 11 | 74 | 56 | 40 | 143 | 121 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.25 | 0.94 | 0.94 | 0.19 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 |
| Lanes: | 1.00 | 1.89 | 0.11 | 1.00 | 1.96 | 0.04 | 0.08 | 0.52 | 0.40 | 0.13 | 0.47 | 0.40 |
| Final Sat.: | 479 | 3387 | 194 | 357 | 3522 | 77 | 137 | 919 | 695 | 224 | 801 | 677 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.44 | 0.33 | 0.33 | 0.13 | 0.27 | 0.27 | 0.08 | 0.08 | 0.08 | 0.18 | 0.18 | 0.18 |
| Crit Moves: | **** | | | | | | | | | | **** | |
| Green Time: | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 |
| Volume/Cap: | 0.69 | 0.51 | 0.51 | 0.20 | 0.42 | 0.42 | 0.31 | 0.31 | 0.31 | 0.69 | 0.69 | 0.69 |
| Uniform Del: | 6.9 | 5.8 | 5.8 | 4.4 | 5.3 | 5.3 | 17.9 | 17.9 | 17.9 | 20.1 | 20.1 | 20.1 |
| IncremntDel: | 6.6 | 0.2 | 0.2 | 0.4 | 0.1 | 0.1 | 0.4 | 0.4 | 0.4 | 4.6 | 4.6 | 4.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 13.5 | 6.0 | 6.0 | 4.8 | 5.4 | 5.4 | 18.3 | 18.3 | 18.3 | 24.7 | 24.7 | 24.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 13.5 | 6.0 | 6.0 | 4.8 | 5.4 | 5.4 | 18.3 | 18.3 | 18.3 | 24.7 | 24.7 | 24.7 |
| LOS by Move: | B | A | A | A | A | A | B | B | B | C | C | C |
| HCM2kAvgQ: | 4 | 7 | 7 | 1 | 5 | 5 | 2 | 2 | 2 | 7 | 7 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #13: (42) University Avenue and Bell Street



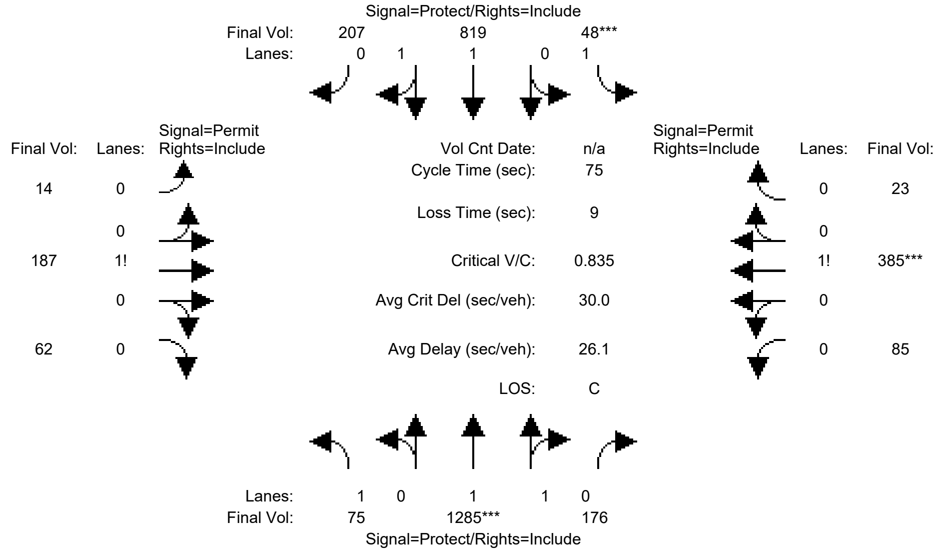

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 70 | 1104 | 104 | 33 | 989 | 141 | 10 | 97 | 51 | 38 | 206 | 20 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.94 | 0.94 | 0.95 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Lanes: | 1.00 | 1.83 | 0.17 | 1.00 | 1.75 | 0.25 | 0.06 | 0.62 | 0.32 | 0.14 | 0.78 | 0.08 |
| Final Sat.: | 1805 | 3256 | 307 | 1805 | 3100 | 442 | 113 | 1094 | 575 | 256 | 1390 | 135 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.34 | 0.34 | 0.02 | 0.32 | 0.32 | 0.09 | 0.09 | 0.09 | 0.15 | 0.15 | 0.15 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 10.1 | 30.6 | 30.6 | 7.0 | 27.5 | 27.5 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 |
| Volume/Cap: | 0.23 | 0.66 | 0.66 | 0.16 | 0.70 | 0.70 | 0.40 | 0.40 | 0.40 | 0.66 | 0.66 | 0.66 |
| Uniform Del: | 21.6 | 10.9 | 10.9 | 23.8 | 12.9 | 12.9 | 19.9 | 19.9 | 19.9 | 21.3 | 21.3 | 21.3 |
| IncremntDel: | 0.4 | 0.9 | 0.9 | 0.3 | 1.3 | 1.3 | 0.7 | 0.7 | 0.7 | 4.2 | 4.2 | 4.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 22.0 | 11.8 | 11.8 | 24.2 | 14.2 | 14.2 | 20.5 | 20.5 | 20.5 | 25.5 | 25.5 | 25.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 22.0 | 11.8 | 11.8 | 24.2 | 14.2 | 14.2 | 20.5 | 20.5 | 20.5 | 25.5 | 25.5 | 25.5 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 10 | 10 | 1 | 10 | 10 | 3 | 3 | 3 | 6 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #13: (42) University Avenue and Bell Street




| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1285 | 176 | 48 | 819 | 207 | 14 | 187 | 62 | 85 | 385 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.88 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.76 | 0.24 | 1.00 | 1.60 | 0.40 | 0.05 | 0.71 | 0.24 | 0.17 | 0.78 | 0.05 |
| Final Sat.: | 1805 | 3118 | 427 | 1805 | 2795 | 706 | 95 | 1274 | 423 | 287 | 1301 | 78 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.41 | 0.41 | 0.03 | 0.29 | 0.29 | 0.15 | 0.15 | 0.15 | 0.30 | 0.30 | 0.30 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 10.0 | 34.3 | 34.3 | 7.0 | 31.4 | 31.4 | 24.7 | 24.7 | 24.7 | 24.7 | 24.7 | 24.7 |
| Volume/Cap: | 0.31 | 0.90 | 0.90 | 0.28 | 0.70 | 0.70 | 0.45 | 0.45 | 0.45 | 0.90 | 0.90 | 0.90 |
| Uniform Del: | 29.4 | 18.7 | 18.7 | 31.7 | 18.0 | 18.0 | 19.8 | 19.8 | 19.8 | 24.0 | 24.0 | 24.0 |
| IncremntDel: | 0.7 | 7.2 | 7.2 | 0.9 | 1.5 | 1.5 | 0.5 | 0.5 | 0.5 | 17.8 | 17.8 | 17.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 30.1 | 26.0 | 26.0 | 32.6 | 19.5 | 19.5 | 20.3 | 20.3 | 20.3 | 41.8 | 41.8 | 41.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 30.1 | 26.0 | 26.0 | 32.6 | 19.5 | 19.5 | 20.3 | 20.3 | 20.3 | 41.8 | 41.8 | 41.8 |
| LOS by Move: | C | C | C | C | B | B | C | C | C | D | D | D |
| HCM2kAvgQ: | 2 | 21 | 21 | 1 | 11 | 11 | 5 | 5 | 5 | 15 | 15 | 15 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 142 985 33***
Lanes: 0 1 1 0 1

Signal=Permit
Rights=Include

| Final Vol: | Lanes: | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|
| 10 | 0 | Vol Cnt Date: | n/a | 0 | 20 |
| | | Cycle Time (sec): | 60 | | |
| | 0 | Loss Time (sec): | 9 | 0 | |
| 125 | 1! | Critical V/C: | 0.650 | 1! | 239*** |
| | 0 | Avg Crit Del (sec/veh): | 16.1 | 0 | |
| 57 | 0 | Avg Delay (sec/veh): | 15.9 | 0 | 38 |
| | | LOS: | B | | |

Signal=Permit
Rights=Include

Lanes: 1 0 1 1 0
Final Vol: 75 1176*** 134
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1176 | 134 | 33 | 985 | 142 | 10 | 125 | 57 | 38 | 239 | 20 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.94 | 0.94 | 0.95 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Lanes: | 1.00 | 1.80 | 0.20 | 1.00 | 1.75 | 0.25 | 0.05 | 0.65 | 0.30 | 0.13 | 0.80 | 0.07 |
| Final Sat.: | 1805 | 3192 | 364 | 1805 | 3095 | 446 | 93 | 1165 | 531 | 229 | 1439 | 120 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.37 | 0.37 | 0.02 | 0.32 | 0.32 | 0.11 | 0.11 | 0.11 | 0.17 | 0.17 | 0.17 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 10.0 | 30.3 | 30.3 | 7.0 | 27.3 | 27.3 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 |
| Volume/Cap: | 0.25 | 0.73 | 0.73 | 0.16 | 0.70 | 0.70 | 0.47 | 0.47 | 0.47 | 0.73 | 0.73 | 0.73 |
| Uniform Del: | 21.7 | 11.6 | 11.6 | 23.8 | 13.1 | 13.1 | 20.0 | 20.0 | 20.0 | 21.4 | 21.4 | 21.4 |
| IncremntDel: | 0.4 | 1.5 | 1.5 | 0.3 | 1.4 | 1.4 | 0.9 | 0.9 | 0.9 | 6.5 | 6.5 | 6.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 22.2 | 13.2 | 13.2 | 24.2 | 14.4 | 14.4 | 20.9 | 20.9 | 20.9 | 28.0 | 28.0 | 28.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 22.2 | 13.2 | 13.2 | 24.2 | 14.4 | 14.4 | 20.9 | 20.9 | 20.9 | 28.0 | 28.0 | 28.0 |
| LOS by Move: | C | B | B | C | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 1 | 11 | 11 | 1 | 10 | 10 | 4 | 4 | 4 | 7 | 7 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #13: (42) University Avenue and Bell Street

Signal=Protect/Rights=Include
Final Vol: 192 871 48***
Lanes: 0 1 1 0 1

| Final Vol: | Lanes: | Signal=Permit Rights=Include | | | Signal=Permit Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| | | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 75 | | | |
| 14 | 0 | | | | | 0 | 23 |
| | | | Loss Time (sec): | 9 | | | |
| | 0 | | | | | 0 | |
| 212 | 1! | | Critical V/C: | 0.897 | | 1! | 396*** |
| | 0 | | Avg Crit Del (sec/veh): | 40.9 | | 0 | |
| 57 | 0 | | Avg Delay (sec/veh): | 32.9 | | 0 | 105 |
| | | | LOS: | C | | | |

Lanes: 1 0 1 1 0
Final Vol: 75 1338*** 189
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Bell Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 75 | 1338 | 189 | 48 | 871 | 192 | 14 | 212 | 57 | 105 | 396 | 23 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.93 | 0.93 | 0.95 | 0.92 | 0.92 | 0.95 | 0.95 | 0.95 | 0.83 | 0.83 | 0.83 |
| Lanes: | 1.00 | 1.75 | 0.25 | 1.00 | 1.64 | 0.36 | 0.05 | 0.75 | 0.20 | 0.20 | 0.76 | 0.04 |
| Final Sat.: | 1805 | 3103 | 438 | 1805 | 2878 | 634 | 89 | 1352 | 363 | 317 | 1195 | 69 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.43 | 0.43 | 0.03 | 0.30 | 0.30 | 0.16 | 0.16 | 0.16 | 0.33 | 0.33 | 0.33 |
| Crit Moves: | | **** | | **** | | | | | | | **** | |
| Green Time: | 9.5 | 33.4 | 33.4 | 7.0 | 30.8 | 30.8 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 |
| Volume/Cap: | 0.33 | 0.97 | 0.97 | 0.28 | 0.74 | 0.74 | 0.46 | 0.46 | 0.46 | 0.97 | 0.97 | 0.97 |
| Uniform Del: | 29.8 | 20.3 | 20.3 | 31.7 | 18.6 | 18.6 | 19.3 | 19.3 | 19.3 | 24.3 | 24.3 | 24.3 |
| IncremntDel: | 0.8 | 16.0 | 16.0 | 0.9 | 2.0 | 2.0 | 0.5 | 0.5 | 0.5 | 30.9 | 30.9 | 30.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 30.7 | 36.3 | 36.3 | 32.6 | 20.7 | 20.7 | 19.8 | 19.8 | 19.8 | 55.2 | 55.2 | 55.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 30.7 | 36.3 | 36.3 | 32.6 | 20.7 | 20.7 | 19.8 | 19.8 | 19.8 | 55.2 | 55.2 | 55.2 |
| LOS by Move: | C | D | D | C | C | C | B | B | B | E | E | E |
| HCM2kAvgQ: | 2 | 25 | 25 | 1 | 12 | 12 | 5 | 5 | 5 | 18 | 18 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 438 338***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include
Final Vol: Lanes:
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.969
Avg Crit Del (sec/veh): 131.6
Avg Delay (sec/veh): 68.7
LOS: E

Signal=Split Rights=Overlap
Lanes: Final Vol:
1 271
0
0 0
0
1 9***

Lanes: 0 0 1 1 0
Final Vol: 0 307*** 9
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 307 | 9 | 338 | 438 | 0 | 0 | 0 | 0 | 9 | 0 | 271 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 35 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.55 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.49 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 13.1 | 13.1 | 27.9 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 37.9 |
| Volume/Cap: | 0.00 | 1.18 | 1.18 | 1.18 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.78 |
| Uniform Del: | 0.0 | 23.5 | 23.5 | 16.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 8.0 |
| IncremntDel: | 0.0 | 114 | 114.4 | 112.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 10.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 138 | 137.8 | 128.8 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 18.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 138 | 137.8 | 128.8 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 18.9 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 9 | 9 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 754 444***
Lanes: 0 0 3 0 1

Signal=Split
Rights=Include
Final Vol: 0, Lanes: 0
Lanes: 0
Final Vol: 0, Lanes: 0
Lanes: 0
Final Vol: 0, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.954
Avg Crit Del (sec/veh): 120.3
Avg Delay (sec/veh): 64.4
LOS: E

Signal=Split
Rights=Overlap
Lanes: 1, Final Vol: 207
Lanes: 0
Lanes: 0, Final Vol: 0
Lanes: 0
Lanes: 1, Final Vol: 7***

Lanes: 0 0 1 1 0
Final Vol: 0 541*** 26
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 541 | 26 | 444 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 207 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.91 | 0.09 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1720 | 83 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.31 | 0.31 | 0.49 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.25 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 16.0 | 16.0 | 25.0 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 35.0 |
| Volume/Cap: | 0.00 | 1.18 | 1.18 | 1.18 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.44 |
| Uniform Del: | 0.0 | 22.0 | 22.0 | 17.5 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 7.0 |
| IncremntDel: | 0.0 | 99.1 | 99.1 | 103.5 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 121 | 121.0 | 121.0 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 121 | 121.0 | 121.0 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.7 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 14 | 14 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 433 328***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include
Final Vol: Lanes:
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.950
Avg Crit Del (sec/veh): 122.8
Avg Delay (sec/veh): 64.2
LOS: E

Signal=Split Rights=Overlap
Lanes: Final Vol:
1 257
0
0 0
0
1 9***

Lanes: 0 0 1 1 0
Final Vol: 0 307*** 9
Signal=Protect/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 307 | 9 | 328 | 433 | 0 | 0 | 0 | 0 | 9 | 0 | 257 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.34 | 0.32 | 0.32 | 0.32 | 0.31 | 0.34 | 0.34 | 0.34 | 0.34 | 0.32 | 0.34 | 0.29 |
| Lanes: | 0.00 | 1.94 | 0.06 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1188 | 35 | 614 | 1764 | 0 | 0 | 0 | 0 | 614 | 0 | 549 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.26 | 0.26 | 0.53 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.47 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 13.4 | 13.4 | 27.6 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 37.6 |
| Volume/Cap: | 0.00 | 1.16 | 1.16 | 1.16 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.75 |
| Uniform Del: | 0.0 | 23.3 | 23.3 | 16.2 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.8 |
| IncremntDel: | 0.0 | 105 | 105.0 | 104.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 8.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 128 | 128.4 | 120.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 128 | 128.4 | 120.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.5 | 0.0 | 16.5 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | B |
| HCM2kAvgQ: | 0 | 9 | 9 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #20: (50) East Bayshore Road and Donohoe Street

Signal=Protect/Rights=Include
Final Vol: 0 754 438***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include (Eastbound)
Final Vol: 0, 0, 0
Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.944
Avg Crit Del (sec/veh): 115.4
Avg Delay (sec/veh): 61.8
LOS: E

Signal=Split Rights=Overlap (Westbound)
Lanes: 1, 0, 0, 0, 1
Final Vol: 199, 0, 7***

Lanes: 0 0 1 1 0
Final Vol: 0 537*** 26
Signal=Protect/Rights=Include

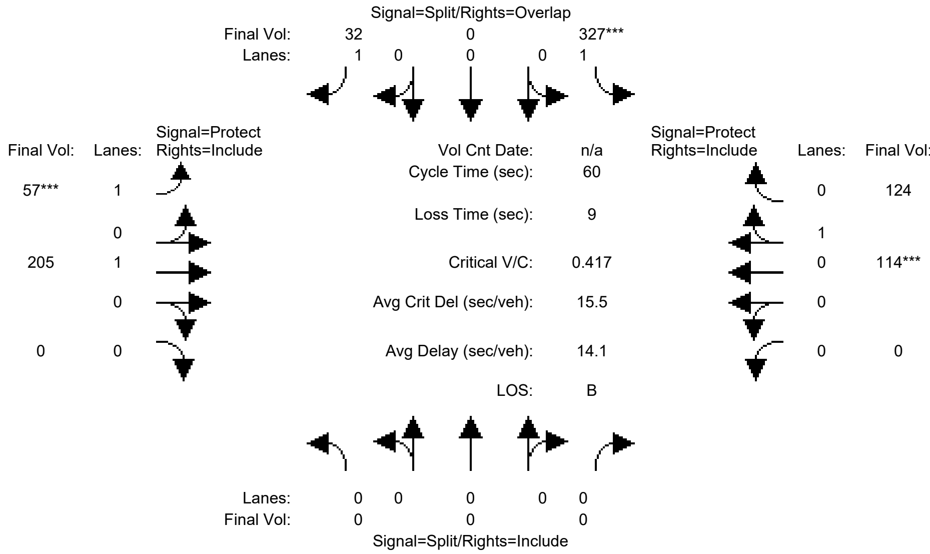
| Street Name: | East Bayshore Road | | | | | | Donohoe Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 537 | 26 | 438 | 754 | 0 | 0 | 0 | 0 | 7 | 0 | 199 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.50 | 0.47 | 0.47 | 0.48 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.50 | 0.43 |
| Lanes: | 0.00 | 1.91 | 0.09 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 1720 | 83 | 908 | 2609 | 0 | 0 | 0 | 0 | 908 | 0 | 812 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.31 | 0.31 | 0.48 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.24 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 16.1 | 16.1 | 24.9 | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 0.0 | 34.9 |
| Volume/Cap: | 0.00 | 1.16 | 1.16 | 1.16 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.42 |
| Uniform Del: | 0.0 | 21.9 | 21.9 | 17.6 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 21.0 | 0.0 | 7.0 |
| IncremntDel: | 0.0 | 94.0 | 94.0 | 98.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 116 | 116.0 | 116.2 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 116 | 116.0 | 116.2 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 21.1 | 0.0 | 7.6 |
| LOS by Move: | A | F | F | F | A | A | A | A | A | C | A | A |
| HCM2kAvgQ: | 0 | 14 | 14 | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

## Intersection #25: (54) East Bayshore Road and Clarke Avenue




| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 327 | 0 | 32 | 57 | 205 | 0 | 0 | 114 | 124 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.91 | 0.91 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.48 | 0.52 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 829 | 902 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.14 | 0.14 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 25.2 | 0.0 | 32.2 | 7.0 | 25.8 | 0.0 | 0.0 | 18.8 | 18.8 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.04 | 0.28 | 0.26 | 0.00 | 0.00 | 0.44 | 0.44 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 12.4 | 0.0 | 6.6 | 24.2 | 11.0 | 0.0 | 0.0 | 16.4 | 16.4 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.6 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 6.6 | 24.9 | 11.1 | 0.0 | 0.0 | 17.0 | 17.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 12.8 | 0.0 | 6.6 | 24.9 | 11.1 | 0.0 | 0.0 | 17.0 | 17.0 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 3 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

## Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap
Final Vol: 26 0 182***
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include
Final Vol: Lanes:
81*** 1
0
325 1
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 75
Loss Time (sec): 9
Critical V/C: 0.414
Avg Crit Del (sec/veh): 17.7
Avg Delay (sec/veh): 13.9
LOS: B

Signal=Protect Rights=Include
Lanes: Final Vol:
0 172
1
0 205***
0
0 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 182 | 0 | 26 | 81 | 325 | 0 | 0 | 205 | 172 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.54 | 0.46 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 950 | 797 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.02 | 0.05 | 0.17 | 0.00 | 0.00 | 0.22 | 0.22 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 18.6 | 0.0 | 26.9 | 8.3 | 47.4 | 0.0 | 0.0 | 39.1 | 39.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.41 | 0.00 | 0.05 | 0.41 | 0.28 | 0.00 | 0.00 | 0.41 | 0.41 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.6 | 0.0 | 15.7 | 31.1 | 6.2 | 0.0 | 0.0 | 11.0 | 11.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 1.4 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 24.3 | 0.0 | 15.7 | 32.5 | 6.3 | 0.0 | 0.0 | 11.3 | 11.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 24.3 | 0.0 | 15.7 | 32.5 | 6.3 | 0.0 | 0.0 | 11.3 | 11.3 |
| LOS by Move: | A | A | A | C | A | B | C | A | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 3 | 0 | 0 | 5 | 5 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #25: (54) East Bayshore Road and Clarke Avenue

Signal=Split/Rights=Overlap
Final Vol: 32 0 329***
Lanes: 1 0 0 0 1

Signal=Protect Rights=Include (west side)
Final Vol: 57*** Lanes: 1
Lanes: 0
Final Vol: 204 Lanes: 1
Lanes: 0
Final Vol: 0 Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 60
Loss Time (sec): 9
Critical V/C: 0.425
Avg Crit Del (sec/veh): 15.6
Avg Delay (sec/veh): 14.2
LOS: B

Signal=Protect Rights=Include (east side)
Lanes: 0 Final Vol: 120
Lanes: 1
Lanes: 0 Final Vol: 129***
Lanes: 0
Lanes: 0 Final Vol: 0

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

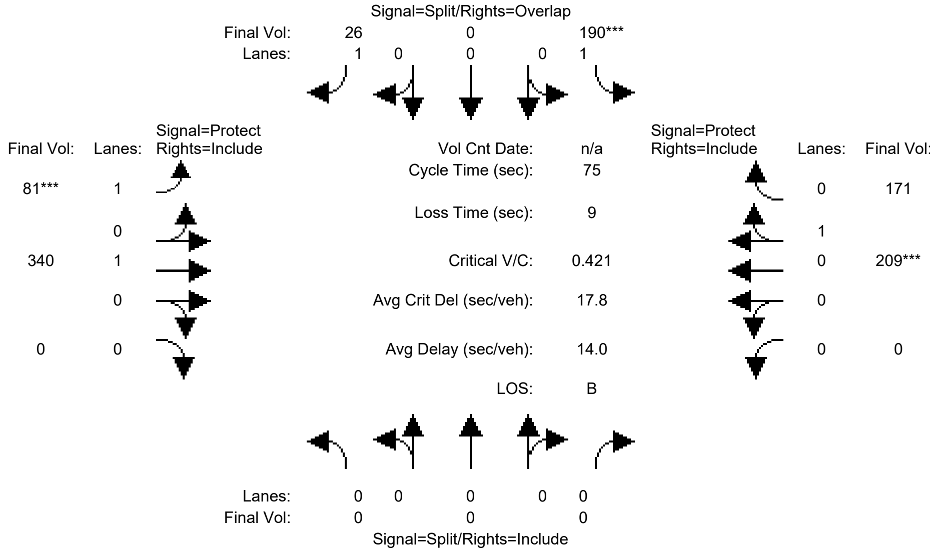
| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 329 | 0 | 32 | 57 | 204 | 0 | 0 | 129 | 120 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.52 | 0.48 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 902 | 839 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.02 | 0.03 | 0.11 | 0.00 | 0.00 | 0.14 | 0.14 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 24.9 | 0.0 | 31.9 | 7.0 | 26.1 | 0.0 | 0.0 | 19.1 | 19.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.45 | 0.00 | 0.04 | 0.28 | 0.25 | 0.00 | 0.00 | 0.45 | 0.45 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 12.6 | 0.0 | 6.7 | 24.2 | 10.7 | 0.0 | 0.0 | 16.2 | 16.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0.6 | 0.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 13.1 | 0.0 | 6.7 | 24.9 | 10.9 | 0.0 | 0.0 | 16.8 | 16.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 13.1 | 0.0 | 6.7 | 24.9 | 10.9 | 0.0 | 0.0 | 16.8 | 16.8 |
| LOS by Move: | A | A | A | B | A | A | C | B | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 2 | 0 | 0 | 4 | 4 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #25: (54) East Bayshore Road and Clarke Avenue



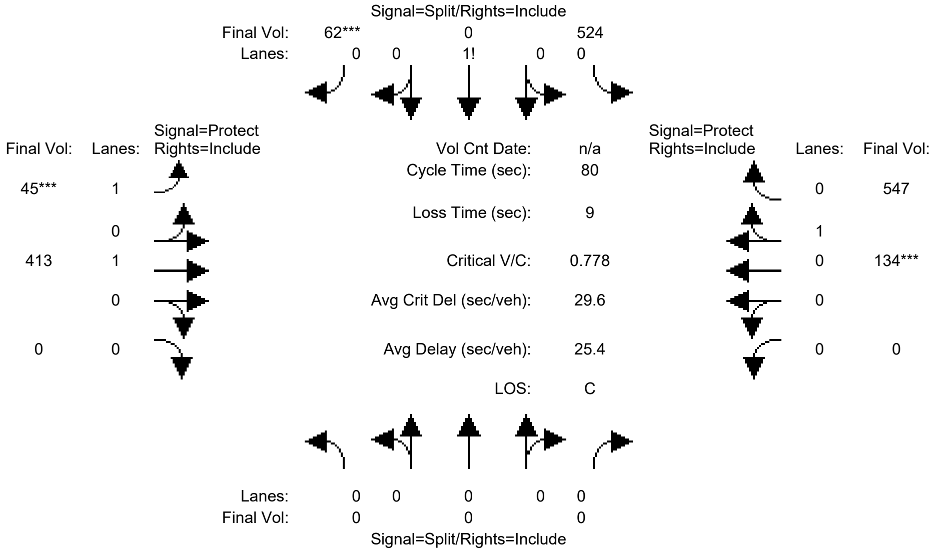

| Street Name: | East Bayshore Road | | | | | | Clarke Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 190 | 0 | 26 | 81 | 340 | 0 | 0 | 209 | 171 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.83 | 0.93 | 0.98 | 1.00 | 1.00 | 0.92 | 0.92 |
| Lanes: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.55 | 0.45 |
| Final Sat.: | 0 | 0 | 0 | 1769 | 0 | 1583 | 1769 | 1862 | 0 | 0 | 962 | 787 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.02 | 0.05 | 0.18 | 0.00 | 0.00 | 0.22 | 0.22 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 19.1 | 0.0 | 27.3 | 8.2 | 46.9 | 0.0 | 0.0 | 38.7 | 38.7 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.42 | 0.00 | 0.05 | 0.42 | 0.29 | 0.00 | 0.00 | 0.42 | 0.42 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.3 | 0.0 | 15.4 | 31.2 | 6.5 | 0.0 | 0.0 | 11.2 | 11.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 1.5 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 23.9 | 0.0 | 15.5 | 32.7 | 6.6 | 0.0 | 0.0 | 11.5 | 11.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 23.9 | 0.0 | 15.5 | 32.7 | 6.6 | 0.0 | 0.0 | 11.5 | 11.5 |
| LOS by Move: | A | A | A | C | A | B | C | A | A | A | B | B |
| HCM2kAvgQ: | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 4 | 0 | 0 | 6 | 6 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road




| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 413 | 0 | 0 | 134 | 547 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.20 | 0.80 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 374 | 1526 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.22 | 0.00 | 0.00 | 0.36 | 0.36 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 29.6 | 0.0 | 29.6 | 7.0 | 41.4 | 0.0 | 0.0 | 34.4 | 34.4 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.83 | 0.00 | 0.83 | 0.27 | 0.42 | 0.00 | 0.00 | 0.83 | 0.83 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.0 | 0.0 | 23.0 | 34.1 | 11.9 | 0.0 | 0.0 | 20.3 | 20.3 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 8.5 | 0.0 | 8.5 | 0.9 | 0.3 | 0.0 | 0.0 | 7.4 | 7.4 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 31.4 | 0.0 | 31.4 | 35.0 | 12.2 | 0.0 | 0.0 | 27.6 | 27.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 31.4 | 0.0 | 31.4 | 35.0 | 12.2 | 0.0 | 0.0 | 27.6 | 27.6 |
| LOS by Move: | A | A | A | C | A | C | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 16 | 0 | 16 | 1 | 6 | 0 | 0 | 17 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

Signal=Split/Rights=Include
Final Vol: 80*** 0 581
Lanes: 0 0 1! 0 0

Signal=Protect Rights=Include (East Bound) — Final Vol: 127*** / 385 / 0; Lanes: 1 0 1 0 0

Signal=Protect Rights=Include (West Bound) — Lanes: 0 1 0 0 0; Final Vol: 561 / 297*** / 0

Vol Cnt Date: n/a
Cycle Time (sec): 80
Loss Time (sec): 9
Critical V/C: 0.976
Avg Crit Del (sec/veh): 56.0
Avg Delay (sec/veh): 47.4
LOS: D

Lanes: 0 0 0 0 0
Final Vol: 0 0 0
Signal=Split/Rights=Include

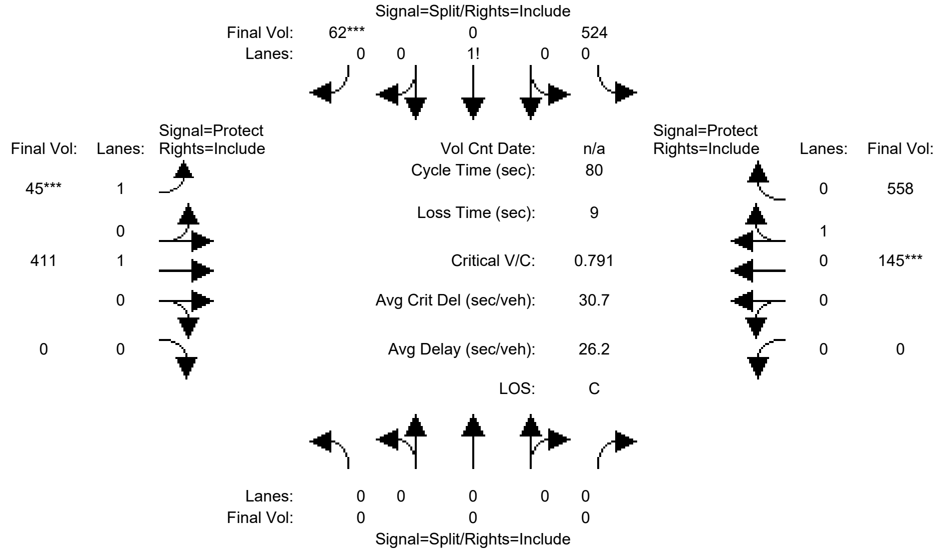
| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 581 | 0 | 80 | 127 | 385 | 0 | 0 | 297 | 561 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.35 | 0.65 |
| Final Sat.: | 0 | 0 | 0 | 1670 | 0 | 230 | 1900 | 1900 | 0 | 0 | 658 | 1242 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | 0.07 | 0.20 | 0.00 | 0.00 | 0.45 | 0.45 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 27.8 | 0.0 | 27.8 | 7.0 | 43.2 | 0.0 | 0.0 | 36.2 | 36.2 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.76 | 0.38 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 26.1 | 35.7 | 10.6 | 0.0 | 0.0 | 21.9 | 21.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 34.8 | 0.0 | 34.8 | 18.7 | 0.2 | 0.0 | 0.0 | 30.5 | 30.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 60.9 | 0.0 | 60.9 | 54.4 | 10.9 | 0.0 | 0.0 | 52.5 | 52.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 60.9 | 0.0 | 60.9 | 54.4 | 10.9 | 0.0 | 0.0 | 52.5 | 52.5 |
| LOS by Move: | A | A | A | E | A | E | D | B | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 24 | 0 | 24 | 5 | 6 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road

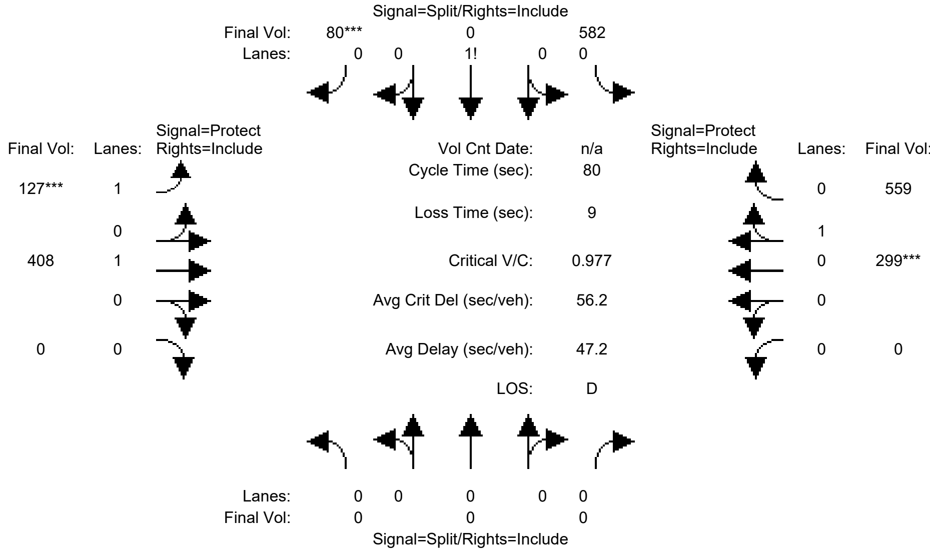



| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 524 | 0 | 62 | 45 | 411 | 0 | 0 | 145 | 558 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 | 0.11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.21 | 0.79 |
| Final Sat.: | 0 | 0 | 0 | 1699 | 0 | 201 | 1900 | 1900 | 0 | 0 | 392 | 1508 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.31 | 0.02 | 0.22 | 0.00 | 0.00 | 0.37 | 0.37 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 29.1 | 0.0 | 29.1 | 7.0 | 41.9 | 0.0 | 0.0 | 34.9 | 34.9 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.85 | 0.27 | 0.41 | 0.00 | 0.00 | 0.85 | 0.85 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 23.4 | 0.0 | 23.4 | 34.1 | 11.6 | 0.0 | 0.0 | 20.2 | 20.2 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 9.6 | 0.0 | 9.6 | 0.9 | 0.3 | 0.0 | 0.0 | 8.2 | 8.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 33.1 | 0.0 | 33.1 | 35.0 | 11.9 | 0.0 | 0.0 | 28.4 | 28.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 33.1 | 0.0 | 33.1 | 35.0 | 11.9 | 0.0 | 0.0 | 28.4 | 28.4 |
| LOS by Move: | A | A | A | C | A | C | C | B | A | A | C | C |
| HCM2kAvgQ: | 0 | 0 | 0 | 16 | 0 | 16 | 1 | 6 | 0 | 0 | 18 | 18 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #31: (55) Pulgas Avenue and East Bayshore Road




| Street Name: | Puglas Avenue | | | | | | East Bayshore Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 0 | 0 | 0 | 10 | 0 | 10 | 7 | 10 | 0 | 0 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 582 | 0 | 80 | 127 | 408 | 0 | 0 | 299 | 559 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 | 0.12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.35 | 0.65 |
| Final Sat.: | 0 | 0 | 0 | 1670 | 0 | 230 | 1900 | 1900 | 0 | 0 | 662 | 1238 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | 0.07 | 0.21 | 0.00 | 0.00 | 0.45 | 0.45 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green Time: | 0.0 | 0.0 | 0.0 | 27.9 | 0.0 | 27.9 | 7.0 | 43.1 | 0.0 | 0.0 | 36.1 | 36.1 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.76 | 0.40 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Del: | 0.0 | 0.0 | 0.0 | 26.1 | 0.0 | 26.1 | 35.7 | 10.8 | 0.0 | 0.0 | 21.9 | 21.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 35.0 | 0.0 | 35.0 | 18.7 | 0.3 | 0.0 | 0.0 | 30.7 | 30.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 61.0 | 0.0 | 61.0 | 54.4 | 11.1 | 0.0 | 0.0 | 52.7 | 52.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 61.0 | 0.0 | 61.0 | 54.4 | 11.1 | 0.0 | 0.0 | 52.7 | 52.7 |
| LOS by Move: | A | A | A | E | A | E | D | B | A | A | D | D |
| HCM2kAvgQ: | 0 | 0 | 0 | 24 | 0 | 24 | 5 | 6 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #32: (51) East Bayshore Road and Holland Street

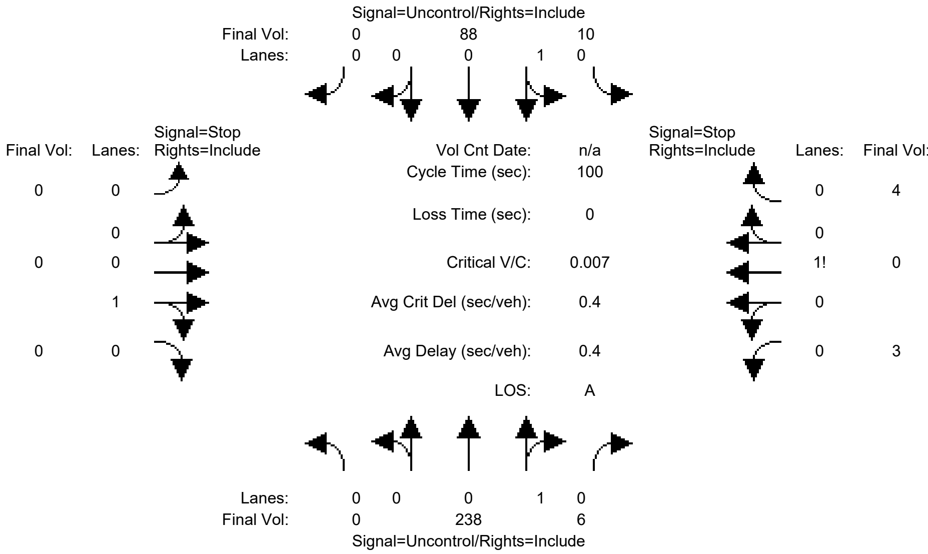
```
                         Signal=Uncontrol/Rights=Include
               Final Vol:    0          77        5
                   Lanes:    0    0      0     1    0

                 Signal=Stop                                    Signal=Stop
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:     n/a    Rights=Include    Lanes:  Final Vol:
                                       Cycle Time (sec):  100
    0         0                                                                    0        11
                                       Loss Time (sec):    0
              0                                                                    0
    0         0                        Critical V/C:     0.011                     1!        0
              0                        Avg Crit Del (sec/veh):  1.0                0
    0         0                        Avg Delay (sec/veh):     1.0                0         3
                                       LOS:               A

                   Lanes:    0    0      0     1    0
               Final Vol:    0          59        0
                         Signal=Uncontrol/Rights=Include
```

```
Street Name:        East Bayshore Road                 Holland Street
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   59     0     5   77     0     0    0     0     3    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx              8.8
ApproachLOS:         *                 *                 *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L - T - R     L - T - R     L - T - R     L - T - R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59    0     5   77    0     0    0    0     3    0   11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L - T - R     L - T - R     L - T - R     L - T - R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
Initial Vol:    0   59    0     5   77    0     0    0    0     3    0   11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            141
Minor Approach Volume:          14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

## Intersection #32: (51) East Bayshore Road and Holland Street




| Street Name: | East Bayshore Road | | | | | | Holland Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 238 | 6 | 10 | 88 | 0 | 0 | 0 | 0 | 3 | 0 | 4 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 238 | 6 | 10 | 88 | 0 | 0 | 0 | 0 | 3 | 0 | 4 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 238 | 6 | 10 | 88 | 0 | 0 | 0 | 0 | 3 | 0 | 4 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 238 | 6 | 10 | 88 | 0 | 0 | 0 | 0 | 3 | 0 | 4 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 0 | 238 | 6 | 10 | 88 | 0 | 0 | 0 | 0 | 3 | 0 | 4 |
| **Critical Gap Module:** | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | 4.1 | xxxx | xxxxx | xxxxx | 6.5 | 6.2 | 6.4 | 6.5 | 6.2 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | 2.2 | xxxx | xxxxx | xxxxx | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| **Capacity Module:** | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | 244 | xxxx | xxxxx | xxxx | 352 | 88 | 349 | 349 | 241 |
| Potent Cap.: | xxxx | xxxx | xxxxx | 1334 | xxxx | xxxxx | xxxx | 576 | 976 | 652 | 578 | 803 |
| Move Cap.: | xxxx | xxxx | xxxxx | 1334 | xxxx | xxxxx | xxxx | 572 | 976 | 648 | 574 | 803 |
| Volume/Cap: | xxxx | xxxx | xxxx | 0.01 | xxxx | xxxx | xxxx | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Level Of Service Module:** | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | 7.7 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | * | * | * | A | * | * | * | * | * | * | * | * |
| Movement: | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT | LT | LTR | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 0 | xxxx | 728 | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 0.0 | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | 7.7 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | 10.0 | xxxxx |
| Shared LOS: | * | * | * | A | * | * | * | * | * | * | A | * |
| ApproachDel: | | xxxxxx | | | xxxxxx | | | xxxxxx | | | 10.0 | |
| ApproachLOS: | | * | | | * | | | * | | | A | |

Note: Queue reported is the number of cars per lane.

Peak Hour Delay Signal Warrant Report

**************************************************************************************

Intersection #32 (51) East Bayshore Road and Holland Street

**************************************************************************************

Future Volume Alternative: Peak Hour Warrant NOT Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            342
Minor Approach Volume:          7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #32: (51) East Bayshore Road and Holland Street

Signal=Uncontrol/Rights=Include
Final Vol: 0 77 5
Lanes: 0 0 0 1 0

Signal=Stop Rights=Include (East Bound) — Final Vol: 0, 0, 0; Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.011
Avg Crit Del (sec/veh): 1.0
Avg Delay (sec/veh): 1.0
LOS: A

Signal=Stop Rights=Include (West Bound) — Lanes: 0, 0, 1!, 0, 0; Final Vol: 11, 0, 3

Lanes: 0 0 0 1 0
Final Vol: 0 59 0
Signal=Uncontrol/Rights=Include

```
Street Name:        East Bayshore Road                 Holland Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   59     0     5   77     0     0    0     0     3    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   59     0     5   77     0     0    0     0     3    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   59     0     5   77     0     0    0     0     3    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   59     0     5   77     0     0    0     0     3    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    59 xxxx xxxxx  xxxx xxxx xxxxx   146  146    59
Potent Cap.: xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   851  749  1012
Move Cap.:   xxxx xxxx xxxxx  1558 xxxx xxxxx  xxxx xxxx xxxxx   849  747  1012
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  972 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx              8.8
ApproachLOS:          *                *                *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              8.8
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=155]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1  0  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:    0   59     0     5   77     0     0    0     0     3    0    11
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            141
Minor Approach Volume:          14
Minor Approach Volume Threshold: 742
--------------------------------------------------------------------------------
```

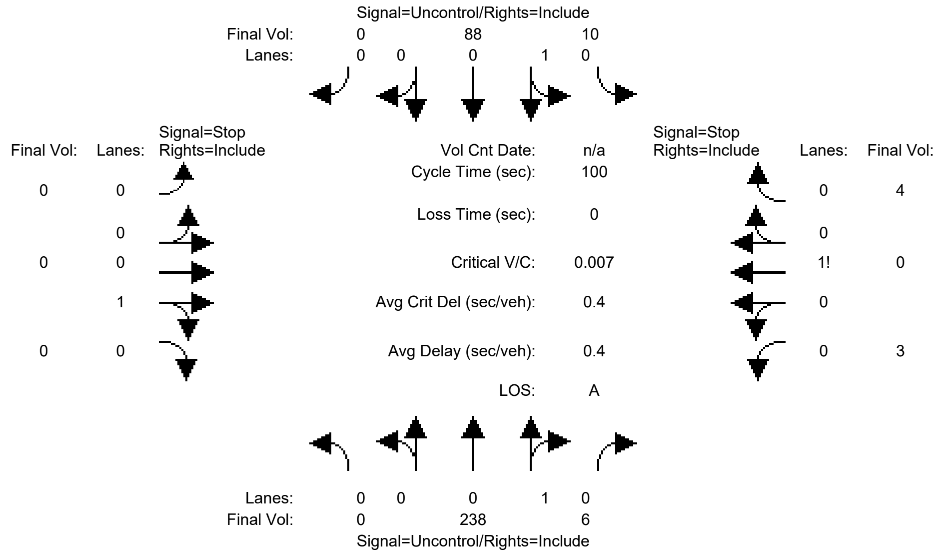
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #32: (51) East Bayshore Road and Holland Street




```
Street Name:        East Bayshore Road                 Holland Street
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  238     6    10   88     0     0    0     0     3    0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  238     6    10   88     0     0    0     0     3    0     4
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  238     6    10   88     0     0    0     0     3    0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  238     6    10   88     0     0    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0  238     6    10   88     0     0    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx  6.5   6.2   6.4  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   244 xxxx xxxxx  xxxx  352    88   349  349   241
Potent Cap.: xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  576   976   652  578   803
Move Cap.:   xxxx xxxx xxxxx  1334 xxxx xxxxx  xxxx  572   976   648  574   803
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx 0.00  0.00  0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx     0  xxxx  728 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             10.0
ApproachLOS:        *                *                *                A
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
ApproachDel:    xxxxxx          xxxxxx          xxxxxx             10.0
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=7]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=349]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #32 (51) East Bayshore Road and Holland Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0
Initial Vol:    0  238    6    10   88    0     0    0    0     3    0    4
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            342
Minor Approach Volume:          7
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 162 1283*** 0
Lanes: 0 1 1 0 0

Signal=Split Rights=Include (West side)
Final Vol: 65, Lanes: 0
Lanes: 0
Final Vol: 0, Lanes: 1!
Lanes: 0
Final Vol: 236***, Lanes: 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.699
Avg Crit Del (sec/veh): 31.9
Avg Delay (sec/veh): 24.7
LOS: C

Signal=Split Rights=Include (East side)
Lanes: 0, Final Vol: 0
Lanes: 0
Lanes: 0, Final Vol: 0
Lanes: 0
Lanes: 0, Final Vol: 0

Lanes: 1 0 2 0 0
Final Vol: 127*** 935 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 127 | 935 | 0 | 0 | 1283 | 162 | 65 | 0 | 236 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.88 | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.22 | 0.00 | 0.78 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3151 | 398 | 363 | 0 | 1317 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.26 | 0.00 | 0.00 | 0.41 | 0.41 | 0.18 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | | | **** | | | |
| Green Time: | 15.1 | 103 | 0.0 | 0.0 | 87.4 | 87.4 | 38.5 | 0.0 | 38.5 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.70 | 0.38 | 0.00 | 0.00 | 0.70 | 0.70 | 0.70 | 0.00 | 0.70 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 65.2 | 10.1 | 0.0 | 0.0 | 22.0 | 22.0 | 50.5 | 0.0 | 50.5 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 11.4 | 0.1 | 0.0 | 0.0 | 1.1 | 1.1 | 5.0 | 0.0 | 5.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 76.6 | 10.2 | 0.0 | 0.0 | 23.1 | 23.1 | 55.5 | 0.0 | 55.5 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 76.6 | 10.2 | 0.0 | 0.0 | 23.1 | 23.1 | 55.5 | 0.0 | 55.5 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | E | A | E | A | A | A |
| HCM2kAvgQ: | 7 | 9 | 0 | 0 | 25 | 25 | 13 | 0 | 13 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 77 555 0***
Lanes: 0 1 1 0 0

Signal=Split Rights=Include (westbound side); Signal=Split Rights=Include (eastbound side)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 89*** | 0 | Vol Cnt Date: | n/a | | 0 | 0 |
| | 0 | Cycle Time (sec): | 150 | | 0 | |
| 0 | 1! | Loss Time (sec): | 9 | | 0 | 0 |
| | 0 | Critical V/C: | 0.683 | | 0 | |
| 234 | 0 | Avg Crit Del (sec/veh): | 22.5 | | 0 | 0 |
| | | Avg Delay (sec/veh): | 22.7 | | | |
| | | LOS: | C | | | |

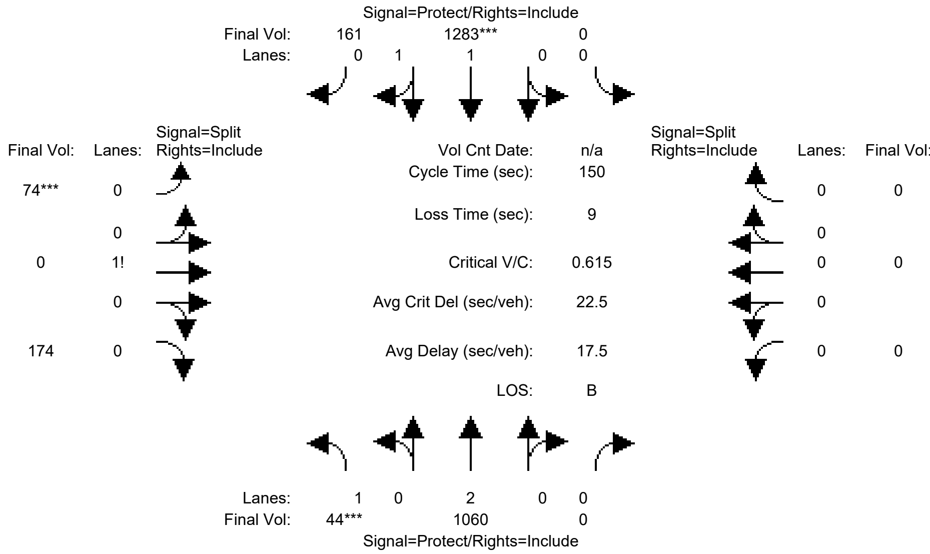
Lanes: 1 0 2 0 0
Final Vol: 47 1627*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 47 | 1627 | 0 | 0 | 555 | 77 | 89 | 0 | 234 | 0 | 0 | 0 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.76 | 0.24 | 0.28 | 0.00 | 0.72 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3113 | 432 | 466 | 0 | 1224 | 0 | 0 | 0 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.45 | 0.00 | 0.00 | 0.18 | 0.18 | 0.19 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 20.5 | 99.0 | 0.0 | 0.0 | 78.5 | 78.5 | 42.0 | 0.0 | 42.0 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.19 | 0.68 | 0.00 | 0.00 | 0.34 | 0.34 | 0.68 | 0.00 | 0.68 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 57.4 | 15.8 | 0.0 | 0.0 | 20.8 | 20.8 | 48.1 | 0.0 | 48.1 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 0.4 | 0.8 | 0.0 | 0.0 | 0.1 | 0.1 | 4.1 | 0.0 | 4.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 57.7 | 16.6 | 0.0 | 0.0 | 20.9 | 20.9 | 52.2 | 0.0 | 52.2 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.7 | 16.6 | 0.0 | 0.0 | 20.9 | 20.9 | 52.2 | 0.0 | 52.2 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | D | A | D | A | A | A |
| HCM2kAvgQ: | 2 | 24 | 0 | 0 | 9 | 9 | 14 | 0 | 14 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive




| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 44 | 1060 | 0 | 0 | 1283 | 161 | 74 | 0 | 174 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.93 | 0.93 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.78 | 0.22 | 0.30 | 0.00 | 0.70 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3153 | 396 | 505 | 0 | 1188 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.29 | 0.00 | 0.00 | 0.41 | 0.41 | 0.15 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |
| Green Time: | 7.0 | 106 | 0.0 | 0.0 | 98.5 | 98.5 | 35.5 | 0.0 | 35.5 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.52 | 0.42 | 0.00 | 0.00 | 0.62 | 0.62 | 0.62 | 0.00 | 0.62 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 69.9 | 9.3 | 0.0 | 0.0 | 14.9 | 14.9 | 51.2 | 0.0 | 51.2 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 5.8 | 0.1 | 0.0 | 0.0 | 0.5 | 0.5 | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 75.7 | 9.4 | 0.0 | 0.0 | 15.4 | 15.4 | 54.2 | 0.0 | 54.2 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 75.7 | 9.4 | 0.0 | 0.0 | 15.4 | 15.4 | 54.2 | 0.0 | 54.2 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | A | A | A | B | B | D | A | D | A | A | A |
| HCM2kAvgQ: | 3 | 10 | 0 | 0 | 20 | 20 | 11 | 0 | 11 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #33: (39.2) University Avenue and Kavanaugh Drive

Signal=Protect/Rights=Include
Final Vol: 47 657 0***
Lanes: 0 1 1 0 0

Signal=Split Rights=Include (West approach)
Final Vol: 94*** / 0 / 233
Lanes: 0 0 1! 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.685
Avg Crit Del (sec/veh): 22.7
Avg Delay (sec/veh): 23.5
LOS: C

Signal=Split Rights=Include (East approach)
Lanes: 0 0 0 0 0
Final Vol: 0 0 0

Lanes: 1 0 2 0 0
Final Vol: 90 1627*** 0
Signal=Protect/Rights=Include

| Street Name: | University Avenue | | | | | | Kavanaugh Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 90 | 1627 | 0 | 0 | 657 | 47 | 94 | 0 | 233 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 1.00 | 1.00 | 0.94 | 0.94 | 0.89 | 1.00 | 0.89 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 1.87 | 0.13 | 0.29 | 0.00 | 0.71 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1805 | 3610 | 0 | 0 | 3335 | 239 | 487 | 0 | 1207 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.45 | 0.00 | 0.00 | 0.20 | 0.20 | 0.19 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | **** | | | | | |
| Green Time: | 19.9 | 98.7 | 0.0 | 0.0 | 78.8 | 78.8 | 42.3 | 0.0 | 42.3 | 0.0 | 0.0 | 0.0 |
| Volume/Cap: | 0.38 | 0.68 | 0.00 | 0.00 | 0.38 | 0.38 | 0.68 | 0.00 | 0.68 | 0.00 | 0.00 | 0.00 |
| Uniform Del: | 59.3 | 16.0 | 0.0 | 0.0 | 21.1 | 21.1 | 47.9 | 0.0 | 47.9 | 0.0 | 0.0 | 0.0 |
| IncremntDel: | 1.0 | 0.8 | 0.0 | 0.0 | 0.1 | 0.1 | 4.1 | 0.0 | 4.1 | 0.0 | 0.0 | 0.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| Delay/Veh: | 60.3 | 16.8 | 0.0 | 0.0 | 21.2 | 21.2 | 52.0 | 0.0 | 52.0 | 0.0 | 0.0 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 60.3 | 16.8 | 0.0 | 0.0 | 21.2 | 21.2 | 52.0 | 0.0 | 52.0 | 0.0 | 0.0 | 0.0 |
| LOS by Move: | E | B | A | A | C | C | D | A | D | A | A | A |
| HCM2kAvgQ: | 4 | 24 | 0 | 0 | 10 | 10 | 14 | 0 | 14 | 0 | 0 | 0 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #45: (43) University/Donohoe

Signal=Protect/Rights=Include
Final Vol: 69 860 19***
Lanes: 1 0 2 0 1

Signal=Split
Rights=Include

| Final Vol: | Lanes: | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|
| 5 | 1 | Vol Cnt Date: | n/a | 1 | 532 |
| | | Cycle Time (sec): | 150 | | |
| | 0 | Loss Time (sec): | 12 | 1 | |
| 56 | 1 | Critical V/C: | 1.118 | 0 | 547*** |
| | 0 | Avg Crit Del (sec/veh): | 152.2 | 1 | |
| 451*** | 1 | Avg Delay (sec/veh): | 125.0 | 1 | 582 |
| | | LOS: | F | | |

Signal=Split
Rights=Include

Lanes: 2 0 2 0 1
Final Vol: 206 590 439***
Signal=Protect/Rights=Include

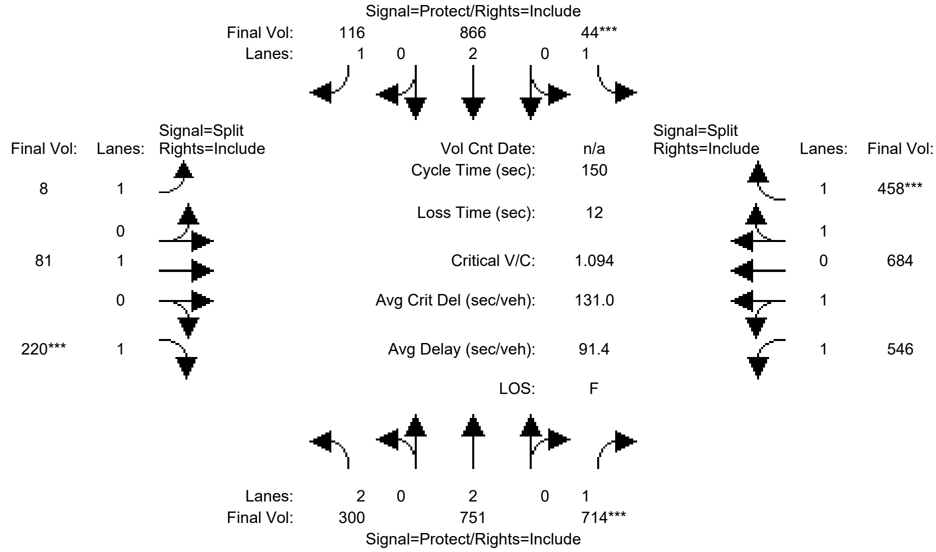
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 206 | 590 | 439 | 19 | 860 | 69 | 5 | 56 | 451 | 582 | 547 | 532 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.75 | 0.67 | 0.75 | 0.79 | 0.67 | 0.70 | 0.70 | 0.70 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.40 | 1.32 | 1.28 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2834 | 1268 | 1417 | 1492 | 1268 | 1858 | 1747 | 1699 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.21 | 0.35 | 0.01 | 0.30 | 0.05 | 0.00 | 0.04 | 0.36 | 0.31 | 0.31 | 0.31 |
| Crit Moves: | | | **** | **** | | | | | **** | | **** | |
| Green Time: | 10.6 | 43.7 | 43.7 | 10.0 | 43.0 | 43.0 | 44.9 | 44.9 | 44.9 | 39.5 | 39.5 | 39.5 |
| Volume/Cap: | 1.06 | 0.72 | 1.19 | 0.20 | 1.06 | 0.19 | 0.01 | 0.13 | 1.19 | 1.19 | 1.19 | 1.19 |
| Uniform Del: | 69.7 | 47.6 | 53.2 | 66.2 | 53.5 | 40.3 | 37.0 | 38.3 | 52.6 | 55.3 | 55.3 | 55.3 |
| IncremntDel: | 80.6 | 3.0 | 109.3 | 1.1 | 48.0 | 0.3 | 0.0 | 0.1 | 108.7 | 92.8 | 92.8 | 92.8 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 150.3 | 50.6 | 162.4 | 67.3 | 101 | 40.6 | 37.0 | 38.4 | 161.3 | 148.0 | 148 | 148.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 150.3 | 50.6 | 162.4 | 67.3 | 101 | 40.6 | 37.0 | 38.4 | 161.3 | 148.0 | 148 | 148.0 |
| LOS by Move: | F | D | F | E | F | D | D | D | F | F | F | F |
| HCM2kAvgQ: | 8 | 14 | 31 | 1 | 28 | 2 | 0 | 2 | 32 | 31 | 31 | 31 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #45: (43) University/Donohoe



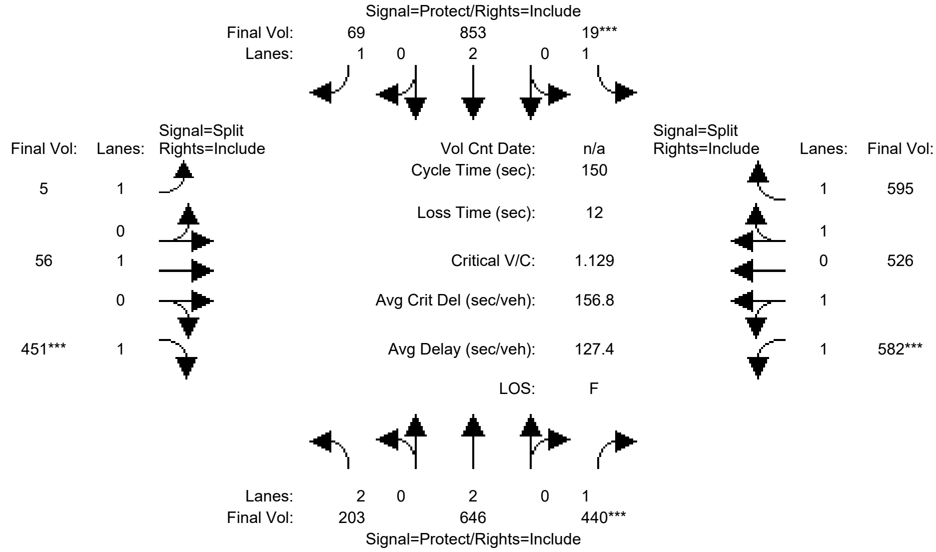

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 300 | 751 | 714 | 44 | 866 | 116 | 8 | 81 | 220 | 546 | 684 | 458 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.80 | 0.72 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.29 | 1.62 | 1.09 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 3050 | 1365 | 1525 | 1606 | 1365 | 1862 | 2333 | 1562 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.25 | 0.52 | 0.03 | 0.28 | 0.09 | 0.01 | 0.05 | 0.16 | 0.29 | 0.29 | 0.29 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 20.7 | 68.5 | 68.5 | 10.0 | 57.8 | 57.8 | 21.1 | 21.1 | 21.1 | 38.4 | 38.4 | 38.4 |
| Volume/Cap: | 0.74 | 0.54 | 1.15 | 0.43 | 0.74 | 0.22 | 0.04 | 0.36 | 1.15 | 1.15 | 1.15 | 1.15 |
| Uniform Del: | 62.1 | 29.4 | 40.7 | 67.3 | 39.5 | 30.9 | 55.7 | 58.3 | 64.4 | 55.8 | 55.8 | 55.8 |
| IncremntDel: | 6.9 | 0.4 | 83.4 | 2.9 | 2.5 | 0.2 | 0.1 | 1.0 | 109.6 | 74.0 | 74.0 | 74.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 68.9 | 29.8 | 124.1 | 70.2 | 42.0 | 31.2 | 55.7 | 59.3 | 174.1 | 129.8 | 130 | 129.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 68.9 | 29.8 | 124.1 | 70.2 | 42.0 | 31.2 | 55.7 | 59.3 | 174.1 | 129.8 | 130 | 129.8 |
| LOS by Move: | E | C | F | E | D | C | E | E | F | F | F | F |
| HCM2kAvgQ: | 8 | 13 | 46 | 2 | 19 | 4 | 0 | 4 | 16 | 30 | 30 | 30 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #45: (43) University/Donohoe



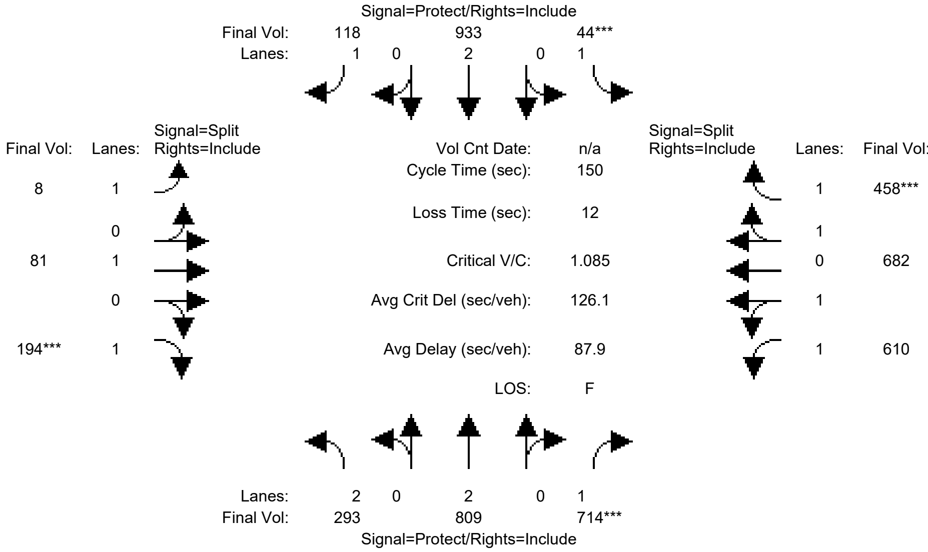

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 203 | 646 | 440 | 19 | 853 | 69 | 5 | 56 | 451 | 582 | 526 | 595 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.72 | 0.75 | 0.67 | 0.75 | 0.75 | 0.67 | 0.75 | 0.79 | 0.67 | 0.69 | 0.69 | 0.69 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.37 | 1.23 | 1.40 |
| Final Sat.: | 2749 | 2834 | 1268 | 1417 | 2834 | 1268 | 1417 | 1492 | 1268 | 1805 | 1631 | 1845 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.23 | 0.35 | 0.01 | 0.30 | 0.05 | 0.00 | 0.04 | 0.36 | 0.32 | 0.32 | 0.32 |
| Crit Moves: | | | **** | **** | | | | | **** | **** | | |
| Green Time: | 10.5 | 43.3 | 43.3 | 10.0 | 42.8 | 42.8 | 44.4 | 44.4 | 44.4 | 40.3 | 40.3 | 40.3 |
| Volume/Cap: | 1.05 | 0.79 | 1.20 | 0.20 | 1.05 | 0.19 | 0.01 | 0.13 | 1.20 | 1.20 | 1.20 | 1.20 |
| Uniform Del: | 69.7 | 49.1 | 53.3 | 66.2 | 53.6 | 40.5 | 37.3 | 38.6 | 52.8 | 54.9 | 54.9 | 54.9 |
| IncremntDel: | 79.9 | 5.2 | 114.0 | 1.1 | 46.9 | 0.3 | 0.0 | 0.1 | 113.5 | 97.7 | 97.7 | 97.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 149.7 | 54.3 | 167.3 | 67.3 | 101 | 40.8 | 37.3 | 38.7 | 166.3 | 152.6 | 153 | 152.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 149.7 | 54.3 | 167.3 | 67.3 | 101 | 40.8 | 37.3 | 38.7 | 166.3 | 152.6 | 153 | 152.6 |
| LOS by Move: | F | D | F | E | F | D | D | D | F | F | F | F |
| HCM2kAvgQ: | 8 | 16 | 32 | 1 | 28 | 2 | 0 | 2 | 32 | 32 | 32 | 32 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #45: (43) University/Donohoe



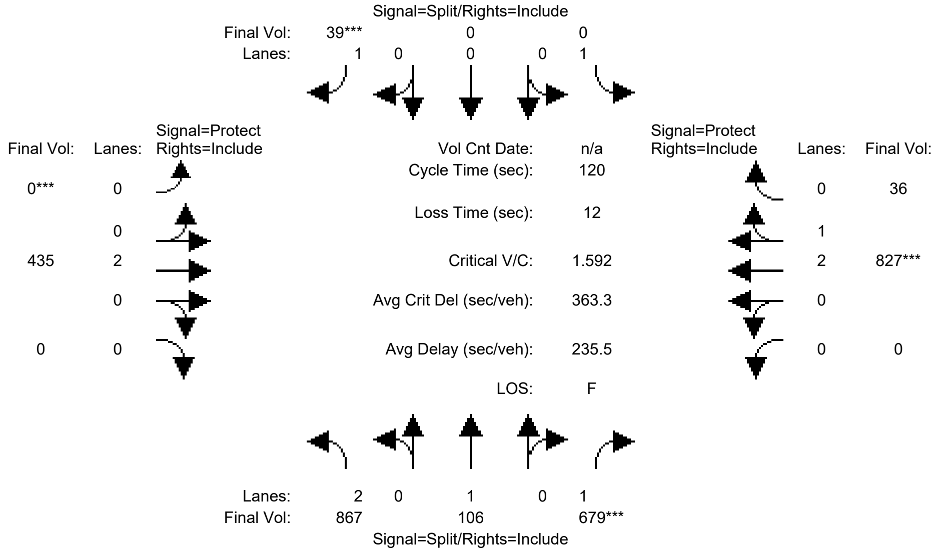

| Approach: | North Bound L | North Bound T | North Bound R | South Bound L | South Bound T | South Bound R | East Bound L | East Bound T | East Bound R | West Bound L | West Bound T | West Bound R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Green: | 11 | 9 | 9 | 10 | 8 | 8 | 9 | 9 | 9 | 8 | 8 | 8 |
| Y+R: | 3.5 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 293 | 809 | 714 | 44 | 933 | 118 | 8 | 81 | 194 | 610 | 682 | 458 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.78 | 0.80 | 0.72 | 0.80 | 0.80 | 0.72 | 0.80 | 0.85 | 0.72 | 0.76 | 0.76 | 0.76 |
| Lanes: | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.39 | 1.56 | 1.05 |
| Final Sat.: | 2959 | 3050 | 1365 | 1525 | 3050 | 1365 | 1525 | 1606 | 1365 | 2009 | 2246 | 1508 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.27 | 0.52 | 0.03 | 0.31 | 0.09 | 0.01 | 0.05 | 0.14 | 0.30 | 0.30 | 0.30 |
| Crit Moves: | | | **** | **** | | | | | **** | | | **** |
| Green Time: | 19.3 | 69.1 | 69.1 | 10.0 | 59.8 | 59.8 | 18.8 | 18.8 | 18.8 | 40.1 | 40.1 | 40.1 |
| Volume/Cap: | 0.77 | 0.58 | 1.14 | 0.43 | 0.77 | 0.22 | 0.04 | 0.40 | 1.14 | 1.14 | 1.14 | 1.14 |
| Uniform Del: | 63.2 | 29.7 | 40.4 | 67.3 | 39.1 | 29.7 | 57.7 | 60.4 | 65.6 | 54.9 | 54.9 | 54.9 |
| IncremntDel: | 9.1 | 0.6 | 79.4 | 2.9 | 3.0 | 0.2 | 0.1 | 1.3 | 110.0 | 69.6 | 69.6 | 69.6 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 72.3 | 30.3 | 119.9 | 70.2 | 42.1 | 29.9 | 57.8 | 61.8 | 175.6 | 124.5 | 125 | 124.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 72.3 | 30.3 | 119.9 | 70.2 | 42.1 | 29.9 | 57.8 | 61.8 | 175.6 | 124.5 | 125 | 124.5 |
| LOS by Move: | E | C | F | E | D | C | E | E | F | F | F | F |
| HCM2kAvgQ: | 8 | 14 | 46 | 2 | 21 | 4 | 0 | 4 | 15 | 31 | 31 | 31 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #46: (44) Capitol/Donohoe



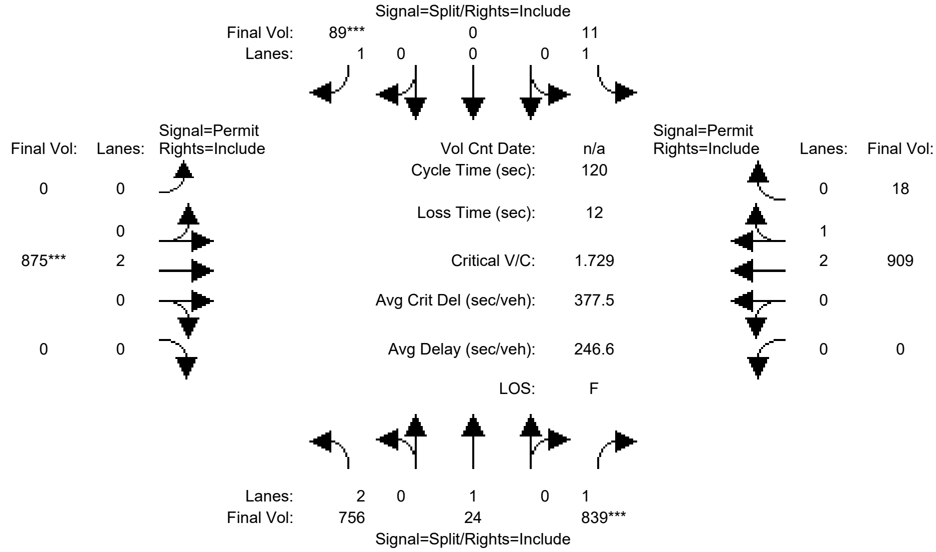

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 867 | 106 | 679 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.58 | 0.13 | 0.98 | 0.00 | 0.00 | 0.06 | 0.00 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 68.7 | 68.7 | 68.7 | 0.0 | 0.0 | 12.0 | 0.0 | 27.3 | 0.0 | 0.0 | 27.3 | 27.3 |
| Volume/Cap: | 1.01 | 0.23 | 1.72 | 0.00 | 0.00 | 0.57 | 0.00 | 1.24 | 0.00 | 0.00 | 1.72 | 1.72 |
| Uniform Del: | 25.7 | 12.6 | 25.7 | 0.0 | 0.0 | 51.5 | 0.0 | 46.3 | 0.0 | 0.0 | 46.3 | 46.3 |
| IncremntDel: | 34.1 | 0.3 | 334.9 | 0.0 | 0.0 | 10.5 | 0.0 | 130 | 0.0 | 0.0 | 333 | 332.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 59.8 | 12.9 | 360.6 | 0.0 | 0.0 | 62.0 | 0.0 | 176 | 0.0 | 0.0 | 379 | 379.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 59.8 | 12.9 | 360.6 | 0.0 | 0.0 | 62.0 | 0.0 | 176 | 0.0 | 0.0 | 379 | 379.0 |
| LOS by Move: | E | B | F | A | A | E | A | F | A | A | F | F |
| HCM2kAvgQ: | 23 | 2 | 60 | 0 | 0 | 2 | 0 | 16 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #46: (44) Capitol/Donohoe



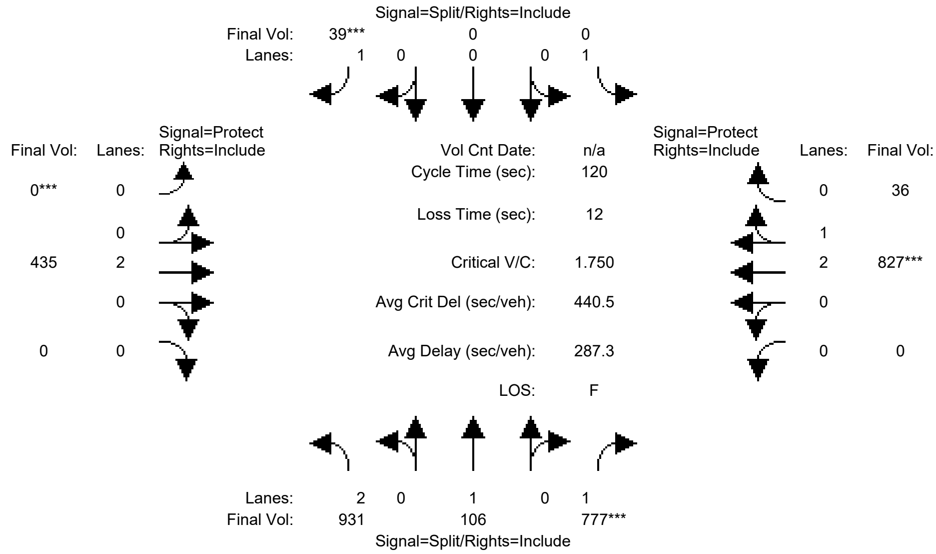

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 756 | 24 | 839 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 909 | 18 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.94 | 0.06 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2662 | 53 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.41 | 0.02 | 0.99 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.34 | 0.34 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 68.2 | 68.2 | 68.2 | 8.0 | 0.0 | 8.0 | 0.0 | 31.8 | 0.0 | 0.0 | 31.8 | 31.8 |
| Volume/Cap: | 0.72 | 0.04 | 1.74 | 0.17 | 0.00 | 1.57 | 0.00 | 1.74 | 0.00 | 0.00 | 1.29 | 1.29 |
| Uniform Del: | 19.0 | 11.5 | 25.9 | 52.9 | 0.0 | 56.0 | 0.0 | 44.1 | 0.0 | 0.0 | 44.1 | 44.1 |
| IncremntDel: | 2.5 | 0.0 | 342.2 | 1.3 | 0.0 | 327.4 | 0.0 | 342 | 0.0 | 0.0 | 140 | 139.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 21.5 | 11.5 | 368.1 | 54.2 | 0.0 | 383.4 | 0.0 | 386 | 0.0 | 0.0 | 184 | 184.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 21.5 | 11.5 | 368.1 | 54.2 | 0.0 | 383.4 | 0.0 | 386 | 0.0 | 0.0 | 184 | 184.0 |
| LOS by Move: | C | B | F | D | A | F | A | F | A | A | F | F |
| HCM2kAvgQ: | 12 | 0 | 75 | 1 | 0 | 9 | 0 | 42 | 0 | 0 | 24 | 24 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #46: (44) Capitol/Donohoe




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 8 | 8 | 8 | 12 | 12 | 12 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 931 | 106 | 777 | 0 | 0 | 39 | 0 | 435 | 0 | 0 | 827 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.39 | 0.43 | 0.36 | 0.43 | 0.43 | 0.36 | 0.43 | 0.41 | 0.43 | 0.43 | 0.39 | 0.39 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.87 | 0.13 |
| Final Sat.: | 1495 | 811 | 690 | 811 | 0 | 690 | 0 | 1541 | 0 | 0 | 2110 | 92 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.62 | 0.13 | 1.13 | 0.00 | 0.00 | 0.06 | 0.00 | 0.28 | 0.00 | 0.00 | 0.39 | 0.39 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |
| Green Time: | 71.2 | 71.2 | 71.2 | 0.0 | 0.0 | 12.0 | 0.0 | 24.8 | 0.0 | 0.0 | 24.8 | 24.8 |
| Volume/Cap: | 1.05 | 0.22 | 1.90 | 0.00 | 0.00 | 0.57 | 0.00 | 1.37 | 0.00 | 0.00 | 1.90 | 1.90 |
| Uniform Del: | 24.4 | 11.4 | 24.4 | 0.0 | 0.0 | 51.5 | 0.0 | 47.6 | 0.0 | 0.0 | 47.6 | 47.6 |
| IncremntDel: | 43.9 | 0.2 | 413.4 | 0.0 | 0.0 | 10.5 | 0.0 | 184 | 0.0 | 0.0 | 412 | 412.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 68.3 | 11.6 | 437.8 | 0.0 | 0.0 | 62.0 | 0.0 | 232 | 0.0 | 0.0 | 460 | 460.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 68.3 | 11.6 | 437.8 | 0.0 | 0.0 | 62.0 | 0.0 | 232 | 0.0 | 0.0 | 460 | 460.1 |
| LOS by Move: | E | B | F | A | A | E | A | F | A | A | F | F |
| HCM2kAvgQ: | 25 | 2 | 74 | 0 | 0 | 2 | 0 | 18 | 0 | 0 | 31 | 31 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #46: (44) Capitol/Donohoe

Signal=Split/Rights=Include
Final Vol: 89*** 0 11
Lanes: 1 0 0 0 1

Signal=Permit
Rights=Include

Final Vol: Lanes:
0 0
0
875*** 2
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.837
Avg Crit Del (sec/veh): 426.4
Avg Delay (sec/veh): 292.9
LOS: F

Signal=Permit
Rights=Include

Lanes: Final Vol:
0 18
1
2 964
0
0 0

Lanes: 2 0 1 0 1
Final Vol: 762 24 921***
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| Y+R: | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 762 | 24 | 921 | 11 | 0 | 89 | 0 | 875 | 0 | 0 | 964 | 18 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.48 | 0.53 | 0.45 | 0.50 | 0.53 | 0.45 | 0.53 | 0.50 | 0.53 | 0.53 | 0.48 | 0.48 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.95 | 0.05 |
| Final Sat.: | 1838 | 998 | 848 | 948 | 0 | 848 | 0 | 1895 | 0 | 0 | 2665 | 50 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.41 | 0.02 | 1.09 | 0.01 | 0.00 | 0.10 | 0.00 | 0.46 | 0.00 | 0.00 | 0.36 | 0.36 |
| Crit Moves: | | | **** | | | **** | | **** | | | | |
| Green Time: | 70.2 | 70.2 | 70.2 | 8.0 | 0.0 | 8.0 | 0.0 | 29.8 | 0.0 | 0.0 | 29.8 | 29.8 |
| Volume/Cap: | 0.71 | 0.04 | 1.86 | 0.17 | 0.00 | 1.57 | 0.00 | 1.86 | 0.00 | 0.00 | 1.46 | 1.46 |
| Uniform Del: | 17.7 | 10.6 | 24.9 | 52.9 | 0.0 | 56.0 | 0.0 | 45.1 | 0.0 | 0.0 | 45.1 | 45.1 |
| IncremntDel: | 2.2 | 0.0 | 393.6 | 1.3 | 0.0 | 327.4 | 0.0 | 394 | 0.0 | 0.0 | 213 | 213.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 19.9 | 10.6 | 418.5 | 54.2 | 0.0 | 383.4 | 0.0 | 439 | 0.0 | 0.0 | 258 | 258.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 19.9 | 10.6 | 418.5 | 54.2 | 0.0 | 383.4 | 0.0 | 439 | 0.0 | 0.0 | 258 | 258.1 |
| LOS by Move: | B | B | F | D | A | F | A | F | A | A | F | F |
| HCM2kAvgQ: | 11 | 0 | 86 | 1 | 0 | 9 | 0 | 44 | 0 | 0 | 29 | 29 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 372*** 0 218
Lanes: 1 0 0 1 0

| Final Vol: | Lanes: | Signal=Protect Rights=Include | | | Signal=Protect Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 541*** | 1 | | Vol Cnt Date: | n/a | | | |
| | | | Cycle Time (sec): | 120 | | 0 | 59 |
| | 0 | | Loss Time (sec): | 12 | | 1 | |
| 616 | 3 | | Critical V/C: | 0.917 | | 1 | 549*** |
| | 0 | | Avg Crit Del (sec/veh): | 83.4 | | 0 | |
| 0 | 0 | | Avg Delay (sec/veh): | 68.6 | | 0 | 1 |
| | | | LOS: | E | | | |

Lanes: 1 1 0 0 1
Final Vol: 1 1*** 1
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 218 | 0 | 372 | 541 | 616 | 0 | 1 | 549 | 59 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.80 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.01 | 1.80 | 0.19 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 5 | 2725 | 293 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.27 | 0.35 | 0.14 | 0.00 | 0.20 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 32.5 | 0.0 | 32.5 | 42.3 | 27.2 | 0.0 | 39.3 | 24.2 | 24.2 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.52 | 0.00 | 1.00 | 1.00 | 0.62 | 0.00 | 0.62 | 1.00 | 1.00 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 37.2 | 0.0 | 43.7 | 38.8 | 41.7 | 0.0 | 34.0 | 47.9 | 47.9 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 1.2 | 0.0 | 46.7 | 38.7 | 1.2 | 0.0 | 1.2 | 36.5 | 36.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 38.4 | 0.0 | 90.4 | 77.6 | 42.9 | 0.0 | 35.2 | 84.4 | 84.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 38.4 | 0.0 | 90.4 | 77.6 | 42.9 | 0.0 | 35.2 | 84.4 | 84.4 |
| LOS by Move: | D | D | D | D | A | F | E | D | A | D | F | F |
| HCM2kAvgQ: | 0 | 0 | 0 | 7 | 0 | 19 | 26 | 8 | 0 | 11 | 17 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 208*** 0 134
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (West approach)
Final Vol: Lanes:
594*** 1
0
941 3
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.188
Avg Crit Del (sec/veh): 165.0
Avg Delay (sec/veh): 103.6
LOS: F

Signal=Protect Rights=Include (East approach)
Lanes: Final Vol:
0 146
1
1 517***
0
0 0

Lanes: 1 1 0 0 1
Final Vol: 80 15*** 39
Signal=Split/Rights=Include

| Approach: | North Bound L | North Bound T | North Bound R | South Bound L | South Bound T | South Bound R | East Bound L | East Bound T | East Bound R | West Bound L | West Bound T | West Bound R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 134 | 0 | 208 | 594 | 941 | 0 | 0 | 517 | 146 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.56 | 0.44 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1715 | 484 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.12 | 0.00 | 0.20 | 0.52 | 0.29 | 0.00 | 0.00 | 0.30 | 0.30 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 19.7 | 0.0 | 19.7 | 50.3 | 79.3 | 0.0 | 0.0 | 29.0 | 29.0 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.72 | 0.00 | 1.25 | 1.25 | 0.44 | 0.00 | 0.00 | 1.25 | 1.25 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 47.5 | 0.0 | 50.2 | 34.9 | 9.7 | 0.0 | 0.0 | 45.5 | 45.5 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 12.5 | 0.0 | 150.9 | 127.5 | 0.1 | 0.0 | 0.0 | 126 | 125.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 60.0 | 0.0 | 201.1 | 162.3 | 9.8 | 0.0 | 0.0 | 171 | 171.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 60.0 | 0.0 | 201.1 | 162.3 | 9.8 | 0.0 | 0.0 | 171 | 171.4 |
| LOS by Move: | E | E | E | E | A | F | F | A | A | A | F | F |
| HCM2kAvgQ: | 3 | 3 | 2 | 6 | 0 | 15 | 38 | 6 | 0 | 0 | 24 | 24 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 372*** 0 266
Lanes: 1 0 0 1 0

Final Vol: Lanes: Signal=Protect Rights=Include
660*** 1
0
568 3
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.002
Avg Crit Del (sec/veh): 110.6
Avg Delay (sec/veh): 87.9
LOS: F

Signal=Protect Rights=Include Lanes: Final Vol:
0 56
1
1 549***
0
0 1

Lanes: 1 1 0 0 1
Final Vol: 1 1*** 1
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 1 | 1 | 1 | 266 | 0 | 372 | 660 | 568 | 0 | 1 | 549 | 56 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.83 | 0.83 | 0.72 | 0.81 | 0.85 | 0.72 | 0.81 | 0.77 | 0.85 | 0.80 | 0.80 | 0.80 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.01 | 1.81 | 0.18 |
| Final Sat.: | 1576 | 1576 | 1373 | 1537 | 0 | 1373 | 1534 | 4409 | 0 | 5 | 2741 | 280 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.27 | 0.43 | 0.13 | 0.00 | 0.20 | 0.20 | 0.20 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 29.8 | 0.0 | 29.8 | 47.2 | 27.1 | 0.0 | 42.1 | 22.0 | 22.0 |
| Volume/Cap: | 0.01 | 0.01 | 0.01 | 0.70 | 0.00 | 1.09 | 1.09 | 0.57 | 0.00 | 0.57 | 1.09 | 1.09 |
| Uniform Del: | 51.4 | 51.4 | 51.4 | 41.0 | 0.0 | 45.1 | 36.4 | 41.3 | 0.0 | 31.6 | 49.0 | 49.0 |
| IncremntDel: | 0.0 | 0.0 | 0.0 | 5.6 | 0.0 | 75.9 | 64.4 | 0.8 | 0.0 | 0.7 | 65.9 | 65.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 51.4 | 51.4 | 51.4 | 46.6 | 0.0 | 121.1 | 100.8 | 42.1 | 0.0 | 32.3 | 115 | 114.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 51.4 | 51.4 | 51.4 | 46.6 | 0.0 | 121.1 | 100.8 | 42.1 | 0.0 | 32.3 | 115 | 114.9 |
| LOS by Move: | D | D | D | D | A | F | F | D | A | C | F | F |
| HCM2kAvgQ: | 0 | 0 | 0 | 10 | 0 | 21 | 35 | 7 | 0 | 10 | 19 | 19 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #47: (45) Cooley/Donohoe

Signal=Split/Rights=Include
Final Vol: 270*** 0 163
Lanes: 1 0 0 1 0

Signal=Protect Rights=Include (Eastbound) — Final Vol: 676***, 941, 0; Lanes: 1, 0, 3, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 120
Loss Time (sec): 12
Critical V/C: 1.331
Avg Crit Del (sec/veh): 227.9
Avg Delay (sec/veh): 144.1
LOS: F

Signal=Protect Rights=Include (Westbound) — Lanes: 0, 1, 1, 0, 0; Final Vol: 149, 503***, 0

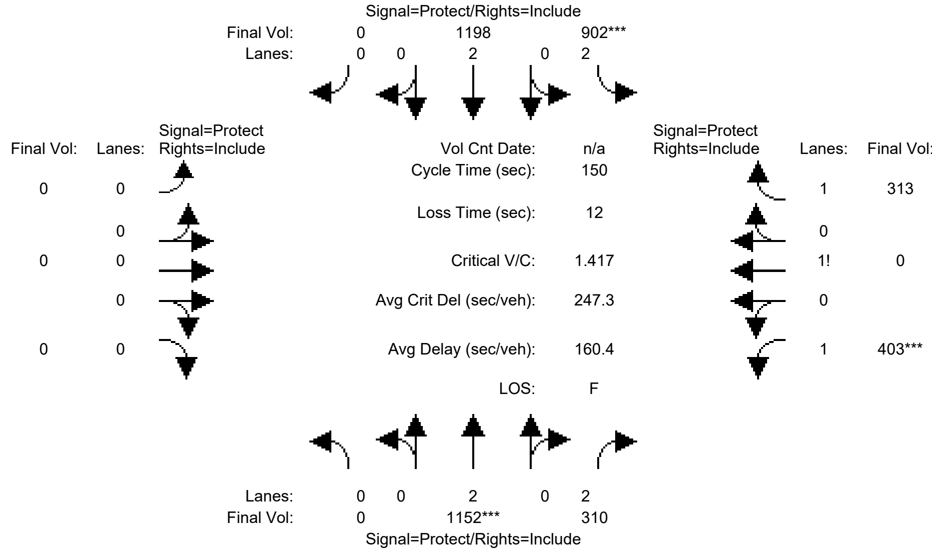
Lanes: 1 1 0 0 1
Final Vol: 80 15*** 39
Signal=Split/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 10 | 10 |
| Y+R: | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 80 | 15 | 39 | 163 | 0 | 270 | 676 | 941 | 0 | 0 | 503 | 149 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.60 | 0.60 | 0.54 | 0.60 | 0.63 | 0.54 | 0.60 | 0.57 | 0.63 | 0.63 | 0.58 | 0.58 |
| Lanes: | 1.68 | 0.32 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 1.54 | 0.46 |
| Final Sat.: | 1935 | 363 | 1017 | 1140 | 0 | 1017 | 1137 | 3268 | 0 | 0 | 1695 | 502 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.04 | 0.04 | 0.14 | 0.00 | 0.27 | 0.59 | 0.29 | 0.00 | 0.00 | 0.30 | 0.30 |
| Crit Moves: | | **** | | | | **** | **** | | | | **** | |
| Green Time: | 9.0 | 9.0 | 9.0 | 22.7 | 0.0 | 22.7 | 50.9 | 76.3 | 0.0 | 0.0 | 25.4 | 25.4 |
| Volume/Cap: | 0.55 | 0.55 | 0.51 | 0.76 | 0.00 | 1.40 | 1.40 | 0.45 | 0.00 | 0.00 | 1.40 | 1.40 |
| Uniform Del: | 53.6 | 53.6 | 53.4 | 46.0 | 0.0 | 48.6 | 34.6 | 11.2 | 0.0 | 0.0 | 47.3 | 47.3 |
| IncremntDel: | 3.8 | 3.8 | 5.7 | 14.1 | 0.0 | 209.1 | 193.1 | 0.2 | 0.0 | 0.0 | 193 | 193.5 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Delay/Veh: | 57.3 | 57.3 | 59.1 | 60.2 | 0.0 | 257.7 | 227.6 | 11.3 | 0.0 | 0.0 | 241 | 240.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 57.3 | 57.3 | 59.1 | 60.2 | 0.0 | 257.7 | 227.6 | 11.3 | 0.0 | 0.0 | 241 | 240.8 |
| LOS by Move: | E | E | E | E | A | F | F | B | A | A | F | F |
| HCM2kAvgQ: | 3 | 3 | 2 | 7 | 0 | 21 | 50 | 7 | 0 | 0 | 27 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #48: (46) University/US 101 SB Ramps



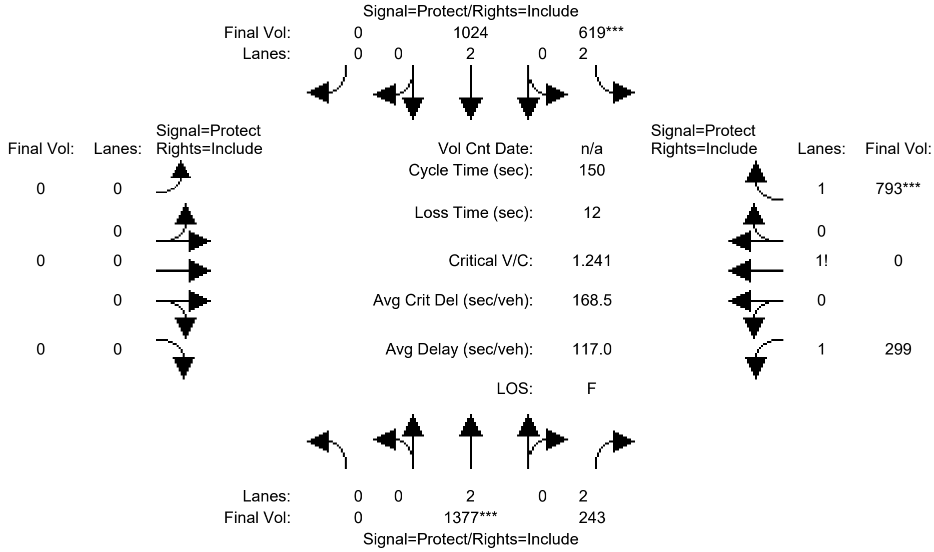

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1152 | 310 | 902 | 1198 | 0 | 0 | 0 | 0 | 403 | 0 | 313 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.56 | 0.00 | 1.44 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1503 | 0 | 1382 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.57 | 0.20 | 0.46 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.27 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 60.7 | 60.7 | 49.0 | 110 | 0.0 | 0.0 | 0.0 | 0.0 | 28.4 | 0.0 | 28.4 |
| Volume/Cap: | 0.00 | 1.42 | 0.48 | 1.42 | 0.82 | 0.00 | 0.00 | 0.00 | 0.00 | 1.42 | 0.00 | 1.20 |
| Uniform Del: | 0.0 | 44.7 | 33.1 | 50.5 | 13.4 | 0.0 | 0.0 | 0.0 | 0.0 | 60.8 | 0.0 | 60.8 |
| IncremntDel: | 0.0 | 195 | 0.6 | 196.7 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 199.0 | 0.0 | 104.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 239 | 33.7 | 247.3 | 17.1 | 0.0 | 0.0 | 0.0 | 0.0 | 259.8 | 0.0 | 164.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 239 | 33.7 | 247.3 | 17.1 | 0.0 | 0.0 | 0.0 | 0.0 | 259.8 | 0.0 | 164.9 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 51 | 6 | 39 | 21 | 0 | 0 | 0 | 0 | 23 | 0 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #48: (46) University/US 101 SB Ramps



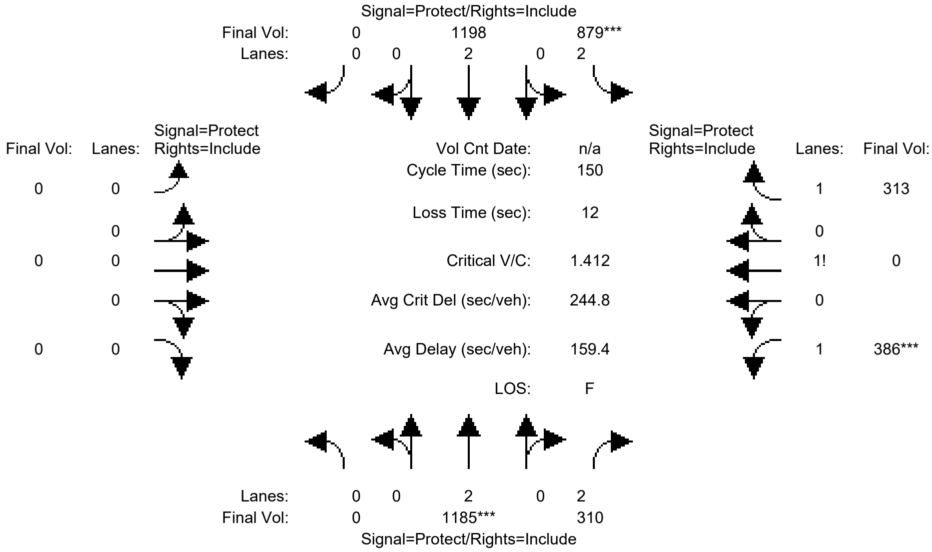

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1377 | 243 | 619 | 1024 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 0.00 | 1.73 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1552 | 0 | 2103 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.52 | 0.12 | 0.24 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 63.2 | 63.2 | 29.3 | 92.4 | 0.0 | 0.0 | 0.0 | 0.0 | 45.6 | 0.0 | 45.6 |
| Volume/Cap: | 0.00 | 1.24 | 0.28 | 1.24 | 0.63 | 0.00 | 0.00 | 0.00 | 0.00 | 0.63 | 0.00 | 1.24 |
| Uniform Del: | 0.0 | 43.4 | 28.5 | 60.4 | 18.1 | 0.0 | 0.0 | 0.0 | 0.0 | 45.0 | 0.0 | 52.2 |
| IncremntDel: | 0.0 | 116 | 0.2 | 124.6 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 118.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 160 | 28.6 | 185.0 | 18.9 | 0.0 | 0.0 | 0.0 | 0.0 | 45.8 | 0.0 | 170.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 160 | 28.6 | 185.0 | 18.9 | 0.0 | 0.0 | 0.0 | 0.0 | 45.8 | 0.0 | 170.3 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 52 | 4 | 25 | 16 | 0 | 0 | 0 | 0 | 10 | 0 | 34 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #48: (46) University/US 101 SB Ramps




| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1185 | 310 | 879 | 1198 | 0 | 0 | 0 | 0 | 386 | 0 | 313 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.56 | 0.53 | 0.42 | 0.51 | 0.53 | 0.56 | 0.56 | 0.56 | 0.56 | 0.51 | 0.56 | 0.51 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.55 | 0.00 | 1.45 |
| Final Sat.: | 0 | 2011 | 1583 | 1950 | 2011 | 0 | 0 | 0 | 0 | 1491 | 0 | 1391 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.59 | 0.20 | 0.45 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.23 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 62.6 | 62.6 | 47.9 | 110 | 0.0 | 0.0 | 0.0 | 0.0 | 27.5 | 0.0 | 27.5 |
| Volume/Cap: | 0.00 | 1.41 | 0.47 | 1.41 | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 1.41 | 0.00 | 1.23 |
| Uniform Del: | 0.0 | 43.7 | 31.7 | 51.1 | 12.9 | 0.0 | 0.0 | 0.0 | 0.0 | 61.2 | 0.0 | 61.2 |
| IncremntDel: | 0.0 | 192 | 0.5 | 194.7 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 197.0 | 0.0 | 117.2 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 236 | 32.2 | 245.8 | 16.3 | 0.0 | 0.0 | 0.0 | 0.0 | 258.3 | 0.0 | 178.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 236 | 32.2 | 245.8 | 16.3 | 0.0 | 0.0 | 0.0 | 0.0 | 258.3 | 0.0 | 178.5 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | F | A | F |
| HCM2kAvgQ: | 0 | 52 | 6 | 38 | 21 | 0 | 0 | 0 | 0 | 22 | 0 | 17 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #48: (46) University/US 101 SB Ramps

Signal=Protect/Rights=Include
Final Vol: 0 1066 632***
Lanes: 0 0 2 0 2

Final Vol: Lanes: Signal=Protect Rights=Include
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 1.258
Avg Crit Del (sec/veh): 175.5
Avg Delay (sec/veh): 121.1
LOS: F

Signal=Protect Rights=Include Lanes: Final Vol:
1 793***
0
1! 0
0
1 299

Lanes: 0 0 2 0 2
Final Vol: 0 1404*** 243
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 12 | 12 | 12 | 4 | 10 | 10 | 0 | 0 | 0 | 6 | 6 | 6 |
| Y+R: | 4.5 | 4.5 | 4.5 | 3.5 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1404 | 243 | 632 | 1066 | 0 | 0 | 0 | 0 | 299 | 0 | 793 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.73 | 0.69 | 0.55 | 0.67 | 0.69 | 0.73 | 0.73 | 0.73 | 0.73 | 0.64 | 0.73 | 0.64 |
| Lanes: | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 0.00 | 1.73 |
| Final Sat.: | 0 | 2635 | 2075 | 2556 | 2635 | 0 | 0 | 0 | 0 | 1552 | 0 | 2103 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.53 | 0.12 | 0.25 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.38 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green Time: | 0.0 | 63.5 | 63.5 | 29.5 | 93.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.0 | 0.0 | 45.0 |
| Volume/Cap: | 0.00 | 1.26 | 0.28 | 1.26 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.64 | 0.00 | 1.26 |
| Uniform Del: | 0.0 | 43.2 | 28.2 | 60.3 | 18.2 | 0.0 | 0.0 | 0.0 | 0.0 | 45.5 | 0.0 | 52.5 |
| IncremntDel: | 0.0 | 123 | 0.2 | 131.4 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 125.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 167 | 28.4 | 191.6 | 19.1 | 0.0 | 0.0 | 0.0 | 0.0 | 46.4 | 0.0 | 177.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 167 | 28.4 | 191.6 | 19.1 | 0.0 | 0.0 | 0.0 | 0.0 | 46.4 | 0.0 | 177.8 |
| LOS by Move: | A | F | C | F | B | A | A | A | A | D | A | F |
| HCM2kAvgQ: | 0 | 54 | 4 | 25 | 17 | 0 | 0 | 0 | 0 | 10 | 0 | 35 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 511*** 924 181
Lanes: 1 0 2 0 2

Signal=Split Rights=Include (West) | Signal=Split Rights=Include (East)

| Final Vol: | Lanes: | | | | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|
| 493*** | 1 | | | | 1 | 308*** |
| | 0 | Vol Cnt Date: | n/a | | 0 | |
| 88 | 0 | Cycle Time (sec): | 200 | | 0 | 111 |
| | 1 | Loss Time (sec): | 12 | | 1 | |
| 53 | 0 | Critical V/C: | 1.102 | | 0 | 27 |
| | | Avg Crit Del (sec/veh): | 148.3 | | | |
| | | Avg Delay (sec/veh): | 101.3 | | | |
| | | LOS: | F | | | |

Lanes: 1 0 1 1 0
Final Vol: 50*** 687 14
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 50 | 687 | 14 | 181 | 924 | 511 | 493 | 88 | 53 | 27 | 111 | 308 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.72 | 0.74 | 0.66 | 0.74 | 0.74 | 0.74 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 2.00 | 2.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.20 | 0.80 | 1.00 |
| Final Sat.: | 1408 | 2751 | 56 | 2731 | 2816 | 1260 | 1408 | 873 | 526 | 287 | 1180 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.25 | 0.25 | 0.07 | 0.33 | 0.41 | 0.35 | 0.10 | 0.10 | 0.09 | 0.09 | 0.24 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.0 | 63.5 | 63.5 | 16.9 | 73.4 | 73.4 | 63.4 | 63.4 | 63.4 | 44.2 | 44.2 | 44.2 |
| Volume/Cap: | 1.01 | 0.79 | 0.79 | 0.79 | 0.89 | 1.11 | 1.11 | 0.32 | 0.32 | 0.43 | 0.43 | 1.11 |
| Uniform Del: | 96.5 | 62.0 | 62.0 | 89.8 | 59.6 | 63.3 | 68.3 | 51.9 | 51.9 | 66.9 | 66.9 | 77.9 |
| IncremntDel: | 132.5 | 4.7 | 4.7 | 16.2 | 10.1 | 73.7 | 74.4 | 0.4 | 0.4 | 0.9 | 0.9 | 85.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 229.0 | 66.7 | 66.7 | 106.0 | 69.7 | 137.0 | 142.7 | 52.3 | 52.3 | 67.8 | 67.8 | 163.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 229.0 | 66.7 | 66.7 | 106.0 | 69.7 | 137.0 | 142.7 | 52.3 | 52.3 | 67.8 | 67.8 | 163.0 |
| LOS by Move: | F | E | E | F | E | F | F | D | D | E | E | F |
| HCM2kAvgQ: | 5 | 22 | 22 | 7 | 30 | 40 | 39 | 6 | 6 | 7 | 7 | 25 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 473*** 649 211
Lanes: 1 0 2 0 1

Signal=Split Rights=Include (West approach)
Final Vol: / Lanes:
474*** 2
0
128 0
1
63 0

Vol Cnt Date: n/a
Cycle Time (sec): 200
Loss Time (sec): 12
Critical V/C: 1.630
Avg Crit Del (sec/veh): 374.4
Avg Delay (sec/veh): 295.2
LOS: F

Signal=Split Rights=Include (East approach)
Lanes: / Final Vol:
1 363***
0
0 58
1
0 17

Lanes: 1 0 1 1 0
Final Vol: 52*** 693 7
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 52 | 693 | 7 | 211 | 649 | 473 | 474 | 128 | 63 | 17 | 58 | 363 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.67 | 0.33 | 0.23 | 0.77 | 1.00 |
| Final Sat.: | 803 | 1589 | 16 | 803 | 1606 | 719 | 1558 | 539 | 265 | 190 | 647 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.44 | 0.44 | 0.26 | 0.40 | 0.66 | 0.30 | 0.24 | 0.24 | 0.09 | 0.09 | 0.51 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.9 | 55.4 | 55.4 | 33.3 | 80.8 | 80.8 | 37.3 | 37.3 | 37.3 | 62.0 | 62.0 | 62.0 |
| Volume/Cap: | 1.63 | 1.58 | 1.58 | 1.58 | 1.00 | 1.63 | 1.63 | 1.27 | 1.27 | 0.29 | 0.29 | 1.63 |
| Uniform Del: | 96.0 | 72.3 | 72.3 | 83.3 | 59.6 | 59.6 | 81.3 | 81.3 | 81.3 | 52.3 | 52.3 | 69.0 |
| IncremntDel: | 389.7 | 270 | 269.8 | 291.8 | 35.5 | 298.7 | 298.7 | 165 | 164.5 | 0.6 | 0.6 | 303.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 485.7 | 342 | 342.1 | 375.1 | 95.1 | 358.3 | 380.0 | 246 | 245.9 | 52.9 | 52.9 | 372.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 485.7 | 342 | 342.1 | 375.1 | 95.1 | 358.3 | 380.0 | 246 | 245.9 | 52.9 | 52.9 | 372.1 |
| LOS by Move: | F | F | F | F | F | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 7 | 40 | 40 | 24 | 26 | 51 | 28 | 19 | 19 | 4 | 4 | 40 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 512*** 913 179
Lanes: 1 0 2 0 2

| Final Vol: | Lanes: | Signal=Split Rights=Include | | | Signal=Split Rights=Include | Lanes: | Final Vol: |
|---|---|---|---|---|---|---|---|
| 539*** | 1 | | Vol Cnt Date: | n/a | | 1 | 314*** |
| | | | Cycle Time (sec): | 200 | | | |
| | 0 | | Loss Time (sec): | 12 | | 0 | |
| 76 | 0 | | Critical V/C: | 1.142 | | 0 | 106 |
| | 1 | | Avg Crit Del (sec/veh): | 162.4 | | 1 | |
| 52 | 0 | | Avg Delay (sec/veh): | 110.0 | | 0 | 27 |
| | | | LOS: | F | | | |

Lanes: 1 0 1 1 0
Final Vol: 49*** 690 14
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 10 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 49 | 690 | 14 | 179 | 913 | 512 | 539 | 76 | 52 | 27 | 106 | 314 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.74 | 0.74 | 0.74 | 0.72 | 0.74 | 0.66 | 0.74 | 0.73 | 0.73 | 0.77 | 0.77 | 0.66 |
| Lanes: | 1.00 | 1.96 | 0.04 | 2.00 | 2.00 | 1.00 | 1.00 | 0.59 | 0.41 | 0.20 | 0.80 | 1.00 |
| Final Sat.: | 1408 | 2752 | 56 | 2731 | 2816 | 1260 | 1408 | 826 | 565 | 298 | 1169 | 1260 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.25 | 0.25 | 0.07 | 0.32 | 0.41 | 0.38 | 0.09 | 0.09 | 0.09 | 0.09 | 0.25 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.0 | 61.7 | 61.7 | 16.1 | 70.8 | 70.8 | 66.7 | 66.7 | 66.7 | 43.4 | 43.4 | 43.4 |
| Volume/Cap: | 0.99 | 0.81 | 0.81 | 0.81 | 0.92 | 1.15 | 1.15 | 0.28 | 0.28 | 0.42 | 0.42 | 1.15 |
| Uniform Del: | 96.5 | 63.8 | 63.8 | 90.5 | 61.7 | 64.6 | 66.6 | 48.9 | 48.9 | 67.4 | 67.4 | 78.3 |
| IncremntDel: | 126.0 | 5.9 | 5.9 | 20.1 | 12.7 | 89.6 | 88.7 | 0.3 | 0.3 | 0.9 | 0.9 | 100.3 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 222.5 | 69.7 | 69.7 | 110.5 | 74.4 | 154.2 | 155.4 | 49.2 | 49.2 | 68.3 | 68.3 | 178.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 222.5 | 69.7 | 69.7 | 110.5 | 74.4 | 154.2 | 155.4 | 49.2 | 49.2 | 68.3 | 68.3 | 178.6 |
| LOS by Move: | F | E | E | F | E | F | F | D | D | E | E | F |
| HCM2kAvgQ: | 5 | 22 | 22 | 7 | 31 | 42 | 44 | 6 | 6 | 7 | 7 | 27 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #49: (47) University/Woodland

Signal=Protect/Rights=Include
Final Vol: 481*** 660 211
Lanes: 1 0 2 0 1

Signal=Split
Rights=Include

| Final Vol: | Lanes: | | | |
|---|---|---|---|---|
| 484*** | 2 | Vol Cnt Date: | n/a | |
| | 0 | Cycle Time (sec): | 200 | |
| 123 | 0 | Loss Time (sec): | 12 | |
| | 1 | Critical V/C: | 1.658 | |
| 59 | 0 | Avg Crit Del (sec/veh): | 386.4 | |
| | | Avg Delay (sec/veh): | 301.8 | |
| | | LOS: | F | |

Signal=Split
Rights=Include

| Lanes: | Final Vol: |
|---|---|
| 1 | 373*** |
| 0 | |
| 0 | 55 |
| 1 | |
| 0 | 17 |

Lanes: 1 0 1 1 0
Final Vol: 48*** 692 7
Signal=Protect/Rights=Include

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 7 | 10 | 10 | 7 | 10 | 10 | 9 | 9 | 9 | 11 | 11 | 11 |
| Y+R: | 4.5 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 3.6 | 3.6 | 3.6 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 48 | 692 | 7 | 211 | 660 | 481 | 484 | 123 | 59 | 17 | 55 | 373 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.38 | 0.41 | 0.42 | 0.42 | 0.44 | 0.44 | 0.38 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 2.00 | 0.68 | 0.32 | 0.24 | 0.76 | 1.00 |
| Final Sat.: | 803 | 1589 | 16 | 803 | 1606 | 719 | 1558 | 543 | 261 | 197 | 638 | 719 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.06 | 0.44 | 0.44 | 0.26 | 0.41 | 0.67 | 0.31 | 0.23 | 0.23 | 0.09 | 0.09 | 0.52 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |
| Green Time: | 7.2 | 54.9 | 54.9 | 33.1 | 80.7 | 80.7 | 37.5 | 37.5 | 37.5 | 62.6 | 62.6 | 62.6 |
| Volume/Cap: | 1.66 | 1.59 | 1.59 | 1.59 | 1.02 | 1.66 | 1.66 | 1.21 | 1.21 | 0.28 | 0.28 | 1.66 |
| Uniform Del: | 96.4 | 72.6 | 72.6 | 83.5 | 59.6 | 59.6 | 81.3 | 81.3 | 81.3 | 51.6 | 51.6 | 68.7 |
| IncremntDel: | 409.5 | 275 | 275.3 | 297.2 | 39.9 | 311.1 | 311.0 | 140 | 140.1 | 0.6 | 0.6 | 315.1 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Delay/Veh: | 505.9 | 348 | 347.8 | 380.7 | 99.5 | 370.7 | 392.2 | 221 | 221.4 | 52.2 | 52.2 | 383.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 505.9 | 348 | 347.8 | 380.7 | 99.5 | 370.7 | 392.2 | 221 | 221.4 | 52.2 | 52.2 | 383.8 |
| LOS by Move: | F | F | F | F | F | F | F | F | F | D | D | F |
| HCM2kAvgQ: | 7 | 40 | 40 | 24 | 26 | 53 | 28 | 17 | 17 | 3 | 3 | 41 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

```
                          Signal=Stop/Rights=Include
           Final Vol:   50          3          2
               Lanes:    0    0     1!    0    0

                 Signal=Uncontrol                              Signal=Uncontrol
 Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:    n/a    Rights=Include    Lanes:  Final Vol:
                                      Cycle Time (sec):   100
      6        0                                                                     0        50
                                       Loss Time (sec):     0
               0                                                                     0
    571        1!                          Critical V/C:  0.944                      1!      401
               0                   Avg Crit Del (sec/veh):  46.2                     0
     49        0                       Avg Delay (sec/veh):  46.2                    0         3
                                                    LOS:    F

               Lanes:    0    0     1!    0    0
           Final Vol:  356         111         5
                          Signal=Stop/Rights=Include
```

```
Street Name:          Saratoga Avenue                  Newbridge Street
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     356  111     5     2    3    50     6  571    49     3  401    50
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  356  111     5     2    3    50     6  571    49     3  401    50
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  356  111     5     2    3    50     6  571    49     3  401    50
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   356  111     5     2    3    50     6  571    49     3  401    50
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  356  111     5     2    3    50     6  571    49     3  401    50
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1066 1065   596  1098 1064   426   451 xxxx xxxxx   620 xxxx xxxxx
Potent Cap.:  202  225   508   192  225   633  1120 xxxx xxxxx   970 xxxx xxxxx
Move Cap.:    183  223   508   115  223   633  1120 xxxx xxxxx   970 xxxx xxxxx
Total Cap:    377  399 xxxxx   296  396 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.94 0.28  0.01  0.01 0.01  0.08  0.01 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.2 xxxx xxxxx   8.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  383 xxxxx  xxxx  589 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx 20.0 xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  156 xxxxx xxxxx 11.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F     *     *    B     *     *    *     *     *    *     *
ApproachDel:      155.9             11.7             xxxxxx           xxxxxx
ApproachLOS:         F                B                *                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  356  111     5     2    3    50     6  571    49     3  401    50
ApproachDel:     155.9              11.7           xxxxxx            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=20.4]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=472]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1607]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=55]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1607]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  356  111     5     2    3    50     6  571    49     3  401    50
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1080
Minor Approach Volume:          472
Minor Approach Volume Threshold: 199
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

```
                         Signal=Stop/Rights=Include
          Final Vol:    13          1          2
              Lanes:     0    0     1!    0    0

Final Vol:  Lanes:  Signal=Uncontrol                         Signal=Uncontrol   Lanes:  Final Vol:
                    Rights=Include     Vol Cnt Date:    n/a  Rights=Include
                                    Cycle Time (sec):   100
   19         0                                                                   0        12
                                     Loss Time (sec):     0
              0                                                                   0
  531         1!                       Critical V/C:  0.392                       1!      581
              0                 Avg Crit Del (sec/veh):   5.8                     0
  212         0                     Avg Delay (sec/veh):  5.8                     0         0
                                                LOS:      E

              Lanes:     0    0     1!    0    0
          Final Vol:    98         135         7
                         Signal=Stop/Rights=Include
```

```
Street Name:        Saratoga Avenue                 Newbridge Street
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      98  135     7     2    1    13    19  531   212     0  581    12
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   98  135     7     2    1    13    19  531   212     0  581    12
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   98  135     7     2    1    13    19  531   212     0  581    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    98  135     7     2    1    13    19  531   212     0  581    12
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   98  135     7     2    1    13    19  531   212     0  581    12
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1269 1268   637  1333 1368   587   593 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  147  170   481   132  148   513   993 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    140  167   481    42  145   513   993 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    329  345 xxxxx   229  324 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.30 0.39  0.01  0.01 0.00  0.03  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx  341 xxxxx  xxxx  431 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  5.1 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 37.2 xxxxx xxxxx 13.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    E     *     *    B     *     *    *     *     *    *     *
ApproachDel:      37.2             13.7            xxxxxx           xxxxxx
ApproachLOS:         E                B                *                *
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
*******************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
*******************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98  135    7     2    1    13    19  531   212     0  581    12
ApproachDel:      37.2             13.7            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=240]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1611]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=16]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1611]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   98  135    7     2    1    13    19  531   212     0  581    12
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            1355
Minor Approach Volume:          240
Minor Approach Volume Threshold: 138
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #52: (52) Saratoga Avenue and Newbridge Street

Signal=Stop/Rights=Include
Final Vol: 49 1 2
Lanes: 0 0 1! 0 0

Final Vol: Lanes: Signal=Uncontrol Rights=Include
6 0
0
570 1!
0
49 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 1.019
Avg Crit Del (sec/veh): 50.9
Avg Delay (sec/veh): 50.9
LOS: F

Signal=Uncontrol Rights=Include Lanes: Final Vol:
0 53
0
1! 361
0
0 3

Lanes: 0 0 1! 0 0
Final Vol: 397 91 5
Signal=Stop/Rights=Include

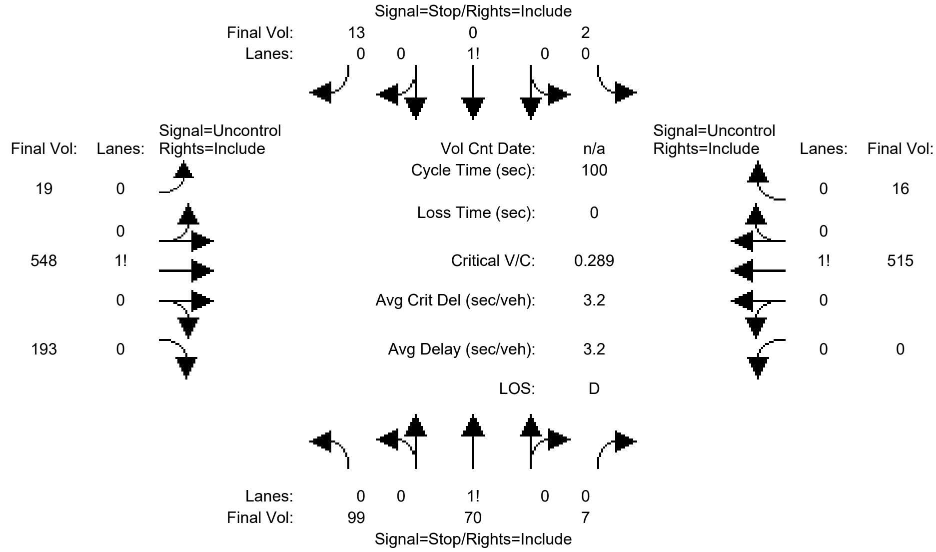
```
Street Name:         Saratoga Avenue                  Newbridge Street
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     397   91     5     2    1    49     6  570    49     3  361    53
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  397   91     5     2    1    49     6  570    49     3  361    53
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  397   91     5     2    1    49     6  570    49     3  361    53
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   397   91     5     2    1    49     6  570    49     3  361    53
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  397   91     5     2    1    49     6  570    49     3  361    53
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1025 1027   595  1048 1025   388   414 xxxx xxxxx   619 xxxx xxxxx
Potent Cap.:  215  236   508   208  237   665  1156 xxxx xxxxx   971 xxxx xxxxx
Move Cap.:    197  234   508   143  235   665  1156 xxxx xxxxx   971 xxxx xxxxx
Total Cap:    390  407 xxxxx   320  403 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  1.02 0.22  0.01  0.01 0.00  0.07  0.01 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx   8.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  394 xxxxx  xxxx  631 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx 21.2 xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  162 xxxxx xxxxx 11.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F     *     *    B     *     *    *     *     *    *     *
ApproachDel:      162.4             11.2            xxxxxx            xxxxxx
ApproachLOS:         F                B                *                 *
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  397   91     5     2    1    49     6  570    49     3  361    53
ApproachDel:     162.4              11.2           xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=22.2]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=493]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1587]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=52]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1587]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  397   91     5     2    1    49     6  570    49     3  361    53
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1042
Minor Approach Volume:           493
Minor Approach Volume Threshold: 208
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #52: (52) Saratoga Avenue and Newbridge Street



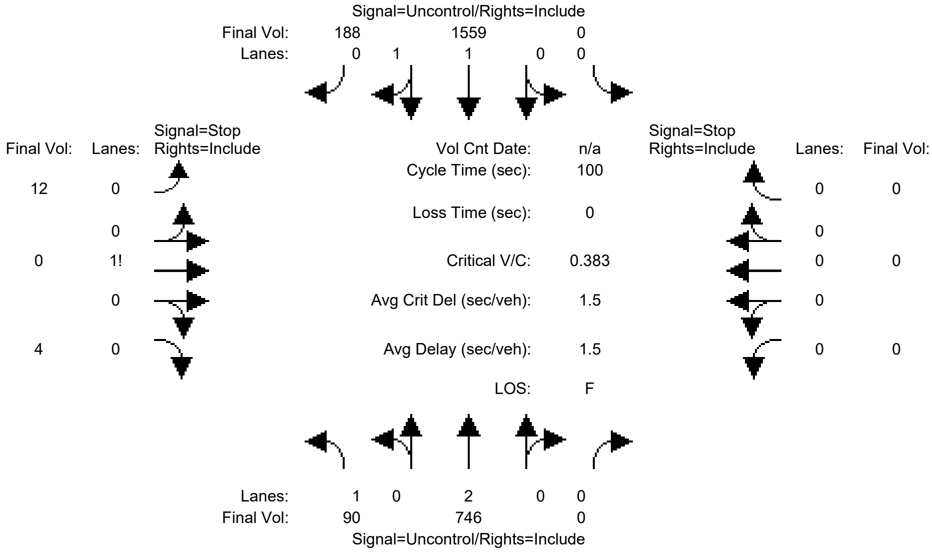

```
Street Name:          Saratoga Avenue                  Newbridge Street
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      99   70     7     2    0    13    19  548   193     0  515    16
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   99   70     7     2    0    13    19  548   193     0  515    16
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   99   70     7     2    0    13    19  548   193     0  515    16
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    99   70     7     2    0    13    19  548   193     0  515    16
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   99   70     7     2    0    13    19  548   193     0  515    16
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1212 1214   645  1244 1302   523   531 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  160  183   476   152  162   558  1047 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    154  180   476   103  159   558  1047 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:    343  356 xxxxx   289  335 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.29 0.20  0.01  0.01 0.00  0.02  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.5 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  352 xxxxx  xxxx  496 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  2.7 xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 25.0 xxxxx xxxxx 12.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    D     *     *    B     *     *    *     *     *    *     *
ApproachDel:      25.0              12.5            xxxxxx            xxxxxx
ApproachLOS:         D                 B                 *                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   99   70    7     2    0    13    19  548   193     0  515    16
ApproachDel:      25.0             12.5            xxxxxx           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[northbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=176]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1482]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[southbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1482]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #52 (52) Saratoga Avenue and Newbridge Street
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  0  1  0
Initial Vol:   99   70    7     2    0    13    19  548   193     0  515    16
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1291
Minor Approach Volume:           176
Minor Approach Volume Threshold: 151
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #300: (37) University Ave & Adams Dr

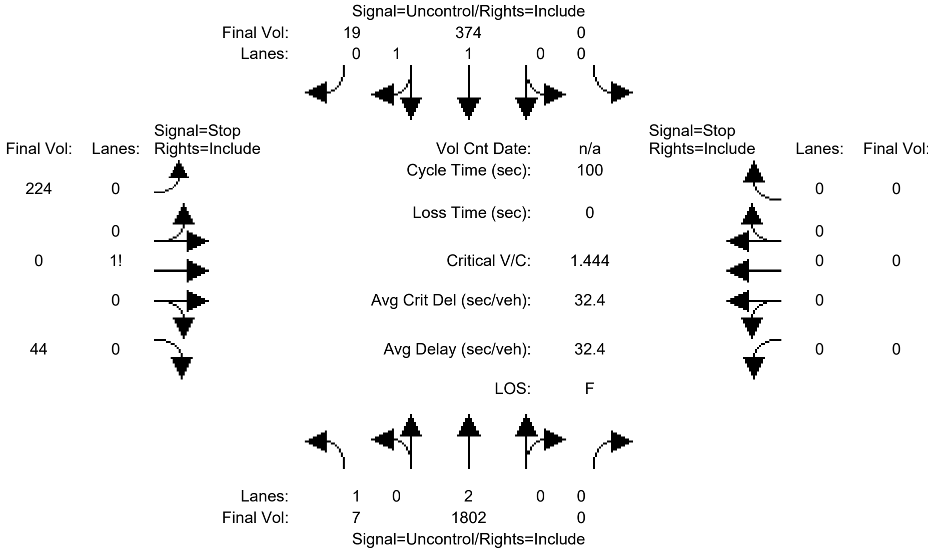



```
Street Name:         University Ave                     Adams Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      90  746     0     0 1559   188    12    0     4     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   90  746     0     0 1559   188    12    0     4     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   90  746     0     0 1559   188    12    0     4     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    90  746     0     0 1559   188    12    0     4     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   90  746     0     0 1559   188    12    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1747 xxxx xxxxx  xxxx xxxx xxxxx  2206 2579   874  xxxx xxxx xxxxx
Potent Cap.:  364 xxxx xxxxx  xxxx xxxx xxxxx    39   26   297  xxxx xxxx xxxxx
Move Cap.:    364 xxxx xxxxx  xxxx xxxx xxxxx    31   20   297  xxxx xxxx xxxxx
Volume/Cap:  0.25 xxxx  xxxx  xxxx xxxx  xxxx  0.38 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    1.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del: 18.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    C    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   40 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  144 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            143.7            xxxxxx
ApproachLOS:        *                *                F                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:   90  746    0     0 1559   188    12    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx            143.7           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=16]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2599]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:   90  746    0     0 1559   188    12    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2583
Minor Approach Volume:           16
Minor Approach Volume Threshold: -42 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #300: (37) University Ave & Adams Dr

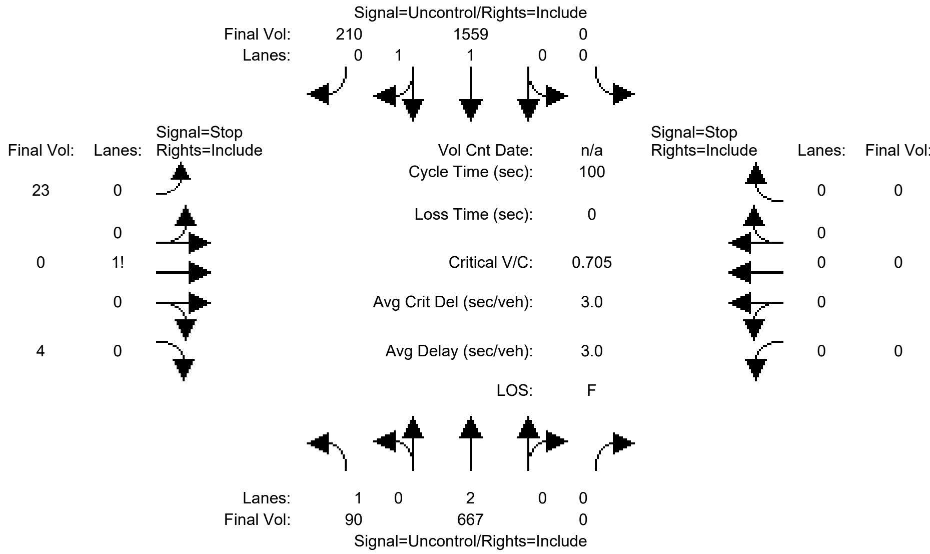



```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        7 1802     0     0  374    19   224    0    44     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7 1802     0     0  374    19   224    0    44     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     7 1802     0     0  374    19   224    0    44     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      7 1802     0     0  374    19   224    0    44     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     7 1802     0     0  374    19   224    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   393 xxxx xxxxx  xxxx xxxx xxxxx  1299 2200   197  xxxx xxxx xxxxx
Potent Cap.:  1177 xxxx xxxxx  xxxx xxxx xxxxx   156   45   818  xxxx xxxx xxxxx
Move Cap.:    1177 xxxx xxxxx  xxxx xxxx xxxxx   155   45   818  xxxx xxxx xxxxx
Volume/Cap:   0.01 xxxx  xxxx  xxxx xxxx  xxxx  1.44 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  179 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 17.0 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  299 xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            298.6            xxxxxx
ApproachLOS:         *                *                F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    19   224    0    44     0    0     0
ApproachDel:    xxxxxx           xxxxxx            298.6           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=22.2]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=268]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2470]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    19   224    0    44     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2202
Minor Approach Volume:           268
Minor Approach Volume Threshold: 13 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #300: (37) University Ave & Adams Dr

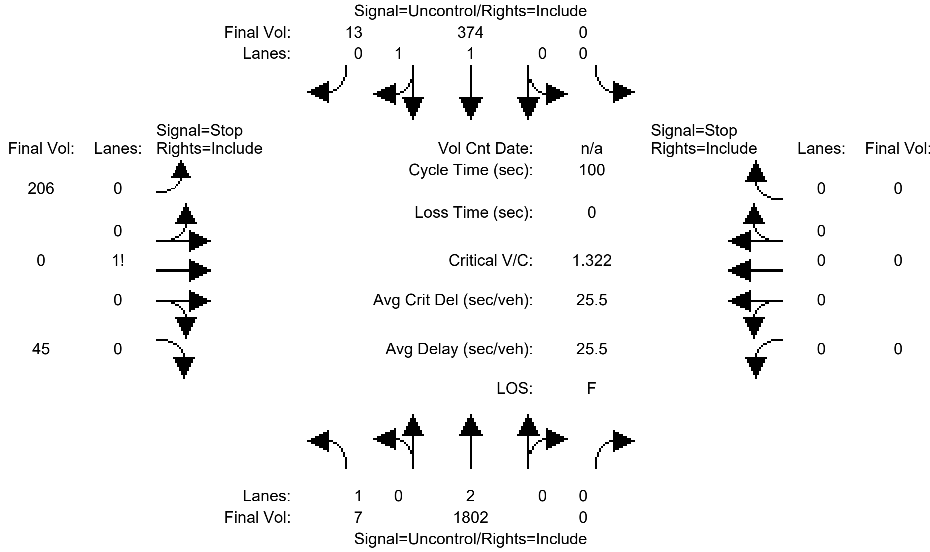



```
Street Name:          University Ave                      Adams Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      90  667     0     0 1559   210    23    0     4     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   90  667     0     0 1559   210    23    0     4     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   90  667     0     0 1559   210    23    0     4     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    90  667     0     0 1559   210    23    0     4     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   90  667     0     0 1559   210    23    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1769 xxxx xxxxx  xxxx xxxx xxxxx  2178 2511   885  xxxx xxxx xxxxx
Potent Cap.:  357 xxxx xxxxx  xxxx xxxx xxxxx    40   29   292  xxxx xxxx xxxxx
Move Cap.:    357 xxxx xxxxx  xxxx xxxx xxxxx    33   21   292  xxxx xxxx xxxxx
Volume/Cap:  0.25 xxxx  xxxx  xxxx xxxx  xxxx  0.71 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    1.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del: 18.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    C    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   38 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  225 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            224.7           xxxxxx
ApproachLOS:        *                *                F                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   210    23    0     4     0    0     0
ApproachDel:    xxxxxx           xxxxxx            224.7            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.7]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=27]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2553]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0    0  0  1  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   90  667     0     0 1559   210    23    0     4     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2526
Minor Approach Volume:           27
Minor Approach Volume Threshold: -34 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #300: (37) University Ave & Adams Dr

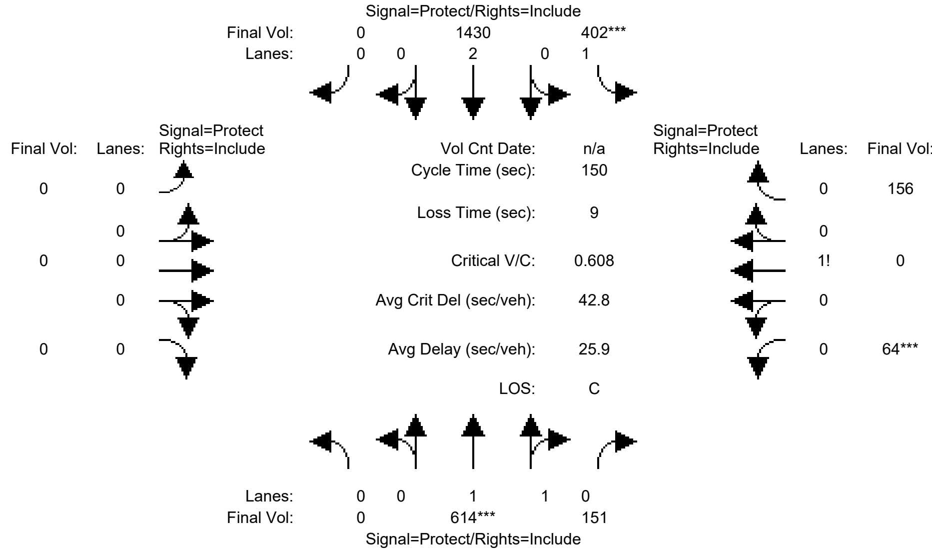



```
Street Name:          University Ave                     Adams Dr
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       7 1802     0     0  374    13   206     0    45     0     0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    7 1802     0     0  374    13   206     0    45     0     0     0
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:    7 1802     0     0  374    13   206     0    45     0     0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     7 1802     0     0  374    13   206     0    45     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:    7 1802     0     0  374    13   206     0    45     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  387 xxxx xxxxx  xxxx xxxx xxxxx  1296 2197   194  xxxx xxxx xxxxx
Potent Cap.: 1183 xxxx xxxxx  xxxx xxxx xxxxx   157   46   822  xxxx xxxx xxxxx
Move Cap.:   1183 xxxx xxxxx  xxxx xxxx xxxxx   156   45   822  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  1.32 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  182 xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 14.9 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  249 xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx            xxxxxx            248.8            xxxxxx
ApproachLOS:          *                 *                F                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   206    0    45     0    0     0
ApproachDel:    xxxxxx           xxxxxx            248.8            xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=17.3]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=251]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=2447]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #300 (37) University Ave & Adams Dr
********************************************************************************
Future Volume Alternative: Peak Hour Warrant Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        1  0  2  0  0   0  0  1  1  0   0  0  1! 0  0   0  0  0  0  0
Initial Vol:    7 1802     0     0  374    13   206    0    45     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             2196
Minor Approach Volume:           251
Minor Approach Volume Threshold: 14 [less than minimum of 100]
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)




| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 151 | 402 | 1430 | 0 | 0 | 0 | 0 | 64 | 0 | 156 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.61 | 0.39 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.71 |
| Final Sat.: | 0 | 2811 | 691 | 1805 | 3610 | 0 | 0 | 0 | 0 | 493 | 0 | 1201 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.22 | 0.22 | 0.22 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.13 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 53.9 | 53.9 | 55.0 | 109 | 0.0 | 0.0 | 0.0 | 0.0 | 32.1 | 0.0 | 32.1 |
| Volume/Cap: | 0.00 | 0.61 | 0.61 | 0.61 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.61 | 0.00 | 0.61 |
| Uniform Del: | 0.0 | 39.4 | 39.4 | 38.7 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 53.3 | 0.0 | 53.3 |
| IncremntDel: | 0.0 | 0.9 | 0.9 | 1.6 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 40.2 | 40.2 | 40.3 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 56.2 | 0.0 | 56.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 40.2 | 40.2 | 40.3 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 56.2 | 0.0 | 56.2 |
| LOS by Move: | A | D | D | D | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton No Project PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)

```
                         Signal=Protect/Rights=Include
           Final Vol:    0            1430           359***
              Lanes:     0      0       2       0     1

              Signal=Protect                                  Signal=Protect
Final Vol:  Lanes:  Rights=Include   Vol Cnt Date:       n/a  Rights=Include  Lanes:  Final Vol:
                                     Cycle Time (sec):   150
    0          0                                                               0        188
                                     Loss Time (sec):      9
               0                                                               0
    0          0                     Critical V/C:     0.625                  1!         0
               0                     Avg Crit Del (sec/veh): 43.6              0
    0          0                     Avg Delay (sec/veh):   28.0               0        79***
                                     LOS:                  C

              Lanes:     0      0       1       1     0
           Final Vol:    0            614***         190
                         Signal=Protect/Rights=Include
```

| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| **Volume Module:** | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 190 | 359 | 1430 | 0 | 0 | 0 | 0 | 79 | 0 | 188 |
| **Saturation Flow Module:** | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.53 | 0.47 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.70 |
| Final Sat.: | 0 | 2660 | 823 | 1805 | 3610 | 0 | 0 | 0 | 0 | 501 | 0 | 1193 |
| **Capacity Analysis Module:** | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.23 | 0.23 | 0.20 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.16 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 55.4 | 55.4 | 47.7 | 103 | 0.0 | 0.0 | 0.0 | 0.0 | 37.8 | 0.0 | 37.8 |
| Volume/Cap: | 0.00 | 0.62 | 0.62 | 0.62 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 | 0.00 | 0.62 |
| Uniform Del: | 0.0 | 38.8 | 38.8 | 43.5 | 12.1 | 0.0 | 0.0 | 0.0 | 0.0 | 49.8 | 0.0 | 49.8 |
| IncremntDel: | 0.0 | 1.0 | 1.0 | 2.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 0.0 | 2.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 39.7 | 39.7 | 45.7 | 12.4 | 0.0 | 0.0 | 0.0 | 0.0 | 52.7 | 0.0 | 52.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 39.7 | 39.7 | 45.7 | 12.4 | 0.0 | 0.0 | 0.0 | 0.0 | 52.7 | 0.0 | 52.7 |
| LOS by Move: | A | D | D | D | B | A | A | A | A | D | A | D |
| HCM2kAvgQ: | 0 | 16 | 16 | 14 | 18 | 0 | 0 | 0 | 0 | 11 | 0 | 11 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project AM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)

Signal=Protect/Rights=Include
Final Vol: 0 1430 344***
Lanes: 0 0 2 0 1

Signal=Protect Rights=Include (Eastbound)
Final Vol: 0, 0, 0
Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 9
Critical V/C: 0.537
Avg Crit Del (sec/veh): 39.0
Avg Delay (sec/veh): 22.3
LOS: C

Signal=Protect Rights=Include (Westbound)
Lanes: 0, 0, 1!, 0, 0
Final Vol: 120, 0, 47***

Lanes: 0 0 1 1 0
Final Vol: 0 614*** 142
Signal=Protect/Rights=Include

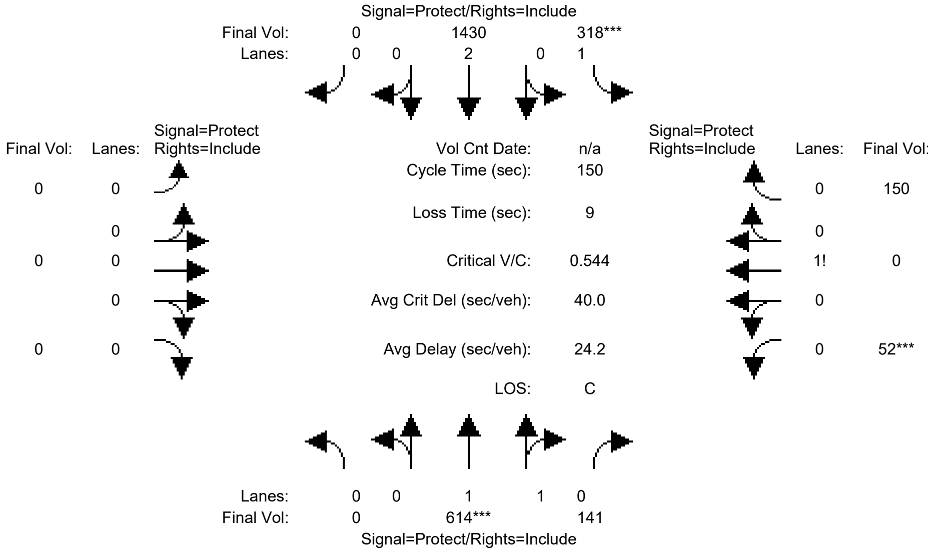
| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 142 | 344 | 1430 | 0 | 0 | 0 | 0 | 47 | 0 | 120 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.62 | 0.38 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.00 | 0.72 |
| Final Sat.: | 0 | 2850 | 659 | 1805 | 3610 | 0 | 0 | 0 | 0 | 476 | 0 | 1216 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.22 | 0.22 | 0.19 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.10 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 60.2 | 60.2 | 53.2 | 113 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 | 0.0 | 27.6 |
| Volume/Cap: | 0.00 | 0.54 | 0.54 | 0.54 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.54 |
| Uniform Del: | 0.0 | 34.3 | 34.3 | 38.6 | 7.4 | 0.0 | 0.0 | 0.0 | 0.0 | 55.4 | 0.0 | 55.4 |
| IncremntDel: | 0.0 | 0.4 | 0.4 | 0.9 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 1.9 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 34.7 | 34.7 | 39.5 | 7.6 | 0.0 | 0.0 | 0.0 | 0.0 | 57.3 | 0.0 | 57.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 34.7 | 34.7 | 39.5 | 7.6 | 0.0 | 0.0 | 0.0 | 0.0 | 57.3 | 0.0 | 57.3 |
| LOS by Move: | A | C | C | D | A | A | A | A | A | E | A | E |
| HCM2kAvgQ: | 0 | 14 | 14 | 13 | 14 | 0 | 0 | 0 | 0 | 7 | 0 | 7 |

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cumulative + Dumbarton WITH Project PM

Intersection #800: (36) University Avenue and Purdue Avenue (New Signal)




| Street Name: | University Avenue | | | | | | Purdue Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Min. Green: | 10 | 10 | 10 | 7 | 10 | 10 | 0 | 0 | 0 | 10 | 10 | 10 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 614 | 141 | 318 | 1430 | 0 | 0 | 0 | 0 | 52 | 0 | 150 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.92 | 0.92 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 1.00 | 0.89 |
| Lanes: | 0.00 | 1.63 | 0.37 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.74 |
| Final Sat.: | 0 | 2854 | 655 | 1805 | 3610 | 0 | 0 | 0 | 0 | 434 | 0 | 1253 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.22 | 0.22 | 0.18 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.12 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |
| Green Time: | 0.0 | 59.4 | 59.4 | 48.6 | 108 | 0.0 | 0.0 | 0.0 | 0.0 | 33.0 | 0.0 | 33.0 |
| Volume/Cap: | 0.00 | 0.54 | 0.54 | 0.54 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.54 |
| Uniform Del: | 0.0 | 34.9 | 34.9 | 41.6 | 9.7 | 0.0 | 0.0 | 0.0 | 0.0 | 51.8 | 0.0 | 51.8 |
| IncremntDel: | 0.0 | 0.4 | 0.4 | 1.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 1.7 |
| InitQueuDel: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Delay Adj: | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Delay/Veh: | 0.0 | 35.3 | 35.3 | 42.7 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 53.5 | 0.0 | 53.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 35.3 | 35.3 | 42.7 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 53.5 | 0.0 | 53.5 |
| LOS by Move: | A | D | D | D | B | A | A | A | A | D | A | D |
| HCM2kAvgQ: | 0 | 14 | 14 | 12 | 16 | 0 | 0 | 0 | 0 | 9 | 0 | 9 |

Note: Queue reported is the number of cars per lane.

# Appendix D
## Trip Generation Analysis

Hexagon Transportation Consultants, Inc.

## Memorandum

---

**Date:** October 13, 2021

**To:** Ms. Kirsten Chapman, ICF

**From:** Gary Black
Shikha Jain

**Subject:** Trip Generation for the Proposed Facebook Willow Village Campus in Menlo Park, California

---

Hexagon Transportation Consultants, Inc. has developed trip generation estimates for the proposed Facebook Willow Village Campus in Menlo Park, California. The project site, which is approximately 59 acres in area, is located on Willow Road between the Joint Powers Board (JPB) Rail Corridor in the north and O'Brien Drive in the south. The site is accessed via Hamilton Avenue and two driveways that connect directly to Willow Road. Existing uses on the site include approximately one million square feet of industrial, office, and warehouse space. The project proposes to replace the existing uses with a mixed-use village that include residential, retail, recreational, hotel, and office uses.

# Trip Generation

Trip generation estimates for the mixed-use development are based on standard trip generation rates published in the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition manual. A variety of trip reduction credits were applied to the project's gross trip generation estimates based on the project's mixed-use nature, physical design features, and geographic location. The resulting trip generation was then subject to a 20% site-wide TDM trip reduction requirement to derive a site-wide trip cap.

Net project trip generation on the surrounding roadway network was estimated by further crediting potential pass-by trips and trips generated by the existing land uses on site.

## Gross Project Trip Generation

A description of the source of trip generation rates for each land-use is provided below:

- ***Facebook Office***. Initial trip estimates for Facebook office uses are based on ITE Land Use code 710: General Office Building.
- ***Residential.*** The trip estimate is based on the ITE Land Use code 221: Multifamily Housing (Mid-Rise), which includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three to ten levels. Some of the apartments are designated as senior housing, which could have a lower trip rate. Thus, the trip generation estimate for the apartments is conservative.
- ***Retail.*** Trip estimates are based on ITE Land Use code 820: Shopping Center, which includes several types of retail uses like restaurants, movie theaters, bowling alleys etc. that are typically present in shopping centers.
- ***Hotel.*** Trip estimates are based on ITE Land Use code 310: Hotel.

- ***Public Park.*** Trip estimates are based on ITE Land Use code 488: Soccer Complex due to the programmatic design of the park, which will have play structures and open field areas for warm-ups or casual play.
- ***Community Space.*** Trip estimates are based on ITE Land Use code 495: Recreational Community Center

**Internal Capture**

Since this project is mixed-use in nature, a portion of the trips generated by the project will both begin and end within the development, also called as internal capture. Internal capture trip estimates were made for each of the Project's land uses based on the specific mix of uses, sizes, and location within the Project utilizing a combination of two internal capture methodologies: the Transportation Research Board (TRB) *National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments,* and US EPA *Mixed Use Trip Generation Model v.4 (MXD),* 2010.

NCHRP Report 684 includes an assessment of on-site land-use categories including retail, office, residential, restaurants, theaters, and hotels within the site land use mix when generating internal capture. The EPA MXD method does not explicitly differentiate subcategories such as restaurants, theaters, and hotels but it does account for location factors influencing the project, including regional location, transit availability, density of development, walkability factors, and the sociodemographic profile of site residents and businesses. Given the strengths and weaknesses of both methodologies, an integrated approach for internal capture was developed as described in *Getting Trip Generation Right: Eliminating the Bias Against Mixed-Use Development, PAS Memo, American Planning Association, May 2013.* In accordance with the PAS memo, the full EPA MXD methodology and NCHRP 684 methodology were applied to get internal capture from each method. The results of the two methods were then combined in terms of percentages of trips remaining internal to the development site using proportioning factors provided in the PAS Memo (see Appendix A).

Local area characteristics inputs into the EPA MXD model are described in Table 1.

**Table 1**
**Input for EPA MXD Model V4**

| Factor | Input Value | Source |
|---|---|---|
| Project Acearage | 59 acres | Project Plan |
| Number of intersections within or on the perimeter of the MXD | 6 | Project Plan |
| Is transit present within the site or across the street | Yes | Project Plan |
| Is the site a Central Business District or TOD | No | -- |
| Employment within one mile of the MXD | 20,851 | http://onthemap.ces.census.gov/ |
| Employment within a 30 min transit trip | 43,479 | http://onthemap.ces.census.gov/ |

**External Walk, Bike, and Transit**

External walk, bike, and transit trip reduction is based on trips to the site using these alternative modes of transportation. This reduction is dependent on local area characteristics like availability of transit near the site, intersection density, etc. EPA MXD accounts for local area characteristics (see Table 1) to provide trip reductions based on external walking, biking, and transit.

The internal capture and external walk, bike and transit reductions were credited against the initial trip generation estimates (using ITE rates) to derive the gross project trip generation. Some of the external walk, bike, and transit (tram) trips would be to the other facilities of the Facebook campus. The gross project trip generation would be subject to the 20% site-wide TDM requirement, discussed below.

As shown in Table 2, the project trips generated by the proposed land uses after internal capture and external walk, bike, and transit reductions are 34,254 daily trips, including 3,123 AM peak hour trips (2,223 inbound trips and 900 outbound trips), and 3,834 PM peak hour trips (1,241 inbound trips and 2,593 outbound trips).

## Table 2
## Trip Generation Estimates

| Land Use | ITE Code [1] | Size | | Daily Rate | Daily Trips | AM Peak Hour Rate | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour Rate | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Proposed Use** | | | | | | | | | | | | | |
| Facebook Office Buildings | 710 | 6,950 | emp | 3.28 | 22,796 | 0.37 | 2,135 | 437 | 2,572 | 0.40 | 556 | 2,224 | 2,780 |
| *Internal Capture* [2] | | | | | *(1,603)* | | *(59)* | *(15)* | *(74)* | | *(21)* | *(71)* | *(92)* |
| *External Walk, Bike, and Transit* [3] | | | | | *(2,420)* | | *(151)* | *(31)* | *(182)* | | *(45)* | *(183)* | *(228)* |
| ***Facebook Office trips before active TDM measures:*** | | | | | **18,773** | | **1,925** | **391** | **2,316** | | **490** | **1,970** | **2,460** |
| Multifamily Housing (Mid-Rise) | 221 | 1,730 | du | 5.44 | 9,411 | 0.36 | 162 | 461 | 623 | 0.44 | 464 | 297 | 761 |
| *Internal Capture* [2] | | | | | *(662)* | | *(4)* | *(13)* | *(17)* | | *(56)* | *(27)* | *(83)* |
| *External Walk, Bike, and Transit* [3] | | | | | *(999)* | | *(12)* | *(33)* | *(45)* | | *(35)* | *(23)* | *(58)* |
| ***Residential trips before active TDM measures:*** | | | | | **7,750** | | **146** | **415** | **561** | | **373** | **247** | **620** |
| General Retail | 820 | 200 | ksf | 37.75 | 7,550 | 0.94 | 117 | 71 | 188 | 3.81 | 366 | 396 | 762 |
| *Internal Capture* [2] | | | | | *(531)* | | *(7)* | *(4)* | *(11)* | | *(36)* | *(54)* | *(90)* |
| *External Walk, Bike, and Transit* [3] | | | | | *(802)* | | *(8)* | *(5)* | *(13)* | | *(28)* | *(29)* | *(57)* |
| ***Retail trips before active TDM measures:*** | | | | | **6,217** | | **102** | **62** | **164** | | **302** | **313** | **615** |
| Hotel | 310 | 193 | rms | 8.36 | 1,613 | 0.47 | 54 | 37 | 91 | 0.60 | 59 | 57 | 116 |
| *Internal Capture* [2] | | | | | *(113)* | | *(2)* | *(4)* | *(6)* | | *(7)* | *(4)* | *(11)* |
| *External Walk, Bike, and Transit* [3] | | | | | *(171)* | | *(4)* | *(2)* | *(6)* | | *(4)* | *(5)* | *(9)* |
| ***Hotel trips before active TDM measures:*** | | | | | **1,329** | | **48** | **31** | **79** | | **48** | **48** | **96** |
| Soccer Complex [4] | 488 | 3 | fields | 71.33 | 214 | 0.99 | 2 | 1 | 3 | 16.43 | 32 | 17 | 49 |
| *Internal Capture* [3] | | | | | *(15)* | | *0* | *0* | *0* | | *(1)* | *(1)* | *(2)* |
| *External Walk, Bike, and Transit* [4] | | | | | *(23)* | | *0* | *0* | *0* | | *(3)* | *(1)* | *(4)* |
| ***Public Park trips before active TDM measures:*** | | | | | **176** | | **2** | **1** | **3** | | **28** | **15** | **43** |
| **Project Trips Before active TDM measures** | | | | | **34,245** | | **2,223** | **900** | **3,123** | | **1,241** | **2,593** | **3,834** |
| *Facebook Office Active TDM Reduction* [5] | | | | | *(536)* | | *(555)* | *(91)* | *(646)* | | *(105)* | *(685)* | *(790)* |
| *Non-Office Uses Active TDM Reduction* [5] | | | | | *(446)* | | *(30)* | *(51)* | *(81)* | | *(75)* | *(62)* | *(137)* |
| **Project Trips After Active TDM Reduction** | | | | | **33,263** | | **1,638** | **758** | **2,396** | | **1,061** | **1,846** | **2,907** |
| *Retail Pass-By Reduction (34%)* [6] | | | | | *(1,026)* | | *0* | *0* | *0* | | *(92)* | *(96)* | *(188)* |
| **New Project Trips Generated on Roadway Network** | | | | | **32,237** | | **1,638** | **758** | **2,396** | | **969** | **1,750** | **2,719** |
| **Other Trip Adjustments** | | | | | | | | | | | | | |
| Existing Uses [7] | | | | | (11,700) | | (699) | (286) | (985) | | (250) | (555) | (805) |
| **Net Project Trips on Project Network** | | | | | **20,537** | | **939** | **472** | **1,411** | | **719** | **1,195** | **1,914** |

Notes:

emp = employees; ksf = 1,000 square feet; du = dwelling unit; rms = rooms

1 Daily, AM, and PM peak hour average rates published in *ITE Trip Generation Manual, 10th Edition, 2017* were used for each land use.

2 Internal Capture developed using *National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments* and *US EPA Mixed Use Trip Generation Model v.4, 2010* per the methodology described in *Getting Trip Generation Right: Eliminating the Bias Against Mixed-Use Development, PAS Memo*, American Planning Association, May 2013.

3 External walk, bike, and transit reduction developed using *US EPA Mixed Use Trip Generation Model v.4, 2010*.

4 ITE Trip Generation Manual, 10th Edition, 2017 provides trip rates per field for a soccer complex. The park is planned for 4 acres. Number of soccer fields on 4 acres of land was estimated based on the size of a standard soccer field.

5 Daily TDM reduction based on Willow Village Adjustment Request: Transportation Demand Management. *Peak Hour TDM reduction based on proposed peak hour trip caps for Facebook, and a 10% TDM reduction for non-Facebook uses.*

6 Pass-by trip reduction is based on the average pass-by trip reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Hexagon assumes no pass-by trip reduction during the AM peak hour and half of the PM peak pass-by reduction for daily trip generation.

7 Existing use Trip Estimates based on driveway counts conducted over three days in September 2019 per *Facebook Willow Traffic Counts Memorandum*, Fehr & Peers, March 26, 2020. 8-9 AM in the AM peak period and 4-5 PM in the PM peak period have been considered as peak hours since they have the highest trips.

### Transportation Demand Management (TDM)

The City of Menlo Park requires all new developments to reduce their trip generation by 20 percent via TDM strategies. The TDM reduction is applied to the trip generation after the internal capture and the proposed project location and ambient mode split have been accounted for. This method of accounting for the 20 percent reduction is applied to the peak hour trips. For daily trips, the project has requested an exemption to have the 20 percent reduction applied to the trip generation before the internal capture and other trip reductions.

Per the Willow Village VMT and Trip Generation Analyses Assumptions Memorandum developed by Fehr & Peers dated August 9th, 2021, the Facebook offices will be capping their trips to a much lower trip generation level during the AM and PM peak hours by using aggressive TDM measures. These TDM measures are estimated to achieve a reduction of 20 percent from ITE trip rates on daily trips. During the AM and PM peak hours, the project proposes TDM greater than 20 percent from ITE trip rates after accounting for internal capture and external walk, bike and transit trips. Accordingly, a lower TDM trip reduction is needed for the other proposed land uses on the site to achieve an overall TDM reduction of 20 percent for the proposed project. A TDM trip reduction of 3 percent was assumed for the other proposed land uses for daily trips and a TDM trip reduction of 10 percent was assumed for the other proposed land uses for peak hour trips.

After accounting for the Facebook trip cap and the TDM reduction for all other proposed land uses, the main campus is estimated to generate 33,263 daily trips, including 2,396 AM peak hour trips (1,638 inbound trips and 758 outbound trips), and 2,907 PM peak hour trips (1,061 inbound trips and 1,846 outbound trips).

## Net Project Trip Generation

Net project trip generation estimates the number of new project trips generated onto the surrounding roadway network. The following categories of trips are credited from the site-specific trip cap to derive the net project trip generation.

**Pass-By**

The retail uses would attract some of their customers from people who are passing by the site on Willow Road or Bayfront Expressway heading towards their destination. These customers would not need to make a separate vehicle trip to come to the Project Site. Such vehicle trips are categorized as pass-by trips as they are not new trips generated on the roadway network and should be credited from the project trip generation. A pass-by trip reduction for retail trips was applied based on the average pass-by reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Pass-by data are typically available only for the PM peak hour. Hexagon assumed no pass-by trip reduction for the AM peak hour and half of the PM peak pass-by trip reduction for daily trip generation.

**Existing Uses**

Trips associated with the existing uses on the Project Site were credited against the new trip generation. The trips generated by the existing buildings on the site were estimated based on driveway counts conducted over three days in September 2019 per Facebook Willow Traffic Counts Memorandum, Fehr & Peers, March 26, 2020. The existing uses on the site generated an average of 11,700 trips daily, including 985 trips in the AM peak hour (699 inbound and 286 outbound trips), and 805 trips in the PM peak hour (250 inbound and 555 outbound trips).

As shown in Table 2, the net proposed project trips generated by the main campus on the roadway network would be 20,537 daily trips, including 1,411 AM peak hour trips (939 inbound trips and 472 outbound trips), and 1,914 PM peak hour trips (719 inbound trips and 1,195 outbound trips). As shown in Table 11, the net trips generated by the Hamilton Parcel are estimated to be 218 daily trips, including 6 AM peak hour trips (3 inbound trips and 3 outbound trips), and 18 PM peak hour trips (9 inbound trips and 9 outbound trips).

Hexagon Transportation Consultants, Inc.

# Appendix A
# Internal Capture Reduction Calculations

**Table A-1: Internal Capture Proportioning Factors**

| | AM Peak Traffic | PM Peak Traffic | Average Daily Traffic |
|---|---|---|---|
| NCHRP 684 | 10.1% | 36.5% | 0.0% |
| EPA MXD | 89.9% | 63.5% | 100.0% |
| **Total** | **100.0%** | **100.0%** | **100.0%** |

Source: *Getting Trip Generation Right: Eliminating the Bias Against Mixed-Use Development, PAS Memo, American Planning Association, May 2013.*

## Table A-2: Trip Generation Estimates

| Land Use | ITE Code | Size | | Daily Rate | Daily Trips | AM Peak Hour Rate | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour Rate | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Proposed Use** | **ITE Code [1]** | | | | | | | | | | | | |
| Facebook Office Buildings | 710 | 6,950 | emp | 3.28 | 22,796 | 0.37 | 2,135 | 437 | 2,572 | 0.40 | 556 | 2,224 | 2,780 |
| Internal Capture % (NCHRP) | | | | | | | 3% | 8% | | | 4% | 2% | |
| Internal Capture Reduction (NCHRP) | | | | | | | (58) | (37) | (95) | | (20) | (48) | (68) |
| Internal Capture (MXD) | | | | | (1,603) | | (59) | (12) | (71) | | (21) | (84) | (105) |
| *Internal Capture [2]* | | | | | *(1,603)* | | *(59)* | *(15)* | *(74)* | | *(21)* | *(71)* | *(92)* |
| *External Walk, Bike, and Transit [3]* | | | | | *(2,420)* | | *(151)* | *(31)* | *(182)* | | *(45)* | *(183)* | *(228)* |
| ***Facebook Office trips before active TDM measures:*** | | | | | **18,773** | | **1,925** | **391** | **2,316** | | **490** | **1,970** | **2,460** |
| Multifamily Housing (Mid-Rise) | 221 | 1,730 | du | 5.44 | 9,411 | 0.36 | 162 | 461 | 623 | 0.44 | 464 | 297 | 761 |
| Internal Capture % (NCHRP) | | | | | | | 2% | 3% | | | 26% | 19% | |
| Internal Capture Reduction (NCHRP) | | | | | | | (3) | (14) | (17) | | (122) | (56) | (178) |
| Internal Capture (MXD) | | | | | (662) | | (4) | (13) | (17) | | (18) | (11) | (29) |
| *Internal Capture [2]* | | | | | *(662)* | | *(4)* | *(13)* | *(17)* | | *(56)* | *(27)* | *(83)* |
| *External Walk, Bike, and Transit [3]* | | | | | *(999)* | | *(12)* | *(33)* | *(45)* | | *(35)* | *(23)* | *(58)* |
| ***Residential trips before active TDM measures:*** | | | | | **7,750** | | **146** | **415** | **561** | | **373** | **247** | **620** |
| General Retail | 820 | 200 | ksf | 37.75 | 7,550 | 0.94 | 117 | 71 | 188 | 3.81 | 366 | 396 | 762 |
| Internal Capture % (NCHRP) | | | | | | | 40% | 34% | | | 20% | 31% | |
| Internal Capture Reduction (NCHRP) | | | | | | | (47) | (24) | (71) | | (73) | (121) | (194) |
| Internal Capture (MXD) | | | | | (531) | | (3) | (2) | (5) | | (14) | (15) | (29) |
| *Internal Capture [2]* | | | | | *(531)* | | *(7)* | *(4)* | *(11)* | | *(36)* | *(54)* | *(90)* |
| *External Walk, Bike, and Transit [3]* | | | | | *(802)* | | *(8)* | *(5)* | *(13)* | | *(28)* | *(29)* | *(57)* |
| ***Retail trips before active TDM measures:*** | | | | | **6,217** | | **102** | **62** | **164** | | **302** | **313** | **615** |
| Hotel | 310 | 193 | rms | 8.36 | 1,613 | 0.47 | 54 | 37 | 91 | 0.60 | 59 | 57 | 116 |
| Internal Capture % (NCHRP) | | | | | | | 0% | 89% | | | 29% | 12% | |
| Internal Capture Reduction (NCHRP) | | | | | | | 0 | (33) | (33) | | (17) | (7) | (24) |
| Internal Capture (MXD) | | | | | (113) | | (2) | (1) | (3) | | (2) | (2) | (4) |
| *Internal Capture [2]* | | | | | *(113)* | | *(2)* | *(4)* | *(6)* | | *(7)* | *(4)* | *(11)* |
| *External Walk, Bike, and Transit [3]* | | | | | *(171)* | | *(4)* | *(2)* | *(6)* | | *(4)* | *(5)* | *(9)* |
| ***Hotel trips before active TDM measures:*** | | | | | **1,329** | | **48** | **31** | **79** | | **48** | **48** | **96** |
| Soccer Complex[4] | 488 | 3 | fields | 71.33 | 214 | 0.99 | 2 | 1 | 3 | 16.43 | 32 | 17 | 49 |
| Internal Capture % (NCHRP) | | | | | | | 0% | 0% | | | 0% | 0% | |
| Internal Capture Reduction (NCHRP) | | | | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Internal Capture (MXD) | | | | | (15) | | 0 | 0 | 0 | | (1) | (1) | (2) |
| *Internal Capture [3]* | | | | | *(15)* | | *0* | *0* | *0* | | *(1)* | *(1)* | *(2)* |
| *External Walk, Bike, and Transit [4]* | | | | | *(23)* | | *0* | *0* | *0* | | *(3)* | *(1)* | *(4)* |
| ***Public Park trips before active TDM measures:*** | | | | | **176** | | **2** | **1** | **3** | | **28** | **15** | **43** |
| **Project Trips Before active TDM measures** | | | | | **34,245** | | **2,223** | **900** | **3,123** | | **1,241** | **2,593** | **3,834** |
| *Facebook Office Active TDM Reduction [5]* | | | | | *(536)* | | *(555)* | *(91)* | *(646)* | | *(105)* | *(685)* | *(790)* |
| *Non-Office Uses Active TDM Reduction [5]* | | | | | *(446)* | | *(30)* | *(51)* | *(81)* | | *(75)* | *(62)* | *(137)* |
| **Project Trips After Active TDM Reduction** | | | | | **33,263** | | **1,638** | **758** | **2,396** | | **1,061** | **1,846** | **2,907** |
| *Retail Pass-By Reduction (34%) [6]* | | | | | *(1,026)* | | *0* | *0* | *0* | | *(92)* | *(96)* | *(188)* |
| **New Project Trips Generated on Roadway Network** | | | | | **32,237** | | **1,638** | **758** | **2,396** | | **969** | **1,750** | **2,719** |
| **Other Trip Adjustments** | | | | | | | | | | | | | |
| Existing Uses [7] | | | | | (11,700) | | (699) | (286) | (985) | | (250) | (555) | (805) |
| **Net Project Trips on Project Network** | | | | | **20,537** | | **939** | **472** | **1,411** | | **719** | **1,195** | **1,914** |

Notes:

emp = employees; ksf = 1,000 square feet; du = dwelling unit; rms = rooms

1 Daily, AM, and PM peak hour average rates published in *ITE Trip Generation Manual, 10th Edition, 2017* were used for each land use.

2 Internal Capture developed using *National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments* and *US EPA Mixed Use Trip Generation Model v.4, 2010* per the methodology described in *Getting Trip Generation Right: Eliminating the Bias Against Mixed-Use Development, PAS Memo*, American Planning Association, May 2013.

3 External walk, bike, and transit reduction developed using *US EPA Mixed Use Trip Generation Model v.4, 2010*.

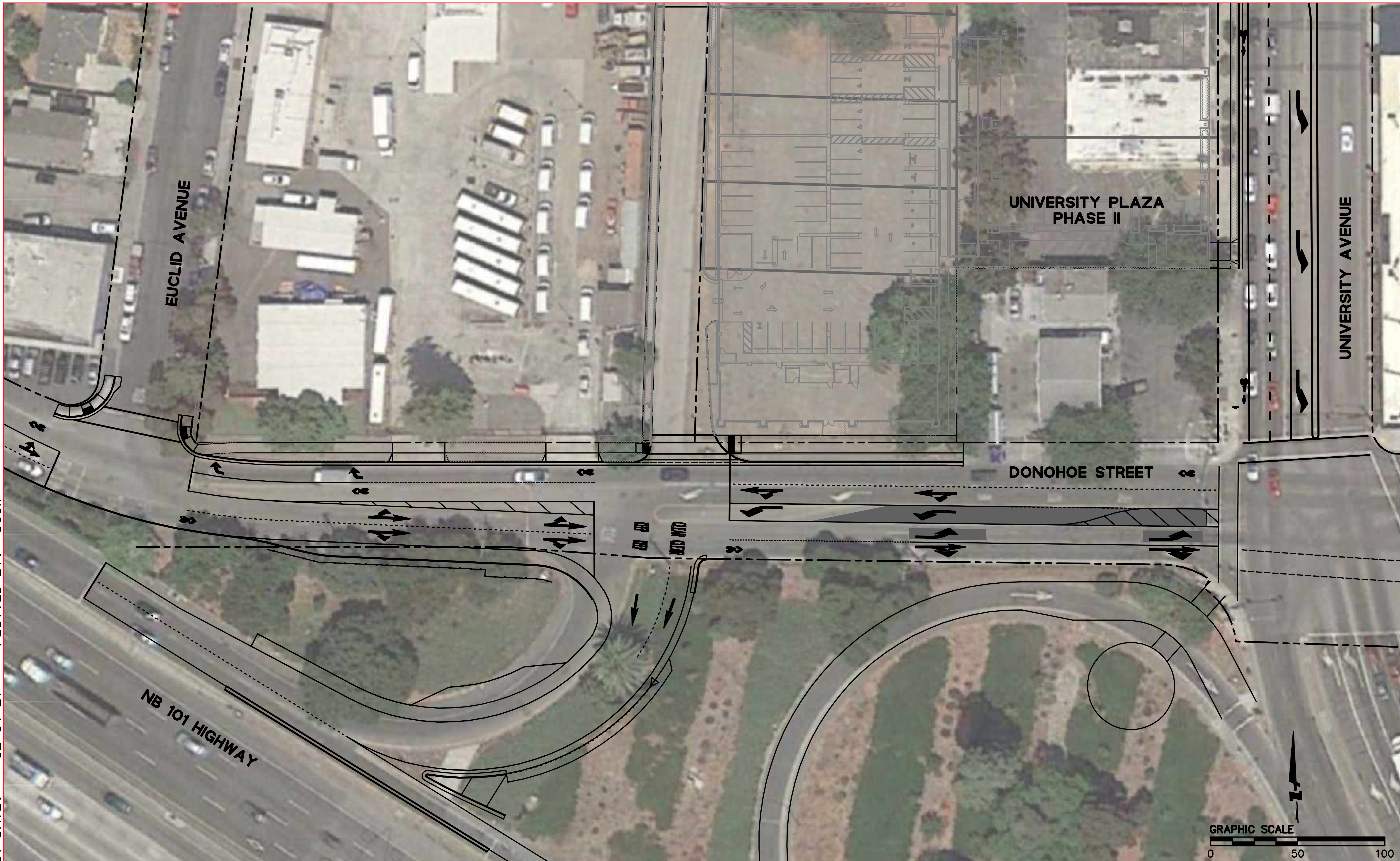
4 ITE Trip Generation Manual, 10th Edition, 2017 provides trip rates per field for a soccer complex. The park is planned for 4 acres. Number of soccer fields on 4 acres of land was estimated based on the size of a standard soccer field.

5 Daily TDM reduction based on Willow Village Adjustment Request: Transportation Demand Management. *Peak Hour TDM reduction based on proposed peak hour trip caps for Facebook, and a 10% TDM reduction for non-Facebook uses.*

6 Pass-by trip reduction is based on the average pass-by trip reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Hexagon assumes no pass-by trip reduction during the AM peak hour and half of the PM peak pass-by reduction for daily trip generation.

7 Existing use Trip Estimates based on driveway counts conducted over three days in September 2019 per *Facebook Willow Traffic Counts Memorandum*, Fehr & Peers, March 26, 2020. 8-9 AM in the AM peak period and 4-5 PM in the PM peak period have been considered as peak hours since they have the highest trips.

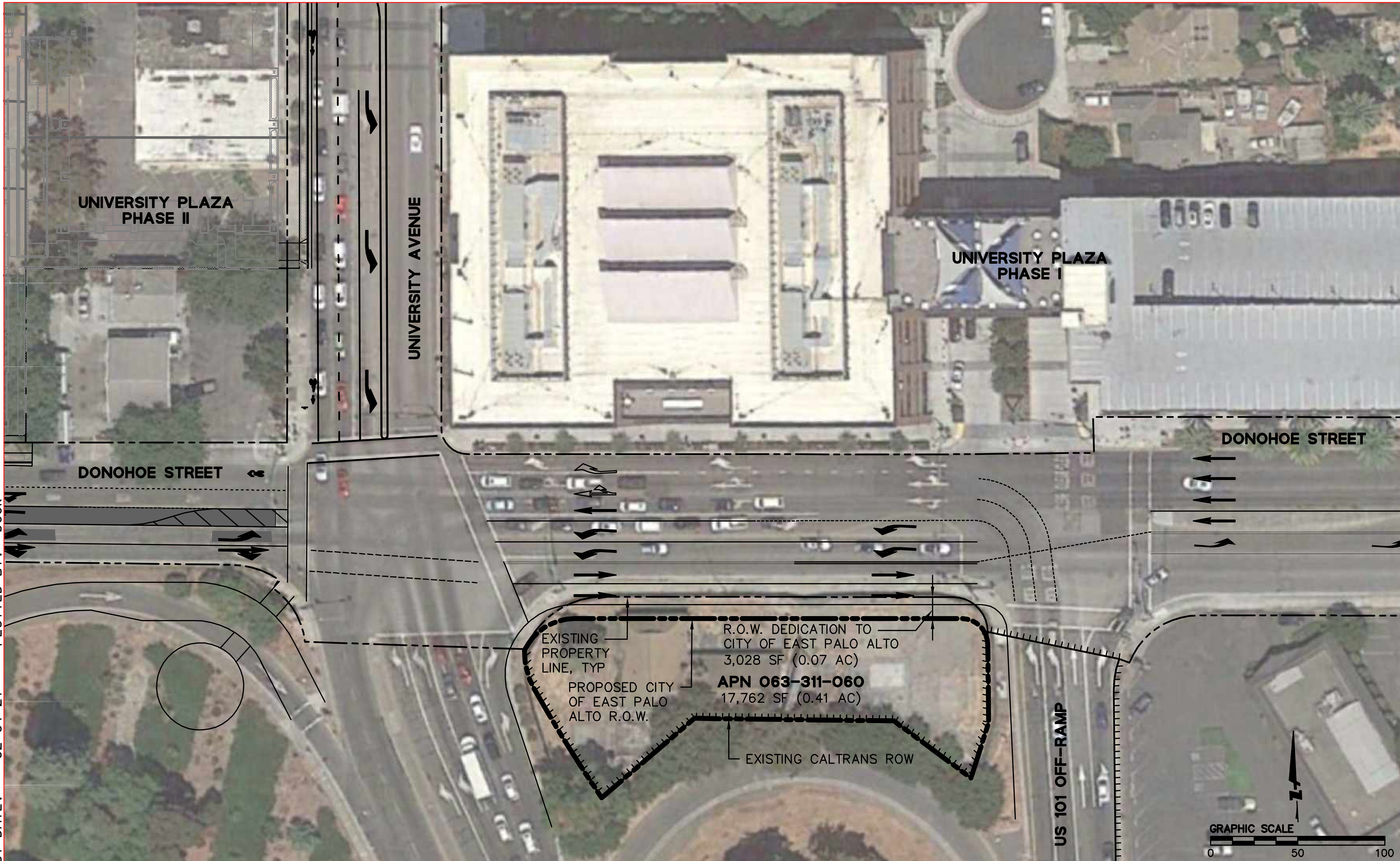
# Appendix E
## Planned Donohoe Street Improvements



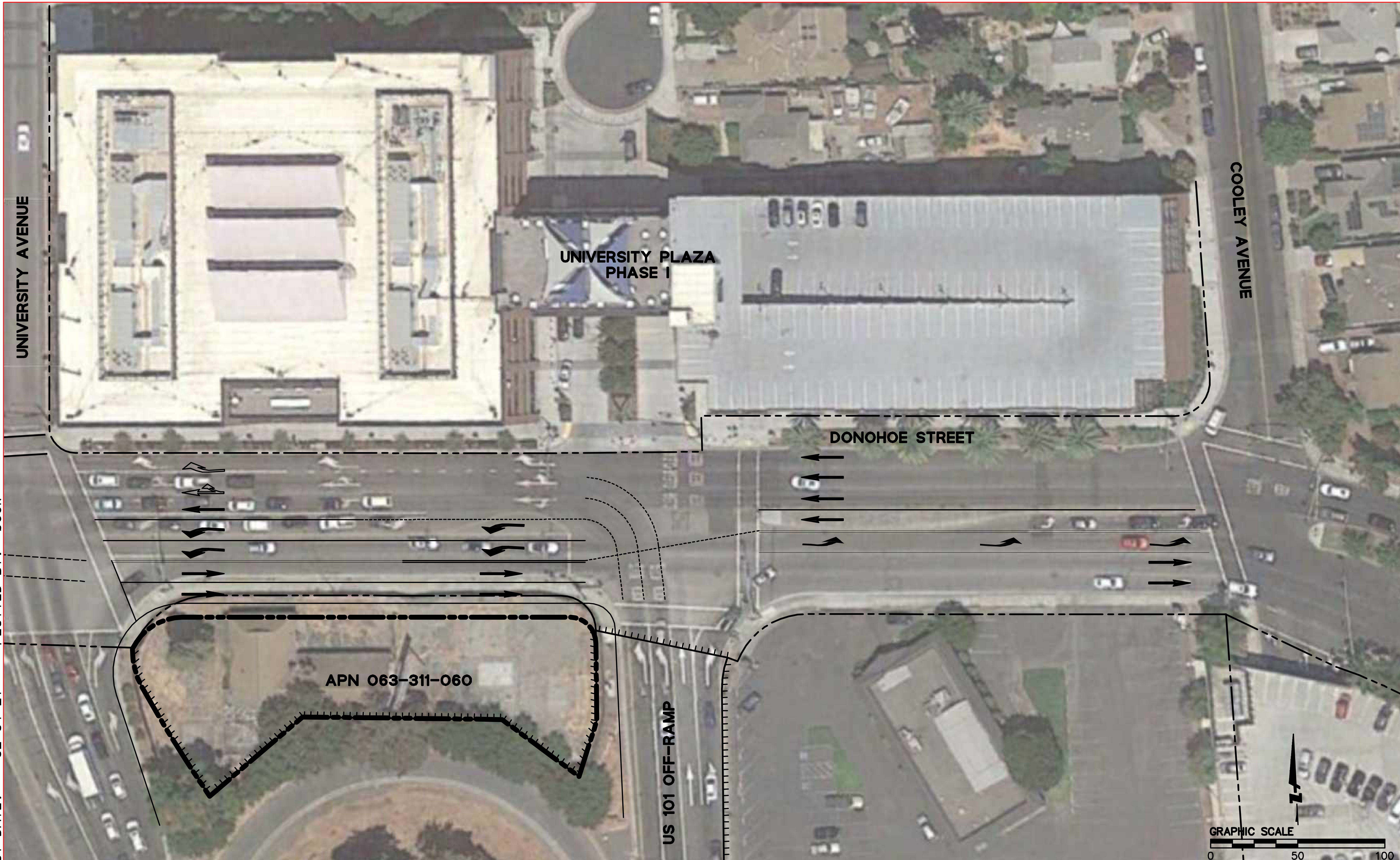

DRAWING NAME: K:\2016\160076_EPA_Ph2\ENG\EXHIBITS\Donohoe Widening\Donohoe Widening.dwg
PLOT DATE: 02-04-21 PLOTTED BY: beck

BKF ENGINEERS

JANUARY 26, 2021




DRAWING NAME: K:\2016\160076_EPA_Ph2\ENG\EXHIBITS\Donohoe Widening\Donohoe Widening.dwg
PLOT DATE: 02-04-21
PLOTTED BY: beck




DRAWING NAME: K:\2016\160076_EPA_Ph2\ENG\EXHIBITS\Donohoe Widening\Donohoe Widening.dwg
PLOT DATE: 02-04-21 PLOTTED BY: beck

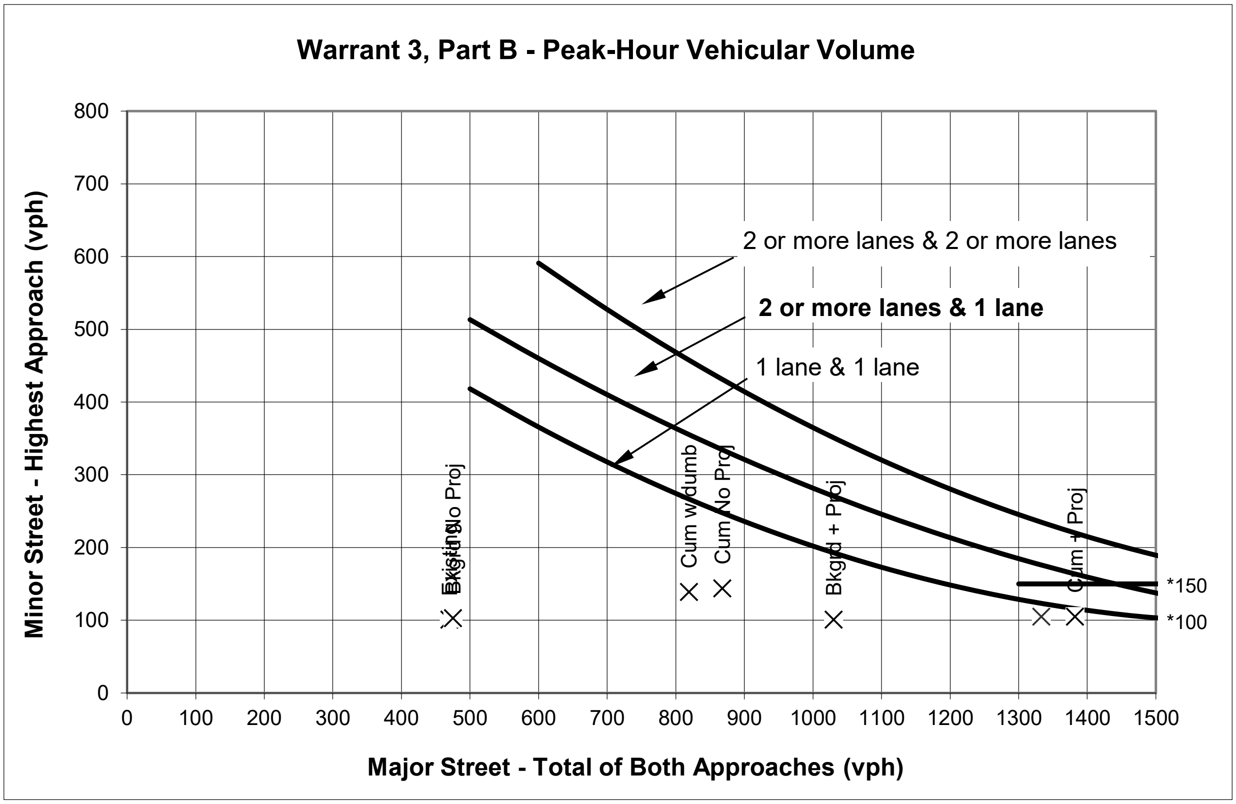
BKF ENGINEERS

JANUARY 26, 2021

# Appendix F
## Signal Warrant Analysis

*Facebook Willow Village*

**Adams Drive & O'Brien Drive** **AM PEAK PERIOD**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | AM PEAK PERIOD: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 470 | 475 | 1030 | 868 | 1382 | 819 | 1333 | |
| Minor Street - Highest Approach | Adams Drive/ | X | | 101 | 103 | 101 | 144 | 105 | 139 | 105 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **No** | **No** | **No** | **No** | **No** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: O'Brien Drive — Critical Approach Speed* (mph) 25

Minor Street: Adams Drive/ — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)………………………. ☑ or Rural (R)

In built up area of isolated community of < 10,000 population……………………. ☐

☐ Urban (U)

**AM PEAK PERIOD**

### Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | SB | SB | SB | SB | SB | SB | SB | |
| Highest Minor Street Average Delay (sec/veh) | 14.0 | 14.1 | 49.5 | 48.3 | 320.8 | 35.8 | 193.0 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 101 | 103 | 101 | 144 | 105 | 139 | 105 | |
| Minor Street Total Delay (veh-hrs) | 0.4 | 0.4 | 1.4 | 1.9 | 9.4 | 1.4 | 5.6 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | No | No | Yes | No | Yes | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **No** | **No** | **Yes** | **No** | **Yes** | |

**PART B**

AM PEAK PERIOD

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 470 | 475 | 1030 | 868 | 1382 | 819 | 1333 | |
| Minor Street - Highest Approach | Adams Drive/ | X | | 101 | 103 | 101 | 144 | 105 | 139 | 105 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **No** | **No** | **No** | **No** | **Yes** | |

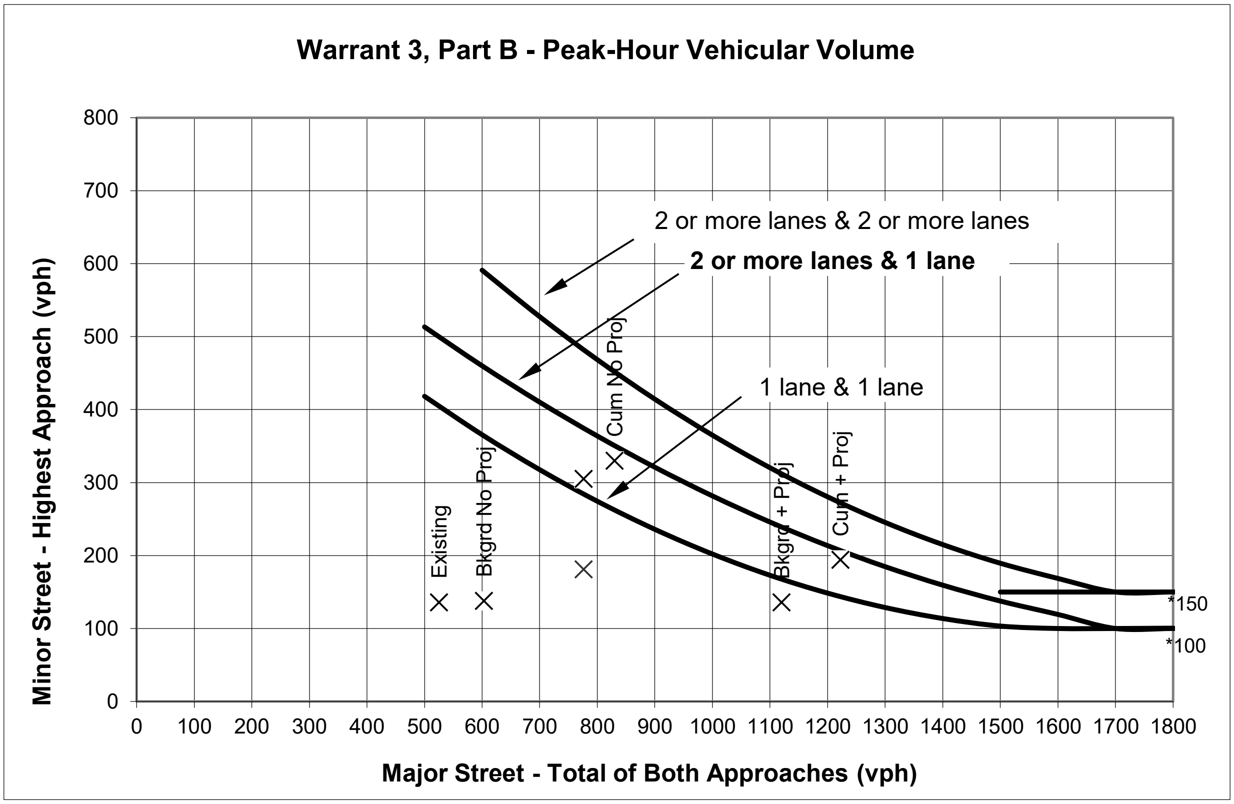
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**Adams Drive & O'Brien Drive** **PM PEAK HOUR**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | PM PEAK HOUR: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 525 | 603 | 1120 | 830 | 1222 | 776 | 776 | |
| Minor Street - Highest Approach | Adams Drive/ | X | | 136 | 138 | 136 | 330 | 194 | 305 | 181 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | No | No | No | Yes | Yes | Yes | No | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: O'Brien Drive — Critical Approach Speed* (mph) 25

Minor Street: Adams Drive/ — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)……………………… ☑ or
In built up area of isolated community of < 10,000 population…………………… ☐ } **Rural (R)**

☐ **Urban (U)**

**PM PEAK HOUR**

### Warrant 3 - Peak Hour

**PART A**
(All parts 1, 2, and 3 below must be satisfied)

PM PEAK HOUR

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | SB | SB | SB | SB | SB | SB | SB | |
| Highest Minor Street Average Delay (sec/veh) | 22.4 | 27.6 | 281.8 | 500.6 | 941.8 | 383.6 | 753.8 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 136 | 138 | 136 | 330 | 194 | 305 | 181 | |
| Minor Street Total Delay (veh-hrs) | 0.8 | 1.1 | 10.6 | 45.9 | 50.8 | 32.5 | 37.9 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | Yes | Yes | Yes | Yes | Yes | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

**PART B**

PM PEAK HOUR

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 525 | 603 | 1120 | 830 | 1222 | 776 | 1176 | |
| Minor Street - Highest Approach | Adams Drive/ | X | | 136 | 138 | 136 | 330 | 194 | 305 | 181 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **No** | **Yes** | **Yes** | **Yes** | **No** | |

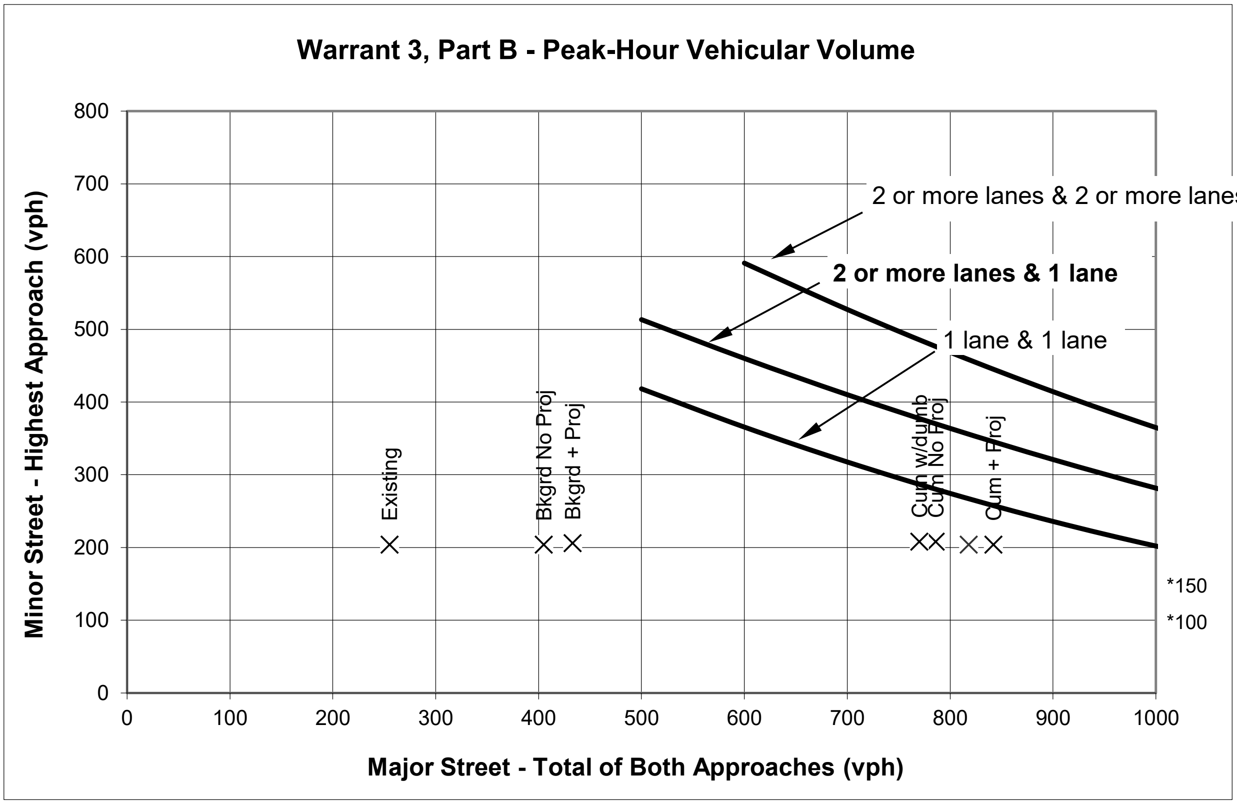
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**Chilco Street & Hamilton Avenue** **AM PEAK PERIOD**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | AM PEAK PERIOD: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Hamilton | X | | 255 | 405 | 433 | 786 | 842 | 770 | 818 | |
| Minor Street - Highest Approach | Chilco | X | | 204 | 204 | 206 | 208 | 204 | 208 | 204 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **No** | **No** | **No** | **No** | **No** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: Hamilton Critical Approach Speed* (mph) 35

Minor Street: Chilco Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)………..…...…......……..  ☑ or

In built up area of isolated community of < 10,000 population……….....…………. ☐ } **Rural (R)**

☐ **Urban (U)**

**AM PEAK PERIOD**

### Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | WB | WB | WB | WB | WB | WB | WB | |
| Highest Minor Street Average Delay (sec/veh) | 9.3 | 10.3 | 10.5 | 14.1 | 14.7 | 13.8 | 14.2 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 204 | 204 | 206 | 208 | 204 | 208 | 204 | |
| Minor Street Total Delay (veh-hrs) | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u> | No | No | No | No | No | No | No | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u> | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** | |

**PART B**

AM PEAK PERIOD

| | | Approach Lanes: One | 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Hamilton | X | | 255 | 405 | 433 | 786 | 842 | 770 | 818 | |
| Minor Street - Highest Approach | Chilco | X | | 204 | 204 | 206 | 208 | 204 | 208 | 204 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **No** | **No** | **No** | **No** | **Yes** | |

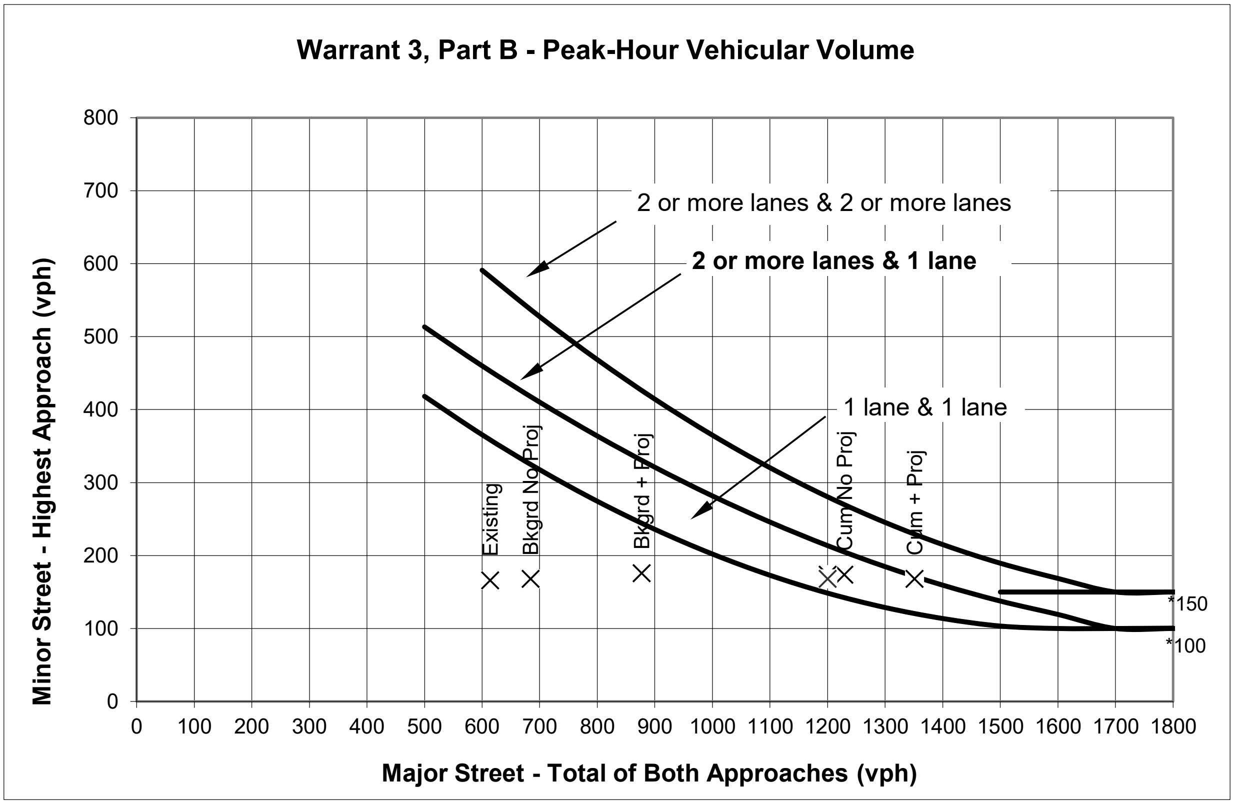
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**Chilco Street & Hamilton Avenue** **PM PEAK HOUR**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | PM PEAK HOUR: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Hamilton | X | | 614 | 684 | 877 | 1229 | 1351 | 1200 | 1200 | |
| Minor Street - Highest Approach | Chilco | X | | 166 | 168 | 176 | 174 | 168 | 174 | 168 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: Hamilton — Critical Approach Speed* (mph) 35

Minor Street: Chilco — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)……………………… ☑ or
In built up area of isolated community of < 10,000 population……………………… ☐ } **Rural (R)**

☐ **Urban (U)**

**PM PEAK HOUR**

### Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

PM PEAK HOUR

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | EB | EB | EB | EB | EB | EB | EB | |
| Highest Minor Street Average Delay (sec/veh) | 11.2 | 11.7 | 13.8 | 13.9 | 14.3 | 13.6 | 14.1 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 166 | 168 | 176 | 174 | 168 | 174 | 168 | |
| Minor Street Total Delay (veh-hrs) | 0.5 | 0.5 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | No | No | No | No | No | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** | |

**PART B**

PM PEAK HOUR

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Hamilton | X | | 614 | 684 | 877 | 1229 | 1351 | 1200 | 1315 | |
| Minor Street - Highest Approach | Chilco | X | | 166 | 168 | 176 | 174 | 168 | 174 | 168 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | |

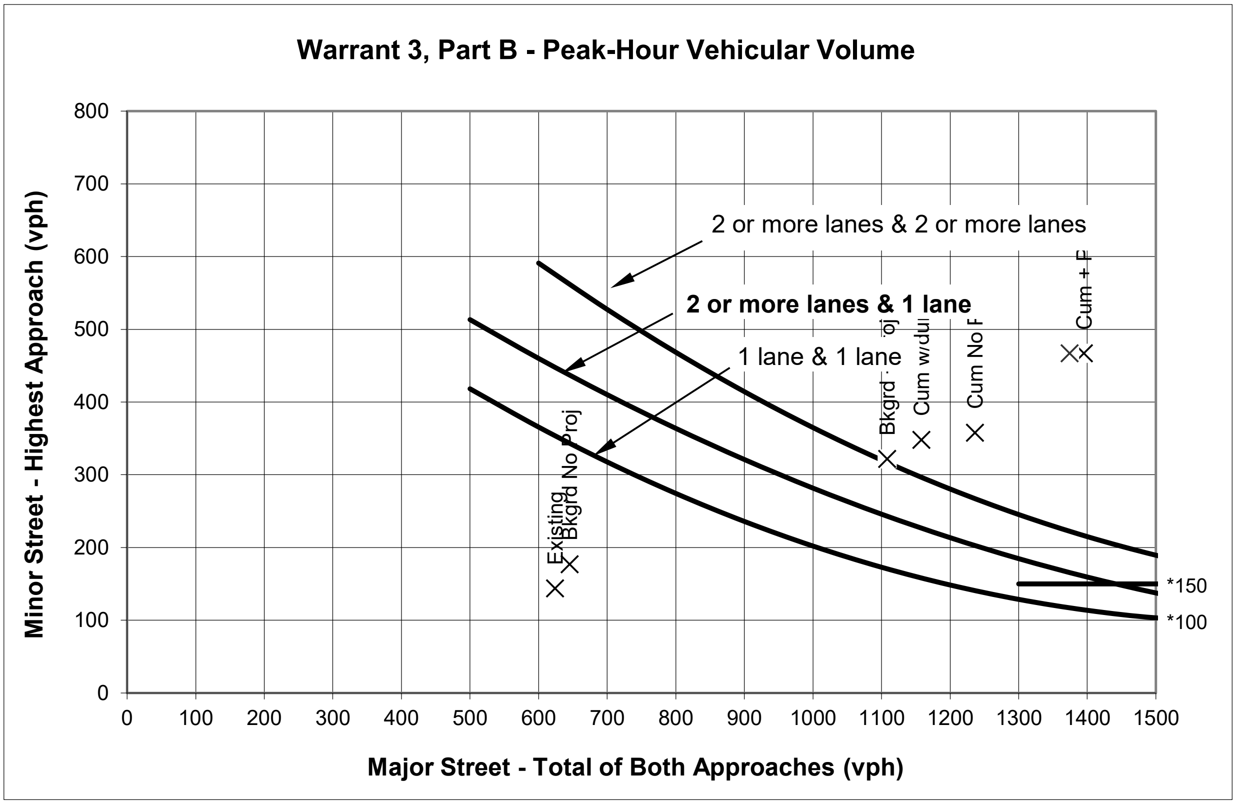
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**O'Brien Drive and Kavanaugh Drive** **AM PEAK PERIOD**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | AM PEAK PERIOD: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 624 | 645 | 1108 | 1236 | 1395 | 1158 | 1374 | |
| Minor Street - Highest Approach | Kavanaugh/ | X | | 144 | 177 | 322 | 358 | 467 | 348 | 467 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: O'Brien Drive — Critical Approach Speed* (mph) 35

Minor Street: Kavanaugh/ — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)……………………… ☑ or

In built up area of isolated community of < 10,000 population……………………… ☐ — **Rural (R)**

☐ **Urban (U)**

**AM PEAK PERIOD**

### Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | SB | WB | NB | NB | NB | NB | NB | |
| Highest Minor Street Average Delay (sec/veh) | 12.7 | 13.6 | 190.5 | 299.1 | 482.3 | 236.7 | 472.6 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 328 | 177 | 713 | 818 | 933 | 760 | 916 | |
| Minor Street Total Delay (veh-hrs) | 1.2 | 0.7 | 37.7 | 68.0 | 125.0 | 50.0 | 120.3 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | Yes | Yes | Yes | Yes | Yes | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

**PART B**

AM PEAK PERIOD

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 624 | 645 | 1108 | 1236 | 1395 | 1158 | 1374 | |
| Minor Street - Highest Approach | Kavanaugh/ | X | | 144 | 177 | 322 | 358 | 467 | 348 | 467 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **Yes** | **Yes** | **Yes** | **No** | **Yes** | |

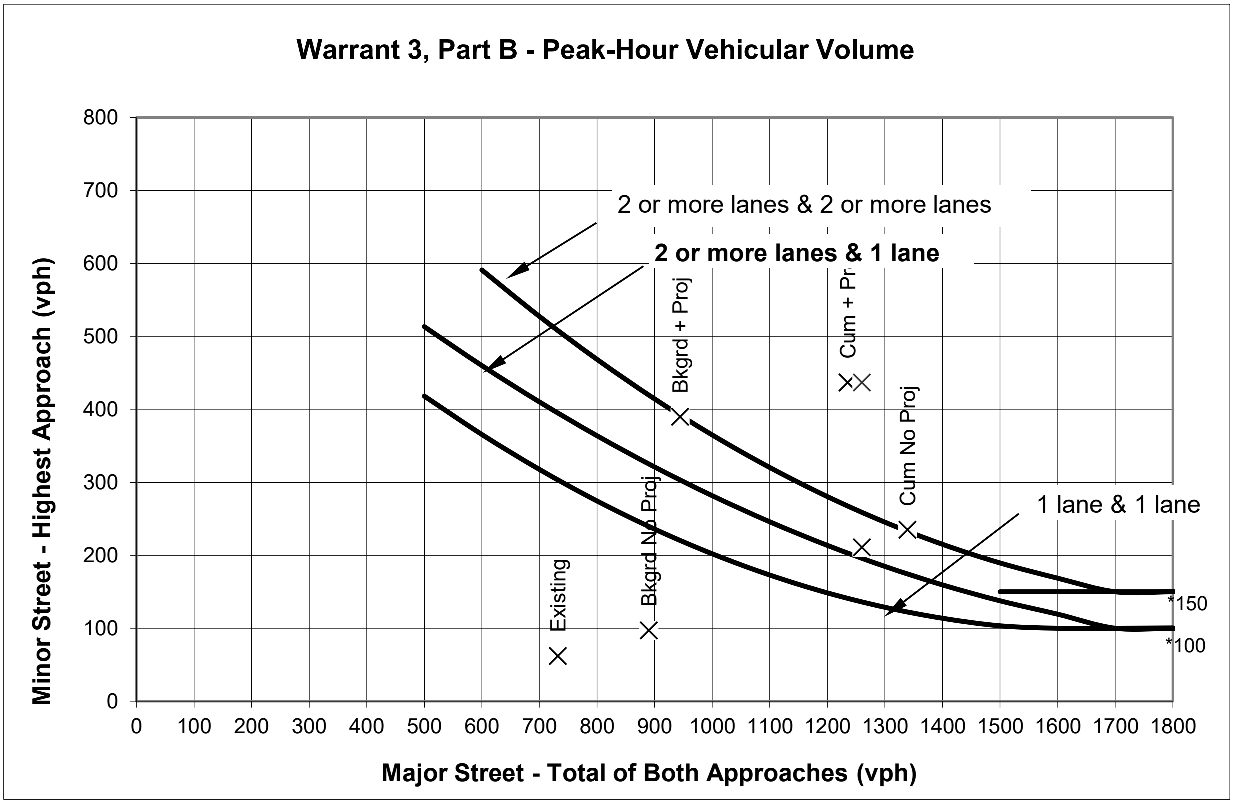
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**O'Brien Drive and Kavanaugh Drive** — **PM PEAK HOUR**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes One | Approach Lanes 2 or More | PM PEAK HOUR Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 732 | 890 | 944 | 1339 | 1235 | 1260 | 1260 | |
| Minor Street - Highest Approach | Kavanaugh/ | X | | 62 | 97 | 390 | 235 | 437 | 211 | 437 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

## TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: O'Brien Drive — Critical Approach Speed* (mph) 35

Minor Street: Kavanaugh/ — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)………………………. ☑ or
In built up area of isolated community of < 10,000 population……………………. ☐ } **Rural (R)**

☐ **Urban (U)**

**PM PEAK HOUR**

### Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

PM PEAK HOUR

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | NB | NB | NB | NB | NB | NB | NB | |
| Highest Minor Street Average Delay (sec/veh) | 17.9 | 39.0 | 129.2 | 308.5 | 320.5 | 250.3 | 313.2 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 529 | 648 | 625 | 914 | 783 | 882 | 760 | |
| Minor Street Total Delay (veh-hrs) | 2.6 | 7.0 | 22.4 | 78.3 | 69.7 | 61.3 | 66.1 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | Yes | Yes | Yes | Yes | Yes | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

**PART B**

PM PEAK HOUR

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | O'Brien Drive | X | | 732 | 890 | 944 | 1339 | 1235 | 1260 | 1188 | |
| Minor Street - Highest Approach | Kavanaugh/ | X | | 62 | 97 | 390 | 235 | 437 | 211 | 437 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

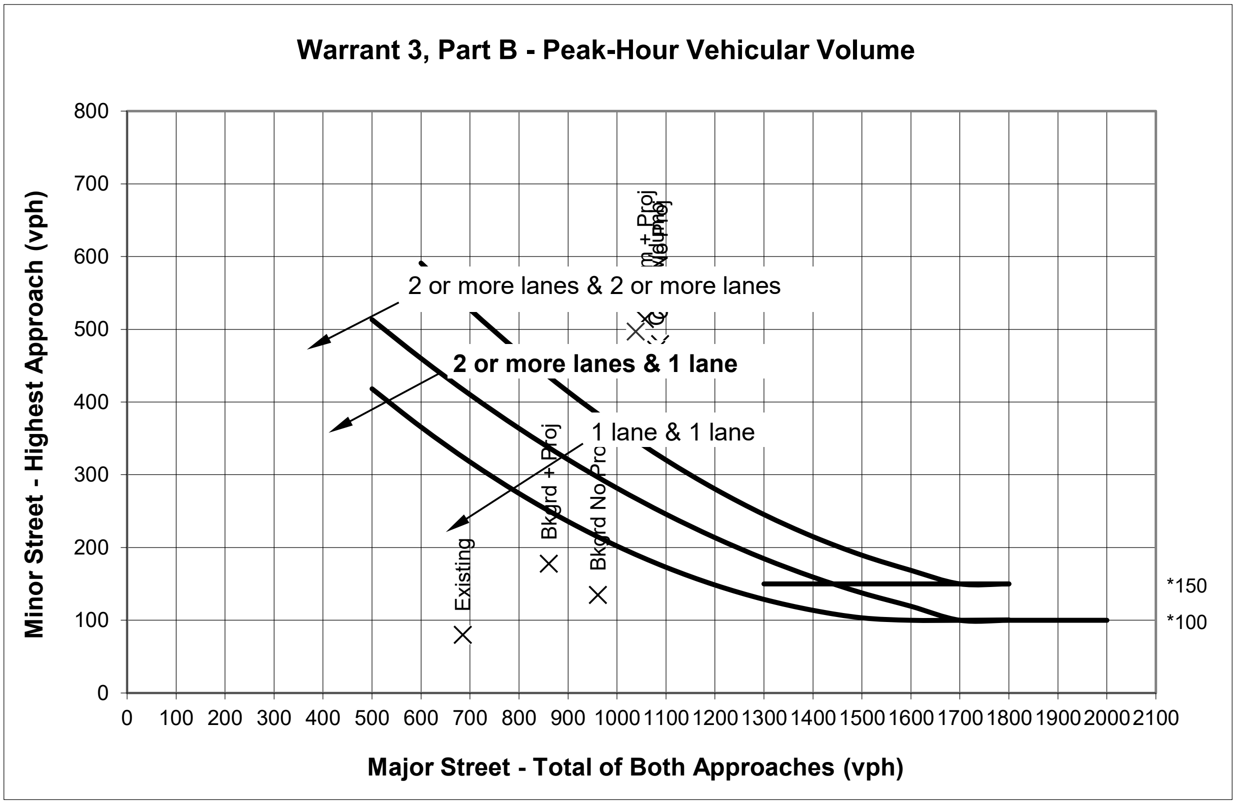
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**Saratoga Avenue and Newbridge Street** — **AM PEAK PERIOD**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | AM PEAK PERIOD: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Newbridge | X | | 685 | 961 | 861 | 1088 | 1057 | 1080 | 1038 | |
| Minor Street - Highest Approach | Saratoga | X | | 80 | 135 | 178 | 480 | 514 | 472 | 497 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

# TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: Newbridge — Critical Approach Speed* (mph) 35

Minor Street: Saratoga — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)…………………………. ☑ or

In built up area of isolated community of < 10,000 population………………………. ☐ **Rural (R)**

☐ **Urban (U)**

**AM PEAK PERIOD**

## Warrant 3 - Peak Hour

**PART A**

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | NB | NB | NB | NB | NB | NB | NB | |
| Highest Minor Street Average Delay (sec/veh) | 13.3 | 17.9 | 18.2 | 167.6 | 187.6 | 155.9 | 163.7 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 80 | 135 | 178 | 480 | 514 | 472 | 497 | |
| Minor Street Total Delay (veh-hrs) | 0.3 | 0.7 | 0.9 | 22.3 | 26.8 | 20.4 | 22.6 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; AND | No | No | No | Yes | Yes | Yes | Yes | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; AND | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **No** | **Yes** | **Yes** | **Yes** | **Yes** | |

**PART B**

AM PEAK PERIOD

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Newbridge | X | | 685 | 961 | 861 | 1088 | 1057 | 1080 | 1038 | |
| Minor Street - Highest Approach | Saratoga | X | | 80 | 135 | 178 | 480 | 514 | 472 | 497 | |
| **Signal Warranted based on Part B?** | | | | **No** | **No** | **No** | **Yes** | **Yes** | **No** | **Yes** | |

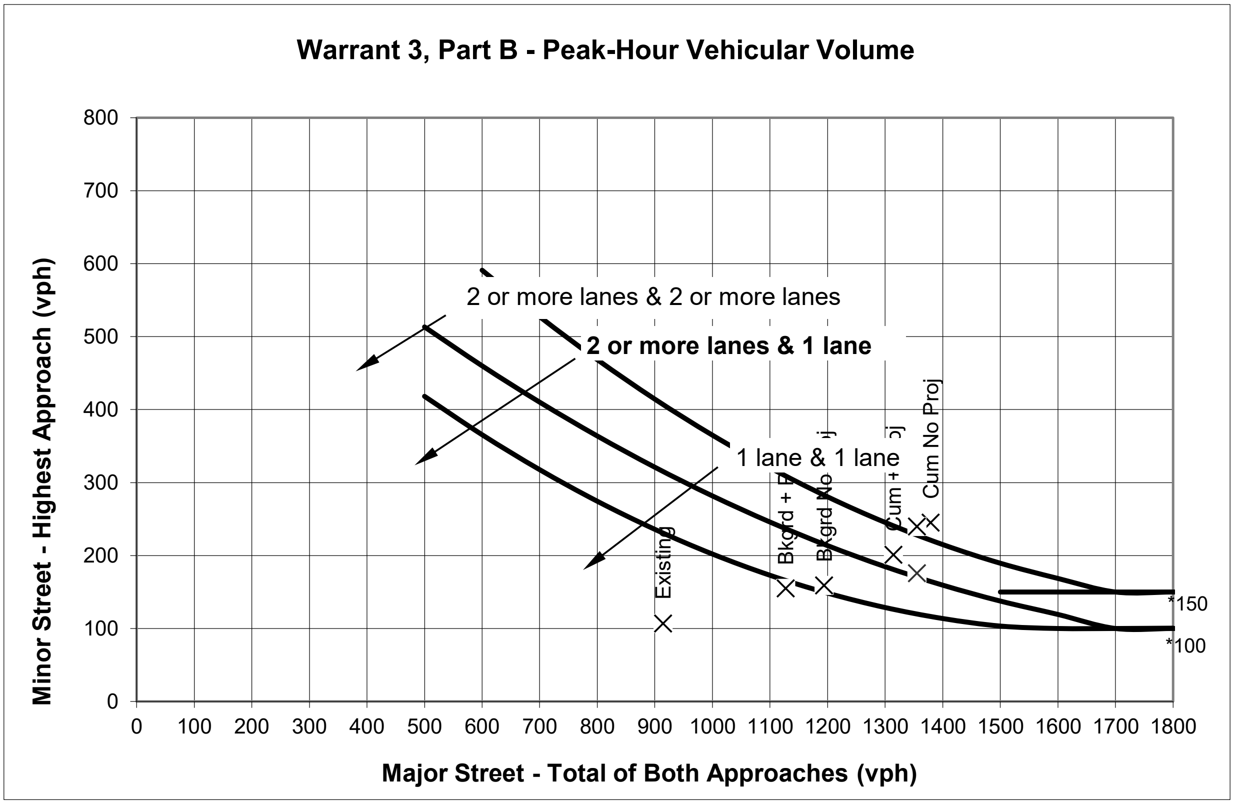
The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

*Notes:*

*Facebook Willow Village*

**Saratoga Avenue and Newbridge Street** **PM PEAK HOUR**




Source: Figure 4C-3 *California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* .

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 3, Part B - Peak-Hour Vehicular Volume**

| | | Approach Lanes: One | Approach Lanes: 2 or More | PM PEAK HOUR: Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Newbridge | X | | 914 | 1194 | 1127 | 1379 | 1314 | 1355 | 1355 | |
| Minor Street - Highest Approach | Saratoga | X | | 107 | 159 | 155 | 245 | 201 | 240 | 176 | |
| **Signal Warranted Based on Part B - Peak-Hour Volumes?** | | | | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

*Facebook Willow Village*

# TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: SJ date: 6/22/21

Major Street: Newbridge — Critical Approach Speed* (mph) 35

Minor Street: Saratoga — Critical Approach Speed* (mph) 25

**Posted Speed.*

Critical speed of major street traffic > 50 mph (64 km/h)………………………. ☑ or
In built up area of isolated community of < 10,000 population…………………… ☐ } **Rural (R)**

☐ **Urban (U)**

**PM PEAK HOUR**

## Warrant 3 - Peak Hour

**PART A**
(All parts 1, 2, and 3 below must be satisfied)

PM PEAK HOUR

| | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|
| Minor Street Approach Direction w/ Highest Delay | NB | NB | NB | NB | NB | NB | NB | |
| Highest Minor Street Average Delay (sec/veh) | 15.6 | 22.0 | 21.0 | 40.0 | 28.6 | 37.2 | 23.4 | |
| Corresponding Minor Street Approach Volume (veh/hr) | 107 | 159 | 155 | 245 | 201 | 240 | 176 | |
| Minor Street Total Delay (veh-hrs) | 0.5 | 1.0 | 0.9 | 2.7 | 1.6 | 2.5 | 1.1 | |
| 1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u> | No | No | No | No | No | No | No | |
| 2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u> | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| 3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches. | No | No | Yes | Yes | Yes | Yes | Yes | |
| **Signal Warranted based on Part A?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** | |

**PART B**

PM PEAK HOUR

| | | Approach Lanes: One | Approach Lanes: 2 or More | Existing | Bkgrd No Proj | Bkgrd + Proj | Cum No Proj | Cum + Proj | Cum w/dumb | Cum w/dumb+P | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Street - Both Approaches | Newbridge | X | | 914 | 1194 | 1127 | 1379 | 1314 | 1355 | 1291 | |
| Minor Street - Highest Approach | Saratoga | X | | 107 | 159 | 155 | 245 | 201 | 240 | 176 | |
| **Signal Warranted based on Part B?** | | | | **No** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | |

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).
*Notes:*

# Appendix G
## Project's Transportation Demand Management Plan

# Willow Village TDM Plan

## Prepared for:
## Peninsula Innovation Partners

July 2021

SJ18-1860

FEHR & PEERS

# Table of Contents

## List of Figures



## List of Tables

# 1. INTRODUCTION

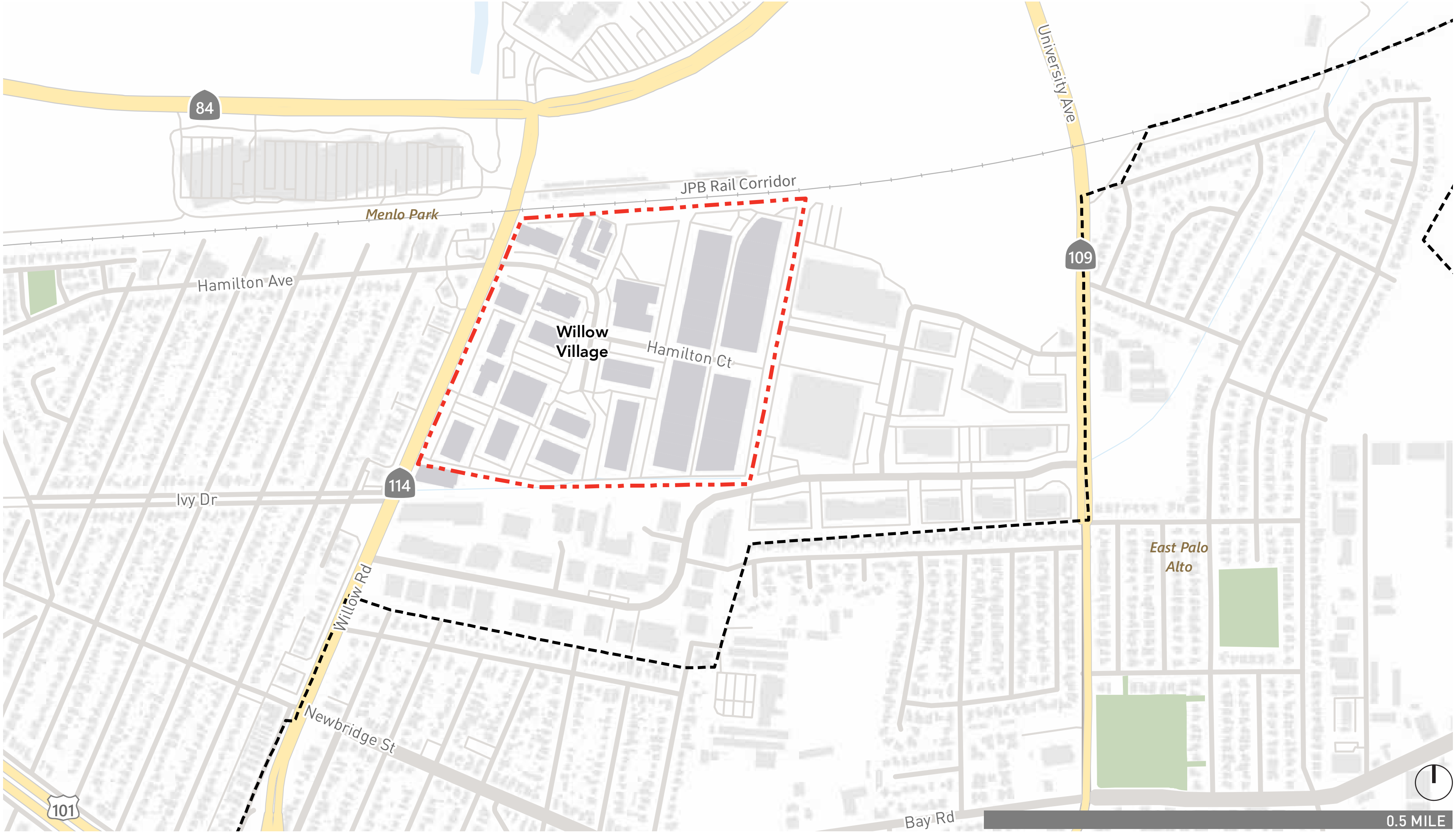
Willow Village will replace approximately one million square feet of industrial, office, and warehouse buildings in the Menlo Science and Technology Park with a mixed-use development. Willow Village creates a new mixed-use community comprised of new housing, retail, hotel, office, and entertainment space. The 59-acre Willow Village site is located in Menlo Park's Bayfront Area. The site is bounded by Willow Road to the west, the Joint Powers Board (JPB) rail corridor to the north, the Hetch-Hetchy corridor and Mid-Peninsula High School to the south and an existing life science office park to the east. **Figure 1** shows the project location and adjacent street network.

The Project will include the following components:

- Community-serving retail – grocery, pharmacy, restaurants, personal services, and entertainment venues
- Below market rate and market rate housing
- A hotel
- Office buildings with associated meeting and conference space
- Open space improvements including a public park and community center
- New bike and pedestrian facilities

The primary purpose of any Transportation Demand Management (TDM) plan is to reduce the amount of vehicle traffic generated by a development by creating measures, strategies, incentives, and policies to shift workers and residents from driving alone to using other travel modes including transit, carpooling/ridesharing, cycling, and walking. TDM strategies can include informational resources, physical site enhancements, monetary incentives, and more. This report presents the comprehensive TDM Plan for the Willow Village development. In addition to reducing vehicles trips, the TDM Plan can reduce the parking demand of the residents and office workers.

The existing and proposed transit, bicycle, and pedestrian facilities near the site are illustrated in this document to provide the transportation context of the Project. The TDM Plan includes attributes of the site's location and physical improvements at the site as well as the TDM measures that will be provided by the Project.




Project Site
City Boundary

Figure 1

## Project Location and Adjacent Street Network

N:\Projects_SJ18_Projects\SJ18_1860_Facebook_Willow_Village\Graphics\GIS\MXD\SJ18_1860_Fig01_Project_Location_Adjacent_Street_Network.mxd

Facebook Willow Village

## 1.1 PROJECT DESCRIPTION AND TDM APPROACH

Willow Village proposes to replace approximately one million square feet of existing industrial, office, and warehouse space in the Menlo Science and Technology Park with a new mixed-use village including up to 1,730 residential units, 200,000 square feet of retail uses, a 193-room hotel, 1,600,000 square feet of office and accessory uses, consisting of a maximum of 1,250,000 square feet of space for office and amenity uses and the balance ( 350,000 square feet, if the office space is maximized) of accessory uses. The proposed site improvements include construction of:

- new circulation improvements to accommodate vehicles, bicycles, and pedestrians,
- utility improvements,
- a community park, an elevated park, and other open space improvements,
- residential mixed-use buildings,
- a hotel, and
- office campus improvements.

**Figure 2** is a site plan showing the roadway network, landscaping, and building locations**. Figure 3** shows the location of the three districts consisting of the Office Campus District, the Town Square District, and Residential/ Shopping District. The Office Campus District includes the office and accessory space that will be used by Facebook. The Town Square District will include the hotel, retail, and restaurants. The Residential / Shopping District will include apartments, a grocery store, and other retail.

Due to the mixture of office, residential, and retail uses, the Project's TDM plan is anticipated to reduce vehicles trips throughout the day as well as during the typical morning and afternoon peak periods of travel. The mix of residential, office, and retail uses within the Project reduces the need to travel long distances to jobs and services. The Project proposes walking and biking improvements including sidewalks and gathering areas for pedestrians as well as on and off-street bike facilities. These facilities reduce the need to use a vehicle to travel within the project.

### 1.1.1 PROPOSED CIRCULATION AND ACCESS

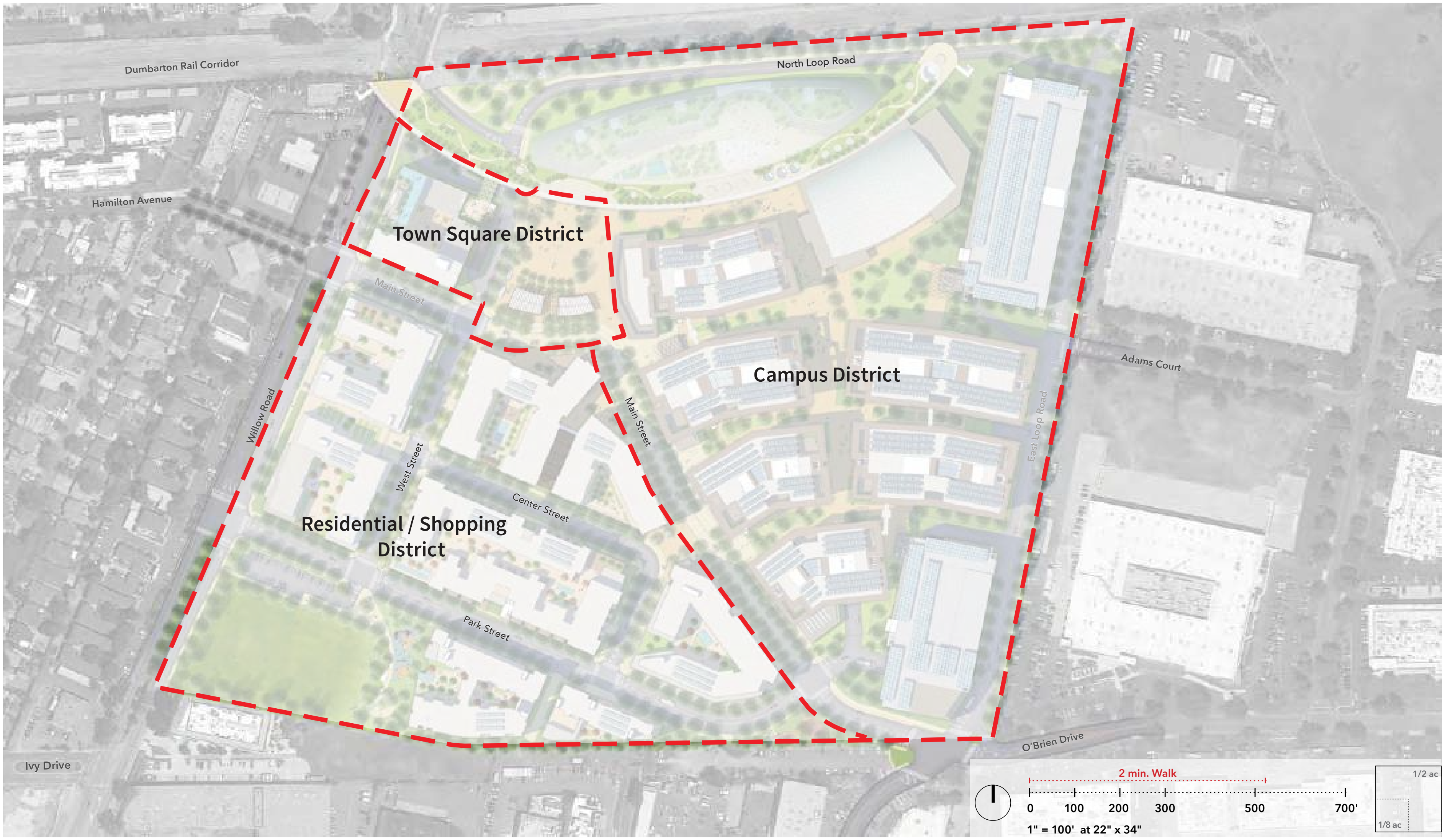
**Figure 2** shows the proposed street network. The Project proposes a new circulation network consisting of approximately 4.6 acres of public rights of way and approximately 7.2 acres of private streets with public access easements. The proposed network will accommodate multiple transportation modes including vehicles, pedestrians, and bicycles. Site access from Willow Road will be primarily provided via two signalized intersections: the realigned Hamilton Avenue intersection and a proposed new intersection at Park Street. Main Street will provide primary north/south access via a new signalized intersection at O'Brien Drive. There


Source: Peninsula Innovation Partners

Figure 2

## Site Plan

N:\Projects_SJ18_Projects\SJ18_1860_Facebook_Willow_Village\Graphics\ADOBE\SJ18_1860_Fig02_Site_Plan.ai




District Boundary

Figure 3

# Office Campus District vs. Residential/Shopping District Location

N:\Projects_SJ18_Projects\SJ18_1860_Facebook_Willow_Village\Graphics\ADOBE\TDM_Fig03_Master_Plan_District.ai

Facebook Willow Village

will also be two right-in/right-out driveways. Both Hamilton Avenue and Park Street connect with Main Street to facilitate circulation throughout the Community. There will also be a connection via the North Loop Road between Hamilton Avenue and Adams Court. In addition to these roadways, the Project includes an off-street pedestrian and bicycle pathways that parallel Main Street and East Loop Road.

### 1.1.2 PROPOSED CAMPUS PARKING AND TRANSIT

Along the eastern edge of the Office Campus District, seated worker parking will be provided in two parking structures with a total of approximately 3,325 parking spaces with an additional 600 valet spaces. Both parking structures include a ground-level transit hub for regional Facebook worker commuter shuttles and intra-campus trams. Intra-campus trams will also operate on Main Street, West Street, and East Loop Road providing service between the Willow Village, Bayfront, and Classic Campuses. Visitor parking for the Office Campus District will be in a shared parking structure in the northwestern corner of the project site. Shared parking is located under the Town Center, Hotel, and Parcel 4 and will be used by the hotel guests and employees, retail patrons and employees, and office visitors.

Reserved residential parking will be located on the residential parcels. On mixed-use parcels with residential and retail uses, provisions will be made to reserve the residential parking spaces. Residential parking spaces will be unbundled to provide flexibility for residents, and it generally keeps car ownership lower which supports the lower end of City's municipal code requirements. The publicly accessible park will have its own surface parking lot and on-street parking will be time limited during the day for general use.

# 2. SITE CONTEXT - TRANSPORTATION SERVICES

The transportation system serving the project site includes roadways, pedestrian and bicycle facilities, and transit services. The existing transit, bicycle and pedestrian facilities, and planned project improvements that will support travel to the site by modes of transportation other than driving alone are described below. The data presented represents transit operating conditions prior to the shelter in place order issued March 16, 2020.

## 2.1 NEARBY TRANSIT SERVICE

The City of Menlo Park encourages the use of transit as an alternative mode of transportation and is served by two major transit providers: SamTrans and Caltrain. San Mateo County Transit District (SamTrans) provides bus service throughout San Mateo County and into parts of San Francisco and Palo Alto. Caltrain provides commuter rail service between San Francisco and San Jose. In addition, Caltrain shuttles provide access from the Menlo Park Caltrain Station to the Willow Road area office buildings during commute hours.

Paratransit services are also available for seniors and people with disabilities. The transit district offers Redi-Wheels paratransit service for persons with disabilities who are unable to take SamTrans regular buses.

**Figure 4** shows the existing transit bus routes and bus stops that serve the Project site. **Table 1** summarizes hours of operation and service frequencies for the bus routes nearest the site.

### 2.1.1 EXPRESS BUS SERVICE BETWEEN THE EAST BAY AND PENINSULA

The Dumbarton Express is an all-day, limited-stop bus service that takes riders from the East Bay to the Peninsula via Dumbarton Bridge on two bus routes. The DB route serves stops on Willow Road in Menlo Park and connects to the Downtown Palo Alto Transit Center. The DB1 route serves stops on Willow Road in Menlo Park north of US 101 and connects to Stanford Research Park via Oregon Expressway. Dumbarton Express bus stops that serve the Willow Village site are located on Willow Road and are accessible within a five-minute walk to and from the site. The closest existing stops are located at the intersection of Willow Road and Ivy Drive and Willow Road and Hamilton Avenue.

### 2.1.2 CALTRAIN

Caltrain provides weekday commuter rail service between San Jose and San Francisco. There are currently 46 trains traveling northbound to San Francisco and 46 trains traveling southbound from San Francisco each weekday. A total of 65 trains that serve the Menlo Park Station each day. The Menlo Park and Palo Alto Downtown stations are located approximately 3.0 miles southwest of the Project site and can be accessed by a twenty-minute bicycle ride, or a thirty-minute bus ride on either M4-Willow Road Shuttle or Dumbarton Express bus routes near the Willow Village site that drop riders off directly in front of the Menlo Park and Palo Alto Caltrain stations. Facebook currently provides additional private shuttle service for their Menlo Park workers to the Palo Alto, Menlo Park and Redwood City Caltrain stations.

### 2.1.3 M4-WILLOW ROAD SHUTTLE

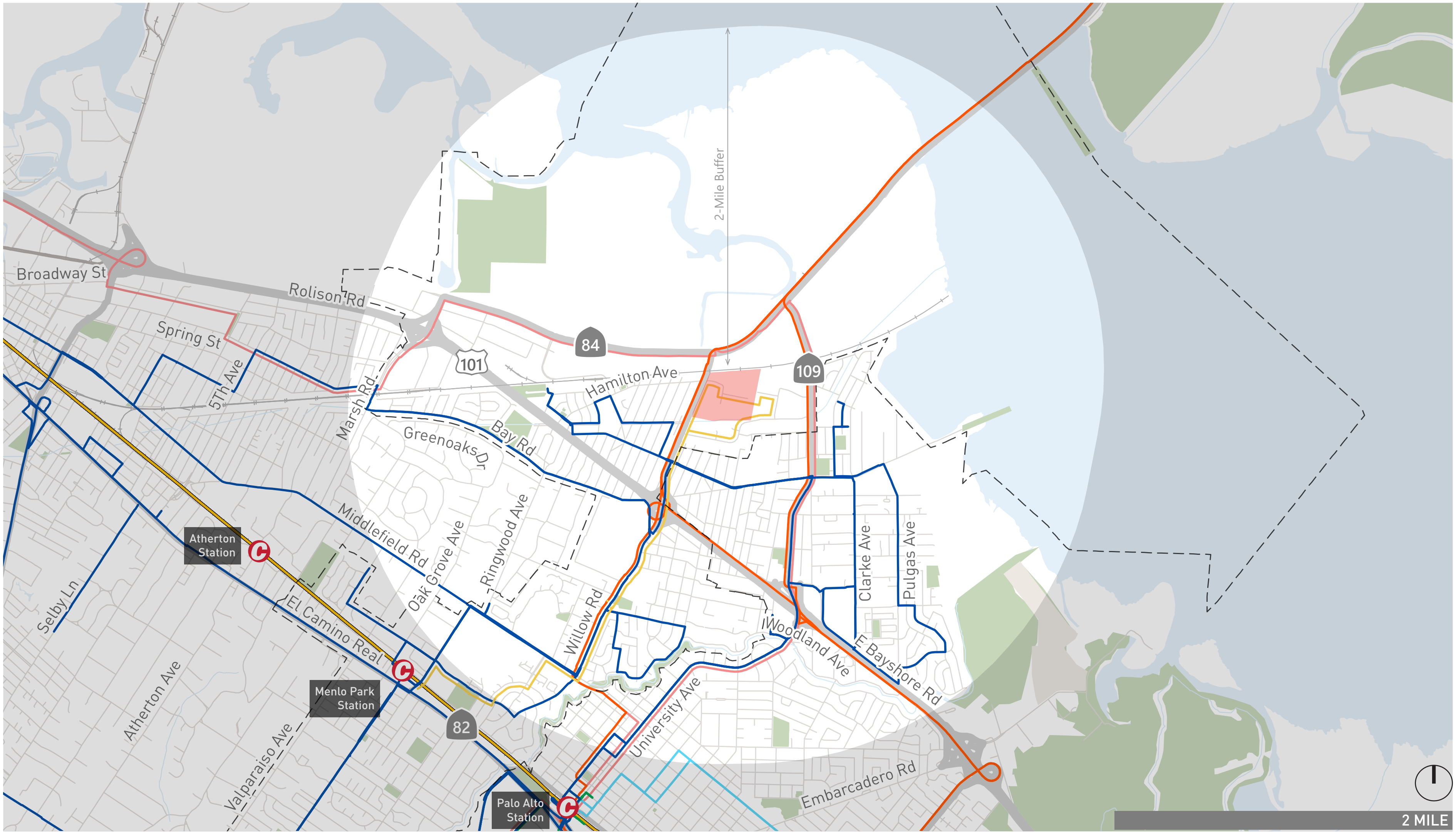
The M4-Willow Road Shuttle is a free commuter shuttle open to everyone. It runs between the Menlo Park Caltrain station and the Willow Road area business parks. The M4-Willow Road Shuttle schedule operates Monday through Friday during the peak period Caltrain schedule. The Menlo Park shuttle service has been in operation since 1989 and is funded through grants from San Mateo City/County Association of Governments, Bay Area Air Quality Management District, and the City of Menlo Park. The closest stops are located south of the Project site along O'Brien Drive, northeast of the intersection of Willow Road and Ivy Drive, and along Hamilton Court and Adams Court.

**TABLE 1: NEARBY TRANSIT SERVICES**

| Route | From | To | Weekdays | | Saturdays | | Sundays | |
|---|---|---|---|---|---|---|---|---|
| | | | Operating Hours | Peak Headway (minutes) | Operating Hours | Headway (minutes) | Operating Hours | Headway (minutes) |
| ***Dumbarton Express*** | | | | | | | | |
| DB | Union City BART | Stanford Oval | 5:20 am to 8:45 pm | 20 | No Service | | | |
| DB1 | Union City BART | 3475 Deer Creek Road | 5:20 am to 8:30 pm | 20 | No Service | | | |
| ***Caltrain Shuttle*** | | | | | | | | |
| M4-Willow Road | Menlo Park Caltrain | Hamilton Court | 7:00 am to 10:00 am & 3:15 pm to 6:15 pm | 60 | No Service | | | |

### 2.1.4 PARATRANSIT

SamTrans paratransit is provided to eligible individuals with disabilities who are prevented from using regular transit services. The San Mateo County Transit District provides paratransit using Redi-Wheels on the bayside of the county and RediCoast on the coast side. Eligible Willow Village residents and employees could use this service to reach nearby destinations.




Transit_Routes

- Caltrain Line and Station
- Caltrain Shuttle
- AC Transbay
- Dumbarton Express
- Santa Clara Valley Transportation Authority
- Stanford Marguerite Shuttle
- samTrans
- Project Site (Willow Village)
- City Boundary

\\Fpsj03.fpainc.local\data\Projects_SJ18_Projects\SJ18_1860_Facebook_Willow_Village\Graphics\ADOBE\SJ18_1860_Fig04_Existing_Transit_Service.ai

Figure 4

## Existing Transit Service

Facebook Willow Village

## 2.2 EXISTING PEDESTRIAN AND BICYCLE FACILITIES

### 2.2.1 EXISTING AND PROPOSED PEDESTRIAN FACILITIES

Pedestrian facilities near the site include sidewalks, crosswalks, curb ramps, and pedestrian signals. There is a continuous sidewalk along Willow road on the east side of the street. To access the west side of Willow Road from the Project site, there are two existing signalized crosswalks within walking distance from the proposed development. The existing crosswalks are located at the intersection of Willow Road and Ivy Drive and the intersection of Willow Road and Hamilton Avenue. The majority of the existing pedestrian activity occurs at the Willow Road and Hamilton intersection, which is the closest pedestrian connection to the Bayfront and Classic campuses.

As part of the Willow Village development and to enhance the pedestrian experience, publicly accessible open spaces within the Project site are proposed including a publicly accessible park located northeast of the intersection of Willow Road and Ivy Drive, an off-street bike and pedestrian path connecting O'Brien Drive to the proposed Willow tunnel, town square, retail district, and a dog park near O'Brien Avenue. **Figure 2** shows the location of the proposed open spaces within the Project site.

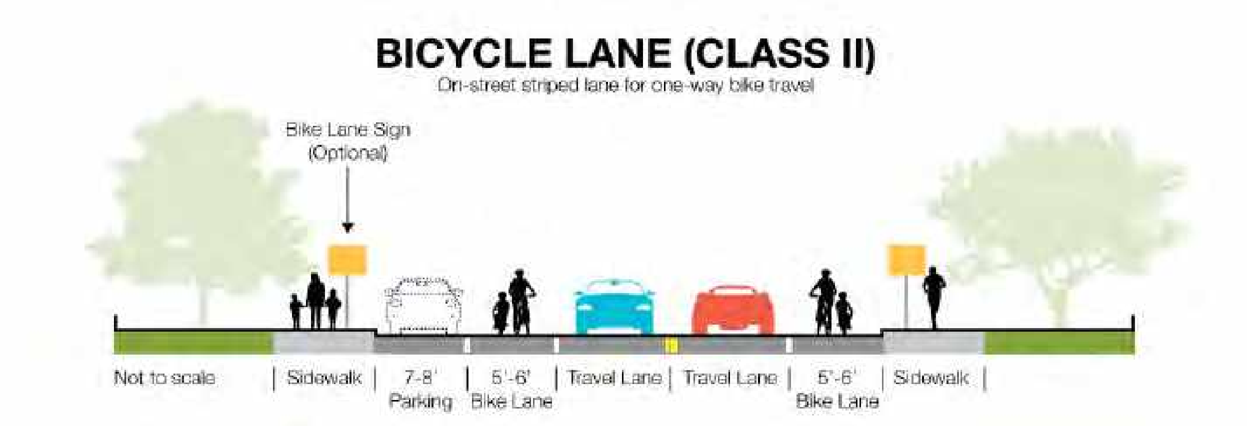
The Project proposes to implement pedestrian crossing improvements along Willow Road. These improvements include installation of new traffic signal at the proposed intersection of Willow Road and Park Street, and sidewalk and landscape improvements. The project will implement a grade separated pedestrian crossing near the Hamilton Avenue and Willow Road intersection via the elevated park. Pedestrian improvements will also be evaluated the intersection of Ivy Drive and Willow Road. Per the proposed site plan, the Project proposes a new intersection at O'Brien Drive requiring new traffic signals with pedestrian crossing considerations.

### 2.2.2 EXISTING AND PROPOSED BICYCLE FACILITIES

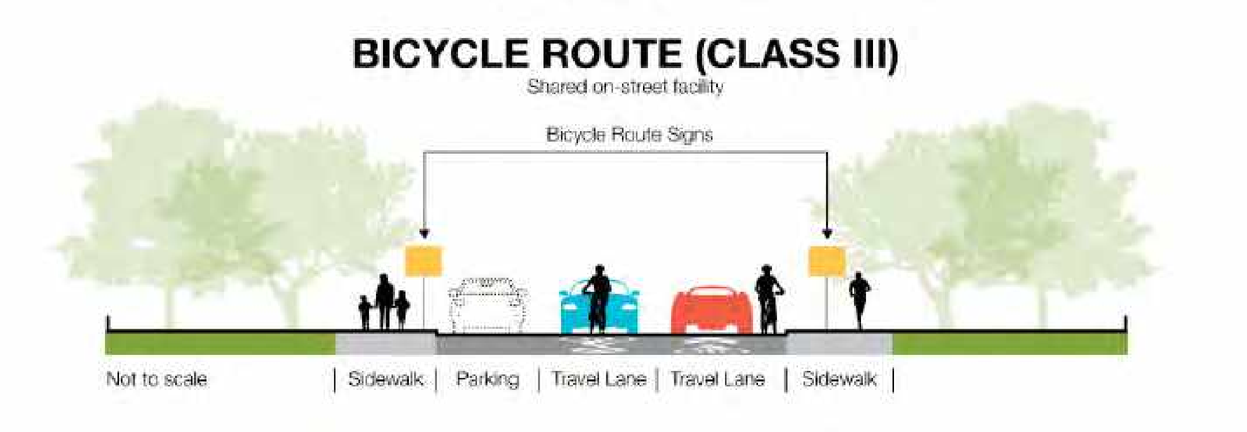
The California Department of Transportation (Caltrans) recognizes four classifications of bicycle facilities:

- **Class I Shared-Use Path**, or commonly referred to as a Bikeway or Bike Path, is a facility separated from automobile traffic for the exclusive use of bicyclists. Class I facilities can be designed to accommodate other modes of transportation, including pedestrians and equestrians, in which case they are referred to as shared use paths.

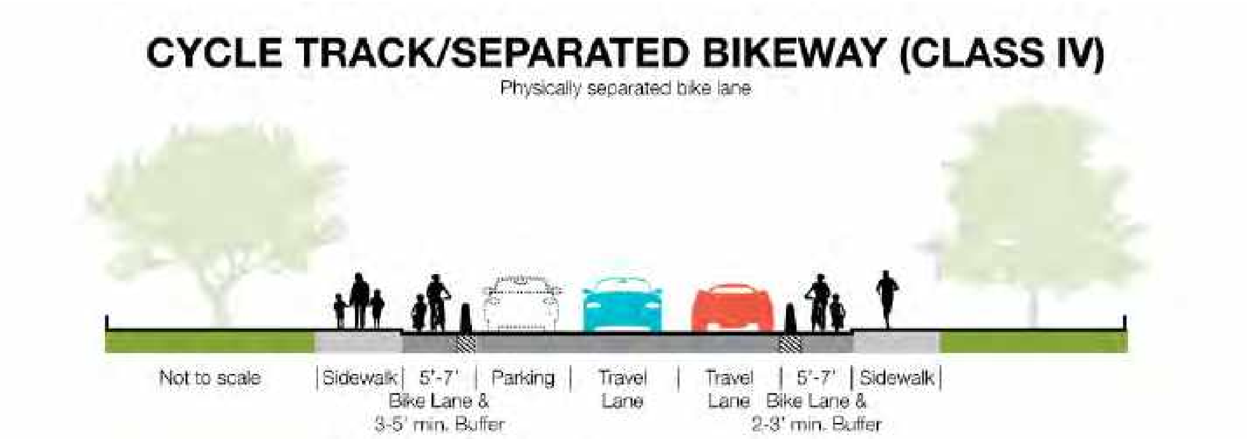

- **Class II Bicycle Lane** is a dedicated facility for bicyclists immediately adjacent to automobile traffic. Class II facilities are identified with striping, pavement markings and signage, and can be modified with a painted buffer to become a buffered bicycle lane (Class II)




- **Class III Bicycle Route** is an on-street route where bicyclists and automobiles share the road. They are identified with pavement markings and signage, and are typically assigned to low-volume and/or low-speed streets.



- **Class IV Cycle Track or Separated Bikeway**, commonly referred to as a protected bicycle lane, is a facility that combines elements of Class I and Class II facilities. They offer an exclusive bicycle route immediately adjacent to a roadway similar to a Class II facility, but provide a physical separation from traffic with plastic delineators, raised curb, or parked automobiles.




Class I shared use path and class II bicycle lanes exist near the site, as shown in **Figure 5**. Willow Road west of the Project site, has class II bike lanes on both sides of the street which are connected to the Bayfront recreational trail shared use path along Bayfront Expressway to the north of the Project site. As part of the Menlo Park Comprehensive Bicycle Development Plan, class II bike lanes are proposed along O'Brien Drive connecting Willow Road to the University Avenue. In addition, Class II bike lanes exist along University Avenue serving local trips with north-south connectivity between East Palo Alto and Bayfront recreational trail. The comprehensive plan recommends class III shared on-street facility along Hamilton Avenue. As part of the proposed Willow Village development, there will be an off-street multi-use pathway adjacent to the East Loop Road that provides north-south connectivity between the proposed North Loop Road and O'Brien Drive within the Project site.


Figure 5

Existing and Proposed Regional Bicycle Facilities

N:\Projects_SJ18_Projects\SJ18_1860_Facebook_Willow_Village\Graphics\GIS\MXD\SJ18_1860_Fig05_Existing_Proposed Bicycle Facilities.mxd

Facebook Willow Village

## 2.3 EXISTING CARSHARE

Carsharing allows members to reserve vehicles by the hour or the day, and is typically used for short-term, local trips. Carsharing supports commute modes of travel such as transit, carpooling, walking, and biking, by providing users with access to a vehicle when needed during the workday. There are several Carsharing providers located near or in Menlo Park include Zipcar, Enterprise, Hertz, Avis, and Budget. Facebook sponsors three existing carshare vehicles operated by Enterprise. There is one existing Zipcar located within the project study area near Facebook Building 58.

Additionally, other carshare services allow residents and neighbors to offer their own vehicles as part of carsharing services (peer-to-peer) such as Getaround, and Turo (formerly Relay Rides).

## 2.4 EXISTING RIDESHARE

Ridesharing is the term to describe grouping travelers into common trips, which allows travelers to better utilize empty seats in passenger cars or vans. Rideshare matching programs, such as 511 Regional Rideshare Program, Scoop, Waze Carpool, Uber Pool, Lyft Carpool, Duet, Carma Carpooling, and other ridesharing apps help carpools and vanpools to form by matching drivers and passengers. Ridesharing services make it easy to coordinate carpools and allows residents or employees to consider downsizing or eliminating the number of vehicles they own.

## 2.5 EXISTING RIDE HAILING

Ride hailing is for-hire, point-to-point transportation services, which include transportation network companies (TNCs) and taxis. Within the last few years, TNCs, such as Uber and Lyft, have become the primary method of ride hailing since the many users can easily utilize smartphone apps to send requests for rides. Similar to carshare and rideshare, ride hailing makes it easy to almost instantly coordinate and reserve a ride, which allows residents and employees to consider downsizing or eliminating the number of vehicles they own.

Facebook has instituted ride hailing lounges on three of their Menlo Park Campuses including the Willow Village campus. The ride hailing lounges provide a centralized location where TNC vehicles are directed to pick up or drop-off their users.

# 3. TDM MEASURES AND STRATEGIES

There are numerous strategies that can be used to encourage residents and workers to use modes of transportation other than driving alone and, therefore, reduce the vehicle miles traveled (VMT) and parking demand generated by a development. TDM is made up of two key components. The first component are the physical design features of a project that allows users not to drive-alone such as combining residential, retail and office uses; building design features such as showers and changing areas and providing pedestrian and bicycle facilities. The second component are the operational programs offered by employers and residential building managers that will reduce drive-alone travel.

The following sections describe a proposed set of programs that could be used to reduce drive-alone trips to the office, residential, retail and hotel components of the project.

## 3.1 OFFICE COMPONENT TDM

It is assumed that Facebook will occupy the office component of the Willow Village project. Facebook currently operates an aggressive TDM program that substantially reduces the number of solo drivers to their Menlo Park campuses. A reduction in solo drivers directly reduces the number of vehicles trips at the campus by two trips - one inbound trip in the morning and one outbound trip in the afternoon. Recent Facebook surveys[1] demonstrated that the drive-alone rate for the Menlo Park campuses is 51%. The drive-alone rate for commuters in San Mateo County is 69% as reported in the 2017 American Community Survey, U.S. Census Bureau. Approximately 34% of Facebook workers use the Facebook shuttles for their commutes.

While the commuter shuttle service is a major component of the TDM program, Facebook offers a broad range of services, subsidies, and amenities to their workers that make it possible to use travel alternatives to driving alone. **Table 2** summarizes the existing Facebook TDM measures that will be available to workers working at office component of Willow Village. These programs include drive-alone alternatives such as transit subsidies, shuttles, carpools, and vanpools. In addition, Facebook provides key support services and amenities such as "last-mile" connections to Caltrain, showers and changing rooms, secure bike storage, preferential vanpool parking, intra-campus trams within the Menlo Park campuses, and carshare that frees workers from needing a personal vehicle at the workplace. The campuses also include other amenities such as banking services, a wellness clinic, fitness centers, and food service. Facebook's TDM program also has an extensive education and marketing program that provides workers information beginning at their initial job orientation.

---

[1] Fehr & Peers conducted ground counts of all driveways serving Facebook's Menlo Park campuses for three days in October 2018. This driveway data was combined with transit ridership, carpool, and vanpool data provided by Facebook to develop mode splits for the 4-hour peak period from 7:00 AM to 11:00 AM. The analysis is documented in Fehr & Peers memorandum *Facebook Menlo Park Campus 2018 Mode Share Monitoring*, December 3, 2019.

**TABLE 2: FACEBOOK OFFICE TDM PROGRAM**

| TDM Measure | Description | Facebook Program |
|---|---|---|
| Transit Pass Subsidy | Monthly reimbursement for public transit commute costs (fare). | Full time employees and interns are eligible for a subsidy of up to $260/month toward eligible public transit. |
| New Hire Clipper Card Program | Clipper cards with cash value for use on specific transit agencies. | Clipper cards with $130 e-cash loaded are available to new workers to allow for immediate use of public transportation. |
| Parking at BART, and Caltrain | Monthly reimbursement for parking at specific transit stations. | Up to $100 month reimbursement available for parking at Caltrain and BART. |
| Last-Mile Transit Connections | Shuttles to/from nearby transit facilities. | Facebook will provide dedicated shuttles to nearby transit facilities to provide reliable connections between transit stops and the Menlo Park campuses. |
| Commuter Shuttle Bus Services | Private shuttle service from various regions of the Bay Area to the Menlo Park campuses. | Currently, Facebook provides free direct services between Menlo Park and Sunnyvale, Palo Alto, San Francisco, Mountain View, Cupertino, Campbell, Berkeley, Oakland, Dublin, Castro Valley, Redwood City, San Jose, Fremont, Danville, San Ramon, Los Gatos, Millbrae, San Mateo, Santa Cruz, Scotts Valley, Marin, Saratoga, and other cities for workers. |
| Bicycle Amenities and Perks | Lockers, showers, towel service, bicycle pumps, FixIt self-repair station, etc. | • A 24/7 DIY FixIt station will be located within the office complex along with a free vending machine with emergency parts for repair.<br>• Routine Bike to Work Days with giveaways are held with bike shop staff leading group rides.<br>• Each worker-occupied building has interior bike parking, and a bike cage that offers additional bike parking space. |

| TDM Measure | Description | Facebook Program |
|---|---|---|
| Bike Sales and Rentals | Bikes available for purchase and rental onsite. | Discounted bikes are available for sale onsite and sold below MSRP and include a commuter-ready package with a helmet, lights, and a U-lock.<br><br>Bike rentals are available for periods of 1-2 weeks for visiting employees. |
| Vanpool Program | A program that allows groups of people to share rides to and from work. | Facebook provides vanpools to and from surrounding areas. |
| Carpool Matching with the Internal Ride App | Scoop & Facebook Ride App for carpool match. | Facebook is in the processing of transitioning to Scoop for carpool matching between workers. Previously, they used their Ride App to connect workers to coordinate a carpool. |
| Dedicated Vanpool Parking | Dedicated parking for Vanpools. | Facebook provides preferred parking for Vanpools. |
| Education and Promotion | Educational and promotional events to encourage employees to use alternative modes to travel to and from the workplace. | Drop-in commute advice is available through the Transportation Desk at the transportation hubs. There will be four transportation hubs when Willow Village is open.<br><br>Events and competitions for prizes include bike commuting classes and Bike to Work Days. New workers receive information on various commute options during orientation. |
| Emergency Ride Home | Rides provided for employees in case of emergency. | In the event of an emergency, Facebook provides rides home to all ride share and alternative mode commuters who may not have a vehicle readily accessible. |
| Campus Bike Share Program | Bicycles provided for employee use on campus. | This program provides Facebook Bike Share Bicycles for workers to use for trips around campus. |
| Intercampus Tram and On-Demand Car Service | Tram service to transport workers between buildings. | A fleet of electric and non-electric vehicles to transport employees between buildings, and a separate on-demand car service for moving between campuses at Menlo Park. |
| Carshare | Car sharing available on campus. | A fleet of shared cars that are available to reserve for free if employees use alternative transportation to commute and have a mid-day errand or business appointment offsite. Facebook provides Enterprise vehicles for employees and there are also publicly available Zipcars. |

| TDM Measure | Description | Facebook Program |
|---|---|---|
| Amenities | Provision of services at the campus so workers do not need a vehicle at work or do not need to make mid-day trips. | Facebook provides a wide range of on-site amenities for workers that minimize the need to make trips in personal vehicles. These amenities include:<br>• cafes<br>• banking services/ATMs<br>• dry cleaning services<br>• fitness center(s)<br>• wellness center<br>• bicycle shop & DIY FixIt stations<br>• car wash services<br>• auto services (oil changes)<br>• vehicle fueling |

Source: Fehr & Peers / Facebook Transportation Group, August 2020

As noted above, the Facebook TDM program reduces the commute drive-alone rate to 51% as compared to the county average drive-alone rate of 69%. This is a reduction of 26% in the drive-alone rate over the county average. This level of drive-alone reduction is sufficient to reduce the peak hour trips by more than 20% relative to the Institute of Transportation Engineers general office trip generation for the office component of the Project. There will be additional peak period commute trip reductions due to the presence of nearby housing in the residential/retail portion of the project.

### 3.1.1 TDM ENHANCEMENTS TO REDUCE OFFICE PARKING DEMAND

The *Willow Village Parking Assessment Report* (July 2021) identified that there would be a shortfall in the office seated worker parking supply of 106 spaces (vehicles). Therefore, the Facebook TDM program will need to make modest improvements to shift more seated workers from driving-alone to other commute modes to reduce the office worker parking demand. As stated above the current drive alone for the entire MPK campus (Classic, Bayfront, Willow, and Chilco) is 51 percent. If the parking reduction is assumed to occur only at the Willow Village campus, the drive-alone rate for the Willow Village campus would need to be 49.7 percent. However, Facebook TDM programs are available to all seated workers in Menlo Park. Any enhancements to the TDM programs will be applied to all of Facebook seated workers; therefore, to achieve a reduction of 106 spaces the overall Menlo Park drive-alone rate would need to be 50.6 percent. To achieve this 0.5% reduction, Facebook will need to invest additional resources into their existing programs and, possibly, add to or expand the commute programs often to workers.

As described above, Facebook's has an extensive set of TDM programs that they can utilize to reduce the drive-alone rate by expanding existing programs and/or offering higher incentives not to drive alone. Some of the key TDM programs Facebook could enhance or increase their investment to achieve the reduction in drive-alone rate and reduce the parking demand are:

- Employee shuttle service – expanded service areas or frequency of service
- Bicycle commute incentives – amenities such as showers, lockers, fix-it stations, bike rentals and bike sales to employees
- Carpool matching – service to match Facebook employees to form carpools or van pools
- Vanpools – provision of a van for groups of five or more employees
- Public transit incentives – subsidized transit passes and station parking costs
- Implement flexible work schedules and work from home policies that will reduce the number of workers on-campus during the work week

In addition to these existing TDM programs, Facebook is considering new TDM programs and activities that will promote other modes of travel for commuters including bicycle facility improvements and parking management options.

The Facebook Transportation team monitors TDM program effectiveness and refines the TDM programs to meet the needs of their workers. The TDM program monitoring and evaluation is designed to determine the effectiveness of each individual program and the program's ability to reduce peak period vehicle trips, eliminate drive alone vehicle trips, and reduce parking demand. Programs that are under performing may be replaced with new programs that are designed to better meet workers' commute travel needs. Therefore, this TDM Plan is designed to evolve over time. A description of the TDM monitoring is provided in Section 3.3 Monitoring Program.

## 3.2 RESIDENTIAL/RETAIL COMPONENT TDM

While the Office TDM program will be delivered by Facebook to their workers, the TDM program for the residential, retail, and hotel (Residential/Retail TDM) components will be delivered by multiple entities including property management companies for residential uses and individual businesses for the retail, restaurant, and entertainment uses. Either the property owner's association or a Transportation Management Association will be created to coordinate the delivery of the Residential/Retail TDM Plan. The Association will improve the effectiveness of the programs and potentially reduce the overall costs to deliver the TDM programs. The Association will establish by laws for the operation of the organization and establish a funding mechanism for common services provided by the Association.

The City of Menlo Park will require the Willow Village Project to implement a TDM program that will reduce the trip generation of the proposed land uses by 20% as compared to the trip generation using standard Institute of Transportation Engineers (ITE) trip generation rates. The 20% reduction will be accomplished through both design features of the Project that make it easier to travel without a vehicle, and specific programs or incentives to reduce the number of drive-alone vehicle trips. The Willow Village Residential/Retail TDM program will consist of strategies that are aimed at discouraging single-occupancy vehicle trips and encouraging alternative modes of transportation, such as carpooling, taking transit, walking, and biking. Strategies included in most TDM programs address a wide range of transportation factors, including parking, transit access, shared mobility, bicycle infrastructure, site design, education and encouragement, and management.

TDM reductions for the Project were estimated based on the California Air Pollution Control Officers Association (CAPCOA) research and methodologies as described in Quantifying Greenhouse Gas Mitigation Measures (2010) and more recent research for the California Air Resources Board Zero Carbon Buildings and Communities studies.

Residential and commercial land use TDM credits were calculated separately, as certain TDM measures are more appropriately applied in the commercial arena or vice versa. For example, for commercial tenants, vanpools and rideshare may be effective tools to reduce employee solo vehicle trips. However, vanpools would be difficult to implement for residents who are traveling from the Project to many disparate destinations. For residents, unbundling parking is a more effective strategy as residents are incentivized to reduce car ownership to save on monthly rental costs for a vehicular parking space. Additionally, the net effectiveness of commute trip reductions is reduced for the commercial land uses as those measures are only applicable to the work trips made by commercial land use employees, rather than the trips made by commercial patrons.

**Table 3** provides a list of physical and programmatic TDM actions that could be provided to the retail/hotel employees and Willow Village residents along with an indication of which use or uses they are appropriate. The TDM measures listed in **Table 3** include both physical design measures such as pedestrian and bike facilities and programs that help shift travelers out of their personal vehicles. In addition, **Table 3** also includes reserved measures that could be used to improve the performance of the Residential/Retail TDM plan, as needed in the future.

**TABLE 3: WILLOW VILLAGE RESIDENTIAL/RETAIL TDM PROGRAM**

| TDM | Description | Implementation | Retail/ Hotel Employees | Residents | Reserved Measure |
|---|---|---|---|---|---|
| Transportation Management Association | Create an Association for the mixed-uses. | • Information sharing<br>• Education & marketing function – TDM coordinator<br>• Pooled resources to reduce costs<br>• Provide emergency rides home for workers<br>• Assist in monitoring TDM programs | ✓ | ✓ | |

| TDM | Description | Implementation | Retail/ Hotel Employees | Residents | Reserved Measure |
|---|---|---|---|---|---|
| Increasing diversity of land uses | Increasing developed area dedicated to a complementary but uncommon or nonexistent use in the surrounding neighborhood | Proposed development includes a combination of multi-family residential units with retail spaces including grocery, restaurants, entertainment, and hotel. | ✓ | ✓ | |
| Housing | Housing built near job center | Willow Village development includes multifamily residential units which could accommodate some of the workers working in the office, retail, and hotel components of the development. | | ✓ | |
| Public Transit Improved Service | Coordination with SamTrans to provide potential service options to the site. | The property managers and employers will work with SamTrans staff to encourage SamTrans to improve the service area around the Project site through providing new frequent routes or re-routing the existing SamTrans routes. | ✓ | ✓ | |
| Bicycle Amenities | Lockers & showers | Clothing lockers and shower can be provided in the overall design of the hotel space. | ✓ | | |
| Bicycle network | Integration of the Project site bike network into the City's bike network | The Proposed site plan includes a network of publicly accessible open spaces and a bike and pedestrian path which will be integrated into the City of Menlo Park's bike network. | ✓ | ✓ | |
| Vanpool Program | A program to allow groups of people to share rides to and from work. | Sponsored by mixed-use employers to create carpools. Potentially, a combined service to take advantage of the large number of Facebook workers for ride matching. | ✓ | | |

| TDM | Description | Implementation | Retail/ Hotel Employees | Residents | Reserved Measure |
|---|---|---|---|---|---|
| Carpool Matching | Use of public or private service | Use of 511 RideMatch, SCOOP or WAZE Carpool for employees and residents. There is an opportunity to take advantage of the large number of Facebook workers for ride matching. | ✓ | | ✓ |
| Dedicated Carpool/ Vanpool Parking | Dedicated parking for multiple-occupancy vehicles | Spaces could be provided in parking structures near retail and/or hotel. | ✓ | | ✓ |
| Shared Parking | Provision of shared pool of parking for the mixed-use development | The retail, hotel, office visitors, and residential guests will share a pool of parking. | ✓ | ✓ | |
| Emergency Ride Home | Rides provided for employees in case of emergency | In the event of an emergency, the Association provides rides home to hotel / retail employees that use alternative modes to commute to work. | ✓ | | |
| Wayfinding and Lighting | Provision of wayfinding signage and lighting | The project developer will provide bicycle, pedestrian, transit and vehicle wayfinding signage and lighting throughout the development. | ✓ | ✓ | |
| Carshare | Car sharing located in public parking areas | Shared cars that are available for a fee to retail/hotel employees and Willow Village residents to run errand or business appointment offsite. Fees could be subsidized for employees using alternative modes for their commute. | ✓ | ✓ | |
| Bicycle Parking | Enclosed secure bicycle parking | Incorporated into the design of the residential units, hotel, and retail buildings. | ✓ | ✓ | |
| Bicycle Repair Stations | Do it yourself repair stations located in the development | These facilities allow residents and employees to repair and maintain bicycles that can be used for their commutes. | ✓ | ✓ | |

| TDM | Description | Implementation | Retail/ Hotel Employees | Residents | Reserved Measure |
|---|---|---|---|---|---|
| Bike Sharing | Provision of bike share stations at the development | The property managers and employers will work with the City of Menlo Park to advocate for bike share stations at the development. | ✓ | ✓ | |
| Commute Assistance Center/Website | Information sharing to new residents & employees | A function provided by the Association for the mixed-use component. | ✓ | ✓ | |
| Unbundled Residential Parking / Limit Parking Supply | Separate sale or lease of a vehicular parking | Unbundled parking, which separates the sale or lease of a vehicular parking space from the sale or lease of living units, will be provided for all market-rate residential units. | | ✓ | |
| Metered On-Street Parking | Priced on-street parking | On-street parking would be priced. This measure requires coordination and approval from the City of Menlo Park. | ✓ | ✓ | |
| Off-Street Parking Fees | Priced off-street parking | | | | ✓ |

Source: Fehr & Peers, August 2020

The TDM programs promote use of transit, carpooling, vanpooling, biking, and walking to reduce vehicle trips. These programs are complimented by physical design features such as bicycle parking, pedestrian and bicycle features, and showers/changing areas in large workspaces. Each TDM strategy has an associated range of effectiveness in reducing vehicle trips and the combination of strategies have an overall effectiveness. The overall effectiveness is not simply additive when programs are combined since some of the programs overlap in terms of their markets and effectiveness. For this analysis, we evaluated the range of effectiveness as shown in **Table 4** and have chosen to use the average of the range of the combined strategies effectiveness.

Based on the CAPCOA and CARB research, it is estimated that the Project's Residential/Retail TDM program would reduce the residential, retail, and hotel trips as follows:

- Residential trip reduction 24%
- Retail trip reduction 18%
- Hotel trip reduction 20%

The overall trip reduction from the Residential/Retail TDM program as proposed would be approximately 20%. The estimates represent the average of the potential range effectiveness for each land use supported by evidence from the application of these same measures at other projects reported in the CAPCOA and found in more recent CARB research.

The City of Menlo Park requires that the project monitor the effectiveness of the TDM programs in achieving a 20% reduction in trips. The TDM monitoring program is outlined below for the Mixed-Use and Office Components.

**TABLE 4: WILLOW VILLAGE RESIDENTIAL/RETAIL TDM PROGRAM EFFECTIVENESS**

| TDM Strategy | Residential | Retail | Hotel |
|---|---|---|---|
| **Parking** | | | |
| Unbundle Parking & Reduced Parking Supply | Up to 20% | -- | -- |
| On-Street Parking Fees | 3% to 11% | 3% to 11% | 3% to 11% |
| Off-Street Parking Fee (reserved program) | 6% to 11% | 6% to 11% | 6% to 11% |
| **Bike & Walk** | | | |
| Secure Parking | Up to 1% | Up to 1% | Up to 1% |
| Showers & Lockers | Up to 1% | -- | -- |
| End of Trip Repair Stations | Up to 1% | Up to 1% | Up to 1% |
| Bike Share & Subsidies | Up to 1% | Up to 1% | Up to 1% |
| **Commute Programs / Association** | | | |
| Marketing Program | 3% to 10% | Up to 1% | Up to 1% |
| Commute Incentives | -- | Up to 1% | Up to 1% |
| **Total of All Measures** | **11% to 36%** | **9% to 27%** | **9% to 31%** |

Source: Fehr & Peers, September 2019

# 4. WILLOW VILLAGE TDM MONITORING PLAN

The City's Zoning Ordinance requires annual reporting to evidence achievement of the intended TDM reduction. While the Zoning Ordinance does not require monitoring, City staff has requested monitoring as a means of demonstrating compliance. This section outlines a TDM monitoring plan designed to measure and document the effectiveness of office and residential / retail TDM plans. As outlined above in Sections 3.1 and 3.2, there are two distinct components in the TDM plan. The office component of the plan will be implemented by Facebook as the sole owner and occupant of the office space. The residential / retail component will have multiple owners, property managers, and tenants; therefore, a Transportation Management Association will be established to assist in the implementation and coordination of the programs included in the residential / retail TDM plan. While the Association can assist in the implementation, the ultimate effectiveness of the residential / retail TDM programs will depend on the execution by each Association member.

## 4.1 OFFICE TDM (TRIP CAP) MONITORING

Since Facebook is proposing an office trip cap for Willow Village office uses that is consistent with the trip caps currently used on the Classic and Bayfront campuses, the trip cap monitoring report will provide information on the driveway vehicle counts as well as a list of TDM programs that are in use on the campus. The monitoring report of the Willow Village Office trip cap, and TDM program, will be packaged with the other trip cap monitoring reports for the Classic and Bayfront campuses.

## 4.2 RESIDENTIAL / RETAIL TDM MONITORING PLAN

As stated above, the TDM Plan monitoring for the residential / retail component introduces a several challenges since there is no single entity responsible for the implementation of the TDM programs. The creation of, and requiring membership in, the Association will provide a means to coordinate the TDM efforts executed by the property owners, property managers, and major tenants. The Association can be used to implement some TDM programs that will benefit from sharing resources between the Association members. However, many of the programs will be implemented by the property owners, property managers, and individual tenants in the retail spaces. The Association can also serve as a clearing house for gathering data, summarizing it, and documenting the TDM performance of the residential properties and retail tenants (including the hotel).

The Association will be responsible for coordinating the monitoring of and report on the residential, retail and hotel components of the Willow Village project. The Association will prepare an annual report documenting the following aspects of the residential and retail TDM plan:

- **Inventory of TDM Facilities** – The Association will establish and maintain an inventory of the TDM Related facilities. The inventory would include a tabular summary and map showing the location of the facilities serving the residential, retail, hotel, and town square parcels. This inventory would include features such as:
    - Bicycle and Pedestrian Networks
    - Bicycle Parking – Long-term and Short-term
    - Bike Share Locations
    - Bicycle Repair Stations
    - Other Bicycle Amenities (i.e., location of public restrooms)
    - Dedicated Carpool/Vanpool Parking Locations
    - Carshare Locations

- **TDM Program Data** – The Association would compile a summary of the TDM programs operated by each member of the organization. This data would include descriptions of the services provided by each of the members and programs sponsored by the Association.
    - Transportation Demand Coordinators – list of names and contact information
    - Commute Assistance Centers/Websites – list of locations and URLs
    - Carpool Matching – number of carpools
    - Vanpool Programs – number of vanpools
    - Transit Subsidies – any subsidies provided to residents or employees
    - Emergency Ride Home – existence of program and operation
    - Unbundled Residential Parking – description of programs and use of program
    - Off-Street Parking Fees (non-residential) – status and rates
    - Metered On-Street Parking – current status and rates
    - Public Transit Improved Service – actions taken by Association

- **Parking Occupancy Data** – Once a year during the spring or fall (agreed to by the City) when school is in session and there are no holidays or special events, the following data will be collected:
    - Parking Occupancy Counts – On two weekdays and one weekend day, parking occupancy counts will be conducted in the parking structures between the hours of 7:00 AM and 7:00 PM. Counts will be conducted in one-hour intervals.

The Association will submit the TDM monitoring report to the City for review. If the City determines that the TDM programs are falling short of the proposed TDM plan, the Association will work with members to improve or expand their individual TDM programs.

# Appendix H
## Internal Intersection Analysis

HEXAGON TRANSPORTATION CONSULTANTS, INC.

## Memorandum

**Date:** April 5, 2021

**To:** Ms. Kirsten Chapman, ICF Jones & Stokes, Inc.

**From:** Ollie Zhou, Katie Riutta

**Subject:** Internal Intersection Analysis for the Proposed Willow Village Project in Menlo Park, CA

Hexagon Transportation Consultants, Inc. has completed an internal intersection analysis for the proposed Willow Village project in Menlo Park, California. The Proposed Project would redevelop an approximately 59-acre industrial site plus two parcels north of Willow Road[1] (collectively, the Project Site) as a mixed-use development. The Proposed Project would demolish all existing onsite buildings and landscaping on the 59-acre portion of the Project Site and construct new buildings, provide open space areas, and install infrastructure within a new Residential/Shopping District, Town Square District, and Campus District. In addition, the Proposed Project would alter two parcels (Hamilton Avenue Parcels North and South[2]) to accommodate realignment of Hamilton Avenue at Willow Road for Project Site access.

The Proposed Project would provide up to 1.6 million sf of space for office and accessory use (consisting of up to 1.25 million sf of office uses and the balance (350,000 square if office use is maximized) of accessory uses[3]) and up to 200,000 sf of commercial/retail space. The Proposed Project would also include up to 1,730 multi-family housing units, an up to 193-room hotel, and open spaces, including publicly accessible parks (e.g. 3.5 acre publicly accessible park, elevated linear park, town square, and dog park).

The Project Site would be bisected by a new north–south street (Main Street) and an east–west street, which would provide access to all three districts. It would include a circulation network for vehicles, bicycles, and pedestrians, inclusive of both public rights-of-way and private streets, that would be generally aligned to an east-to-west and a north-to-south grid. The Proposed Project would also alter parcels north of the industrial site, across Willow Road, on both the east and west sides of Hamilton Avenue (Hamilton Avenue Parcels North and South) to support realignment of the Hamilton Avenue right-of-way and provide access to the new elevated park. This would require demolition and reconstruction of an existing service station (Chevron gas station) and potentially an increase in 1,000 sf on Hamilton Avenue Parcel South and enable the potential addition of up to 6,700 sf of retail uses at the existing neighborhood shopping center on the Hamilton Avenue Parcel North. A total of 7,700 sf could be added to the Hamilton Avenue Parcels.

---

1 For transportation analysis, "North/South" is aligned to be parallel to US 101. Hence, Willow Road and University Avenue are considered east-west streets, whereas Hamilton Road and Bayfront Expressway are considered north-south streets.

2 Hamilton Avenue Parcels North and South consider Hamilton Avenue an east to west street, which differs from the compass directions used for the transportation analysis discussion.

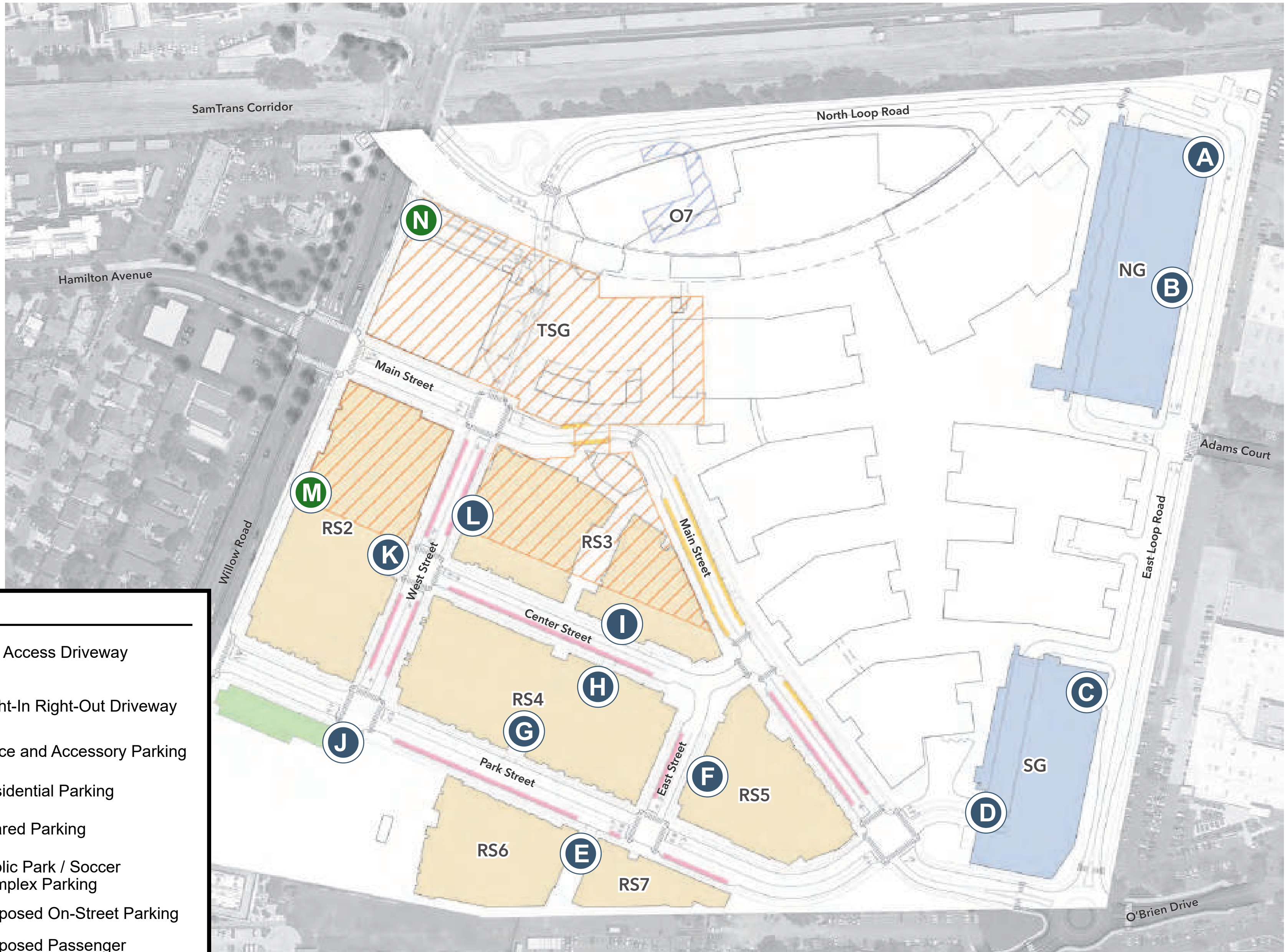
3 Accessory uses could include the following types of spaces: meeting/collaboration space, orientation space, training space, event space, incubator space, a business partner center, an event building (including pre-function space, collaboration areas, and meeting/event rooms), a visitor center, product demonstration areas, film studio, gathering terraces and private gardens, and space for other Meta accessory uses. Accessory uses could occur in spaces located anywhere throughout the Campus District.

Access to the project site would be provided by four intersections on Willow Road (at Hamilton Avenue, one new driveway intersection north of Hamilton Avenue, and two new intersections south of Hamilton Avenue), a new intersection on O'Brien Drive at the southeast corner of the project site, and Adams Court (see Figure 1). This analysis evaluates the internal site's intersection operations, potential queuing issues, and general site access and circulation, and parking. The analysis also evaluates the site access, circulation, and parking for the proposed Hamilton parcels.

A system of new streets would be implemented within the proposed Willow Village area to provide vehicular connections between parking garages in the project area and Willow Road, O'Brien Drive, and Adams Court. Seven new internal streets are planned within the project site, including North Loop Road, East Loop Road, Main Street, West Street, Center Street, East Street, and Park Street. The project proposes 14 parking garage driveways and designated areas for on-street parking within the project area. Most driveways would be full access, but the two garage driveways on Willow Road (Driveways M and N) would be right in right out only. For the purposes of this study, Willow Road is considered to be an east-west roadway.

The new internal streets and project driveways would create 20 new intersections that are listed below and shown on Figure 2.

1. Driveway A & East Loop Road (unsignalized)
2. Driveway B & East Loop Road (unsignalized)
3. Adams Court & East Loop Road
4. Driveway C & East Loop Road (unsignalized)
5. Main Street & Park Street/Driveway D
6. Park Street & Driveway E (unsignalized)
7. Buildings RS6/RS7 & Driveway E (unsignalized)
8. Park Street & East Street (unsignalized)
9. Driveway F & East Street (unsignalized)
10. Center Street & East Street (unsignalized)
11. Main Street & East Street (unsignalized)
12. Park Street & Driveway G (unsignalized)
13. Center Street & Driveway H/Driveway I (unsignalized)
14. Park Street & West Street/Driveway J
15. Center Street/Driveway K & West Street (unsignalized)
16. Driveway L & West Street (unsignalized)
17. Main Street & West Street
18. North Loop Road & West Street (unsignalized)
19. Driveway M & Willow Road (unsignalized)
20. Driveway N & Willow Road (unsignalized)




**LEGEND**

- X = Full Access Driveway
- X = Right-In Right-Out Driveway
- = Office and Accessory Parking
- = Residential Parking
- = Shared Parking
- = Public Park / Soccer Complex Parking
- = Proposed On-Street Parking
- = Proposed Passenger Loading/Drop-Off

**Figure 1**
**Project Driveways**

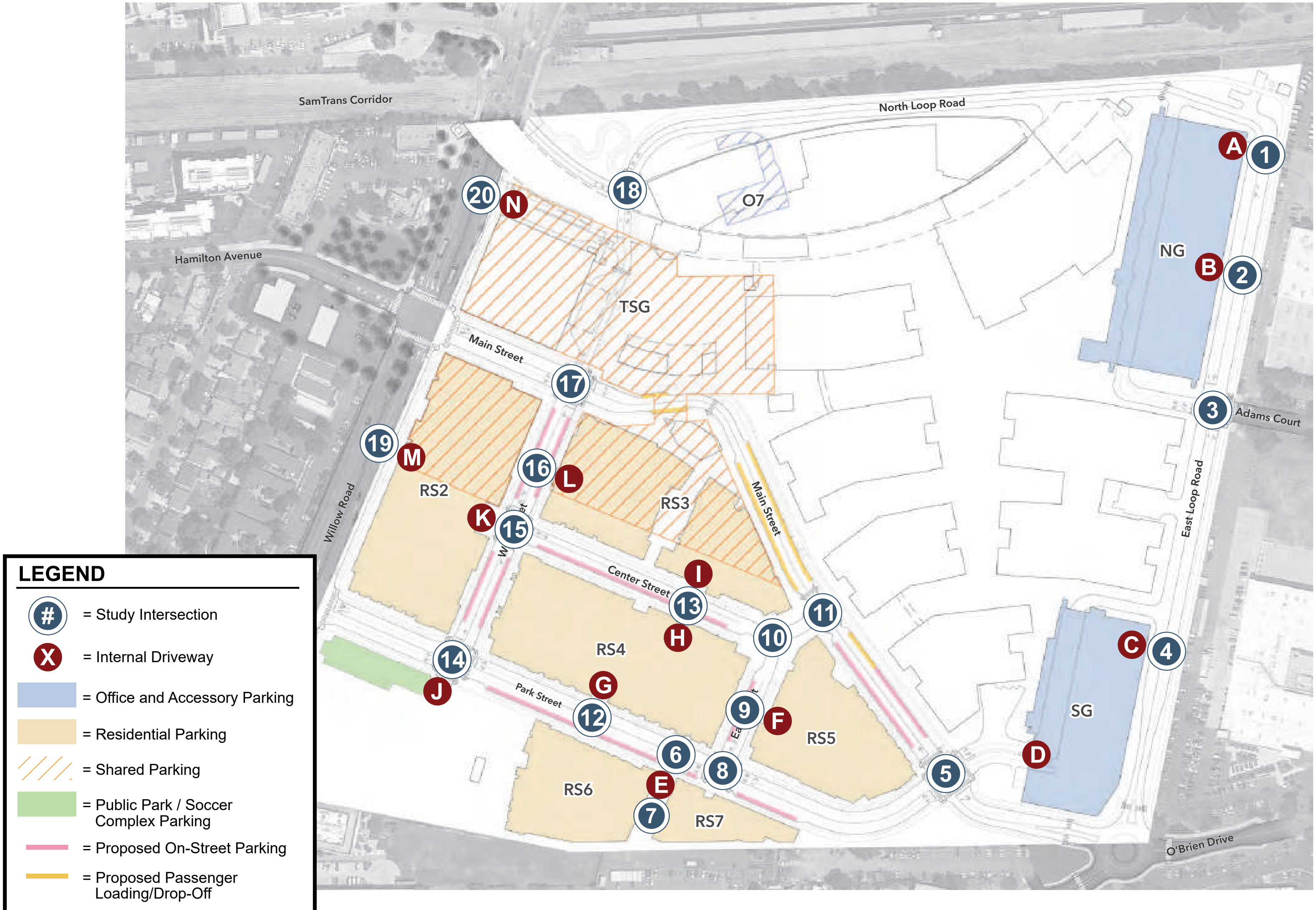



**Figure 2**
**Internal Analysis Study Intersections**

HEXAGON

NORTH
Not to Scale

# Intersection Operations

## Trip Generation

The project trip generation by land use was presented in a trip generation memo by Hexagon Transportation Consultants dated October 13, 2021 and is discussed further in the Transportation Impact Analysis (TIA). As shown in Table 1, the gross project trips generated by the Main Project Site on the roadway network would be 32,237 daily trips, including 2,396 AM peak hour trips (1,638 inbound trips and 758 outbound trips), and 2,719 PM peak hour trips (969 inbound trips and 1,750 outbound trips).

The trip generation by land use was converted to trip generation by parking garage based on the *Willow Village Master Plan Conditional Development Permit* by Peninsula Innovation Partners dated September 7, 2021, and the *Willow Village Parking Assessment* by Fehr & Peers dated July 2021. The trip generation by parking garage considers the respective TDM reductions. Trips were assigned to each parking garage based on the proportion of parking spaces proposed for each garage. Table 2 shows the trip generation for each parking garage. The public on-street and passenger loading parking spaces were assigned to the nearest parking garages.

## Trip Distribution and Assignment

Trips generated by the proposed project were distributed to the study network based on model outputs (see Figures 3 – 4). The proposed office use would typically generate inbound trips in the morning and outbound trips in the evening. The proposed residential, retail, and office/residential visitor uses would typically generate outbound trips in the morning to employment areas and inbound trips in the evening from employment areas. The proposed hotel use would typically generate trips from the nearby office areas.

The peak-hour trips generated by the proposed uses were assigned to the roadway network based on the directions of approach and departure, the roadway network connections, the location of project driveways, and the proposed lane configurations. Retail pass-by trips were added to the network from east and west Willow Road, based on the proportion of through traffic under background plus project conditions. The travel demand forecast model identified some cut-through traffic using the internal roadways within the project site. These were added to the network between Willow Road and O'Brien Drive via Main Street and Park Street based on model outputs (see Figure 5). The proposed lane configurations are shown on Figure 6, the internal intersection project volumes are shown on Figure 7, and the project trip assignment assumptions are detailed in Appendix IIA.A.

## Table 1
## Trip Generation Estimates – Project Buildout (Main Campus)

| Land Use | ITE Land Use Code [1] | Size | Unit | Daily Rate [1] | Daily Total | AM Peak Hour Rate [1] | AM IN | AM OUT | AM Total | PM Peak Hour Rate [1] | PM IN | PM OUT | PM Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Campus District*** | | | | | | | | | | | | | |
| Office | 710 | 6,950 | employees | 3.28 | 22,796 | 0.37 | 2,135 | 437 | 2,572 | 0.40 | 556 | 2,224 | 2,780 |
| *TDM Reductions [2]* | | | | | *(4,559)* | | *(765)* | *(137)* | *(902)* | | *(171)* | *(939)* | *(1,110)* |
| **Office Trip Cap [2]** | | | | | **18,237** | | **1,370** | **300** | **1,670** | | **385** | **1,285** | **1,670** |
| ***Residential/Shopping and Town Square Districts*** | | | | | | | | | | | | | |
| Residential | 221 | 1,730 | d.u. | 5.44 | 9,411 | 0.36 | 162 | 461 | 623 | 0.44 | 464 | 297 | 761 |
| Retail | 820 | 200 | ksf | 37.75 | 7,550 | 0.94 | 117 | 71 | 188 | 3.81 | 366 | 396 | 762 |
| Hotel | 310 | 193 | rooms | 8.36 | 1,613 | 0.47 | 54 | 37 | 91 | 0.60 | 59 | 57 | 116 |
| Publicly Accessible Park [3] | 488 | 3 | fields | 71.33 | 214 | 0.99 | 2 | 1 | 3 | 16.43 | 32 | 17 | 49 |
| Subtotal | | | | | 18,788 | | 335 | 570 | 905 | | 921 | 767 | 1,688 |
| *TDM Reductions [4]* | | | | | *(3,762)* | | *(67)* | *(112)* | *(179)* | | *(245)* | *(206)* | *(451)* |
| **Residential/Shopping and Town Square Districts Trips (MU)** | | | | | **15,026** | | **268** | **458** | **726** | | **676** | **561** | **1,237** |
| Project Trips *after* TDM Reductions (Office + MU) | | | | | 33,263 | | 1,638 | 758 | 2,396 | | 1,061 | 1,846 | 2,907 |
| *Retail Pass-By Reductions [5]* | | | | | *(1,026)* | | *0* | *0* | *0* | | *(92)* | *(96)* | *(188)* |
| **Total New Trips Generated by the Project** | | | | | **32,237** | | **1,638** | **758** | **2,396** | | **969** | **1,750** | **2,719** |
| Existing Trip Generation Credit [6] | | | | | (11,700) | | (699) | (286) | (985) | | (250) | (555) | (805) |
| **Net New Trips Generated on Roadway Network** | | | | | **20,537** | | **939** | **472** | **1,411** | | **719** | **1,195** | **1,914** |

Notes
*d.u. = dwelling unit, ksf = 1,000 s.f.*
1. Daily, AM, and PM peak hour average rates published in ITE Trip Generation Manual, 10th Edition, 2017 were used for each land use.
2. Office trip generation and TDM reductions reflect the proposed daily, AM and PM peak hour trip caps.
3. The publicly accessibleThe programmatic design of the park has not been determined. In order to provide a conservative estimate of potential traffic generation, it is assumed that the park will have play structures and open field areas for warm-ups or casual play. The park is planned for approximately 3.5 acres. Number of soccer fields on 3.5 acres of land was estimated based on the size of a standard soccer field. park is assumed to be programmable. ITE Land Use "Soccer Field" is analyzed as a proxy. Number of soccer fields was estimated based on the size of a standard soccer field.
4. For the Residential/Shopping and Town Square Districts, the applicant proposes a 20 percent reduction from gross ITE trip generation for daily, and a 20 percent and 27 percent reduction from gross ITE trip generation during the AM and PM peak hours of commute, respectively.
5. Pass-by trip reduction is based on the average pass-by trip reduction rate published in the ITE Trip Generation Handbook, 3rd Edition. Hexagon assumes no pass-by trip reduction during the AM peak hour and half of the PM peak pass-by reduction for daily trip generation.
6. Existing Use trip estimates based on driveway counts conducted over three days in September 2019 per Facebook Willow Traffic Counts Memorandum, Fehr & Peers, March 26, 2020. 8-9 AM in the AM peak period and 4-5 PM in the PM peak period have been considered as peak hours since they have the highest trips.

**Table 2**
**Trip Generation by Parking Garage**

| Parking Garage | Parking Use | # Spaces | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|
| **Net Project Trips** | | | | | | | | |
| NG | Office and Accessory Parking | 2,422 | 835 | 183 | 1,018 | 235 | 784 | 1,019 |
| SG | Office and Accessory Parking | 1,511 | 521 | 114 | 635 | 146 | 489 | 635 |
| RS2 | Residential Parking | 351 | 26 | 74 | 100 | 66 | 44 | 110 |
| RS3 | Residential Parking | 419 | 32 | 88 | 120 | 80 | 52 | 132 |
| RS4 | Residential Parking | 466 | 35 | 98 | 133 | 88 | 58 | 146 |
| RS5 | Residential Parking | 276 | 20 | 58 | 78 | 52 | 35 | 87 |
| RS6 | Residential Parking | 195 | 14 | 41 | 55 | 37 | 24 | 61 |
| RS7 | Residential Parking | 68 | 5 | 14 | 19 | 13 | 9 | 22 |
| TSG | Shared Parking (Hotel) | 168 | 43 | 28 | 71 | 43 | 43 | 86 |
| RS2 | Shared Parking (Retail and Residential Visitors) | 297 | 33 | 20 | 53 | 65 | 67 | 132 |
| TSG/RS3 | Shared Parking (Retail and Residential/Office Visitors) | 524 | 72 | 39 | 111 | 119 | 131 | 250 |
| | Publicly Accessible Park | 41 | 2 | 1 | 3 | 25 | 14 | 39 |
| | **Total** | **6,738** | **1,638** | **758** | **2,396** | **969** | **1,750** | **2,719** |
| **Retail Pass-By Trips** | | | | | | | | |
| RS2 | Shared Parking (Retail and Residential Visitors) | 297 | - | - | - | 33 | 35 | 68 |
| TSG/RS3 | Shared Parking (Retail and Residential/Office Visitors) | 524 | - | - | - | 59 | 61 | 120 |
| | **Total** | **821** | **-** | **-** | **-** | **92** | **96** | **188** |

Notes:
Trips were calculated using Willow Village Trip Generation Estimates at the land use level. Trips were assigned to each parking garage based on proportion of parking spaces. The public on-street and passenger loading parking spaces were assigned to the nearest parking garages.

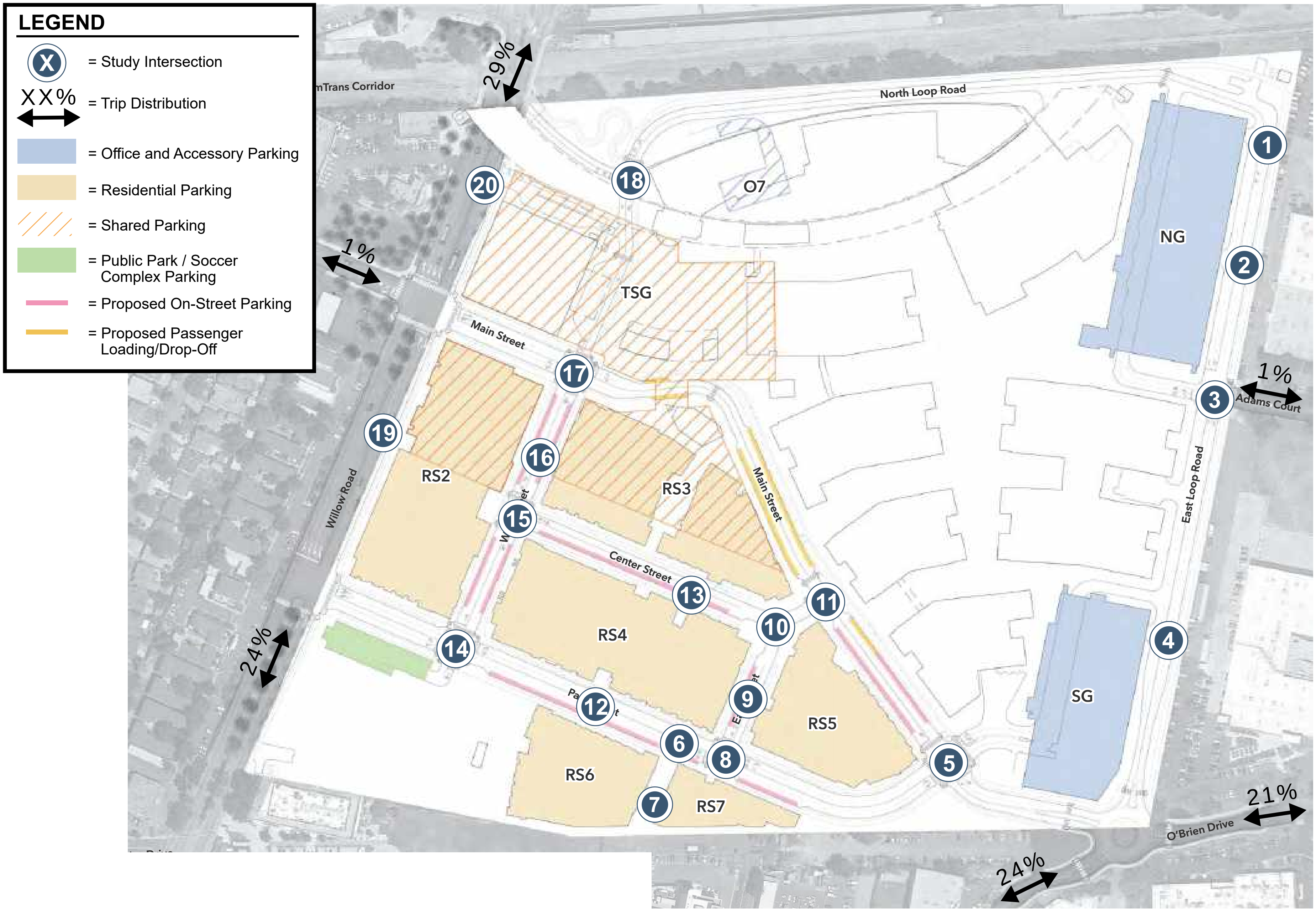



**Figure 3**
**Project Trip Distribution - Campus District**

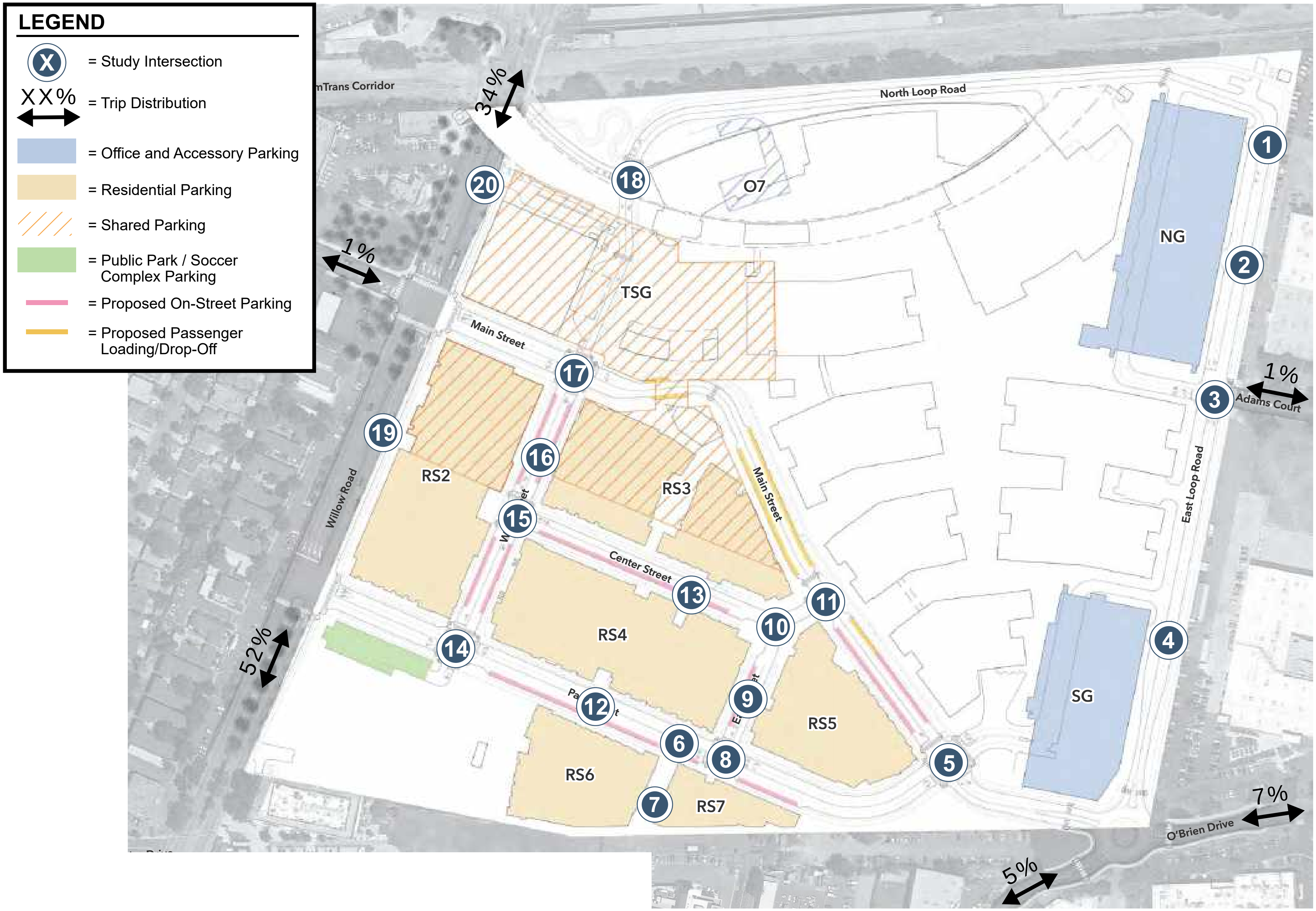



**Figure 4**
**Project Trip Distribution - Mixed-Use District**

HEXAGON

NORTH
Not to Scale

**LEGEND**

XX(XX) = AM(PM) Peak-Hour Cut-Through Trips
= Office and Accessory Parking
= Residential Parking
= Shared Parking
= Public Park / Soccer Complex Parking
= Proposed On-Street Parking
= Proposed Passenger Loading/Drop-Off

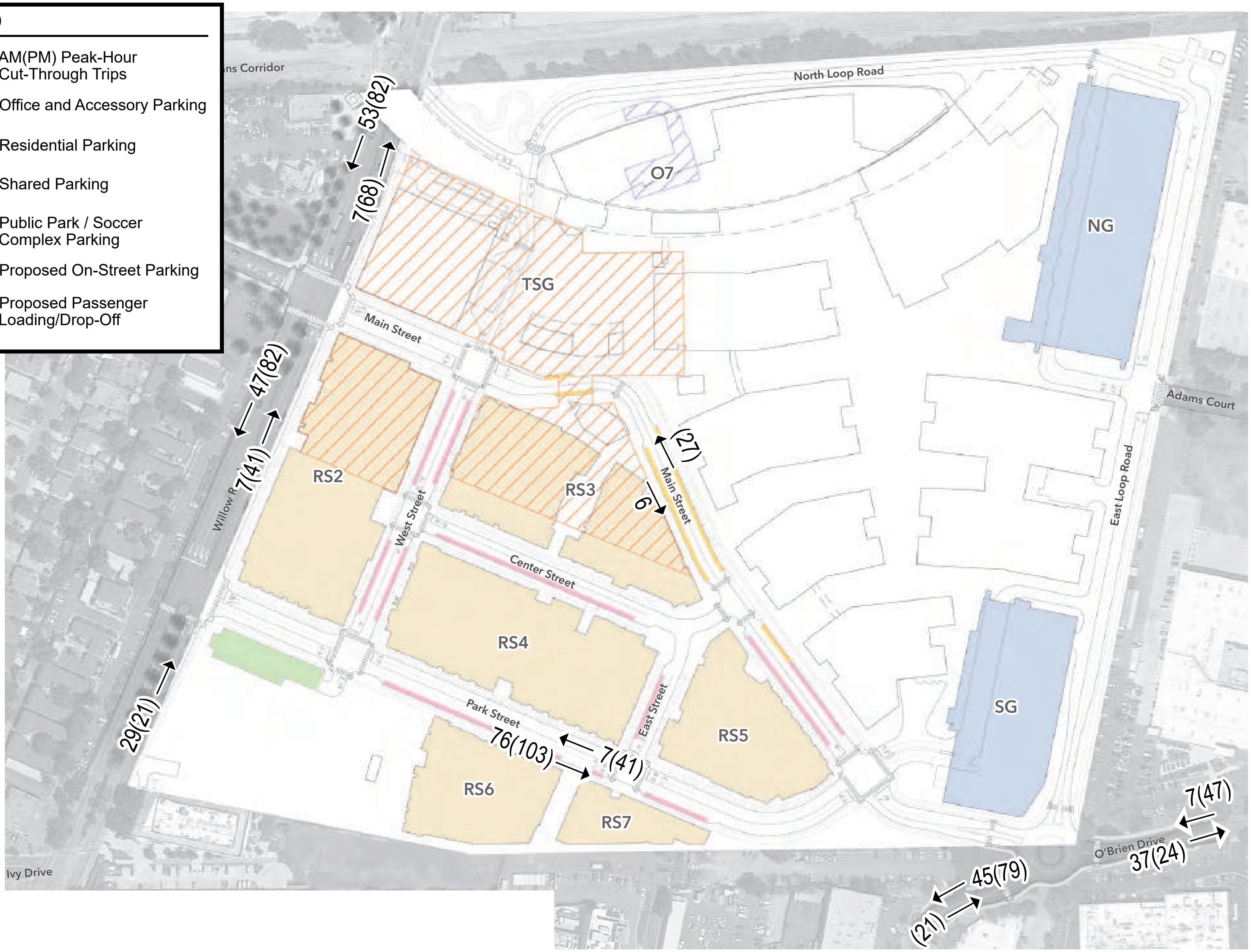



**Figure 5**
**Cut-Through Traffic Volumes**

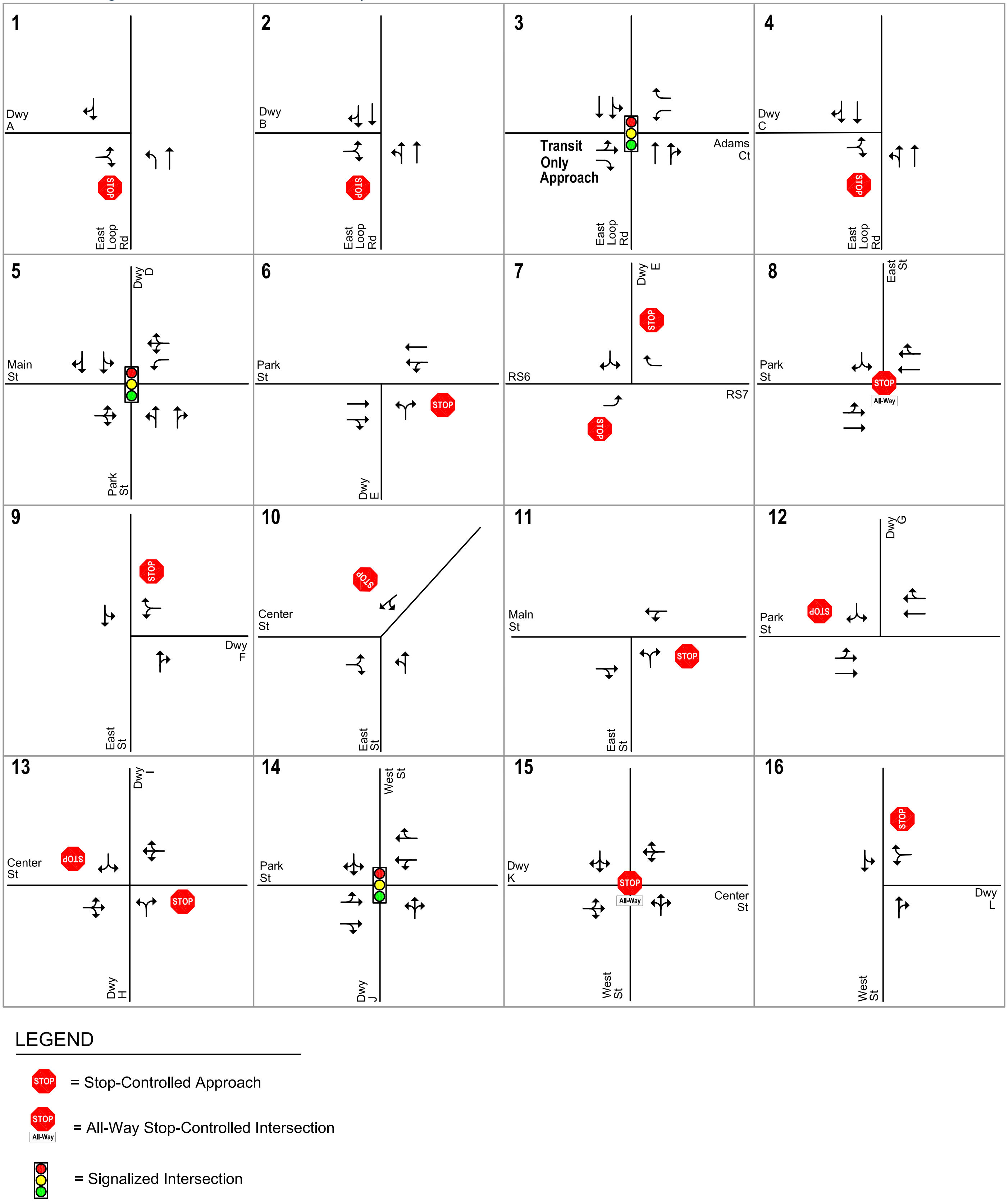
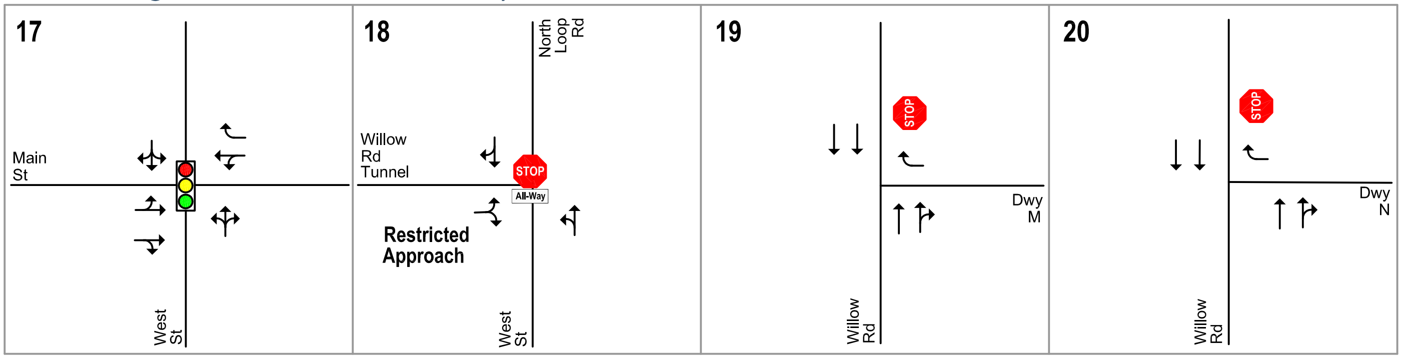



**Figure 6**
**Internal Intersection Lane Configurations**



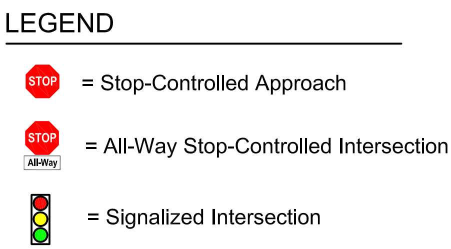
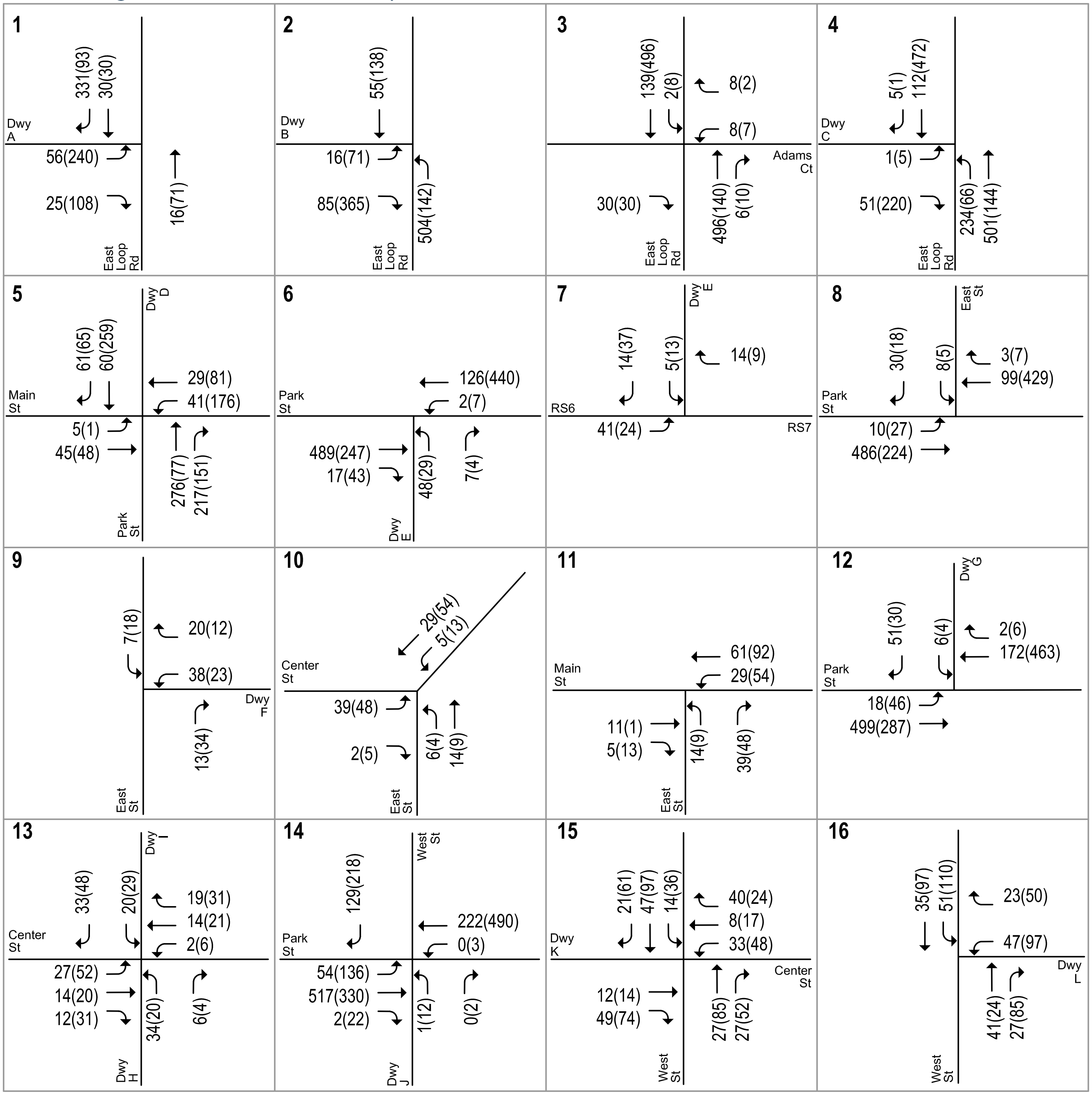




**Figure 6**
**Internal Intersection Lane Configurations**




LEGEND

XX(XX) = AM(PM) Peak-Hour Trips

**Figure 7**
**Internal Intersection Project Volumes**

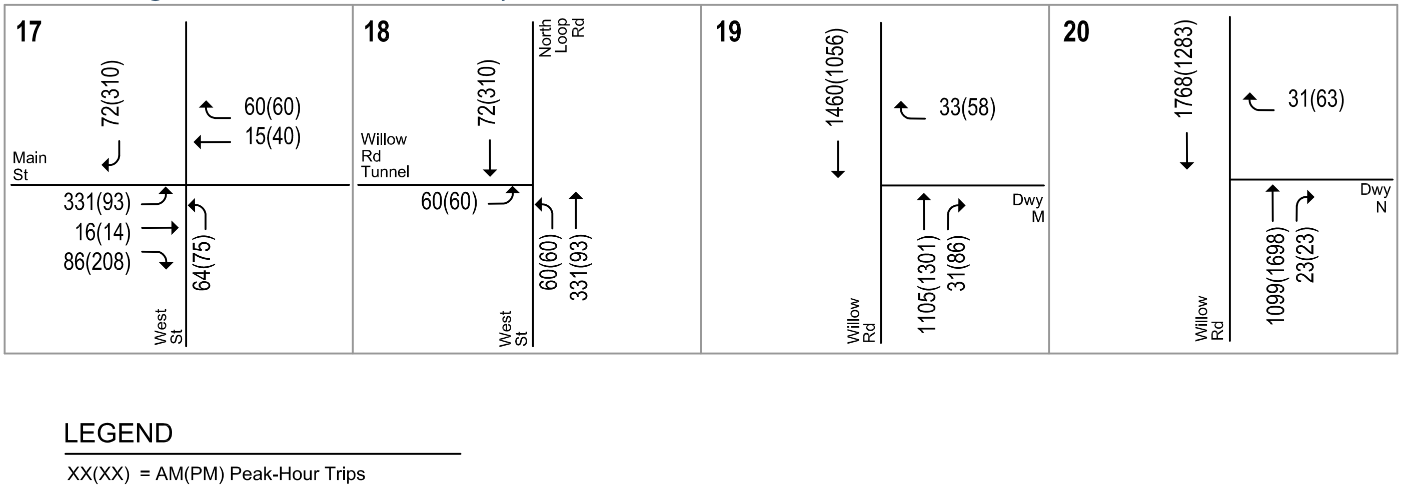



**Figure 7**
**Internal Intersection Project Volumes**

## Vehicular Access and Circulation

The site access and circulation evaluations are based on the September 7, 2021 site plan[4] prepared by Peninsula Innovation Partners (see Figure 2 of the Transportation Impact Analysis). Site access and on-site vehicular circulation were reviewed in accordance with generally accepted traffic engineering standards.

### Site Access

Access to the internal roadway network would be provided via Willow Road, O'Brien Drive, and Adams Court. The following intersections were studied in the TIA using Vistro software: Hamilton Avenue/Main Street & Willow Road, Park Street & Willow Road, and Main Street/O'Brien Drive & East Loop Road/O'Brien Drive.

**Willow Road Corridor**

The results of the level of service analysis in the TIA conducted separately for this project showed that the two intersections on Willow Road would operate at LOS F during both peak hours under near-term (2025) plus project conditions and under cumulative (2040) plus project conditions. The Willow Road corridor is expected to experience capacity issues due to unserved demand at the intersections. Level of service is discussed further in the TIA.

**Proposed Roundabout**

The need for a roundabout was determined at the intersection of Main Street/O'Brien Drive & East Loop Road/O'Brien Drive. Due to the existing intersection's large and skewed shape, trucks and buses would not be able to make all the turning movements. The proposed roundabout is shown in Figure 1. The results of the level of service analysis in the TIA showed that the roundabout intersection would operate at LOS A during both peak hours under near-term (2025) plus project conditions and during the AM peak hour under cumulative (2040) plus project conditions. The intersection would operate at LOS B during the PM peak hour under cumulative plus project conditions.

**Vehicle Queuing Analysis**

The level of service analysis for the intersections that would provide access to the project's internal roadway network was supplemented with a vehicle queuing analysis for left-turn lanes at intersections where the project would add a substantial number of left turns. This analysis provides a basis for estimating future storage requirements at the intersections under near-term plus project conditions. Vehicle queues were estimated using Vistro software. The following left-turn lanes were selected for evaluation:

- Westbound left and Eastbound left lanes at Hamilton Avenue/Main Street & Willow Road
- Westbound left and Northbound left lanes at Park Street & Willow Road
- All approaches at Main Street/O'Brien Drive & East Loop Road/O'Brien Drive

The results show that two intersections are expected to have insufficient turn lane storage to accommodate the anticipated traffic volumes under project conditions (see Table 3).

[4] A site plan resubmittal was received in December 2021 but had no substantive revisions that might affect this analysis.

**Table 3**
**Left-Turn Storage Queuing Analysis for External Intersections**

| | Hamilton Ave/Main St & Willow Rd | | | | Park St & Willow Rd | | | |
|---|---|---|---|---|---|---|---|---|
| | WBL | | NBL | | WBL | | NBL[3] | |
| Measurement | AM | PM | AM | PM | AM | PM | AM | PM |
| ***Near-Term Plus Project*** | | | | | | | | |
| Volume (vph) | 337 | 284 | 18 | 75 | 205 | 150 | 352 | 720 |
| Lanes | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| Volume (vphpl) | 169 | 142 | 18 | 75 | 103 | 75 | 176 | 360 |
| 95th %. Queue[1] (veh) | 11 | 25 | 2 | 4 | 8 | 2 | 10 | 10 |
| 95th %. Queue[2] (ft.) | 275 | 625 | 50 | 100 | 200 | 50 | 250 | 250 |
| Storage (ft/ln) | 230 | 230 | 225 | 225 | 250 | 250 | 225 | 225 |
| Adequate (Y/N) | **N** | **N** | Y | Y | Y | Y | **N** | **N** |

Notes:
[1] Vehicle queues are from Vistro outputs and are rounded up to the next whole number.
[2] Assumes 25 Feet Per Vehicle Queued
[3] Approach shares a turn lane with right-turning movements. Volumes represent the total approach volume.

**Table 3 (continued)**
**Left-Turn Storage Queuing Analysis for External Intersections**

| | Main Street/O'Brien Drive & East Loop Road/O'Brien Drive | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NBLTR [3] | | EBLTR [3] | | SBLTR [3] | | WBLTR [3] | |
| Measurement | AM | PM | AM | PM | AM | PM | AM | PM |
| ***Near-Term Plus Project*** | | | | | | | | |
| Volume (vph) | 355 | 225 | 431 | 175 | 262 | 199 | 162 | 692 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume (vphpl) | 355 | 225 | 431 | 175 | 262 | 199 | 162 | 692 |
| 95th %. Queue[1] (veh) | 3 | 1 | 3 | 1 | 1 | 2 | 1 | 5 |
| 95th %. Queue[2] (ft.) | 75 | 25 | 75 | 25 | 25 | 50 | 25 | 125 |
| Storage (ft/ln) | - | - | - | - | 325 | 325 | 330 | 330 |
| Adequate (Y/N) | - | - | - | - | Y | Y | Y | Y |

Notes:
[1] Vehicle queues are from Vistro outputs and are rounded up to the next whole number.
[2] Assumes 25 Feet Per Vehicle Queued
[3] Approach shares a turn lane with through and right-turning movements. Volumes represent the total approach volume.

***Westbound Left-turn at Hamilton Avenue/Main Street & Willow Road***

Two left turn pockets are proposed for the westbound approach on Willow Road at Hamilton Avenue/Main Street. The proposed vehicle storage for the westbound left turn pockets would be 310 feet and 150 feet, averaging to 230 feet per lane. Under near-term plus project conditions, the 95$^{th}$ percentile queue would exceed the storage length of each turn pocket by 219 vehicles during the AM peak hour and 16 vehicles during the PM peak hour. The project would add 337 vehicles to the left turn movement during the AM peak hour and 284 vehicles during the PM peak hour. If the left turn lanes at Hamilton Avenue/Main Street become saturated, it is assumed that vehicles would choose to instead enter the project site via Park Street. The westbound approach at Park Street would also provide two left turn pockets, which would be 250 feet per lane. It is assumed that the demand queue could be accommodated between the left turn lanes at these two intersections on Willow Road.

***Northbound Left-turn at Park Street & Willow Road***

One left turn lane and one shared left-right lane are proposed for the northbound approach on Park Street at Willow Road. The proposed vehicle storage between Willow Road and West Street would be approximately 225 feet per lane. Under near-term plus project conditions, the 95$^{th}$ percentile queue would exceed the storage length of each turn pocket by one vehicle during both the AM and PM peak hours. The project would add 352 vehicles to the shared lanes during the AM peak hour and 720 vehicles during the PM peak hour. If the approach becomes saturated, northbound right-turning vehicles could use West Street and Main Street to travel eastbound on Willow Road.

***All Approaches at Main Street/O'Brien Drive & East Loop Road/O'Brien Drive (future intersection)***

The Main Street/O'Brien Drive & East Loop Road/O'Brien Drive intersection is proposed to be a roundabout. All legs of the roundabout would have one approach lane. The 95$^{th}$ percentile queues for all legs were checked and found to be a maximum of 5 vehicles, which would not block any nearby intersections or driveways.

## On-site Circulation

On-site vehicular circulation was reviewed in accordance with generally accepted traffic engineering standards. The project would generally expect sufficient levels of service and left-turn storage capacity at driveways and internal intersections. The internal roadway network would provide adequate wayfinding for motorists. Cut-through traffic would be relatively low. Therefore, on-site circulation is expected to be adequate, with some identified circulation issues described below.

### Intersection Levels of Service

Intersection levels of service were evaluated for informational purposes relative to the City of Menlo Park standards and were calculated using Vistro software. No stop controls were specified for the intersections of Center Street & East Street or Main Street & East Street. Therefore, it was assumed that the westbound approach would be stop controlled for the Center Street & East Street intersection, and the eastbound approach would be stop controlled for the Main Street & East Street intersection (see Figure 6). The results of the internal intersection level of service analysis under project conditions are summarized in Table 4. The intersection levels of service calculation sheets are included in Appendix IIA.B.

**Table 4**
**Internal Intersection Levels of Service Summary**

| # | Intersection | Peak Hour | Traffic Control | Project Conditions | |
|---|---|---|---|---|---|
| | | | | Avg delay[1] | LOS |
| 1 | East Loop Road & Driveway A | AM | OWSC | 10.1 | B |
| | | PM | | 11.9 | B |
| 2 | East Loop Road & Driveway B | AM | OWSC | **31.0** | **D** |
| | | PM | | 16.5 | C |
| 3 | East Loop Road & Adams Court | AM | Signal | 4.9 | A |
| | | PM | | 15.2 | B |
| 4 | East Loop Road & Driveway C | AM | OWSC | 19.6 | C |
| | | PM | | 17.0 | C |
| 5 | Main Street & Park Street/Driveway D | AM | Signal | 16.3 | B |
| | | PM | | 17.1 | B |
| 6 | Driveway E & Park Street | AM | OWSC | 13.9 | B |
| | | PM | | 12.7 | B |
| 7 | Driveway E & Buildings RS6/RS7 | AM | TWSC | 8.8 | A |
| | | PM | | 8.8 | A |
| 8 | East Street & Park Street | AM | AWSC | 9.3 | A |
| | | PM | | 9.1 | A |
| 9 | East Street & Driveway F | AM | OWSC | 8.8 | A |
| | | PM | | 8.9 | A |
| 10 | East Street & Center Street | AM | OWSC | 9.5 | A |
| | | PM | | 9.7 | A |
| 11 | Main Street & East Street | AM | OWSC | 9.5 | B |
| | | PM | | 10.0 | A |
| 12 | Driveway G & Park Street | AM | OWSC | 12.2 | B |
| | | PM | | 15.4 | C |
| 13 | Driveway H/Driveway I & Center Street | AM | TWSC | 9.6 | A |
| | | PM | | 10.4 | B |
| 14 | West Street/Driveway J & Park Street | AM | Signal | 12.0 | B |
| | | PM | | 15.7 | B |
| 15 | West Street & Center Street/Driveway K | AM | AWSC | 7.4 | A |
| | | PM | | 8.3 | A |
| 16 | West Street & Driveway L | AM | OWSC | 10.1 | B |
| | | PM | | 12.8 | B |
| 17 | West Street & Main Street | AM | Signal | 10.8 | B |
| | | PM | | 16.9 | B |
| 18 | West Street & North Loop Road | AM | AWSC | 10.1 | B |
| | | PM | | 9.3 | A |
| 19 | Willow Road & Driveway M | AM | OWSC | 13.3 | B |
| | | PM | | 16.0 | C |
| 20 | Willow Road & Driveway N | AM | OWSC | 13.2 | B |
| | | PM | | 20.2 | C |

Notes:
OWSC - One Way Stop Control; TWSC - Two Way Stop Control; AWSC - All Way Stop Control

[1]Average delay is reported for signalized and AWSC intersections. For TWSC intersections and OWSC intersections, the delay for the worst stop-controlled movement is reported.
**Bold** indicates substandard level of service

Per City's LOS standard, the City strives to maintain LOS C at all City-controlled minor intersections during peak hours. The results of the analysis show that the intersection of Driveway B & East Loop Road would operate at LOS D during the AM peak hour. Vehicles turning left out of Driveway B would be expected to experience an average delay of 31 seconds while waiting for a sufficient opening on East Loop Road. During the AM peak hour, approximately 101 vehicles (16 heading eastbound and 85 heading westbound) would be expected to exit the garage, which would be one to two vehicles per minute. Therefore, although exiting drivers would experience some wait time, operations at Driveway B are expected to be adequate.

**Vehicle Queuing Analysis**

The analysis of internal intersection levels of service was supplemented with a vehicle queuing analysis for left-turn lanes at intersections where the project would add a substantial number of left turns. This analysis provides a basis for estimating future storage requirements at the intersections under project conditions. Vehicle queues were estimated using Vistro software. The following left turn lanes were selected for evaluation:

- Southbound shared left/right lane at Driveway A & East Loop Road
- Eastbound shared left/through lane at Driveway B & East Loop Road
- Eastbound shared left/through lane at Driveway C & East Loop Road
- Northbound left lane at Main Street & Park Street/Driveway D
- Southbound shared left/through lane at Park Street & West Street/Driveway J
- Westbound shared left/through lane at Driveway L & West Street
- Southbound shared left/through lane at Main Street & West Street

The results show that all intersections are expected to have sufficient turn lane storage to accommodate the anticipated traffic volumes under project conditions (see Table 5).

**Table 5**
**Left-Turn Storage Queuing Analysis for Internal Intersections**

| | Dwy A & East Loop Rd | | Dwy B & East Loop Rd | | Dwy C & East Loop Rd | | Main St & Park St/Dwy D | |
|---|---|---|---|---|---|---|---|---|
| | SBLR [3] | | EBLT | | EBLT | | NBL [3] | |
| Measurement | AM | PM | AM | PM | AM | PM | AM | PM |
| ***Project*** | | | | | | | | |
| Volume (vph) | 81 | 348 | 504 | 142 | 234 | 66 | 70 | 257 |
| Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| Volume (vphpl) | 81 | 348 | 504 | 142 | 234 | 66 | 35 | 129 |
| 95th %. Queue[1] (veh) | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 5 |
| 95th %. Queue[2] (ft.) | 25 | 50 | 50 | 25 | 25 | 25 | 25 | 125 |
| Storage (ft/ln) | - | - | 230 | 230 | 100 | 100 | 300 | 300 |
| Adequate (Y/N) | - | - | Y | Y | Y | Y | Y | Y |

Notes:
[1] Vehicle queues are from Vistro outputs and are rounded up to the next whole number.
[2] Assumes 25 Feet Per Vehicle Queued
[3] Approach shares turn lane with through and/or right-turning movements. Volumes represent the total approach volume.

**Table 5 (continued)**
**Left-Turn Storage Queuing Analysis for Internal Intersections**

| | Park St & West St/Dwy J | | Dwy L & West St | | Main St & West St | |
|---|---|---|---|---|---|---|
| | SBLT 3 | | WBLT 3 | | SBLT 3 | |
| Measurement | AM | PM | AM | PM | AM | PM |
| ***Project*** | | | | | | |
| Volume (vph) | 573 | 488 | 86 | 207 | 433 | 315 |
| Lanes | 2 | 2 | 1 | 1 | 2 | 2 |
| Volume (vphpl) | 287 | 244 | 86 | 207 | 217 | 158 |
| 95th %. Queue[1] (veh) | 6 | 7 | 1 | 1 | 4 | 6 |
| 95th %. Queue[2] (ft.) | 150 | 175 | 25 | 25 | 100 | 150 |
| Storage (ft/ln) | 225 | 225 | 150 | 150 | 225 | 225 |
| Adequate (Y/N) | Y | Y | Y | Y | Y | Y |

Notes:
[1] Vehicle queues are from Vistro outputs and are rounded up to the next whole number.
[2] Assumes 25 Feet Per Vehicle Queued
[3] Approach shares turn lane with through and/or right-turning movements. Volumes represent the total approach volume.

### *Left Turns from Garage Driveways*

Left-turn lanes with a substantial number of left turns inside the garages were studied to determine how long the turn pockets should be to accommodate the anticipated 95$^{th}$ percentile queues. The southbound shared-left-right lane at Driveway A would be expected to have a 95$^{th}$ percentile queue of 25 feet during the AM peak hour and 50 feet during the PM peak hour. Based on the Master Plan, the north office garage would have enough room to accommodate the anticipated 95$^{th}$ percentile queue.

### *Left Turns near Proposed Roundabout*

The project proposes a roundabout at the intersection of Main Street/O'Brien Drive & East Loop Road/O'Brien Drive. Given the geometric constraints at this intersection, a four-legged signalized intersection would have resulted in insufficient turn spaces for certain movements. A roundabout would resolve the turning movement restrictions caused by the geometric constraints. The queues for left-turn movements on Main Street and East Loop Road near the roundabout were analyzed for functional requirements. The eastbound shared-left-through lane at Driveway C & East Loop Road would be expected to have a 95$^{th}$ percentile queue of 25 feet during both peak hours. The northbound left and shared-left-through-right lanes at Main Street & Park Street/Driveway D would be expected to have a 95$^{th}$ percentile queue of 125 feet during the PM peak hour. Based on the Master Plan, the proposed storage for the left turns near the roundabout intersection could accommodate the anticipated 95$^{th}$ percentile queues and the queues would not be expected to interfere with the roundabout operations.

**East Street "Slow Street" Design**

The section of East Street between Center Street and Main Street would be designed to be a "slow street". As currently proposed, vehicles travelling on southbound Center Street or westbound East Street would only require minor turns to continue along that corridor, whereas vehicles on eastbound East Street would require essentially 90 degree turns.

> **Recommendation:** To discourage vehicle traffic from travelling on the section of East Street between Center Street and Main Street and to clarify to drivers that the main throughfare at this intersection is the 90-degree bend, Hexagon recommends the East Street & Center Street intersection be slightly reconfigured. This could be done by modifying the intersection corners so the southbound left movement does not appear as a throughfare.

**Spillback Queues on Willow Road**

The proposed intersections on West Street at Park Street and Main Street would be located approximately 225 feet from the adjacent intersections on Willow Road.

> **Recommendation:** To prevent southbound queues from spilling back onto Willow Road from Park Street and Main Street, Hexagon recommends coordinating the adjacent signals.

**Emergency Vehicles, Truck Access and Circulation**

Emergency response vehicles would access the project site from the intersections on Willow Road, O'Brien Drive, and Adams Court and would use the internal roadway network. Emergency response vehicles would access the Campus District buildings via Emergency Vehicle Access Easements along the perimeter and through the secure Campus District.

The project proposes five primary loading docks at three buildings in the Campus District. Deliveries for other buildings in the Campus District would use on-street loading zones or the loading docks at other buildings. A grocery loading bay would be located within the parking garage of building RS2. Trucks would enter the garage via Willow Road, back into the diagonal loading bay near the grocery store, and exit the garage via West Street. Rideshare and other delivery vehicles would use the provided on-street parking and loading spaces (see Figure 1). The on-street parking and loading spaces would be located throughout the interior of the project site and would not be expected to create queuing issues onto Willow Road.

## Parking Garage Access and Circulation

**Sight Distance**

The project driveways should be free and clear of any obstructions to optimize sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on the roadway network. Landscaping and signage should not conflict with a driver's ability to locate a gap in traffic and see oncoming pedestrians and bicyclists. Adequate sight distance (sight distance triangles) should be provided at the driveways in accordance with Caltrans standards. Sight distance triangles should be measured approximately 10 feet back from the traveled way.

According to the Caltrans *Highway Design Manual*, the minimum stopping sight distance is the distance required by the user, traveling at a given speed, to bring the vehicle or bicycle to a stop after an object ½-foot high on the road becomes visible. Stopping sight distance for motorists is measured from the driver's eyes, which are assumed to be 3 ½ feet above the pavement surface, to an object ½-foot high on the road. The required stopping sight distances are based on the Caltrans *Highway Design Manual*, Table 201.1. The project driveways are located on Willow Road and throughout the internal roadway network. Willow Road has a speed limit of 40 mph, and the internal roads would have an assumed speed limit of 25 mph. Thus, the Caltrans stopping sight distance requirement is 360 feet (based on a design speed of 45 mph) on Willow Road and 200 feet (based on a design speed of 30 mph) on the internal roads.

On the internal roadways where on-street parking would be prohibited, the parking garage driveways would be expected to have adequate sight distance, provided that the trees within the sidewalk would not obstruct visibility. The site plan shows a sharp roadway curve between North Loop Road and East Loop Road, directly east of Driveway A. The roadway curve would restrict sight distance to approximately 50 feet, which is inadequate. This is considered a potential CEQA Transportation Impact related to hazards and is further discussed under Impact TRA-3 of the draft Environmental Impact Report (dEIR) Transportation Chapter. On roadways with proposed on-street parking, vehicles parked directly next to the garage driveways would interfere with sight distance.

**Mitigation:** Per Mitigation Measure TRA-3 as outlined in the dEIR Transportation Chapter, mitigation would require revising the North Garage access design to provide adequate sight distance for the eastern driveway or incorporate other design solutions to reduce hazards to the satisfaction of the Public Works Director. Potential solutions that would reduce hazards to a less than significant level include restricting the eastern driveway to inbound vehicles only or prohibiting exiting left turns, modifying landscaping or relocating the driveway to the west to allow for adequate sight distance for exiting vehicles, or installing an all-way stop or signal.

**Recommendation:** Prior to final design, the project applicant should ensure that landscaping and vegetation would not obstruct visibility at the parking garage driveways.

**Recommendation:** Hexagon recommends including 30 feet of red curb on both sides of all garage driveways to prevent vehicles from parking and obstructing the vision of exiting drivers.

**Recommendation:** If vehicles exiting the garages cannot see oncoming pedestrians on the sidewalk, Hexagon recommends installing warning signs to alert pedestrians when vehicles are exiting the garages.

**Recommendation:** If any driveways are moved from their position on the current site plan, sight distance should be reevaluated.

## Driveway Operations

The project-generated traffic would access the on-site parking garages via 12 full-access driveways, 2 right-in-right-out driveways on Willow Road, and the internal roadway network. According to the City of Menlo Park's *Parking Stalls and Driveway Design Guidelines*, the width for multi-family, office, and retail driveways should be a minimum of 24 feet for two-way driveways and 15 feet for one-way driveways. Based on the *Willow Village Master Plan* dated September 7, 2021, driveways A, B, C, and N would meet the requirement. The driveways of buildings RS6 and RS7 would be approximately 18 feet, which would not meet the requirement. The remaining buildings do not show the driveway widths.

> **Recommendation:** It is recommended that all driveway widths meet the City's requirements.

The parking garage site plans show that gates would be provided at the inbound and outbound lanes of driveways A, B, C, and D of the Campus District garages, driveways I and L of building RS3, and within the basement level of building TSG near driveway N. A garage door is shown at the entrances of buildings RS6 and RS7. A roll-up gate is shown on level B1 of building RS3 at the tunnel connection to the town square garage (building TSG). Measurements between the inbound gates and the roadways are not provided on the site plans.

> **Recommendation:** At garage driveways where gates and garage doors are proposed, Hexagon recommends conducting an operational analysis to ensure that gate opening and closing times would not create queuing issues and cause vehicles to spill onto the roadway network.

> **Recommendation:** Prior to final design, the residential parking on level P1 of building RS2 should be shown to be gated and separated from the retail parking on levels 1 and 2. In addition, the roll-up gate in building RS3 should be clearly shown to separate the retail parking in level B1 and the residential parking in level B2.

## Drive Aisles

The project would provide 90-degree parking stalls throughout all parking garages shown in the *Willow Village Master Plan.* According to the City of Menlo Park's *Parking Stalls and Driveway Design Guidelines,* the City's standard minimum width for two-way drive aisles is 23 feet wide where 90-degree parking is provided. Based on the *Willow Village Master Plan*, the office parking garages, the residential parking garage in building RS7, and the retail/hotel parking garage in building TSG would meet the requirement. The drive aisles of the residential parking garage in building RS6 are shown to be approximately 22 feet wide, which would not meet the requirement. The site plans for the remaining parking garages do not show the drive aisle widths.

> **Recommendation:** It is recommended that all drive aisle widths meet the City's requirements.

The parking garage site plans show dead-end drive aisles in the north office parking garage on level 1, in the south office parking garage on level 1, in the retail parking on level B1 of building RS3, in the residential parking on level 1 of building RS7, and in the retail parking in the basement level of building TSG. The City's *Parking Stalls and Driveway Design Guidelines* do not provide any requirements for turnaround space. However, providing adequate turnaround space at the end of drive aisles allows drivers to back out of the parking space closest to the end or exit the aisle if there are no parking spaces available.

> **Recommendation:** It is recommended that adequate turnaround space is provided at all dead-end drive aisles.

**Parking Stall Dimensions**

According to the City's *Parking Stalls and Driveway Design Guidelines,* parking stalls are required to have a width of 8 feet 6 inches and a length of 16 feet 6 inches. Based on the *Willow Village Master Plan*, the parking spaces in the Campus District garages would meet the requirements. The parking spaces shown in building TSG would meet the width requirement; however, the parking space lengths are not shown. Parking stall sizes for the remaining buildings are not provided.

> **Recommendation:** It is recommended that all parking stall widths meet the City's requirement.

## Parking Analysis

The Willow Village project is located within two bonus zoning districts as defined by the *City of Menlo Park General Plan* and *M-2 Area Zoning Update (ConnectMenlo)*. All proposed land uses on the main Project Site would be within the Campus District or the residential mixed-use district. Based on the *Menlo Park Municipal Code* Sections 16.45.080 and 16.43.090, the parking requirements for each zoning district are provided as a range of permitted parking ratios. The office and accessory use would be required to provide between 2 and 3 spaces per 1,000 square feet. The market-rate residential use would be required to provide between 1 and 1.5 spaces per unit. The Municipal Code does not provide requirements for below-market-rate senior residential uses. Therefore, based on an applicant adjustment request, the senior residential use would be required to provide 0.5 spaces per unit. The retail use would be required to provide between 2.5 and 3.3 spaces per 1,000 square feet. The hotel use would be required to provide between 0.75 and 1.1 spaces per guest room. Table 6 shows the minimum and maximum number parking spaces per the Municipal Code and the proposed number of parking spaces for each land use.

Based on the range of permitted parking ratios, the proposed parking for the office and residential uses would meet the parking requirements. However, the proposed parking for the retail and hotel uses would be included among the shared parking spaces. Given that the project proposes shared parking facilities for retail, hotel and Campus District visitors, a shared parking analysis was performed to determine whether the proposed amount of shared parking spaces would be adequate based on their varying time-of-day demands. The parking demand for these uses throughout the day was calculated based on the time-of-day trend data and parking ratios published in the Urban Land Institute's *Shared Parking*, 3rd Edition.

**Table 6**
**Parking Requirements by Land Use**

| Land Use | Size | Proposed Spaces | Minimum Spaces | Maximum Spaces |
|---|---|---|---|---|
| Office and Accessory[1] | 1,600 ksf | 3,333 | 3,200 | 4,800 |
| Residential | 1,730 du | 1,702 | 1,670 | 2,475 |
| *Market-rate* | *1,610 du* | | *1,610* | *2,415* |
| *BMR Senior Housing* | *120 du* | | *60* | *60* |
| Publicly Accessible Park | 3 fields | 41 | - | - |
| Shared Parking[2] | | 938 | - | - |

Notes:
ksf = 1,000 square feet
du = dwelling unit
[1] The number of proposed spaces does not include proposed valet parking.
[2] The number of proposed spaces does not include proposed on-street parking.

The shared parking spaces would be used by retail customers and employees, hotel guests and employees, and office and accessory space visitors. Residential guests would also use the shared parking facilities, in addition to the on-street parking. The garages with shared parking spaces would also contain residential parking. There would be a physical separation between resident parking and shared parking within the garages. According to the time-of-day trend data, parking demand for retail uses is highest between 12:00 PM and 2:00 PM on weekdays; parking demand for hotel uses is highest in the evening and early mornings; and parking demand for office visitors is highest between 10:00 AM and 11:00 AM. The project proposes a total shared parking supply of 938 spaces among three parking garages, with two of the garages being connected via tunnel. Assuming the minimum parking requirements for retail and hotel, and the estimated peak parking demand for office visitors, the maximum shared parking demand on the site would be 761 parking spaces on a weekday, which would be lower than the proposed parking supply by 177 spaces (see Table 7). Therefore, the shared parking supply is expected to meet the demand for the retail, hotel, and office visitor use.

The project would provide a variety of parking stalls, including standard, accessible, electric vehicle, compact, puzzle, tandem puzzle, and stacker. Puzzle parking is proposed in the residential areas of buildings RS2 and RS3. Tandem puzzle parking is also proposed in the residential area of building RS3. Stacker parking is proposed in buildings RS6, RS7, and TSG. Parking operations are not provided for the puzzle, tandem puzzle, or stacker parking spaces in the Master Plan. The puzzle and stacker parking are assumed to allow for individual vehicle retrieval. The proposed mechanical parking systems would provide tandem puzzle spaces that are individually accessible.

**Table 7**
**Time-of-Day Shared Parking Demand**

| Hour of Day | Retail [1] | Hotel [1] | Office Visitors [2] | Parking Demand |
|---|---|---|---|---|
| 6:00 AM | 5 | 138 | 0 | 143 |
| 7:00 AM | 25 | 131 | 3 | 159 |
| 8:00 AM | 75 | 116 | 42 | 233 |
| 9:00 AM | 175 | 102 | 126 | 403 |
| 10:00 AM | 300 | 87 | 209 | 596 |
| 11:00 AM | 375 | 87 | 95 | 557 |
| 12:00 PM | 500 | 80 | 32 | 612 |
| 1:00 PM | 500 | 80 | 95 | 675 |
| 2:00 PM | 475 | 87 | 199 | 761 |
| 3:00 PM | 425 | 87 | 95 | 607 |
| 4:00 PM | 425 | 95 | 32 | 552 |
| 5:00 PM | 425 | 102 | 21 | 548 |
| 6:00 PM | 450 | 109 | 11 | 570 |
| 7:00 PM | 400 | 109 | 5 | 514 |
| 8:00 PM | 325 | 116 | 3 | 444 |
| 9:00 PM | 225 | 124 | 0 | 349 |
| 10:00 PM | 75 | 138 | 0 | 213 |
| 11:00 PM | 25 | 145 | 0 | 170 |
| 12:00 AM | 0 | 145 | 0 | 145 |
| | | | **Maximum Demand** | 761 |
| | | | **Shared Parking Supply** | 938 |
| | | | **Surplus** | +177 |

Notes:

Time-of-day factors are from Urban Land Institute's *Shared Parking*, 3rd Edition.

[1] The number of retail and hotel spaces represent the minimum requirements from the Menlo Park Municipal Code, which are 500 and 145 spaces, respectively.

[2] The number of office visitor spaces is based on the peak visitor parking demand estimated at 0.03 vehicles per seated worker, as described in the Willow Village Parking Assessment, dated July 2021

## ADA Requirements

The number of accessible parking spaces were evaluated according to the *2019 California Building Code* (Table 11B-208.2). As shown in Table 8, the project would provide at least the required number of accessible parking spaces in the garages included in the Master Plan. Buildings RS4 and RS5 are not shown in the Master Plan.

> **Recommendation:** Prior to final design, Hexagon recommends that the required amount of ADA parking spaces be provided in all parking garages.

**Table 8**
**ADA Parking Requirements**

| Parking Garage | Total Proposed Spaces | Required ADA Spaces | Proposed ADA Spaces |
|---|---|---|---|
| Parcel 2 / RS2 | 634 | 13 | 15 |
| Parcel 3 / RS3 | 639 | 13 | 18 |
| Parcel 6 / RS6 | 181 | 6 | 6 |
| Parcel 7 / RS7 | 63 | 3 | 4 |
| Town Square / TSG | 435 | 9 | 13 |
| North Office / NG | 2032 | 31 | 44 |
| South Office / SG | 1301 | 24 | 34 |

Source: 2019 California Building Code, Table 11B-208.2

## EV Requirements

The *Menlo Park Municipal Code* (Section 16.72.010) references the *2019 California Green Building Standards Code* regarding electric vehicle (EV) parking spaces. Based on Section 4.106.4.2 of the Building Standards Code, new multifamily dwellings are required to provide 10 percent of the total number of parking spaces. Based on Section 12.18.110 of the Municipal Code, non-residential buildings greater than 9,999 square feet are required to provide 15 percent of the total required number of parking stalls. As shown in Table 9, buildings RS6 and RS7, the Town Square garage, and the Campus District garages would meet the requirements. The EV parking for building RS3 would not meet the requirements. The site plan for building RS2 does not show any provided EV parking.

> **Recommendation:** Prior to final design, Hexagon recommends that the required amount of EV parking spaces be provided in all parking garages.

**Table 9**
**EV Parking Requirements**

| Parking Garage | Total Proposed Spaces | Required EV Spaces | Proposed EV Spaces |
|---|---|---|---|
| Parcel 2 / RS2 | 634 | 79 | |
| *Residential* | 351 | 36 | - |
| *Non-residential* | 283 | 43 | - |
| Parcel 3 / RS3 | 639 | 75 | 2 |
| *Residential* | 419 | 42 | 1 |
| *Non-residential* | 220 | 33 | 1 |
| Parcel 6 / RS6 | 181 | 19 | 27 |
| Parcel 7 / RS7 | 63 | 7 | 12 |
| Town Square / TSG | 435 | 66 | 69 |
| North Office / NG | 2032 | 305 | 420 |
| South Office / SG | 1301 | 196 | 271 |
| Source: Menlo Park Municipal Code Sections 16.72.010 and 12.18.110 | | | |

## Pedestrian, Bicycle and Transit Analysis

### Pedestrian and Bicycle Facilities

The proposed project would include multiple pedestrian and bicycle facilities on the project site and connections between the project site and the surrounding roadway network. The proposed pedestrian facilities are shown in Figure 8 and the proposed bicycle facilities are shown in Figure 9.

The proposed pedestrian facilities include:

- Sidewalks on both sides of realigned Hamilton Avenue, Main Street, West Street, Center Street, East Street, and Park Street.

- Crosswalks at the proposed signalized intersections on Willow Road at Main Street and Park Street that would connect the project site to the Belle Haven neighborhood. Crosswalks would also be provided at most internal intersections. Crosswalks would not be provided at East Street & Center Street or at driveway intersections. A midblock crosswalk would be provided on Main Street.

  **Recommendation:** Hexagon recommends that a crosswalk be provided at the intersection of Center Street & East Street and that midblock crosswalks are provided on Center Street and Park Street to reduce block size and improve pedestrian convenience. Recommended crosswalks are shown on Figure 8.

- An internal pedestrian network connecting Main Street, office buildings, and the transit hubs.
- Pedestrian access to the elevated park connecting the North Loop Road and Willow Road via elevators.
- A subgrade pedestrian connection within the proposed Willow Road Tunnel between the project site and the Meta Bayfront Campus.

The proposed bicycle facilities include:

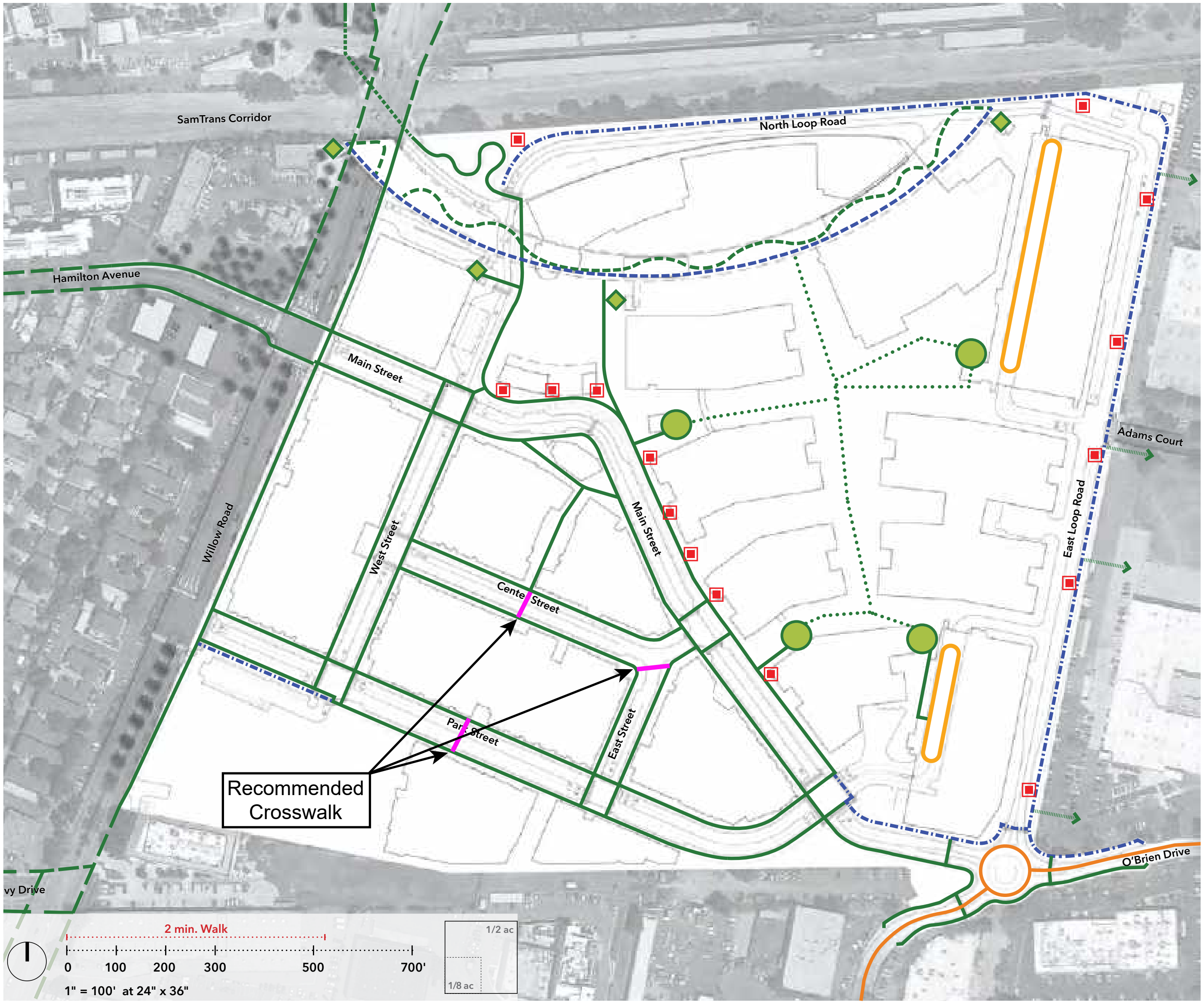
- On-street bicycle circulation along Park Street, West Street, Center Street, and East Street. Class III bikeways would be provided on Main Street between Willow Road and West Street.
- Bicycle connections to the existing class II/proposed class IV bike lanes along Willow Road via Park Street and Main Street.
- A class IV bike path between the Meta Bayfront Campus via the subgrade Willow Road Tunnel and the project site. The class IV bike path would extend along Main Street within the project site to Park Street, where it transitions into a multi-use pathway. A cross section of Main Street is shown on Figure 10.
- A class I multi-use path along North Loop Road, East Loop Road, and portions of Main Street and O'Brien Drive.
- Bicycle parking available for public use along the internal streets within the project site. Bicycle parking for Meta employees would be located in the North Garage and the South Garage, facilitating bicycle access between Campus District transit stops and the multi-use pathway adjacent to East Loop Road and North Loop Road.
- Bicycle access to the elevated park connecting North Loop Road and Willow Road via elevators.

## Transit Facilities

The proposed project would provide two transit hubs adjacent to East Loop Road exclusively for the Meta Commuter Shuttle and five inter-campus tram routes. These transit services would not be open to the public and would be reserved for Campus District workers.

The inter-campus tram route would loop around the project site via Main Street, East Loop Road, and North Loop Road, and would connect to the Meta Bayfront Campus and other Meta campuses via the proposed Willow Road Tunnel. The trams would also stop at two points along Main Street and at the intersection of West Street/North Loop Road & Willow Road Tunnel (see Figure 11). Along Main Street, the trams would utilize the passenger loading areas in the bus turnouts and would not be expected to block the flow of traffic (see Figure 1).

The proposed Meta Commuter Shuttle routes would be along Willow Road, O'Brien Drive, and Adams Court in the immediate vicinity of the project site, and along Park Street and East Loop Road internal to the project site (see Figure 12). Based on Meta Transportation data from March 2020, there were 59 shuttles that traveled to the South Bay, San Francisco, East Bay, the Peninsula, Santa Cruz/Scotts Valley, and North Bay/Marin District. The total ridership was 6,310 for inbound service and 6,391 for outbound service, which represents approximately 39% of the capacity. It is assumed that the existing shuttle program would have sufficient capacity to serve the proposed project.




| LEGEND | |
|---|---|
| | Existing Pedestrian Circulation |
| | Pedestrian Circulation |
| | Subgrade Pedestrian Circulation |
| | Elevated Park Pedestrian Circulation |
| | Internal Campus Pedestrian Circulation |
| | Potential Future Connection |
| | Multi-Use Pathway |
| | Elevated Park Multi-Use Pathway |
| | Furnishing Zone |
| | Elevated Park Access |
| | Secure Campus Entry |
| | Transit Hub |
| | Recommended Crosswalk |

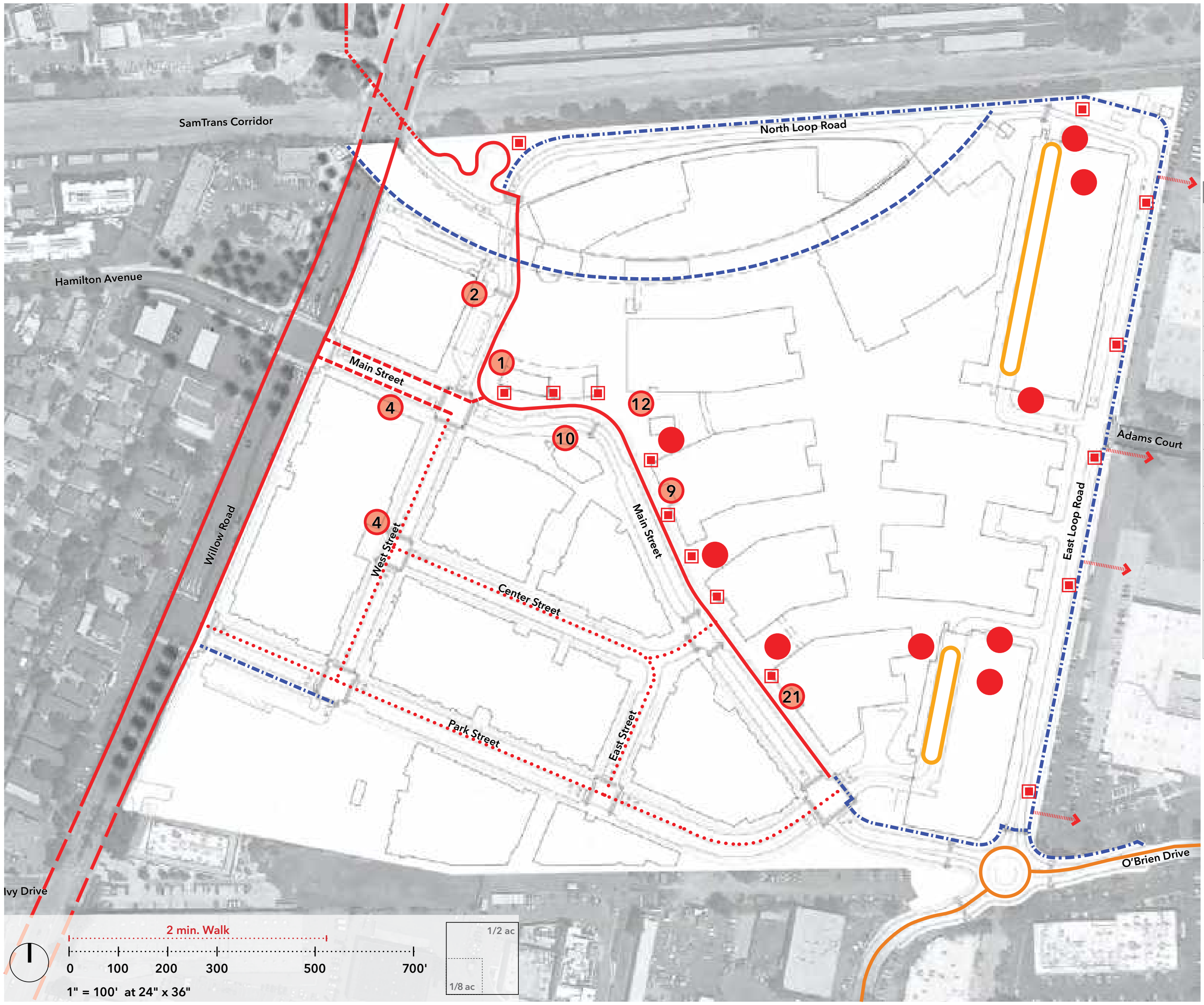
Note:
- Proposed primary pedestrian is conceptual and may be subject to change.
- Refer to Appendix 4 for parcel-by-parcel details on short and long term bike parking.

*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 8**
**Proposed Pedestrian Improvements**

HEXAGON

NORTH
Not to Scale




**LEGEND**

| | |
|---|---|
| | Multi-Use Pathway |
| | Elevated Park Multi-Use Pathway |
| | Existing Class II Bikeway |
| | Class IV Bikeway |
| | Subgrade Class IV Bikeway |
| | Class III Bikeway |
| | On-Street Bike Circulation |
| | Suggested Bike Routes* |
| | Potential Future Connection |
| | Furnishing Zone |
| # | Commercial Short-Term Bicycle Parking (# = Bike Quantity) |
| | Office Development Short-Term Bicycle Parking |
| | Transit Hub |

* Information Source:
- Menlo Park Comprehensive Bicycle Development Plan, City of Menlo Park, 2005
- San Mateo Bike Map Southeast Booklet, City/County Association of Governments of San Mateo County

- Proposed primary bike route is conceptual and may be subject to change.
- Refer to Appendix 4 for parcel-by-parcel details on short and long term bike parking.

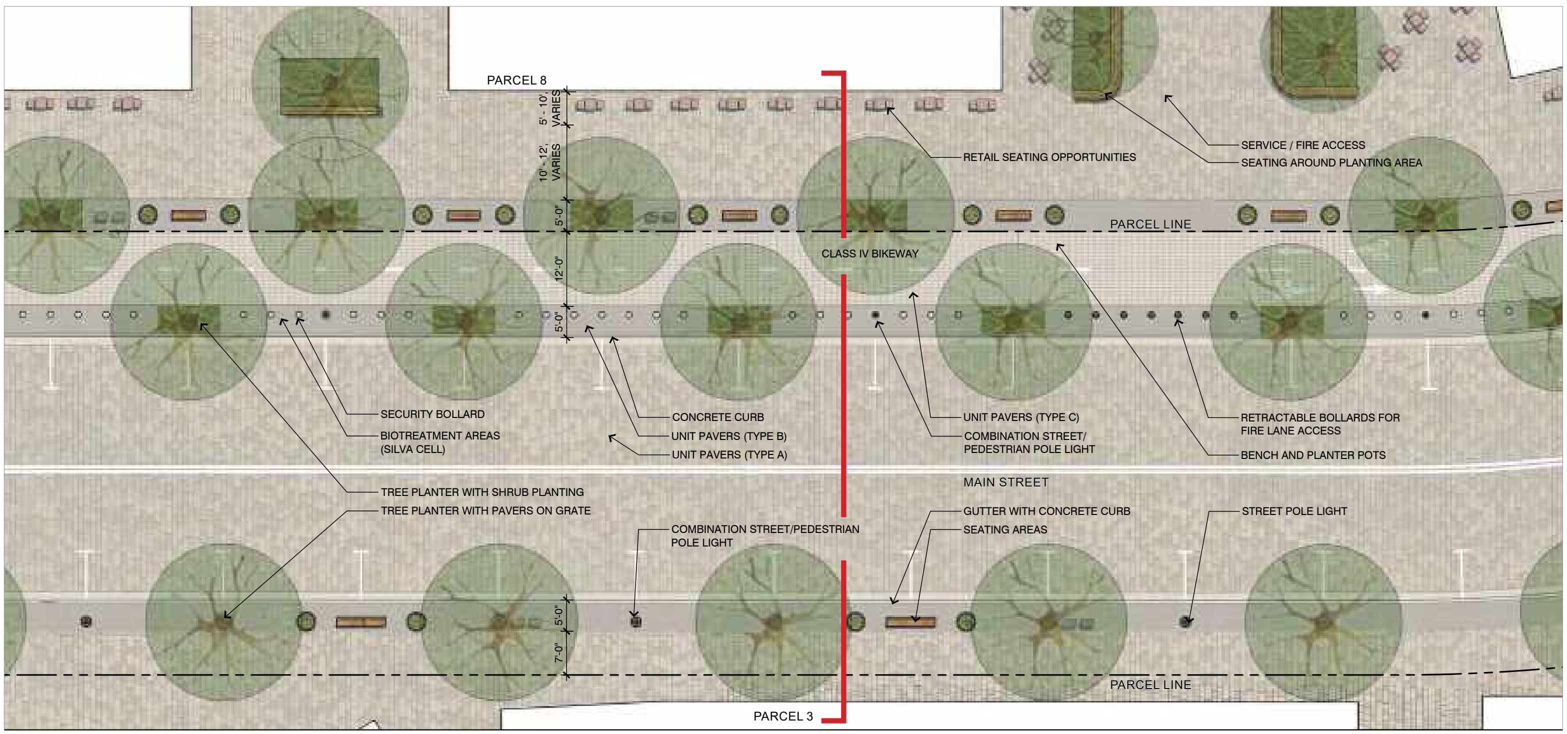
*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 9**
**Proposed Bicycle Improvements**

HEXAGON

NORTH
Not to Scale


**SECTION**




*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 10**
**Conceptual Street Enlargement - Main Street B**

HEXAGON

NORTH
Not to Scale


*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 11**
**Proposed Tram Route**

HEXAGON

NORTH
Not to Scale


*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 12**
**Proposed Shuttle Route**

## Hamilton Parcels

The Proposed Project would also alter parcels north of the industrial site, across Willow Road, on both the east and west sides of Hamilton Avenue (Hamilton Avenue Parcels North and South) to support realignment of the Hamilton Avenue right-of-way and provide access to the new elevated park. This would require demolition and reconstruction of an existing service station (Chevron gas station) and potentially an increase in 1,000 sf on Hamilton Avenue Parcel South and enable the potential addition of up to 6,700 sf of retail uses at the existing neighborhood shopping center on the Hamilton Avenue Parcel North. A total of 7,700 sf could be added to the Hamilton Avenue Parcels. Access to the Hamilton parcels would be provided by one right-in-right-out driveway each on Willow Road and one full-access driveway each on Hamilton Avenue.

The site access and circulation evaluations of the Hamilton parcels are based on the conceptual site plans in Appendix 7 of the September 7, 2021 master plan prepared by Peninsula Innovation Partners (see Figures 13 and 14). Site access and on-site vehicular circulation were reviewed in accordance with generally accepted traffic engineering standards.

### Access and Circulation

**Sight Distance**

The project driveways should be free and clear of any obstructions to optimize sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on the roadway network. Landscaping and signage should not conflict with a driver's ability to locate a gap in traffic and see oncoming pedestrians and bicyclists. Adequate sight distance (sight distance triangles) should be provided at the driveways in accordance with Caltrans standards.

The required stopping sight distances are based on the Caltrans *Highway Design Manual*, Table 201.1. The project driveways are located on Willow Road and Hamilton Avenue. Willow Road has a speed limit of 40 mph and Hamilton Avenue has a speed limit of 25 mph. Thus, the Caltrans stopping sight distance requirement is 360 feet (based on a design speed of 45 mph) on Willow Road and 200 feet (based on a design speed of 30 mph) on Hamilton Avenue.

On Hamilton Avenue, on-street parking may be provided adjacent to the project driveways which may obstruct sight distance for exiting drivers. In addition, landscaping and trees placed within the sidewalk should not obstruct visibility. The driveways on Willow Road would be expected to have adequate sight distance.

> **Recommendation:** Hexagon recommends including 30 feet of red curb on both sides of the project driveways on Hamilton Avenue if on-street parking is provided to prevent vehicles from parking and obstructing the vision of exiting drivers.

**Driveway Operations**

The project-generated traffic would access the Hamilton parcels via two right-in-right-out driveways on Willow Road and two full-access driveways Hamilton Avenue. According to the City of Menlo Park's *Parking Stalls and Driveway Design Guidelines*, the width for multi-family, office, and retail driveways should be a minimum of 24 feet for two-way driveways. The site plans do not show the driveway widths.

> **Recommendation:** It is recommended that all driveway widths meet the City's requirements.

**Drive Aisles**

The project would provide 90-degree parking stalls on surface parking lots as shown in the *Willow Village Master Plan.* According to the City of Menlo Park's *Parking Stalls and Driveway Design Guidelines,* the City's standard minimum width for two-way drive aisles is 23 feet wide where 90-degree parking is provided. The site plans do not show the drive aisle widths.

> **Recommendation:** It is recommended that all drive aisle widths meet the City's requirements.

**Parking Stall Dimensions**

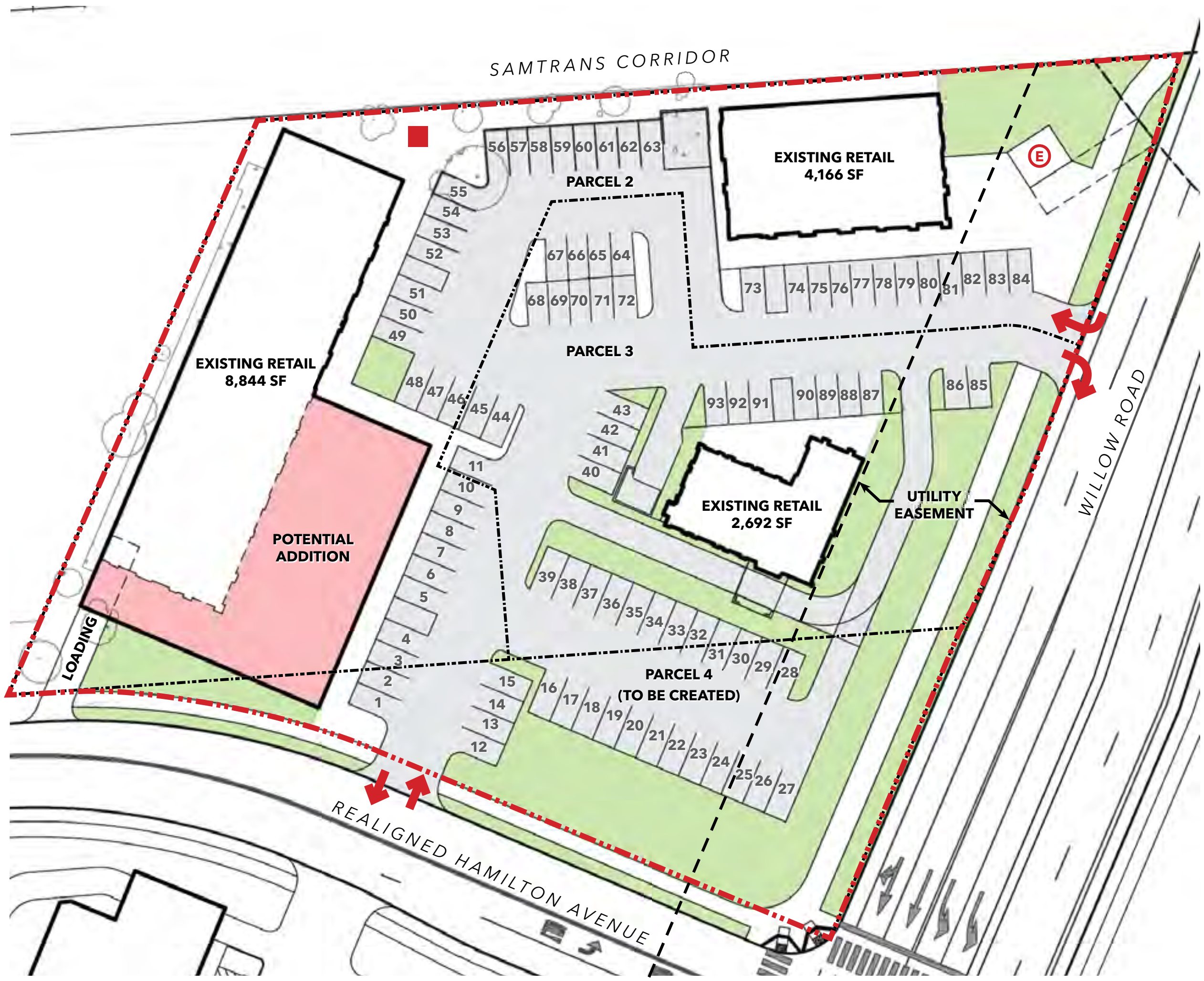
According to the City's *Parking Stalls and Driveway Design Guidelines,* parking stalls are required to have a width of 8 feet 6 inches and a length of 16 feet 6 inches. The site plans do not show the parking stall dimensions.

> **Recommendation:** It is recommended that all parking stall dimensions meet the City's requirements.

## Parking

The Hamilton parcels are located within the C-2-S zoning district, which per Menlo Park Municipal Code Section 16.37(7), will have parking requirements established by the planning commission for each development. The Hamilton North parcel proposes total potential development up to 22,402 square feet and 93 spaces. The Hamilton South parcel proposes total development of 5,760 s.f. and 13 spaces.

> **Recommendation:** It is recommended that the project applicant confirm that sufficient parking is provided for the proposed total development.




| LEGEND | |
|---|---|
| | Existing Parcel Boundary |
| | Existing Easement Boundary |
| | Proposed Parcel Boundary |
| | Proposed Added Built Area |
| | Proposed Landscaped Area |
| | Proposed Generator* |
| E | Proposed Elevator to Elevated Park Access |
| | Driveway Access |

*Generator to be place within sound attenuating enclosure.

| SITE AREA | |
|---|---|
| Existing Total Site Area (Parcels 2 & 3) | +/- 1.81 acre |
| Proposed Site Area (Parcels 2, 3, 4) | +/- 2.21 acre |

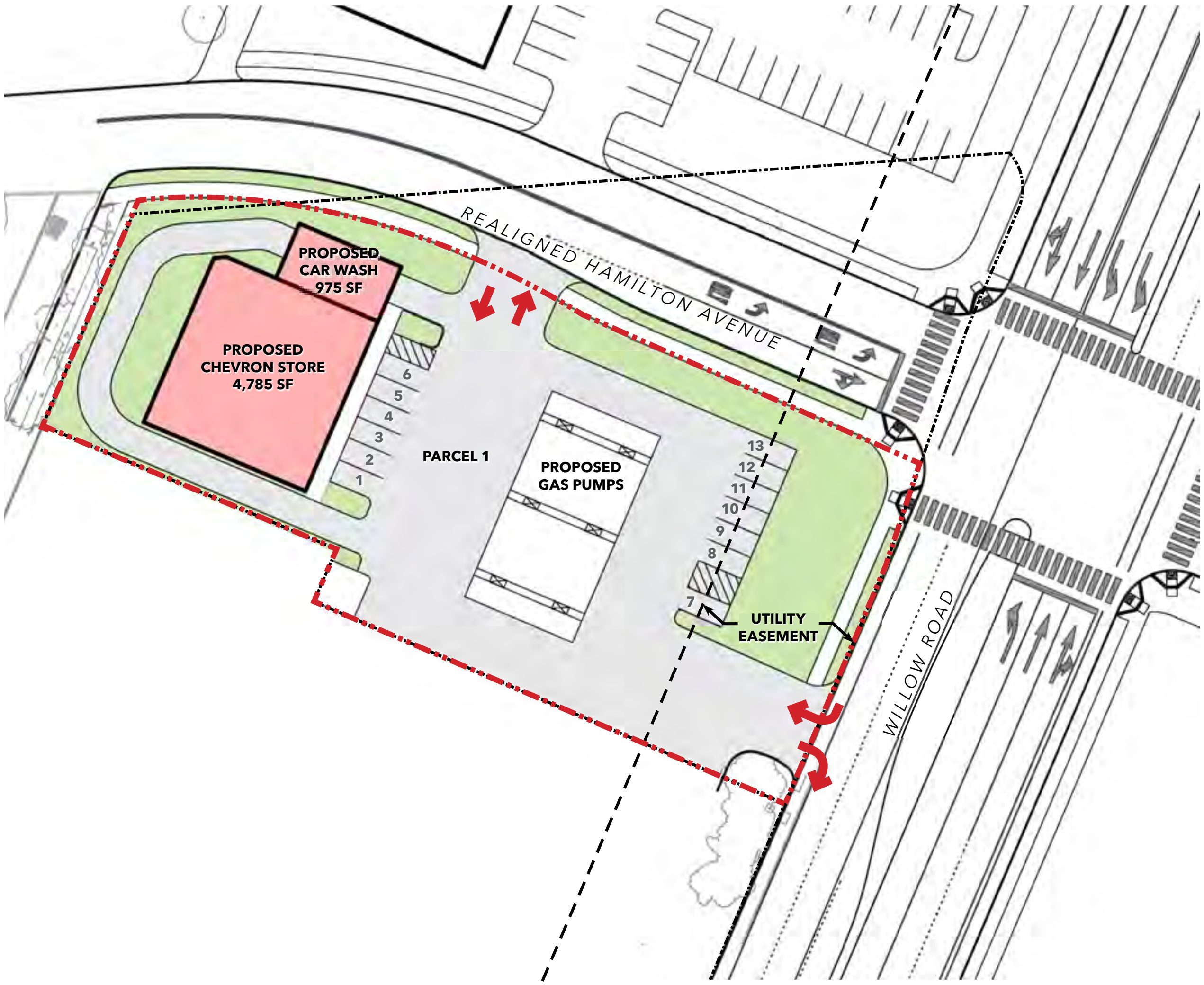
| BUILT AREA | |
|---|---|
| Existing Total Area | 15,702 sf |
| Potential Area Added | Up to 6,700 sf |
| Proposed Potential Total Area | Up to 22,402 sf |

| PARKING | |
|---|---|
| Proposed Total Parking | 93 spaces |
| Proposed Parking Ratio | 4.16 spaces/ksf |

0 20 40 60 80 100
1" = 20' at 24" x 36"

*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 13**
**Hamilton Avenue Parcel North**




| LEGEND | |
|---|---|
| | Existing Parcel Boundary |
| | Existing Easement Boundary |
| | Proposed Parcel Boundary |
| | Proposed Built Area |
| | Proposed Landscaped Area |
| | Driveway Access |

| SITE AREA | |
|---|---|
| **Existing Site Area** | +/- 1.33 acre |
| **Proposed Site Area** | +/- 0.97 acre |

| BUILT AREA | |
|---|---|
| **Proposed Total Area** | 5,760 sf |

| PARKING | |
|---|---|
| **Proposed Total Parking** | 13 spaces |
| **Proposed Parking Ratio** | 2.26 spaces/ksf |



*Source: Willow Village Master Plan, Peninsula Innovation Partners, September 7, 2021*

**Figure 14**
**Hamilton Avenue Parcel South**

## Conclusions

The site plan review evaluated the internal site's intersection operations, potential queuing issues, and general site access and circulation for the proposed seven new internal streets, 14 parking garage driveways, and 20 new intersections. The results of the level of service analysis show that the intersection of Driveway B & East Loop Road would operate at LOS D during the AM peak hour. Vehicles turning left out of Driveway B would be expected to experience an average delay of 31 seconds while waiting for a sufficient opening on East Loop Road. During the AM peak hour, approximately 101 vehicles (16 heading eastbound and 85 heading westbound) would be expected to exit the garage, which would be one to two vehicles per minute. Therefore, although exiting drivers would experience some wait time, operations at Driveway B are expected to be adequate. The results of the queuing analysis show that the intersection of Hamilton Avenue/Main Street & Willow Road is expected to have insufficient turn lane storage to accommodate the anticipated traffic volumes under near-term plus project conditions. However, it is assumed that vehicles would choose to instead enter the project site via Park Street.

Hexagon identified one impact related to a design feature that could increase hazards. This impact is considered less than significant with mitigation, with the following mitigation:

- Per Mitigation Measure TRA-3 as outlined in the dEIR Transportation Chapter, mitigation would require revising the North Garage access design to provide adequate sight distance for the eastern driveway or incorporate other design solutions to reduce hazards to the satisfaction of the Public Works Director. Potential solutions that would reduce hazards to a less than significant level include restricting the eastern driveway to inbound vehicles only or prohibiting exiting left turns, modifying landscaping or relocating the driveway to the west to allow for adequate sight distance for exiting vehicles, or installing an all-way stop or signal.

Hexagon recommends the following regarding the internal project circulation:

### Circulation Related Recommendations

- To discourage vehicle traffic from travelling on the section of East Street between Center Street and Main Street and to clarify to drivers that the main throughfare at this intersection is the 90-degree bend, Hexagon recommends the East Street & Center Street intersection be slightly reconfigured. This could be done by modifying the intersection corners so the southbound left movement does not appear as a throughfare.
- To prevent southbound queues from spilling back onto Willow Road from Park Street and Main Street, Hexagon recommends coordinating the adjacent signals.

### Sight Distance Related Recommendations

- Prior to final design, the project applicant should ensure that landscaping and vegetation would not obstruct visibility at the parking garage driveways.
- Hexagon recommends including 30 feet of red curb on both sides of all garage driveways to prevent vehicles from parking and obstructing the vision of exiting drivers.
- If vehicles exiting the garages cannot see oncoming pedestrians on the sidewalk, Hexagon recommends installing warning signs to alert pedestrians when vehicles are exiting the garages.
- If any driveways are moved from their position on the current site plan, sight distance should be reevaluated.

## Parking Garage Circulation Related Recommendations

- Prior to final design, it is recommended that all driveway widths meet the City's requirement.
- At garage driveways where gates and garage doors are proposed, Hexagon recommends conducting an operational analysis to ensure that gate opening and closing times would not create queuing issues and cause vehicles to spill onto the roadway network.
- Prior to final design, the residential parking on level P1 of building RS2 should be shown to be gated and separated from the retail parking on levels 1 and 2. In addition, the roll-up gate in building RS3 should be clearly shown to separate the retail parking in level B1 and the residential parking in level B2.
- It is recommended that all drive aisle and parking stall widths meet the City's requirements.
- It is recommended that adequate turnaround space is provided at all dead-end drive aisles.

## Parking Related Recommendations

- Prior to final design, Hexagon recommends that the required number of ADA and EV parking spaces be provided in all parking garages.

## Pedestrian Related Recommendations

- Hexagon recommends that a crosswalk is provided at the intersection of Center Street & East Street and that midblock crosswalks are provided on Center Street and Park Street to reduce block size and improve pedestrian convenience.

## Hamilton Parcels Related Recommendations

- Hexagon recommends including 30 feet of red curb on both sides of the Hamilton Avenue driveways if on-street parking is provided to prevent vehicles from parking and obstructing the vision of exiting drivers.
- It is recommended that all driveway widths, drive aisle widths, and parking stall dimensions meet the City's requirements.
- It is recommended that the project applicant confirm that sufficient parking is provided for the proposed total development.

# Appendix IIA.**A**

## Project Trip Assignment Assumptions

## Project Trip Assignment Assumptions

### To/From O'Brien Drive

- Office parking in Building NG: We assumed 100% to travel on East Loop Road enter via Driveway B. We assumed 70% to exit via Driveway B and 30% to exit via Driveway A.
- Office parking in Building SG: We assumed 100% to travel on East Loop Road enter/exit via Driveway C.
- Residential and shared parking in Building RS2*:* We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway K.
- Residential and shared parking in Building RS3: We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway I.
- Residential parking in Building RS4: We assumed 50% to travel on Park Street and enter/exit via Driveway G and 50% to travel on Main Street to Center Street and enter/exit via Driveway H.
- Residential parking in Building RS5: We assumed 100% to travel on Park Street to East Street and enter via Driveway F.
- Residential parking in Building RS6 and RS7: We assumed 100% to travel on Park Street and enter via Driveway E.
- Shared parking in Building TSG: We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway I in Building RS3.
- Public park parking: We assumed 100% to travel on Park Street and enter/exit via Driveway J.

### To/From Adams Court

- Office parking in Building NG: We assumed 100% to travel on East Loop Road enter via Driveway B. We assumed 70% to exit via Driveway B and 30% to exit via Driveway A.
- Office parking in Building SG: We assumed 100% to enter/exit via Driveway C.
- Residential and shared parking in Building RS2: We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway K.
- Residential and shared parking in Building RS3: We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway I.
- Residential parking in Building RS4: We assumed 50% to travel on Park Street and enter/exit via Driveway G and 50% to travel on Main Street to Center Street and enter/exit via Driveway H.
- Residential parking in Building RS5: We assumed 100% to travel on East Loop Road to Park Street and enter/exit via Driveway F.
- Residential parking in Building RS6 and RS7: We assumed 100% to travel on East Loop Road to Park Street and enter/exit via Driveway E.
- Shared parking in Building TSG: We assumed 100% to travel on Main Street to Center Street and enter/exit via Driveway I in Building RS3.
- Public park parking: We assumed 100% to travel on East Loop Road to Park Street and enter/exit via Driveway J.

## To/From Willow Road south of Hamilton Avenue

- Office parking in Building NG: We assumed 60% to travel on Park Street to East Loop Road and enter/exit via Driveway B and 40% to travel on Main Street to North Loop Road and enter/exit via Driveway A.
- Office parking in Building SG: We assumed 100% to travel on Park Street and enter/exit via Driveway D.
- Residential and shared parking in Building RS2: We assumed 100% to enter via Driveway M and 100% to exit via Driveway K and travel on West Street to Park Street.
- Residential and shared parking in Building RS3: We assumed 50% to travel on Park Street to West Street and enter/exit via Driveway L and 50% to travel on West Street to Center Street and enter/exit via Driveway I.
- Residential parking in Building RS4: We assumed 100% to travel on Park Street and enter/exit via Driveway G.
- Residential parking in Building RS5: We assumed 100% to travel on Park Street and enter/exit via Driveway F.
- Residential parking in Building RS6 and RS7: We assumed 100% to travel on Park Street and enter/exit via Driveway E.
- Hotel parking in Building TSG: We assumed 100% to enter via Driveway N. Due to the exclusive right-turn onto Willow Road and prohibited U-turns at Willow Road/Bayfront Expressway, we assumed 100% to exit via Driveway L in Building RS3 and travel on West Street to Park Street.
- Public park parking: We assumed 100% to travel on Park Street and enter/exit via Driveway J.

## To/From Hamilton Avenue

- Office parking in Building NG: We assumed 100% to travel on Main Street to North Loop Road and enter via Driveway A. We assumed 70% to exit via Driveway A and 30% to exit via Driveway B.
- Office parking in Building SG: We assumed 100% to travel on Main Street and enter/exit via Driveway D.
- Residential and shared parking in Building RS2: We assumed 100% to travel on Main Street to West Street and enter via Driveway K and 100% to exit via Driveway M.
- Residential and shared parking in Building RS3: We assumed 100% to travel on Main Street to West Street and enter/exit via Driveway L.
- Residential parking in Building RS4: We assumed 100% to travel on Main Street to West Street and enter/exit via Driveway H.
- Residential parking in Building RS5: We assumed 70% to travel on Main Street to East Street and enter/exit via Driveway F. We assumed 30% to travel on Main Street to West Street and Center Street and enter/exit via Driveway F.
- Residential parking in Building RS6 and RS7: We assumed 50% to travel on Main Street to West Street and Park Street and enter/exit via Driveway E and 50% to travel on Willow Road to Park Street and enter/exit via Driveway E.
- Hotel parking in Building TSG: We assumed 100% to enter via Driveway N on Willow Road. Due to the exclusive right-turn onto Willow Road and prohibited U-turns at Willow

Road/Bayfront Expressway, we assumed 100% to exit via Driveway L in Building RS3 and travel on West Street to Main Street.

- Public park parking: We assumed 50% to travel on Main Street to West Street and enter/exit via Driveway J and 50% to travel on Willow Road to Park Street and enter/exit via Driveway J.

### To/From Willow Road north of Hamilton Avenue

- Office parking in Building NG: We assumed 100% to travel on Main Street to North Loop Road and enter via Driveway A. We assumed 70% to exit via Driveway A and 30% to exit via Driveway B.
- Office parking in Building SG: We assumed 100% to travel on Park Street and enter/exit via Driveway D.
- Residential and shared parking in Building RS2: We assumed 100% to travel on Main Street to West Street and enter via Driveway K and 100% to exit via Driveway M.
- Residential and shared parking in Building RS3: We assumed 100% to travel on Main Street to West Street and enter via Driveway L. We assumed 50% to exit via Driveway L and 50% to exit via Driveway N.
- Residential parking in Building RS4: We assumed 100% to travel on Main Street to West Street and enter/exit via Driveway H.
- Residential parking in Building RS5: We assumed 70% to travel on Main Street to East Street and enter/exit via Driveway F. We assumed 30% to travel on Main Street to West Street and Center Street and enter/exit via Driveway F.
- Residential parking in Building RS6 and RS7: We assumed 100% to travel on Willow Road to Park Street and enter/exit via Driveway E.
- Hotel parking in Building TSG: We assumed 100% to travel on Main Street to West Street and enter via Driveway L. We assumed 100% to exit via Driveway N on Willow Road from Building TSG.
- Public park parking: We assumed 100% to travel on Willow Road to Park Street and enter/exit via Driveway J.

# Appendix IIA.B
## Level of Service Calculations

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro | Scenario 1 Internal Analysis AM
Report File: \...\Internal Site Analysis AM.pdf | 12/6/2021

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | East Loop Road and Driveway A | Two-way stop | HCM 6th Edition | EB Left | 0.072 | 10.1 | B |
| 2 | East Loop Road and Driveway B | Two-way stop | HCM 6th Edition | EB Left | 0.109 | 31.0 | D |
| 3 | East Loop Road and Adams Court | Signalized | HCM 6th Edition | EB Right | 0.165 | 4.9 | A |
| 4 | East Loop Road and Driveway C | Two-way stop | HCM 6th Edition | EB Left | 0.004 | 19.6 | C |
| 5 | Main Street and Park Street/Driveway D | Signalized | HCM 6th Edition | EB Thru | 0.191 | 16.3 | B |
| 6 | Park Street and Driveway E | Two-way stop | HCM 6th Edition | NB Left | 0.106 | 13.9 | B |
| 7 | Driveway E and RS6/RS7 | Two-way stop | HCM 6th Edition | EB Left | 0.041 | 8.8 | A |
| 8 | Park Street and East Street | All-way stop | HCM 6th Edition | EB Left | 0.326 | 9.3 | A |
| 9 | East Street and Driveway F | Two-way stop | HCM 6th Edition | WB Left | 0.038 | 8.8 | A |
| 10 | Center Street and East Street | Two-way stop | HCM 6th Edition | SB Thru | 0.006 | 9.5 | A |
| 11 | Main Street and East Street | Two-way stop | HCM 6th Edition | NB Left | 0.017 | 9.5 | A |
| 12 | Driveway G and Park Street | Two-way stop | HCM 6th Edition | SB Left | 0.011 | 12.2 | B |
| 13 | Dwy H/DwI and Center Street | Two-way stop | HCM 6th Edition | NB Left | 0.042 | 9.6 | A |
| 14 | West Street/Dwy J and Park Street | Signalized | HCM 6th Edition | SB Right | 0.253 | 12.0 | B |
| 15 | West Street and Dwy K/Center Street | All-way stop | HCM 6th Edition | SB Thru | 0.095 | 7.4 | A |
| 16 | West Street/Dwy L | Two-way stop | HCM 6th Edition | WB Left | 0.061 | 10.1 | B |
| 17 | Main Street and West Street | Signalized | HCM 6th Edition | SB Right | 0.290 | 10.8 | B |
| 18 | North loop Road/West Street and Willow Road Tunnel | All-way stop | HCM 6th Edition | NB Thru | 0.457 | 10.1 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 | Willow Road and Driveway M | Two-way stop | HCM 6th Edition | WB Right | 0.071 | 13.3 | B |
| 20 | Willow Road and Driveway N | Two-way stop | HCM 6th Edition | WB Right | 0.066 | 13.2 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

## Intersection Level Of Service Report
## Intersection 1: East Loop Road and Driveway A

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.072 |

### Intersection Setup

| Name | East Loop Road | | East Loop Road | | Driveway A | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | East Loop Road | | East Loop Road | | Driveway A | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 16 | 30 | 331 | 56 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 16 | 30 | 331 | 56 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 4 | 8 | 83 | 14 | 6 |
| Total Analysis Volume [veh/h] | 0 | 16 | 30 | 331 | 56 | 25 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.03 |
| d_M, Delay for Movement [s/veh] | 8.01 | 0.00 | 0.00 | 0.00 | 10.14 | 9.77 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.34 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 8.45 | 8.45 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 10.03 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 1.77 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 2: East Loop Road and Driveway B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 31.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.109 |

**Intersection Setup**

| Name | East Loop Road | | East Loop Road | | Driveway B | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Loop Road | | East Loop Road | | Driveway B | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 504 | 0 | 55 | 0 | 16 | 85 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 504 | 0 | 55 | 0 | 16 | 85 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 126 | 0 | 14 | 0 | 4 | 21 |
| Total Analysis Volume [veh/h] | 504 | 0 | 55 | 0 | 16 | 85 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.33 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 |
| d_M, Delay for Movement [s/veh] | 8.44 | 0.00 | 0.00 | 0.00 | 31.04 | 10.04 |
| Movement LOS | A | A | A | A | D | B |
| 95th-Percentile Queue Length [veh/ln] | 1.43 | 0.72 | 0.00 | 0.00 | 0.70 | 0.70 |
| 95th-Percentile Queue Length [ft/ln] | 35.81 | 17.90 | 0.00 | 0.00 | 17.40 | 17.40 |
| d_A, Approach Delay [s/veh] | 8.44 | | 0.00 | | 13.37 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 8.49 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 3: East Loop Road and Adams Court**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 4.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.165 |

**Intersection Setup**

| Name | East Loop Road | | | East Loop Road | | | Adams Court | | | Adams Court | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | East Loop Road | | | East Loop Road | | | Adams Court | | | Adams Court | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 496 | 6 | 2 | 139 | 0 | 0 | 0 | 30 | 8 | 0 | 8 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 496 | 6 | 2 | 139 | 0 | 0 | 0 | 30 | 8 | 0 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 124 | 2 | 1 | 35 | 0 | 0 | 0 | 8 | 2 | 0 | 2 |
| Total Analysis Volume [veh/h] | 0 | 496 | 6 | 2 | 139 | 0 | 0 | 0 | 30 | 8 | 0 | 8 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 6.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 71 | 0 | 0 | 71 | 0 | 0 | 19 | 0 | 0 | 19 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | | |
| Maximum Recall | | No | | | No | | | No | | | | |
| Pedestrian Recall | | No | | | No | | | No | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | R | |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | |
| g_i, Effective Green Time [s] | 67 | 67 | 67 | 67 | 15 | 15 | |
| g / C, Green / Cycle | 0.74 | 0.74 | 0.74 | 0.74 | 0.17 | 0.17 | |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.13 | 0.04 | 0.04 | 0.00 | 0.02 | |
| s, saturation flow rate [veh/h] | 1870 | 1862 | 1851 | 1702 | 1870 | 1589 | |
| c, Capacity [veh/h] | 1392 | 1386 | 1419 | 1267 | 312 | 265 | |
| d1, Uniform Delay [s] | 3.39 | 3.40 | 3.06 | 3.06 | 0.00 | 31.85 | |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| d2, Incremental Delay [s] | 0.28 | 0.29 | 0.07 | 0.08 | 0.00 | 0.87 | |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |

**Lane Group Results**

| X, volume / capacity | 0.18 | 0.18 | 0.05 | 0.05 | 0.00 | 0.11 | |
|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 3.68 | 3.68 | 3.13 | 3.14 | 0.00 | 32.72 | |
| Lane Group LOS | A | A | A | A | A | C | |
| Critical Lane Group | No | Yes | No | No | No | Yes | |
| 50th-Percentile Queue Length [veh/ln] | 1.13 | 1.13 | 0.30 | 0.27 | 0.00 | 0.61 | |
| 50th-Percentile Queue Length [ft/ln] | 28.15 | 28.18 | 7.41 | 6.84 | 0.00 | 15.31 | |
| 95th-Percentile Queue Length [veh/ln] | 2.03 | 2.03 | 0.53 | 0.49 | 0.00 | 1.10 | |
| 95th-Percentile Queue Length [ft/ln] | 50.67 | 50.72 | 13.34 | 12.30 | 0.00 | 27.56 | |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 3.68 | 3.68 | 3.13 | 3.13 | 0.00 | 0.00 | 0.00 | 32.72 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | A | A | A | A | | A | A | C | | | |
| d_A, Approach Delay [s/veh] | | 3.68 | | | 3.13 | | | 32.72 | | | 0.00 | |
| Approach LOS | | A | | | A | | | C | | | A | |
| d_I, Intersection Delay [s/veh] | 4.86 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |
| Intersection V/C | 0.165 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.296 | 2.288 | 1.951 | 1.947 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1489 | 1489 | 333 | 0 |
| d_b, Bicycle Delay [s] | 2.94 | 2.94 | 31.25 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.974 | 1.676 | 1.609 | 1.560 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 4: East Loop Road and Driveway C**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 19.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.004 |

**Intersection Setup**

| Name | East Loop Road | | East Loop Road | | Driveway C | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Loop Road | | East Loop Road | | Driveway C | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 234 | 501 | 112 | 5 | 1 | 51 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 234 | 501 | 112 | 5 | 1 | 51 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 59 | 125 | 28 | 1 | 0 | 13 |
| Total Analysis Volume [veh/h] | 234 | 501 | 112 | 5 | 1 | 51 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.16 | 0.01 | 0.00 | 0.00 | 0.00 | 0.05 |
| d_M, Delay for Movement [s/veh] | 7.91 | 0.00 | 0.00 | 0.00 | 19.61 | 8.84 |
| Movement LOS | A | A | A | A | C | A |
| 95th-Percentile Queue Length [veh/ln] | 0.57 | 0.28 | 0.00 | 0.00 | 0.18 | 0.18 |
| 95th-Percentile Queue Length [ft/ln] | 14.16 | 7.08 | 0.00 | 0.00 | 4.38 | 4.38 |
| d_A, Approach Delay [s/veh] | 2.52 | | 0.00 | | 9.05 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 2.57 | | | | | |
| Intersection LOS | C | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 5: Main Street and Park Street/Driveway D**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.191 |

**Intersection Setup**

| Name | Park Street | | | Driveway D | | | Main Street | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Park Street | | | Driveway D | | | Main Street | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 276 | 217 | 0 | 60 | 61 | 5 | 45 | 0 | 41 | 29 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 276 | 217 | 0 | 60 | 61 | 5 | 45 | 0 | 41 | 29 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 69 | 54 | 0 | 15 | 15 | 1 | 11 | 0 | 10 | 7 | 0 |
| Total Analysis Volume [veh/h] | 0 | 276 | 217 | 0 | 60 | 61 | 5 | 45 | 0 | 41 | 29 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 6.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 4 | 0 | 0 | 8 | 0 | 0 | 6 | 0 | 2 | 2 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 30 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 35 | 0 | 35 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | L | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 42 | 42 | 42 | 42 | 31 | 31 | 31 |
| g / C, Green / Cycle | 0.47 | 0.47 | 0.47 | 0.47 | 0.34 | 0.34 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.15 | 0.03 | 0.04 | 0.03 | 0.02 | 0.02 |
| s, saturation flow rate [veh/h] | 1870 | 1449 | 1870 | 1446 | 1865 | 1361 | 1762 |
| c, Capacity [veh/h] | 913 | 676 | 913 | 675 | 687 | 494 | 657 |
| d1, Uniform Delay [s] | 14.99 | 15.09 | 13.22 | 13.36 | 19.86 | 19.81 | 19.75 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.84 | 1.28 | 0.14 | 0.26 | 0.21 | 0.24 | 0.17 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.30 | 0.32 | 0.07 | 0.09 | 0.07 | 0.06 | 0.06 |
| d, Delay for Lane Group [s/veh] | 15.83 | 16.36 | 13.36 | 13.63 | 20.07 | 20.05 | 19.92 |
| Lane Group LOS | B | B | B | B | C | C | B |
| Critical Lane Group | No | Yes | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 3.56 | 2.95 | 0.68 | 0.72 | 0.73 | 0.46 | 0.57 |
| 50th-Percentile Queue Length [ft/ln] | 88.94 | 73.64 | 17.07 | 17.88 | 18.32 | 11.49 | 14.29 |
| 95th-Percentile Queue Length [veh/ln] | 6.40 | 5.30 | 1.23 | 1.29 | 1.32 | 0.83 | 1.03 |
| 95th-Percentile Queue Length [ft/ln] | 160.09 | 132.56 | 30.73 | 32.18 | 32.97 | 20.69 | 25.73 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.83 | 15.84 | 16.36 | 13.36 | 13.36 | 13.63 | 20.07 | 20.07 | 20.07 | 20.03 | 19.92 | 19.92 |
| Movement LOS | B | B | B | B | B | B | C | C | C | C | B | B |
| d_A, Approach Delay [s/veh] | 16.07 | | | 13.50 | | | 20.07 | | | 19.98 | | |
| Approach LOS | B | | | B | | | C | | | B | | |
| d_I, Intersection Delay [s/veh] | 16.29 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.191 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.342 | 2.238 | 1.785 | 2.050 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 933 | 933 | 689 | 689 |
| d_b, Bicycle Delay [s] | 12.80 | 12.80 | 19.34 | 19.34 |
| I_b,int, Bicycle LOS Score for Intersection | 1.966 | 1.659 | 1.642 | 1.675 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 6: Park Street and Driveway E**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.106 |

**Intersection Setup**

| Name | Dwy E | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Dwy E | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 48 | 7 | 489 | 17 | 2 | 126 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 48 | 7 | 489 | 17 | 2 | 126 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 2 | 122 | 4 | 1 | 32 |
| Total Analysis Volume [veh/h] | 48 | 7 | 489 | 17 | 2 | 126 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.11 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 13.90 | 10.80 | 0.00 | 0.00 | 8.42 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.39 | 0.39 | 0.00 | 0.00 | 0.01 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 9.68 | 9.68 | 0.00 | 0.00 | 0.14 | 0.07 |
| d_A, Approach Delay [s/veh] | 13.50 | | 0.00 | | 0.13 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 1.10 | | | | | |
| Intersection LOS | B | | | | | |

## Intersection Level Of Service Report
### Intersection 7: Driveway E and RS6/RS7

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.041 |

**Intersection Setup**

| Name | Dwy E | | RS6 | | RS7 | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Dwy E | | RS6 | | RS7 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 14 | 41 | 0 | 0 | 14 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 14 | 41 | 0 | 0 | 14 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 4 | 10 | 0 | 0 | 4 |
| Total Analysis Volume [veh/h] | 5 | 14 | 41 | 0 | 0 | 14 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Stop | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | No | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 8.80 | 0.00 | 0.00 | 0.00 |
| Movement LOS | A | A | A | | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 3.24 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | | 8.80 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.87 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Park Street and East Street**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 9.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.326 |

**Intersection Setup**

| Name | East Street | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 8 | 30 | 10 | 486 | 99 | 3 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 8 | 30 | 10 | 486 | 99 | 3 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 8 | 3 | 122 | 25 | 1 |
| Total Analysis Volume [veh/h] | 8 | 30 | 10 | 486 | 99 | 3 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | | | |
|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 767 | 761 | 764 | 714 | 720 |
| Degree of Utilization, x | 0.05 | 0.33 | 0.32 | 0.07 | 0.07 |

**Movement, Approach, & Intersection Results**

| | | | | | |
|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.16 | 1.42 | 1.41 | 0.23 | 0.23 |
| 95th-Percentile Queue Length [ft] | 3.91 | 35.49 | 35.27 | 5.75 | 5.70 |
| Approach Delay [s/veh] | 7.94 | 9.68 | | 8.11 | |
| Approach LOS | A | A | | A | |
| Intersection Delay [s/veh] | 9.33 | | | | |
| Intersection LOS | A | | | | |

**Intersection Level Of Service Report**
**Intersection 9: East Street and Driveway F**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.038 |

**Intersection Setup**

| Name | East Street | | East Street | | Driveway F | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | ⊢ | | ⊣ | | T | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | East Street | | Driveway F | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 13 | 7 | 0 | 38 | 20 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 13 | 7 | 0 | 38 | 20 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 3 | 2 | 0 | 10 | 5 |
| Total Analysis Volume [veh/h] | 0 | 13 | 7 | 0 | 38 | 20 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.02 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.25 | 0.00 | 8.84 | 8.56 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.01 | 0.01 | 0.18 | 0.18 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.33 | 0.33 | 4.52 | 4.52 |
| d_A, Approach Delay [s/veh] | 0.00 | | 7.25 | | 8.74 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.15 | | | | | |
| Intersection LOS | A | | | | | |

## Intersection Level Of Service Report
## Intersection 10: Center Street and East Street

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.006 |

### Intersection Setup

| Name | East Street | | East Street | | Center Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

### Volumes

| Name | East Street | | East Street | | Center Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 14 | 5 | 29 | 39 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 14 | 5 | 29 | 39 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 4 | 1 | 7 | 10 | 1 |
| Total Analysis Volume [veh/h] | 6 | 14 | 5 | 29 | 39 | 2 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Stop | Free |
| Flared Lane | | No | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | No | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.03 | 0.02 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 9.53 | 8.49 | 7.30 | 0.00 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.10 | 0.10 | 0.07 | 0.07 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 2.58 | 2.58 | 1.87 | 1.87 |
| d_A, Approach Delay [s/veh] | 0.00 | | 8.65 | | 6.94 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.09 | | | | | |
| Intersection LOS | A | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 11: Main Street and East Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.017 |

**Intersection Setup**

| Name | East Street | | Main Street | | Main Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | Main Street | | Main Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 14 | 39 | 11 | 5 | 29 | 61 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 39 | 11 | 5 | 29 | 61 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 10 | 3 | 1 | 7 | 15 |
| Total Analysis Volume [veh/h] | 14 | 39 | 11 | 5 | 29 | 61 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.04 | 0.00 | 0.00 | 0.02 | 0.00 |
| d_M, Delay for Movement [s/veh] | 9.46 | 8.58 | 0.00 | 0.00 | 7.29 | 0.00 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.17 | 0.17 | 0.00 | 0.00 | 0.06 | 0.06 |
| 95th-Percentile Queue Length [ft/ln] | 4.20 | 4.20 | 0.00 | 0.00 | 1.38 | 1.38 |
| d_A, Approach Delay [s/veh] | 8.81 | | 0.00 | | 2.35 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.27 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 12: Driveway G and Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Driveway G | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Driveway G | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 6 | 51 | 18 | 499 | 172 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 51 | 18 | 499 | 172 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 13 | 5 | 125 | 43 | 1 |
| Total Analysis Volume [veh/h] | 6 | 51 | 18 | 499 | 172 | 2 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.17 | 9.06 | 7.60 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.21 | 0.21 | 0.04 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 5.20 | 5.20 | 0.98 | 0.49 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 9.38 | | 0.26 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.90 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 13: Dwy H/Dwl and Center Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.6 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.042 |

**Intersection Setup**

| Name | Dwy H | | | Dwy I | | | Center Street | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | + | | | + | | | + | | | + | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Dwy H | | | Dwy I | | | Center Street | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 34 | 0 | 6 | 20 | 0 | 33 | 27 | 14 | 12 | 2 | 14 | 19 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 34 | 0 | 6 | 20 | 0 | 33 | 27 | 14 | 12 | 2 | 14 | 19 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 0 | 2 | 5 | 0 | 8 | 7 | 4 | 3 | 1 | 4 | 5 |
| Total Analysis Volume [veh/h] | 34 | 0 | 6 | 20 | 0 | 33 | 27 | 14 | 12 | 2 | 14 | 19 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.00 | 0.01 | 0.02 | 0.00 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 9.60 | 9.92 | 8.61 | 9.41 | 9.90 | 8.63 | 7.32 | 0.00 | 0.00 | 7.27 | 0.00 | 0.00 |
| Movement LOS | A | A | A | A | A | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.15 | 0.15 | 0.15 | 0.17 | 0.17 | 0.17 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 3.71 | 3.71 | 3.71 | 4.33 | 4.33 | 4.33 | 1.30 | 1.30 | 1.30 | 0.09 | 0.09 | 0.09 |
| d_A, Approach Delay [s/veh] | 9.46 | | | 8.93 | | | 3.73 | | | 0.42 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.88 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 14: West Street/Dwy J and Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.253 |

**Intersection Setup**

| Name | Dwy J | | | West Street | | | Park Street | | | Park Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Dwy J | | | West Street | | | Park Street | | | Park Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1 | 0 | 0 | 0 | 0 | 129 | 57 | 517 | 2 | 0 | 222 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1 | 0 | 0 | 0 | 0 | 129 | 57 | 517 | 2 | 0 | 222 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 32 | 14 | 129 | 1 | 0 | 56 | 0 |
| Total Analysis Volume [veh/h] | 1 | 0 | 0 | 0 | 0 | 129 | 57 | 517 | 2 | 0 | 222 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 35 | 0 | 0 | 35 | 0 | 0 | 55 | 0 | 0 | 55 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 31 | 31 | 51 | 51 | 51 | 51 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.57 | 0.57 | 0.57 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.08 | 0.17 | 0.17 | 0.06 | 0.06 |
| s, saturation flow rate [veh/h] | 1382 | 1589 | 1702 | 1700 | 1870 | 1702 |
| c, Capacity [veh/h] | 556 | 587 | 1012 | 963 | 1100 | 964 |
| d1, Uniform Delay [s] | 19.35 | 21.05 | 10.01 | 10.15 | 9.01 | 9.01 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.01 | 0.86 | 0.72 | 0.78 | 0.19 | 0.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.00 | 0.22 | 0.29 | 0.30 | 0.11 | 0.11 |
| d, Delay for Lane Group [s/veh] | 19.36 | 21.91 | 10.73 | 10.93 | 9.20 | 9.24 |
| Lane Group LOS | B | C | B | B | A | A |
| Critical Lane Group | No | Yes | Yes | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.01 | 2.04 | 2.95 | 2.92 | 1.04 | 0.96 |
| 50th-Percentile Queue Length [ft/ln] | 0.36 | 50.91 | 73.72 | 73.08 | 26.11 | 23.95 |
| 95th-Percentile Queue Length [veh/ln] | 0.03 | 3.67 | 5.31 | 5.26 | 1.88 | 1.72 |
| 95th-Percentile Queue Length [ft/ln] | 0.65 | 91.63 | 132.70 | 131.54 | 46.99 | 43.11 |

**Movement, Approach, & Intersection Results**

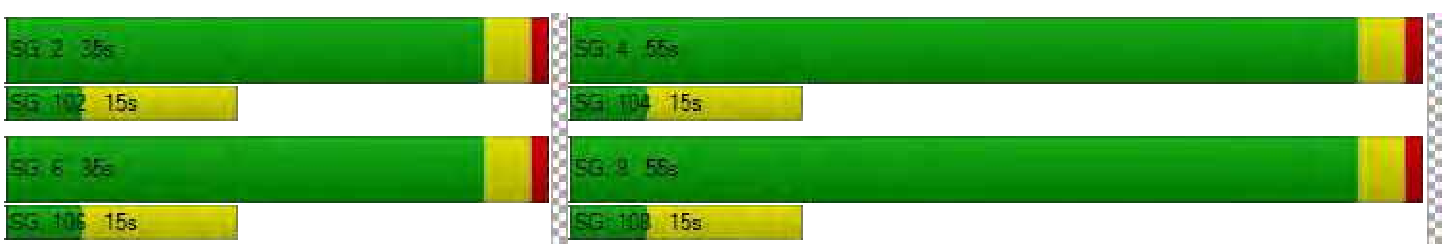
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.36 | 19.36 | 19.36 | 21.91 | 21.91 | 21.91 | 10.73 | 10.84 | 10.93 | 9.20 | 9.22 | 9.24 |
| Movement LOS | B | B | B | C | C | C | B | B | B | A | A | A |
| d_A, Approach Delay [s/veh] | 19.36 | | | 21.91 | | | 10.83 | | | 9.22 | | |
| Approach LOS | B | | | C | | | B | | | A | | |
| d_I, Intersection Delay [s/veh] | 11.99 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.253 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.718 | 1.888 | 2.360 | 2.313 |
| Crosswalk LOS | A | A | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 689 | 689 | 1133 | 1133 |
| d_b, Bicycle Delay [s] | 19.34 | 19.34 | 8.45 | 8.45 |
| I_b,int, Bicycle LOS Score for Intersection | 1.561 | 1.772 | 2.035 | 1.743 |
| Bicycle LOS | A | A | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: West Street and Dwy K/Center Street**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 7.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.095 |

**Intersection Setup**

| Name | West Street | | | West Street | | | Dwy K | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | West Street | | | West Street | | | Dwy K | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 27 | 27 | 14 | 47 | 21 | 0 | 12 | 49 | 33 | 8 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 27 | 27 | 14 | 47 | 21 | 0 | 12 | 49 | 33 | 8 | 40 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 7 | 7 | 4 | 12 | 5 | 0 | 3 | 12 | 8 | 2 | 10 |
| Total Analysis Volume [veh/h] | 0 | 27 | 27 | 14 | 47 | 21 | 0 | 12 | 49 | 33 | 8 | 40 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 898 | 866 | 942 | 885 |
| Degree of Utilization, x | 0.06 | 0.09 | 0.06 | 0.09 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.19 | 0.31 | 0.21 | 0.30 |
| 95th-Percentile Queue Length [ft] | 4.79 | 7.83 | 5.19 | 7.53 |
| Approach Delay [s/veh] | 7.27 | 7.60 | 7.09 | 7.48 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 7.39 | | | |
| Intersection LOS | A | | | |

**Intersection Level Of Service Report**
**Intersection 16: West Street/Dwy L**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.061 |

**Intersection Setup**

| Name | West Street | | West Street | | Driveway L | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | West Street | | West Street | | Driveway L | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 41 | 27 | 51 | 35 | 47 | 23 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 41 | 27 | 51 | 35 | 47 | 23 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 7 | 13 | 9 | 12 | 6 |
| Total Analysis Volume [veh/h] | 41 | 27 | 51 | 35 | 47 | 23 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.03 | 0.00 | 0.06 | 0.02 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.43 | 0.00 | 10.07 | 8.95 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.10 | 0.10 | 0.27 | 0.27 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 2.58 | 2.58 | 6.83 | 6.83 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.41 | | 9.70 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.72 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 17: Main Street and West Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 10.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.290 |

**Intersection Setup**

| Name | West Street | | | West Street | | | Driveway N | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | West Street | | | West Street | | | Driveway N | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 64 | 0 | 0 | 0 | 0 | 72 | 331 | 16 | 86 | 0 | 15 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 64 | 0 | 0 | 0 | 0 | 72 | 331 | 16 | 86 | 0 | 15 | 60 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 16 | 0 | 0 | 0 | 0 | 18 | 83 | 4 | 22 | 0 | 4 | 15 |
| Total Analysis Volume [veh/h] | 64 | 0 | 0 | 0 | 0 | 72 | 331 | 16 | 86 | 0 | 15 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 19 | 0 | 0 | 19 | 0 | 0 | 71 | 0 | 0 | 71 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 15 | 15 | 67 | 67 | 67 | 67 |
| g / C, Green / Cycle | 0.17 | 0.17 | 0.74 | 0.74 | 0.74 | 0.74 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.05 | 0.24 | 0.07 | 0.01 | 0.04 |
| s, saturation flow rate [veh/h] | 1496 | 1589 | 1353 | 1481 | 1870 | 1589 |
| c, Capacity [veh/h] | 329 | 305 | 1087 | 1103 | 1432 | 1183 |
| d1, Uniform Delay [s] | 32.41 | 32.73 | 4.62 | 3.16 | 2.96 | 3.05 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.31 | 1.82 | 0.72 | 0.17 | 0.01 | 0.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.19 | 0.24 | 0.30 | 0.09 | 0.01 | 0.05 |
| d, Delay for Lane Group [s/veh] | 33.73 | 34.55 | 5.34 | 3.32 | 2.98 | 3.14 |
| Lane Group LOS | C | C | A | A | A | A |
| Critical Lane Group | No | Yes | Yes | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.31 | 1.51 | 2.00 | 0.43 | 0.06 | 0.25 |
| 50th-Percentile Queue Length [ft/ln] | 32.79 | 37.69 | 50.04 | 10.87 | 1.46 | 6.13 |
| 95th-Percentile Queue Length [veh/ln] | 2.36 | 2.71 | 3.60 | 0.78 | 0.10 | 0.44 |
| 95th-Percentile Queue Length [ft/ln] | 59.03 | 67.83 | 90.07 | 19.57 | 2.62 | 11.04 |

**Movement, Approach, & Intersection Results**

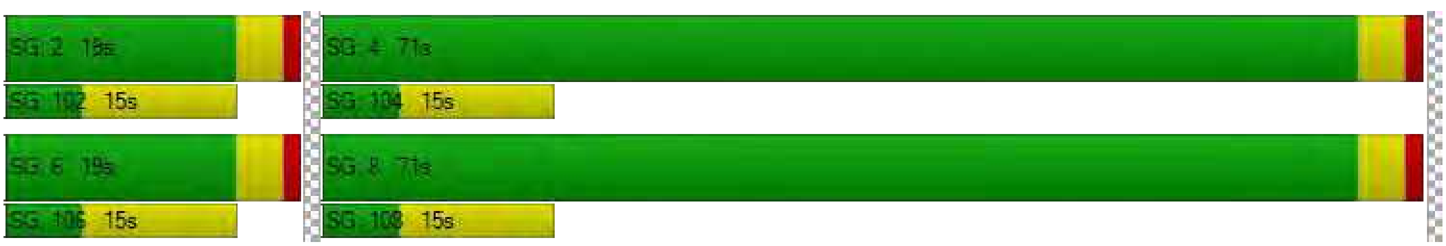
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.73 | 33.73 | 33.73 | 34.55 | 34.55 | 34.55 | 5.34 | 3.32 | 3.32 | 2.98 | 2.98 | 3.14 |
| Movement LOS | C | C | C | C | C | C | A | A | A | A | A | A |
| d_A, Approach Delay [s/veh] | 33.73 | | | 34.55 | | | 4.87 | | | 3.10 | | |
| Approach LOS | C | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 10.85 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.290 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.789 | 2.413 | 2.223 | 2.155 |
| Crosswalk LOS | A | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 333 | 333 | 1489 | 1489 |
| d_b, Bicycle Delay [s] | 31.25 | 31.25 | 2.94 | 2.94 |
| I_b,int, Bicycle LOS Score for Intersection | 1.665 | 1.678 | 1.917 | 1.683 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 18: North loop Road/West Street and Willow Road Tunnel**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 10.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.457 |

**Intersection Setup**

| Name | West Street | | North Loop Road | | Willow Road Tunnel | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | West Street | | North Loop Road | | Willow Road Tunnel | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 60 | 331 | 72 | 0 | 60 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 60 | 331 | 72 | 0 | 60 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 15 | 83 | 18 | 0 | 15 | 0 |
| Total Analysis Volume [veh/h] | 60 | 331 | 72 | 0 | 60 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 855 | 800 | 698 |
| Degree of Utilization, x | 0.46 | 0.09 | 0.09 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 2.43 | 0.30 | 0.28 |
| 95th-Percentile Queue Length [ft] | 60.66 | 7.39 | 7.03 |
| Approach Delay [s/veh] | 10.71 | 7.94 | 8.64 |
| Approach LOS | B | A | A |
| Intersection Delay [s/veh] | 10.09 | | |
| Intersection LOS | B | | |

**Intersection Level Of Service Report**
**Intersection 19: Willow Road and Driveway M**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.071 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Driveway M | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 100.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Driveway M | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1105 | 31 | 0 | 1460 | 0 | 33 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1105 | 31 | 0 | 1460 | 0 | 33 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 276 | 8 | 0 | 365 | 0 | 8 |
| Total Analysis Volume [veh/h] | 1105 | 31 | 0 | 1460 | 0 | 33 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.07 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.31 |
| Movement LOS | A | A | | A | | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.69 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 13.31 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 0.17 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 20: Willow Road and Driveway N**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.066 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Driveway N | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Driveway N | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1099 | 23 | 0 | 1768 | 0 | 31 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1099 | 23 | 0 | 1768 | 0 | 31 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 275 | 6 | 0 | 442 | 0 | 8 |
| Total Analysis Volume [veh/h] | 1099 | 23 | 0 | 1768 | 0 | 31 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.07 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.18 |
| Movement LOS | A | A | | A | | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.26 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 13.18 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 0.14 | | | | | |
| Intersection LOS | B | | | | | |

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro
Report File: \...\Internal Site Analysis AM.pdf

Scenario 1 Internal Analysis AM
12/6/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 1 | East Loop Road and Driveway A | 0 | 16 | 30 | 331 | 56 | 25 | 458 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 2 | East Loop Road and Driveway B | 504 | 0 | 55 | 0 | 16 | 85 | 660 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Thru | Right | Left | Right | |
| 3 | East Loop Road and Adams Court | 496 | 6 | 2 | 139 | 0 | 0 | 30 | 8 | 8 | 689 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 4 | East Loop Road and Driveway C | 234 | 501 | 112 | 5 | 1 | 51 | 904 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 5 | Main Street and Park Street/Driveway D | 0 | 276 | 217 | 0 | 60 | 61 | 5 | 45 | 0 | 41 | 29 | 0 | 734 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 6 | Park Street and Driveway E | 48 | 7 | 489 | 17 | 2 | 126 | 689 |

| ID | Intersection Name | Southbound | | Eastbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Left | Right | Left | Right | |
| 7 | Driveway E and RS6/RS7 | 5 | 14 | 41 | 14 | 74 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 8 | Park Street and East Street | 8 | 30 | 10 | 486 | 99 | 3 | 636 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 9 | East Street and Driveway F | 0 | 13 | 7 | 0 | 38 | 20 | 78 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 10 | Center Street and East Street | 6 | 14 | 5 | 29 | 39 | 2 | 95 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 11 | Main Street and East Street | 14 | 39 | 11 | 5 | 29 | 61 | 159 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 12 | Driveway G and Park Street | 6 | 51 | 18 | 499 | 172 | 2 | 748 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 13 | Dwy H/Dwl and Center Street | 34 | 0 | 6 | 20 | 0 | 33 | 27 | 14 | 12 | 2 | 14 | 19 | 181 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 14 | West Street/Dwy J and Park Street | 1 | 0 | 0 | 0 | 0 | 129 | 57 | 517 | 2 | 0 | 222 | 0 | 928 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 15 | West Street and Dwy K/Center Street | 0 | 27 | 27 | 14 | 47 | 21 | 0 | 12 | 49 | 33 | 8 | 40 | 278 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 16 | West Street/Dwy L | 41 | 27 | 51 | 35 | 47 | 23 | 224 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Main Street and West Street | 64 | 0 | 0 | 0 | 0 | 72 | 331 | 16 | 86 | 0 | 15 | 60 | 644 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | North loop Road/West Street and Willow Road Tunnel | 60 | 331 | 72 | 0 | 60 | 0 | 523 |

| ID | Intersection Name | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | |
| 19 | Willow Road and Driveway M | 1105 | 31 | 1460 | 33 | 2629 |

| ID | Intersection Name | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | |
| 20 | Willow Road and Driveway N | 1099 | 23 | 1768 | 31 | 2921 |

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro | Scenario 1 Internal Analysis AM
Report File: \...\Internal Site Analysis AM.pdf | 12/6/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 1 | East Loop Road and Driveway A | Final Base | 0 | 16 | 30 | 331 | 56 | 25 | 458 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **16** | **30** | **331** | **56** | **25** | **458** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 2 | East Loop Road and Driveway B | Final Base | 504 | 0 | 55 | 0 | 16 | 85 | 660 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **504** | **0** | **55** | **0** | **16** | **85** | **660** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Thru | Right | Left | Right | |
| 3 | East Loop Road and Adams Court | Final Base | 496 | 6 | 2 | 139 | 0 | 0 | 30 | 8 | 8 | 689 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **496** | **6** | **2** | **139** | **0** | **0** | **30** | **8** | **8** | **689** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 4 | East Loop Road and Driveway C | Final Base | 234 | 501 | 112 | 5 | 1 | 51 | 904 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **234** | **501** | **112** | **5** | **1** | **51** | **904** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 5 | Main Street and Park Street/Driveway D | Final Base | 0 | 276 | 217 | 0 | 60 | 61 | 5 | 45 | 0 | 41 | 29 | 0 | 734 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **276** | **217** | **0** | **60** | **61** | **5** | **45** | **0** | **41** | **29** | **0** | **734** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 6 | Park Street and Driveway E | Final Base | 48 | 7 | 489 | 17 | 2 | 126 | 689 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **48** | **7** | **489** | **17** | **2** | **126** | **689** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Right | |
| 7 | Driveway E and RS6/RS7 | Final Base | 5 | 14 | 41 | 14 | 74 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **5** | **14** | **41** | **14** | **74** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 8 | Park Street and East Street | Final Base | 8 | 30 | 10 | 486 | 99 | 3 | 636 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **8** | **30** | **10** | **486** | **99** | **3** | **636** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 9 | East Street and Driveway F | Final Base | 0 | 13 | 7 | 0 | 38 | 20 | 78 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **13** | **7** | **0** | **38** | **20** | **78** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 10 | Center Street and East Street | Final Base | 6 | 14 | 5 | 29 | 39 | 2 | 95 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **14** | **5** | **29** | **39** | **2** | **95** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 11 | Main Street and East Street | Final Base | 14 | 39 | 11 | 5 | 29 | 61 | 159 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **14** | **39** | **11** | **5** | **29** | **61** | **159** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 12 | Driveway G and Park Street | Final Base | 6 | 51 | 18 | 499 | 172 | 2 | 748 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **6** | **51** | **18** | **499** | **172** | **2** | **748** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 13 | Dwy H/Dwl and Center Street | Final Base | 34 | 0 | 6 | 20 | 0 | 33 | 27 | 14 | 12 | 2 | 14 | 19 | 181 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **34** | **0** | **6** | **20** | **0** | **33** | **27** | **14** | **12** | **2** | **14** | **19** | **181** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 14 | West Street/Dwy J and Park Street | Final Base | 1 | 0 | 0 | 0 | 0 | 129 | 57 | 517 | 2 | 0 | 222 | 0 | 928 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1** | **0** | **0** | **0** | **0** | **129** | **57** | **517** | **2** | **0** | **222** | **0** | **928** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 15 | West Street and Dwy K/Center Street | Final Base | 0 | 27 | 27 | 14 | 47 | 21 | 0 | 12 | 49 | 33 | 8 | 40 | 278 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **27** | **27** | **14** | **47** | **21** | **0** | **12** | **49** | **33** | **8** | **40** | **278** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 16 | West Street/Dwy L | Final Base | 41 | 27 | 51 | 35 | 47 | 23 | 224 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **41** | **27** | **51** | **35** | **47** | **23** | **224** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Main Street and West Street | Final Base | 64 | 0 | 0 | 0 | 0 | 72 | 331 | 16 | 86 | 0 | 15 | 60 | 644 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **64** | **0** | **0** | **0** | **0** | **72** | **331** | **16** | **86** | **0** | **15** | **60** | **644** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | North loop Road/West Street and Willow Road Tunnel | Final Base | 60 | 331 | 72 | 0 | 60 | 0 | 523 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **60** | **331** | **72** | **0** | **60** | **0** | **523** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | |
| 19 | Willow Road and Driveway M | Final Base | 1105 | 31 | 1460 | 33 | 2629 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1105** | **31** | **1460** | **33** | **2629** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | |
| 20 | Willow Road and Driveway N | Final Base | 1099 | 23 | 1768 | 31 | 2921 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1099** | **23** | **1768** | **31** | **2921** |

# Signal Warrants Report For Intersection 1: East Loop Road and Driveway A

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 361 | 16 | 81 |
| 2 | 350 | 16 | 79 |
| 3 | 343 | 15 | 77 |
| 4 | 321 | 14 | 72 |
| 5 | 285 | 13 | 64 |
| 6 | 282 | 12 | 63 |
| 7 | 278 | 12 | 62 |
| 8 | 253 | 11 | 57 |
| 9 | 249 | 11 | 56 |
| 10 | 245 | 11 | 55 |
| 11 | 213 | 9 | 48 |
| 12 | 199 | 9 | 45 |
| 13 | 195 | 9 | 44 |
| 14 | 144 | 6 | 32 |
| 15 | 144 | 6 | 32 |
| 16 | 101 | 4 | 23 |
| 17 | 58 | 3 | 13 |
| 18 | 58 | 3 | 13 |
| 19 | 32 | 1 | 7 |
| 20 | 18 | 1 | 4 |
| 21 | 11 | 0 | 2 |
| 22 | 4 | 0 | 1 |
| 23 | 4 | 0 | 1 |
| 24 | 4 | 0 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 377 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 366 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 358 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 335 | 1 | 72 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 298 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 294 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 290 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 264 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 260 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 256 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 222 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 208 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 204 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 150 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 150 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 105 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 61 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 61 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 33 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 19 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 11 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 4 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:13 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 81 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 458 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 2: East Loop Road and Driveway B

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 55 | 504 | 101 |
| 2 | 53 | 489 | 98 |
| 3 | 52 | 479 | 96 |
| 4 | 49 | 449 | 90 |
| 5 | 43 | 398 | 80 |
| 6 | 43 | 393 | 79 |
| 7 | 42 | 388 | 78 |
| 8 | 39 | 353 | 71 |
| 9 | 38 | 348 | 70 |
| 10 | 37 | 343 | 69 |
| 11 | 32 | 297 | 60 |
| 12 | 30 | 277 | 56 |
| 13 | 30 | 272 | 55 |
| 14 | 22 | 202 | 40 |
| 15 | 22 | 202 | 40 |
| 16 | 15 | 141 | 28 |
| 17 | 9 | 81 | 16 |
| 18 | 9 | 81 | 16 |
| 19 | 5 | 45 | 9 |
| 20 | 3 | 25 | 5 |
| 21 | 2 | 15 | 3 |
| 22 | 1 | 5 | 1 |
| 23 | 1 | 5 | 1 |
| 24 | 1 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 559 | 1 | 101 | No | No | No | Yes | No | No | No | Yes | No | No |
| 2 | 2 | 542 | 1 | 98 | No | No | No | Yes | No | No | No | Yes | No | No |
| 3 | 2 | 531 | 1 | 96 | No | No | No | Yes | No | No | No | Yes | No | No |
| 4 | 2 | 498 | 1 | 90 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 2 | 441 | 1 | 80 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 436 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 430 | 1 | 78 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 392 | 1 | 71 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 386 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 380 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 329 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 307 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 302 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 224 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 224 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 156 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 90 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 90 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 50 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 28 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 17 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:22 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 101 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 660 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 4: East Loop Road and Driveway C

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 117 | 735 | 52 |
| 2 | 113 | 713 | 50 |
| 3 | 111 | 698 | 49 |
| 4 | 104 | 654 | 46 |
| 5 | 92 | 581 | 41 |
| 6 | 91 | 573 | 41 |
| 7 | 90 | 566 | 40 |
| 8 | 82 | 515 | 36 |
| 9 | 81 | 507 | 36 |
| 10 | 80 | 500 | 35 |
| 11 | 69 | 434 | 31 |
| 12 | 64 | 404 | 29 |
| 13 | 63 | 397 | 28 |
| 14 | 47 | 294 | 21 |
| 15 | 47 | 294 | 21 |
| 16 | 33 | 206 | 15 |
| 17 | 19 | 118 | 8 |
| 18 | 19 | 118 | 8 |
| 19 | 11 | 66 | 5 |
| 20 | 6 | 37 | 3 |
| 21 | 4 | 22 | 2 |
| 22 | 1 | 7 | 1 |
| 23 | 1 | 7 | 1 |
| 24 | 1 | 7 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 852 | 1 | 52 | No | No | No | No | No | No | Yes | Yes | No | No |
| 2 | 2 | 826 | 1 | 50 | No | No | No | No | No | No | No | Yes | No | No |
| 3 | 2 | 809 | 1 | 49 | No | No | No | No | No | No | No | Yes | No | No |
| 4 | 2 | 758 | 1 | 46 | No | No | No | No | No | No | No | Yes | No | No |
| 5 | 2 | 673 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 664 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 656 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 597 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 588 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 580 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 503 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 468 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 460 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 341 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 341 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 239 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 137 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 137 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 77 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 43 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 26 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 8 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:07 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 52 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 904 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 6: Park Street and Driveway E

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | S |
| 1 | 128 | 506 | 55 |
| 2 | 124 | 491 | 53 |
| 3 | 122 | 481 | 52 |
| 4 | 114 | 450 | 49 |
| 5 | 101 | 400 | 43 |
| 6 | 100 | 395 | 43 |
| 7 | 99 | 390 | 42 |
| 8 | 90 | 354 | 39 |
| 9 | 88 | 349 | 38 |
| 10 | 87 | 344 | 37 |
| 11 | 76 | 299 | 32 |
| 12 | 70 | 278 | 30 |
| 13 | 69 | 273 | 30 |
| 14 | 51 | 202 | 22 |
| 15 | 51 | 202 | 22 |
| 16 | 36 | 142 | 15 |
| 17 | 20 | 81 | 9 |
| 18 | 20 | 81 | 9 |
| 19 | 12 | 46 | 5 |
| 20 | 6 | 25 | 3 |
| 21 | 4 | 15 | 2 |
| 22 | 1 | 5 | 1 |
| 23 | 1 | 5 | 1 |
| 24 | 1 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 634 | 1 | 55 | No | No | No | No | No | No | Yes | Yes | No | No |
| 2 | 2 | 615 | 1 | 53 | No | No | No | No | No | No | No | Yes | No | No |
| 3 | 2 | 603 | 1 | 52 | No | No | No | No | No | No | No | Yes | No | No |
| 4 | 2 | 564 | 1 | 49 | No | No | No | No | No | No | No | Yes | No | No |
| 5 | 2 | 501 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 495 | 1 | 43 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 489 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 444 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 437 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 431 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 375 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 348 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 342 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 253 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 253 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 178 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 101 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 101 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 58 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 31 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 19 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 6 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | S |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.5 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:12 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 55 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 689 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 7: Driveway E and RS6/RS7

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | N | W |
| 1 | 14 | 19 | 41 |
| 2 | 14 | 18 | 40 |
| 3 | 13 | 18 | 39 |
| 4 | 12 | 17 | 36 |
| 5 | 11 | 15 | 32 |
| 6 | 11 | 15 | 32 |
| 7 | 11 | 15 | 32 |
| 8 | 10 | 13 | 29 |
| 9 | 10 | 13 | 28 |
| 10 | 10 | 13 | 28 |
| 11 | 8 | 11 | 24 |
| 12 | 8 | 10 | 23 |
| 13 | 8 | 10 | 22 |
| 14 | 6 | 8 | 16 |
| 15 | 6 | 8 | 16 |
| 16 | 4 | 5 | 11 |
| 17 | 2 | 3 | 7 |
| 18 | 2 | 3 | 7 |
| 19 | 1 | 2 | 4 |
| 20 | 1 | 1 | 2 |
| 21 | 0 | 1 | 1 |
| 22 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 33 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 32 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 31 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 29 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 26 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 26 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 26 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 23 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 23 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 23 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 19 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 18 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 18 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 14 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 14 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 9 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 5 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 5 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 3 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 2 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:06 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 41 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 74 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 8: Park Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 102 | 496 | 38 |
| 2 | 99 | 481 | 37 |
| 3 | 97 | 471 | 36 |
| 4 | 91 | 441 | 34 |
| 5 | 81 | 392 | 30 |
| 6 | 80 | 387 | 30 |
| 7 | 79 | 382 | 29 |
| 8 | 71 | 347 | 27 |
| 9 | 70 | 342 | 26 |
| 10 | 69 | 337 | 26 |
| 11 | 60 | 293 | 22 |
| 12 | 56 | 273 | 21 |
| 13 | 55 | 268 | 21 |
| 14 | 41 | 198 | 15 |
| 15 | 41 | 198 | 15 |
| 16 | 29 | 139 | 11 |
| 17 | 16 | 79 | 6 |
| 18 | 16 | 79 | 6 |
| 19 | 9 | 45 | 3 |
| 20 | 5 | 25 | 2 |
| 21 | 3 | 15 | 1 |
| 22 | 1 | 5 | 0 |
| 23 | 1 | 5 | 0 |
| 24 | 1 | 5 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 598 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 580 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 568 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 532 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 473 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 467 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 461 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 418 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 412 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 406 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 353 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 329 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 323 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 239 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 239 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 168 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 95 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 95 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 54 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 30 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 18 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 6 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 6 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 6 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 7.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:05 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 38 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 636 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 9: East Street and Driveway F

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 7 | 13 | 58 |
| 2 | 7 | 13 | 56 |
| 3 | 7 | 12 | 55 |
| 4 | 6 | 12 | 52 |
| 5 | 6 | 10 | 46 |
| 6 | 5 | 10 | 45 |
| 7 | 5 | 10 | 45 |
| 8 | 5 | 9 | 41 |
| 9 | 5 | 9 | 40 |
| 10 | 5 | 9 | 39 |
| 11 | 4 | 8 | 34 |
| 12 | 4 | 7 | 32 |
| 13 | 4 | 7 | 31 |
| 14 | 3 | 5 | 23 |
| 15 | 3 | 5 | 23 |
| 16 | 2 | 4 | 16 |
| 17 | 1 | 2 | 9 |
| 18 | 1 | 2 | 9 |
| 19 | 1 | 1 | 5 |
| 20 | 0 | 1 | 3 |
| 21 | 0 | 0 | 2 |
| 22 | 0 | 0 | 1 |
| 23 | 0 | 0 | 1 |
| 24 | 0 | 0 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 20 | 1 | 58 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 20 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 19 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 18 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 16 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 15 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 15 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 14 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 14 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 14 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 12 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 11 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 11 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 8 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 8 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 6 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 3 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 3 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 2 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 1 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 0 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 0 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 0 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 0 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 58 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 78 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 10: Center Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | W, S |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | W | S | N |
| 1 | 41 | 20 | 34 |
| 2 | 40 | 19 | 33 |
| 3 | 39 | 19 | 32 |
| 4 | 36 | 18 | 30 |
| 5 | 32 | 16 | 27 |
| 6 | 32 | 16 | 27 |
| 7 | 32 | 15 | 26 |
| 8 | 29 | 14 | 24 |
| 9 | 28 | 14 | 23 |
| 10 | 28 | 14 | 23 |
| 11 | 24 | 12 | 20 |
| 12 | 23 | 11 | 19 |
| 13 | 22 | 11 | 18 |
| 14 | 16 | 8 | 14 |
| 15 | 16 | 8 | 14 |
| 16 | 11 | 6 | 10 |
| 17 | 7 | 3 | 5 |
| 18 | 7 | 3 | 5 |
| 19 | 4 | 2 | 3 |
| 20 | 2 | 1 | 2 |
| 21 | 1 | 1 | 1 |
| 22 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 61 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 59 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 58 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 54 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 48 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 48 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 47 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 43 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 42 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 42 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 36 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 34 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 33 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 24 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 24 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 17 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 10 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 10 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 6 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 3 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:04 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 34 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 95 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 11: Main Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | S |
| 1 | 90 | 16 | 53 |
| 2 | 87 | 16 | 51 |
| 3 | 86 | 15 | 50 |
| 4 | 80 | 14 | 47 |
| 5 | 71 | 13 | 42 |
| 6 | 70 | 12 | 41 |
| 7 | 69 | 12 | 41 |
| 8 | 63 | 11 | 37 |
| 9 | 62 | 11 | 37 |
| 10 | 61 | 11 | 36 |
| 11 | 53 | 9 | 31 |
| 12 | 50 | 9 | 29 |
| 13 | 49 | 9 | 29 |
| 14 | 36 | 6 | 21 |
| 15 | 36 | 6 | 21 |
| 16 | 25 | 4 | 15 |
| 17 | 14 | 3 | 8 |
| 18 | 14 | 3 | 8 |
| 19 | 8 | 1 | 5 |
| 20 | 5 | 1 | 3 |
| 21 | 3 | 0 | 2 |
| 22 | 1 | 0 | 1 |
| 23 | 1 | 0 | 1 |
| 24 | 1 | 0 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 106 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 103 | 1 | 51 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 101 | 1 | 50 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 94 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 84 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 82 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 81 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 74 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 73 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 72 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 62 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 59 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 58 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 42 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 42 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 29 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 17 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 17 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 9 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 6 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 3 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | S |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:07 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 53 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 159 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 12: Driveway G and Park Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 174 | 517 | 57 |
| 2 | 169 | 501 | 55 |
| 3 | 165 | 491 | 54 |
| 4 | 155 | 460 | 51 |
| 5 | 137 | 408 | 45 |
| 6 | 136 | 403 | 44 |
| 7 | 134 | 398 | 44 |
| 8 | 122 | 362 | 40 |
| 9 | 120 | 357 | 39 |
| 10 | 118 | 352 | 39 |
| 11 | 103 | 305 | 34 |
| 12 | 96 | 284 | 31 |
| 13 | 94 | 279 | 31 |
| 14 | 70 | 207 | 23 |
| 15 | 70 | 207 | 23 |
| 16 | 49 | 145 | 16 |
| 17 | 28 | 83 | 9 |
| 18 | 28 | 83 | 9 |
| 19 | 16 | 47 | 5 |
| 20 | 9 | 26 | 3 |
| 21 | 5 | 16 | 2 |
| 22 | 2 | 5 | 1 |
| 23 | 2 | 5 | 1 |
| 24 | 2 | 5 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 691 | 1 | 57 | No | No | No | No | No | No | Yes | Yes | No | No |
| 2 | 2 | 670 | 1 | 55 | No | No | No | No | No | No | Yes | Yes | No | No |
| 3 | 2 | 656 | 1 | 54 | No | No | No | No | No | No | Yes | Yes | No | No |
| 4 | 2 | 615 | 1 | 51 | No | No | No | No | No | No | No | Yes | No | No |
| 5 | 2 | 545 | 1 | 45 | No | No | No | No | No | No | No | Yes | No | No |
| 6 | 2 | 539 | 1 | 44 | No | No | No | No | No | No | No | Yes | No | No |
| 7 | 2 | 532 | 1 | 44 | No | No | No | No | No | No | No | Yes | No | No |
| 8 | 2 | 484 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 477 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 470 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 408 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 380 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 373 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 277 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 277 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 194 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 111 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 111 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 63 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 35 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 21 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 7 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 57 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 748 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 13: Dwy H/Dwl and Center Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N, S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | E | W | N | S |
| 1 | 35 | 53 | 53 | 40 |
| 2 | 34 | 51 | 51 | 39 |
| 3 | 33 | 50 | 50 | 38 |
| 4 | 31 | 47 | 47 | 36 |
| 5 | 28 | 42 | 42 | 32 |
| 6 | 27 | 41 | 41 | 31 |
| 7 | 27 | 41 | 41 | 31 |
| 8 | 25 | 37 | 37 | 28 |
| 9 | 24 | 37 | 37 | 28 |
| 10 | 24 | 36 | 36 | 27 |
| 11 | 21 | 31 | 31 | 24 |
| 12 | 19 | 29 | 29 | 22 |
| 13 | 19 | 29 | 29 | 22 |
| 14 | 14 | 21 | 21 | 16 |
| 15 | 14 | 21 | 21 | 16 |
| 16 | 10 | 15 | 15 | 11 |
| 17 | 6 | 8 | 8 | 6 |
| 18 | 6 | 8 | 8 | 6 |
| 19 | 3 | 5 | 5 | 4 |
| 20 | 2 | 3 | 3 | 2 |
| 21 | 1 | 2 | 2 | 1 |
| 22 | 0 | 1 | 1 | 0 |
| 23 | 0 | 1 | 1 | 0 |
| 24 | 0 | 1 | 1 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 88 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 85 | 1 | 51 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 83 | 1 | 50 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 78 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 70 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 68 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 68 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 62 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 61 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 60 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 52 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 48 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 48 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 35 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 35 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 25 | 1 | 15 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 14 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 14 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 8 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 5 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 3 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N | S |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.9 | 9.5 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:07 | 0:06 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 53 | 40 |
| High Minor Volume Condition Met | No | No |
| Total Entering Volume on All Approaches During Same Hour | 181 | 181 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 15: West Street and Dwy K/Center Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | N | S | E | W |
| 1 | 82 | 54 | 81 | 61 |
| 2 | 80 | 52 | 79 | 59 |
| 3 | 78 | 51 | 77 | 58 |
| 4 | 73 | 48 | 72 | 54 |
| 5 | 65 | 43 | 64 | 48 |
| 6 | 64 | 42 | 63 | 48 |
| 7 | 63 | 42 | 62 | 47 |
| 8 | 57 | 38 | 57 | 43 |
| 9 | 57 | 37 | 56 | 42 |
| 10 | 56 | 37 | 55 | 41 |
| 11 | 48 | 32 | 48 | 36 |
| 12 | 45 | 30 | 45 | 34 |
| 13 | 44 | 29 | 44 | 33 |
| 14 | 33 | 22 | 32 | 24 |
| 15 | 33 | 22 | 32 | 24 |
| 16 | 23 | 15 | 23 | 17 |
| 17 | 13 | 9 | 13 | 10 |
| 18 | 13 | 9 | 13 | 10 |
| 19 | 7 | 5 | 7 | 5 |
| 20 | 4 | 3 | 4 | 3 |
| 21 | 2 | 2 | 2 | 2 |
| 22 | 1 | 1 | 1 | 1 |
| 23 | 1 | 1 | 1 | 1 |
| 24 | 1 | 1 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 136 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 132 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 129 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 121 | 1 | 72 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 108 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 106 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 105 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 95 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 94 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 93 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 80 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 75 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 73 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 55 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 55 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 38 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 22 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 22 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 12 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 7 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 7.5 | 7.1 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:10 | 0:07 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 81 | 61 |
| High Minor Volume Condition Met | No | No |
| Total Entering Volume on All Approaches During Same Hour | 278 | 278 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 16: West Street/Dwy L

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 86 | 68 | 70 |
| 2 | 83 | 66 | 68 |
| 3 | 82 | 65 | 67 |
| 4 | 77 | 61 | 62 |
| 5 | 68 | 54 | 55 |
| 6 | 67 | 53 | 55 |
| 7 | 66 | 52 | 54 |
| 8 | 60 | 48 | 49 |
| 9 | 59 | 47 | 48 |
| 10 | 58 | 46 | 48 |
| 11 | 51 | 40 | 41 |
| 12 | 47 | 37 | 39 |
| 13 | 46 | 37 | 38 |
| 14 | 34 | 27 | 28 |
| 15 | 34 | 27 | 28 |
| 16 | 24 | 19 | 20 |
| 17 | 14 | 11 | 11 |
| 18 | 14 | 11 | 11 |
| 19 | 8 | 6 | 6 |
| 20 | 4 | 3 | 4 |
| 21 | 3 | 2 | 2 |
| 22 | 1 | 1 | 1 |
| 23 | 1 | 1 | 1 |
| 24 | 1 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 154 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 149 | 1 | 68 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 147 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 138 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 122 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 120 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 118 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 108 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 106 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 104 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 91 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 84 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 83 | 1 | 38 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 61 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 61 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 43 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 25 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 25 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 14 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 7 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 5 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:11 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 70 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 224 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 18: North loop Road/West Street and Willow Road Tunnel

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 72 | 391 | 60 |
| 2 | 70 | 379 | 58 |
| 3 | 68 | 371 | 57 |
| 4 | 64 | 348 | 53 |
| 5 | 57 | 309 | 47 |
| 6 | 56 | 305 | 47 |
| 7 | 55 | 301 | 46 |
| 8 | 50 | 274 | 42 |
| 9 | 50 | 270 | 41 |
| 10 | 49 | 266 | 41 |
| 11 | 42 | 231 | 35 |
| 12 | 40 | 215 | 33 |
| 13 | 39 | 211 | 32 |
| 14 | 29 | 156 | 24 |
| 15 | 29 | 156 | 24 |
| 16 | 20 | 109 | 17 |
| 17 | 12 | 63 | 10 |
| 18 | 12 | 63 | 10 |
| 19 | 6 | 35 | 5 |
| 20 | 4 | 20 | 3 |
| 21 | 2 | 12 | 2 |
| 22 | 1 | 4 | 1 |
| 23 | 1 | 4 | 1 |
| 24 | 1 | 4 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 463 | 1 | 60 | No | No | No | No | No | No | No | Yes | No | No |
| 2 | 1 | 449 | 1 | 58 | No | No | No | No | No | No | No | Yes | No | No |
| 3 | 1 | 439 | 1 | 57 | No | No | No | No | No | No | No | Yes | No | No |
| 4 | 1 | 412 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 366 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 361 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 356 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 324 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 320 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 315 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 273 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 255 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 250 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 185 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 185 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 129 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 75 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 75 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 41 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 24 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 14 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 60 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 523 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 19: Willow Road and Driveway M

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 1460 | 1136 | 33 |
| 2 | 1416 | 1102 | 32 |
| 3 | 1387 | 1079 | 31 |
| 4 | 1299 | 1011 | 29 |
| 5 | 1153 | 897 | 26 |
| 6 | 1139 | 886 | 26 |
| 7 | 1124 | 875 | 25 |
| 8 | 1022 | 795 | 23 |
| 9 | 1007 | 784 | 23 |
| 10 | 993 | 772 | 22 |
| 11 | 861 | 670 | 19 |
| 12 | 803 | 625 | 18 |
| 13 | 788 | 613 | 18 |
| 14 | 584 | 454 | 13 |
| 15 | 584 | 454 | 13 |
| 16 | 409 | 318 | 9 |
| 17 | 234 | 182 | 5 |
| 18 | 234 | 182 | 5 |
| 19 | 131 | 102 | 3 |
| 20 | 73 | 57 | 2 |
| 21 | 44 | 34 | 1 |
| 22 | 15 | 11 | 0 |
| 23 | 15 | 11 | 0 |
| 24 | 15 | 11 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 2596 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 2518 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 2466 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 2310 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 2050 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 2025 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 1999 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 1817 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 1791 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 1765 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 1531 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 1428 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 1401 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 1038 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 1038 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 727 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 416 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 416 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 233 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 130 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 78 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 26 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 26 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 26 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.3 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:07 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 33 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 2629 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 20: Willow Road and Driveway N

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 1768 | 1122 | 31 |
| 2 | 1715 | 1088 | 30 |
| 3 | 1680 | 1066 | 29 |
| 4 | 1574 | 999 | 28 |
| 5 | 1397 | 886 | 24 |
| 6 | 1379 | 875 | 24 |
| 7 | 1361 | 864 | 24 |
| 8 | 1238 | 785 | 22 |
| 9 | 1220 | 774 | 21 |
| 10 | 1202 | 763 | 21 |
| 11 | 1043 | 662 | 18 |
| 12 | 972 | 617 | 17 |
| 13 | 955 | 606 | 17 |
| 14 | 707 | 449 | 12 |
| 15 | 707 | 449 | 12 |
| 16 | 495 | 314 | 9 |
| 17 | 283 | 180 | 5 |
| 18 | 283 | 180 | 5 |
| 19 | 159 | 101 | 3 |
| 20 | 88 | 56 | 2 |
| 21 | 53 | 34 | 1 |
| 22 | 18 | 11 | 0 |
| 23 | 18 | 11 | 0 |
| 24 | 18 | 11 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 2890 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 2803 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 2746 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 2573 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 2283 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 2254 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 2225 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 2023 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 1994 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 1965 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 1705 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 1589 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 1561 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 1156 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 1156 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 809 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 463 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 463 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 260 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 144 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 87 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 29 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 29 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 29 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

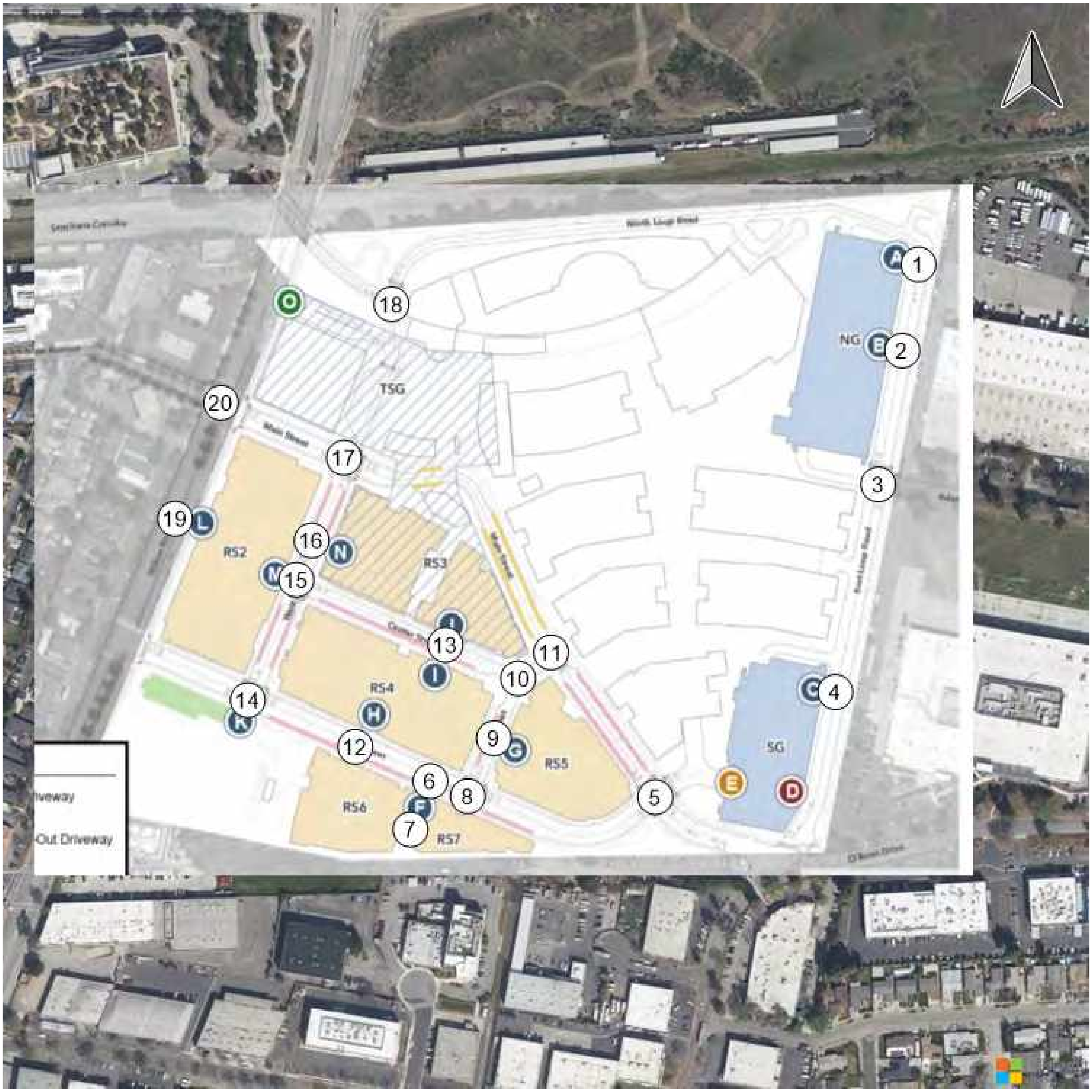
## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.2 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:06 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 31 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 2921 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

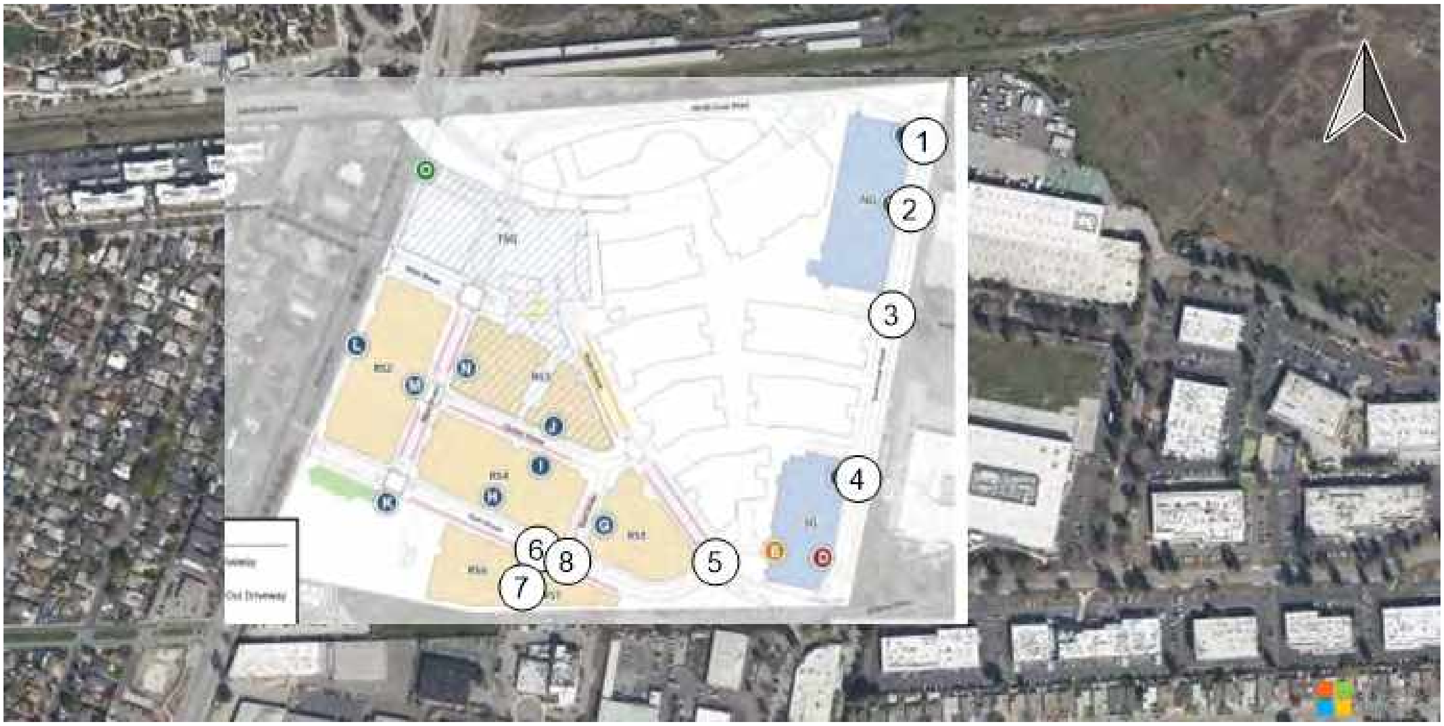
Study Intersections

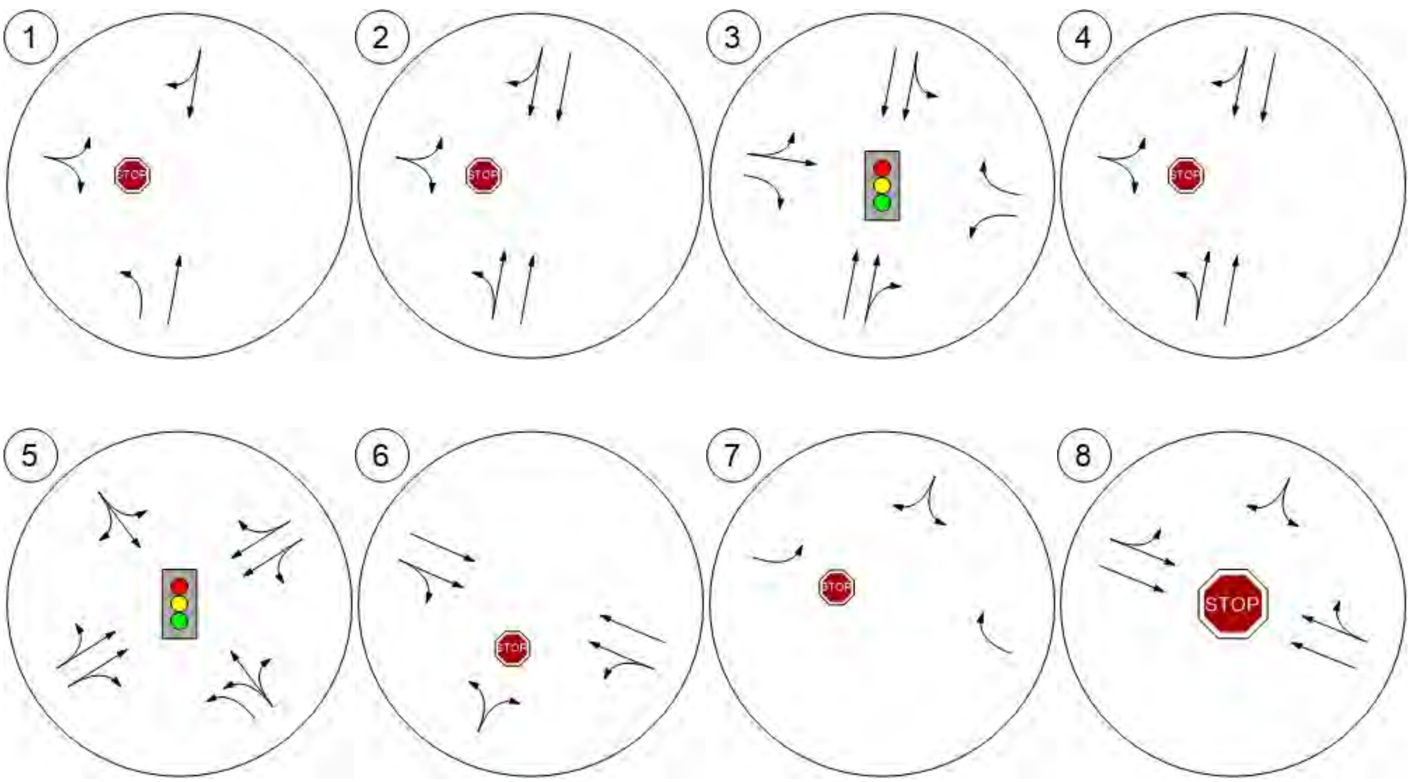


Generated with PTV VISTRO

Version 2021 (SP 0-4)

Lane Configuration and Traffic Control

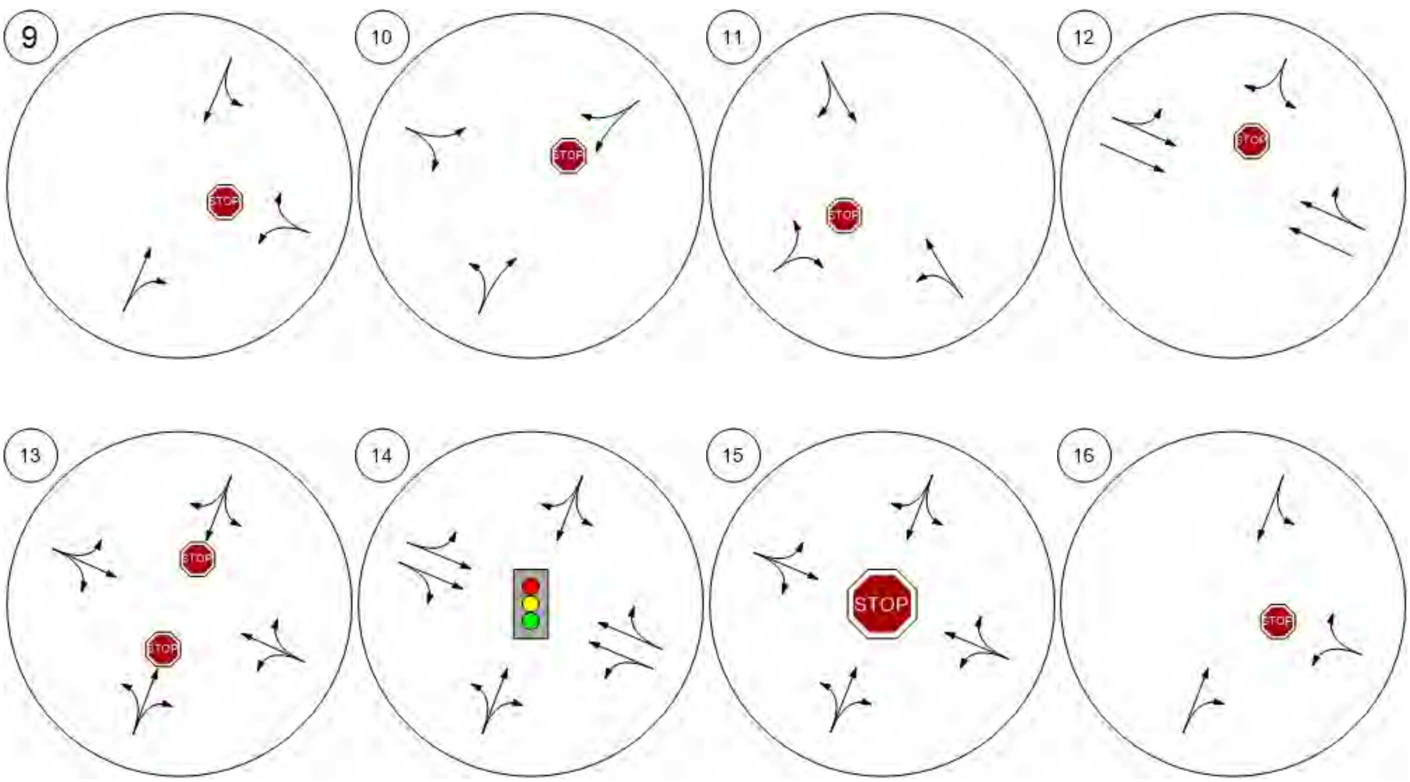


Generated with PTV VISTRO

Version 2021 (SP 0-4)

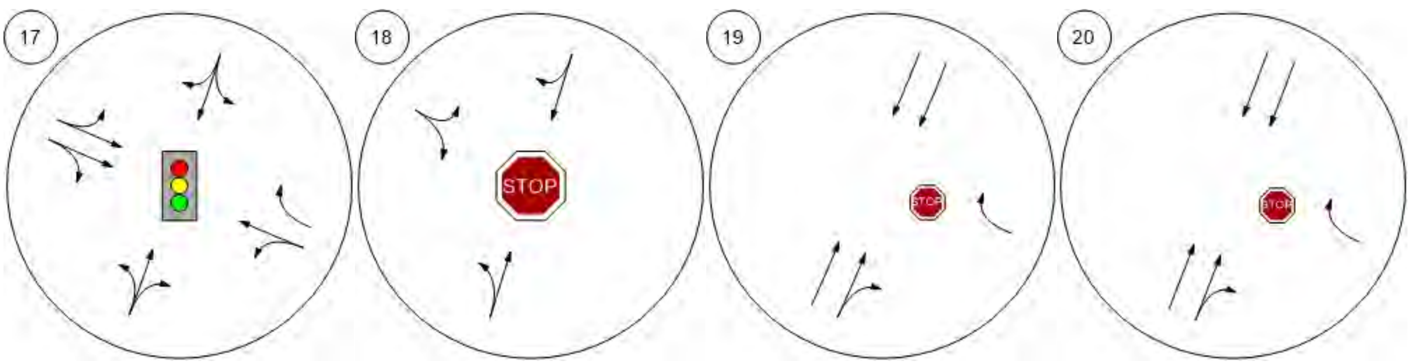
## Lane Configuration and Traffic Control

Generated with PTV VISTRO

Version 2021 (SP 0-4)

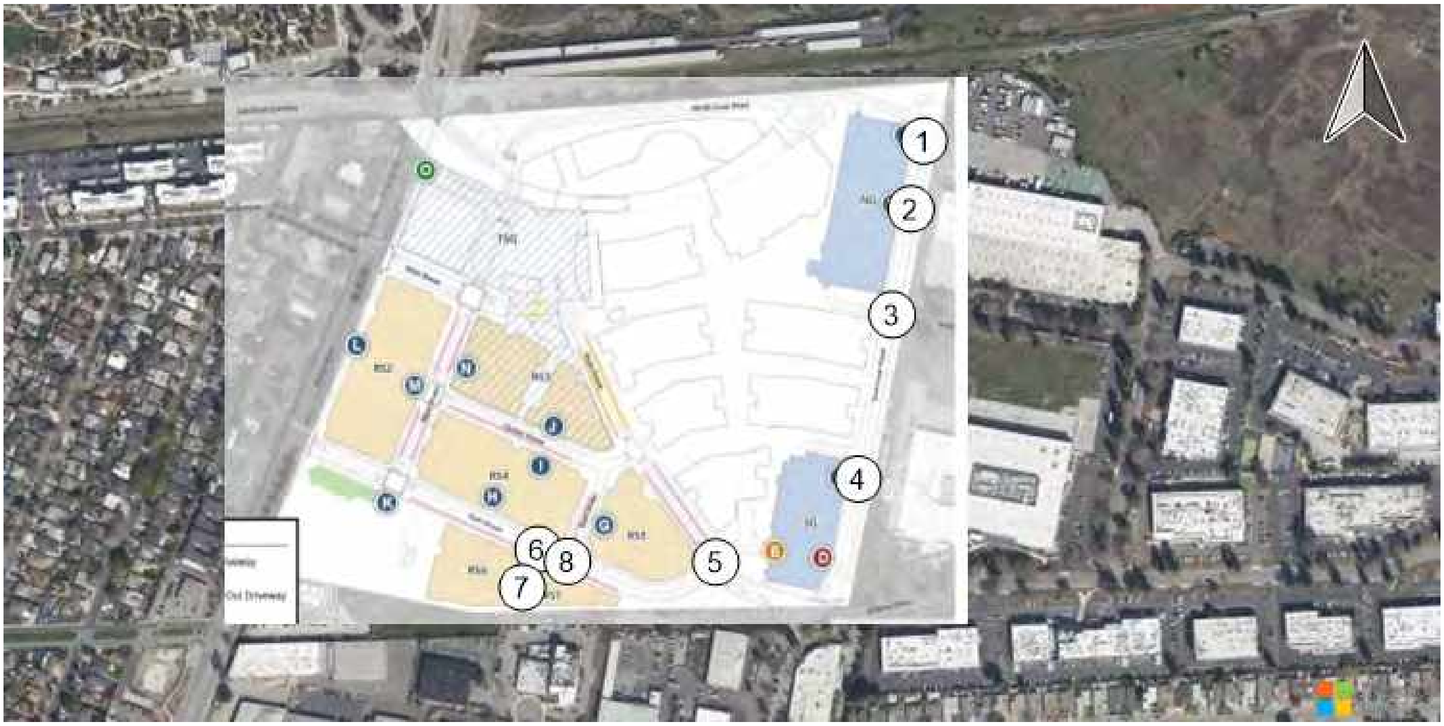
## Lane Configuration and Traffic Control

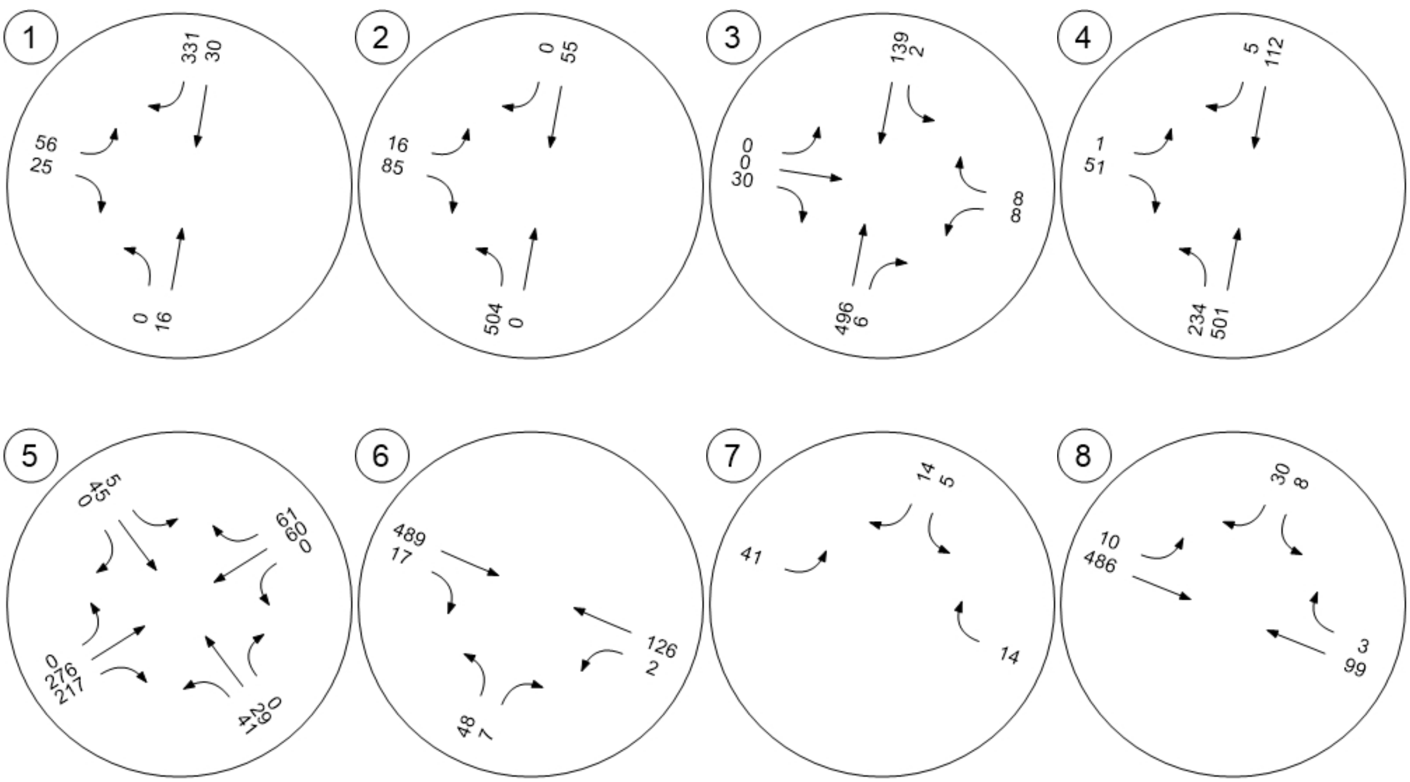



Generated with PTV VISTRO

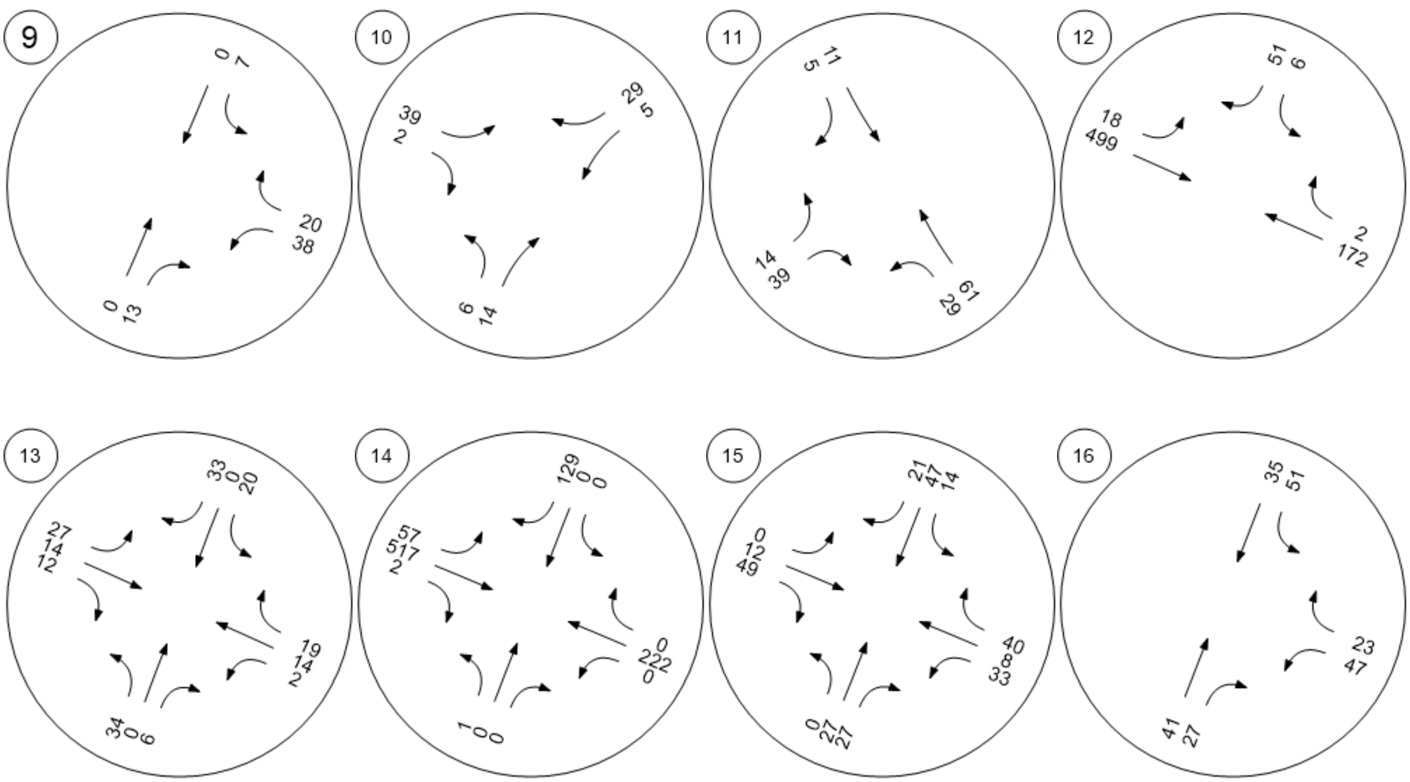
Version 2021 (SP 0-4)

Traffic Volume - Base Volume



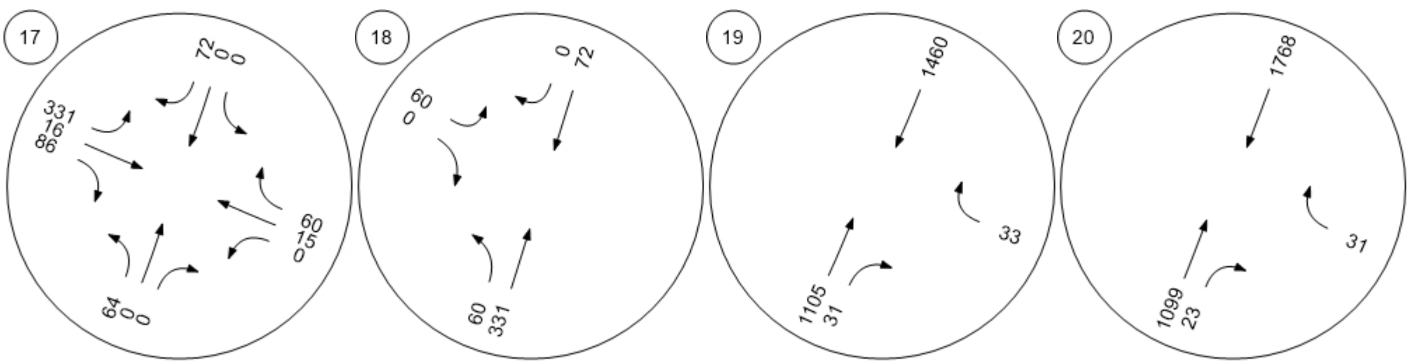
# Traffic Volume - Base Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

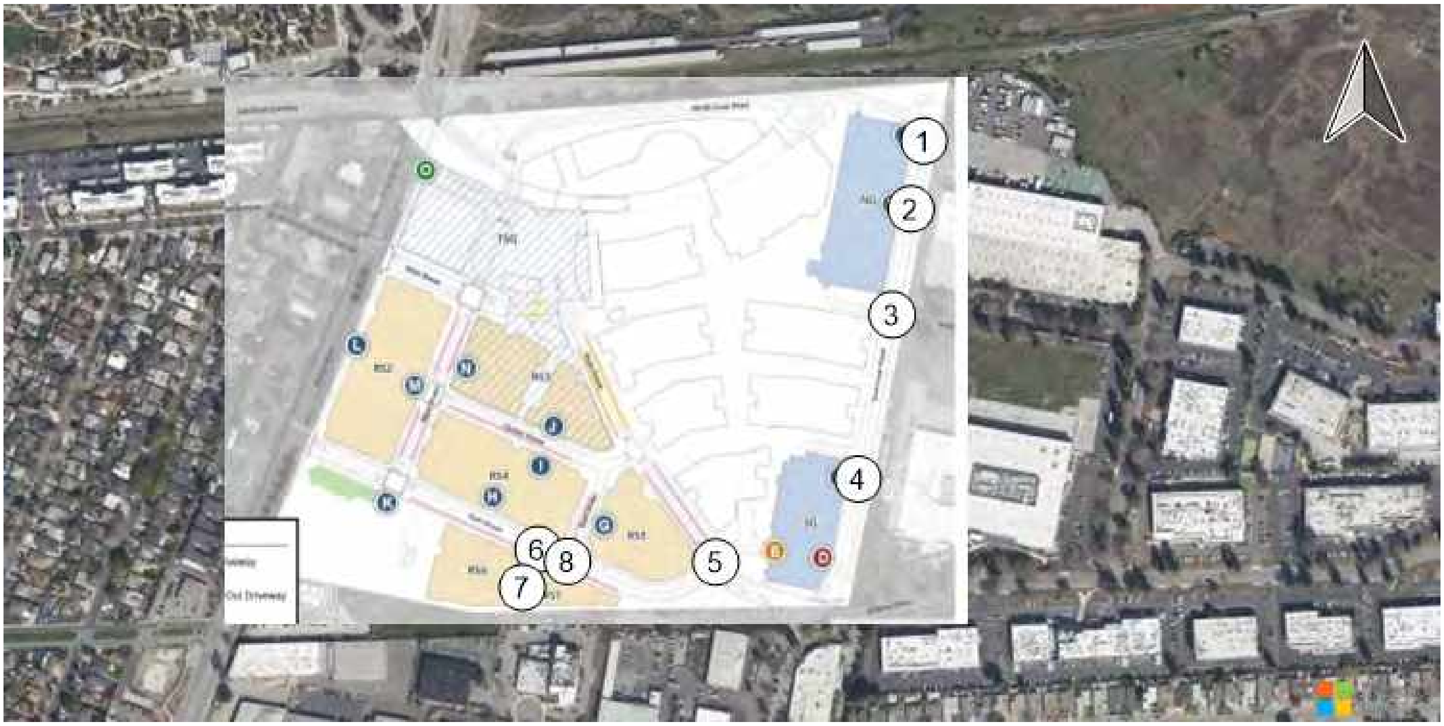
Traffic Volume - Base Volume

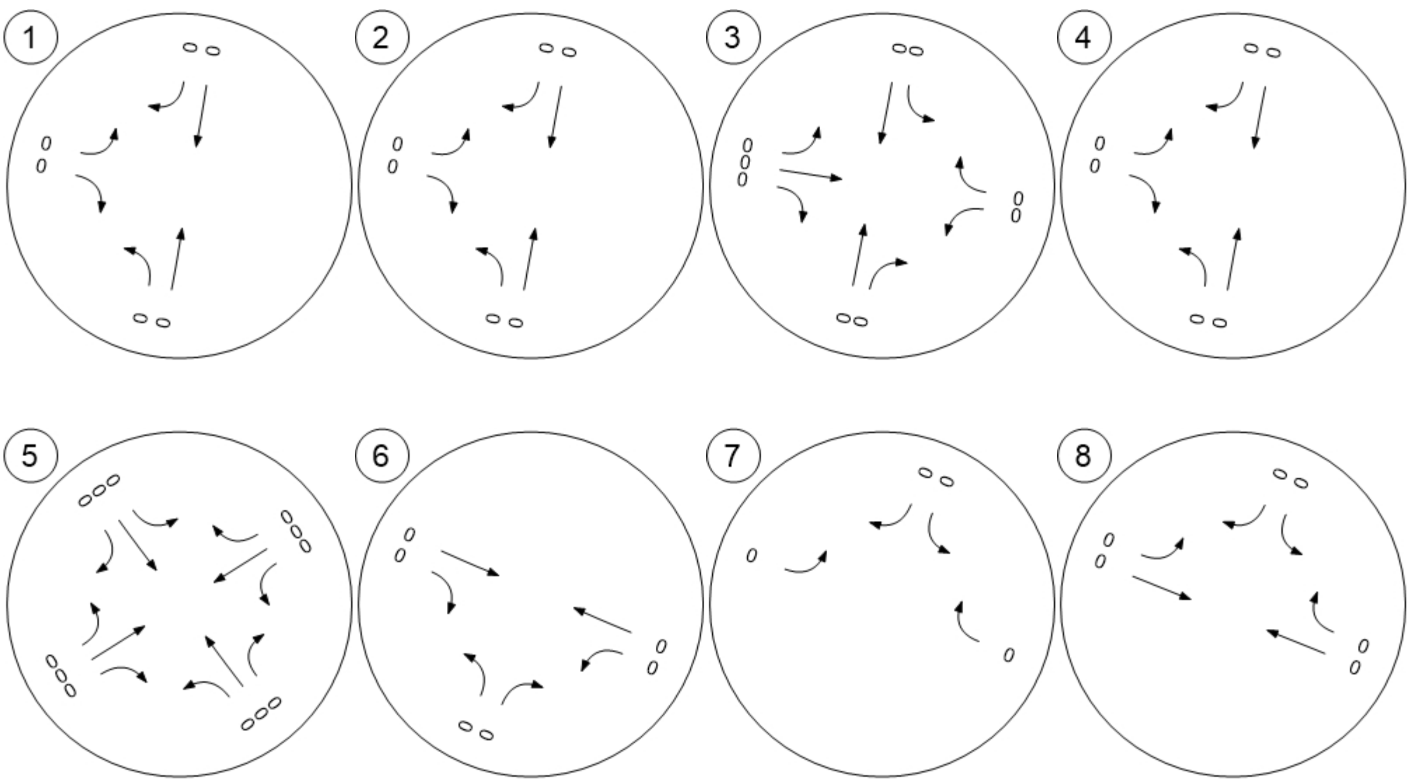



Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Volume - In-Process Volume

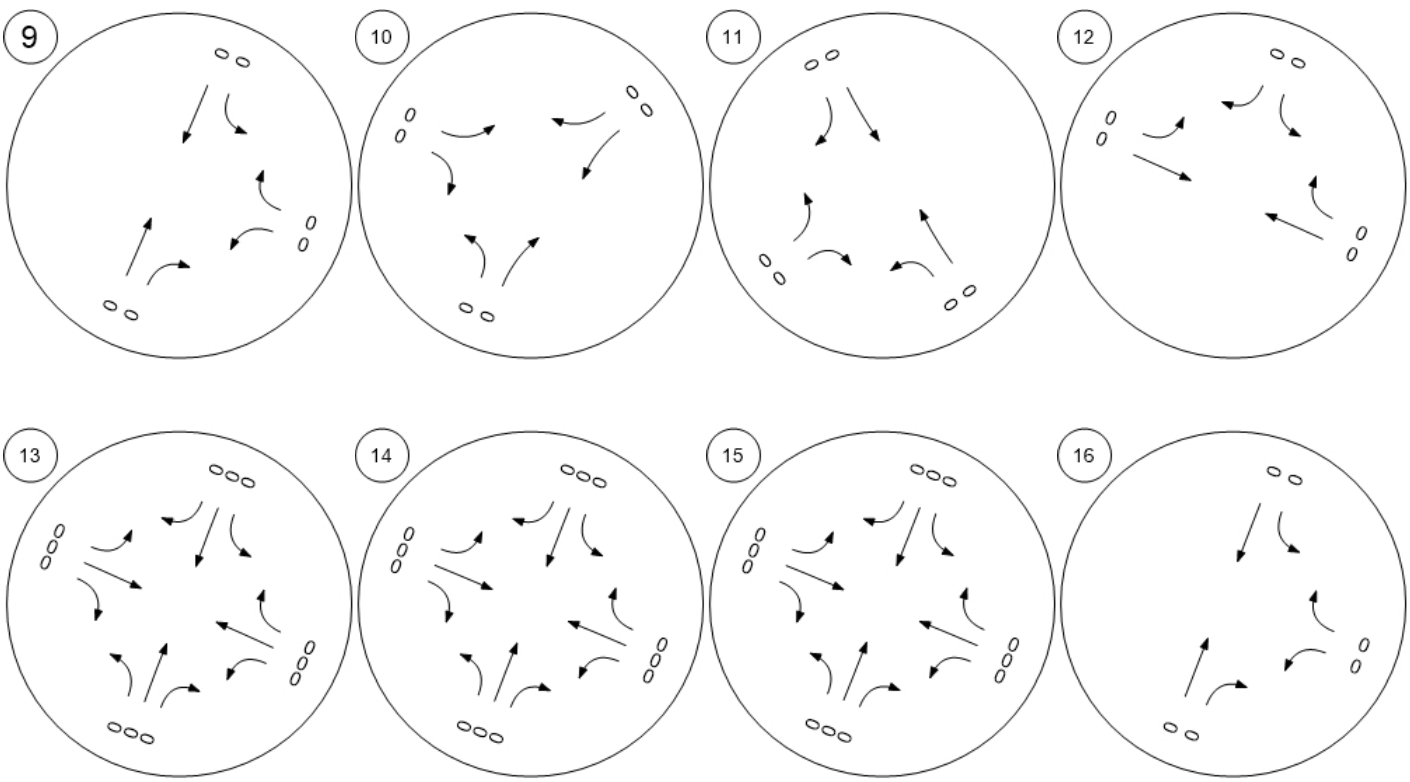


Generated with PTV VISTRO

Version 2021 (SP 0-4)

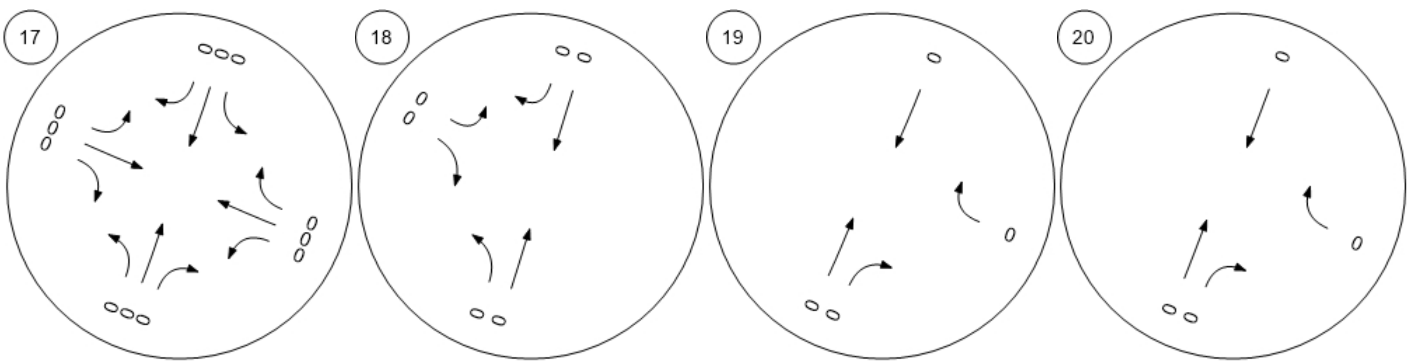
# Traffic Volume - In-Process Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

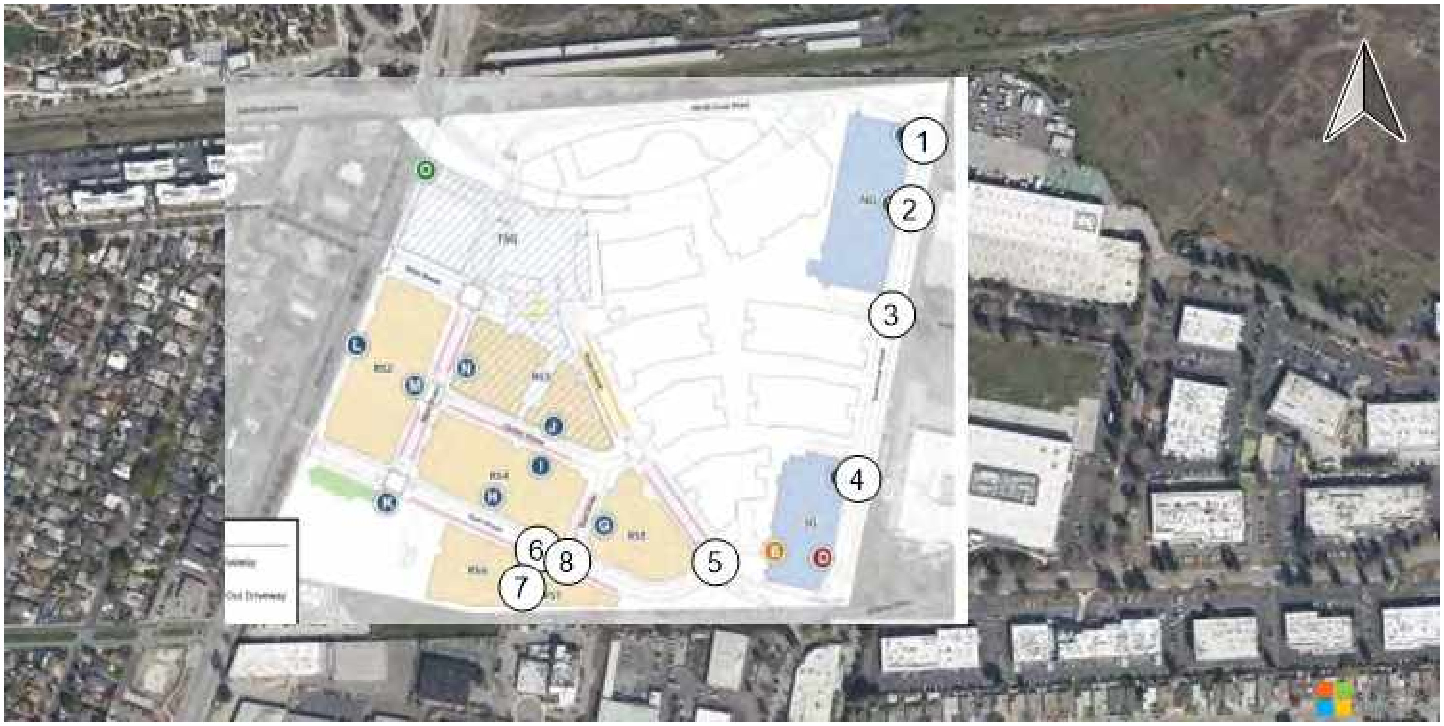
## Traffic Volume - In-Process Volume

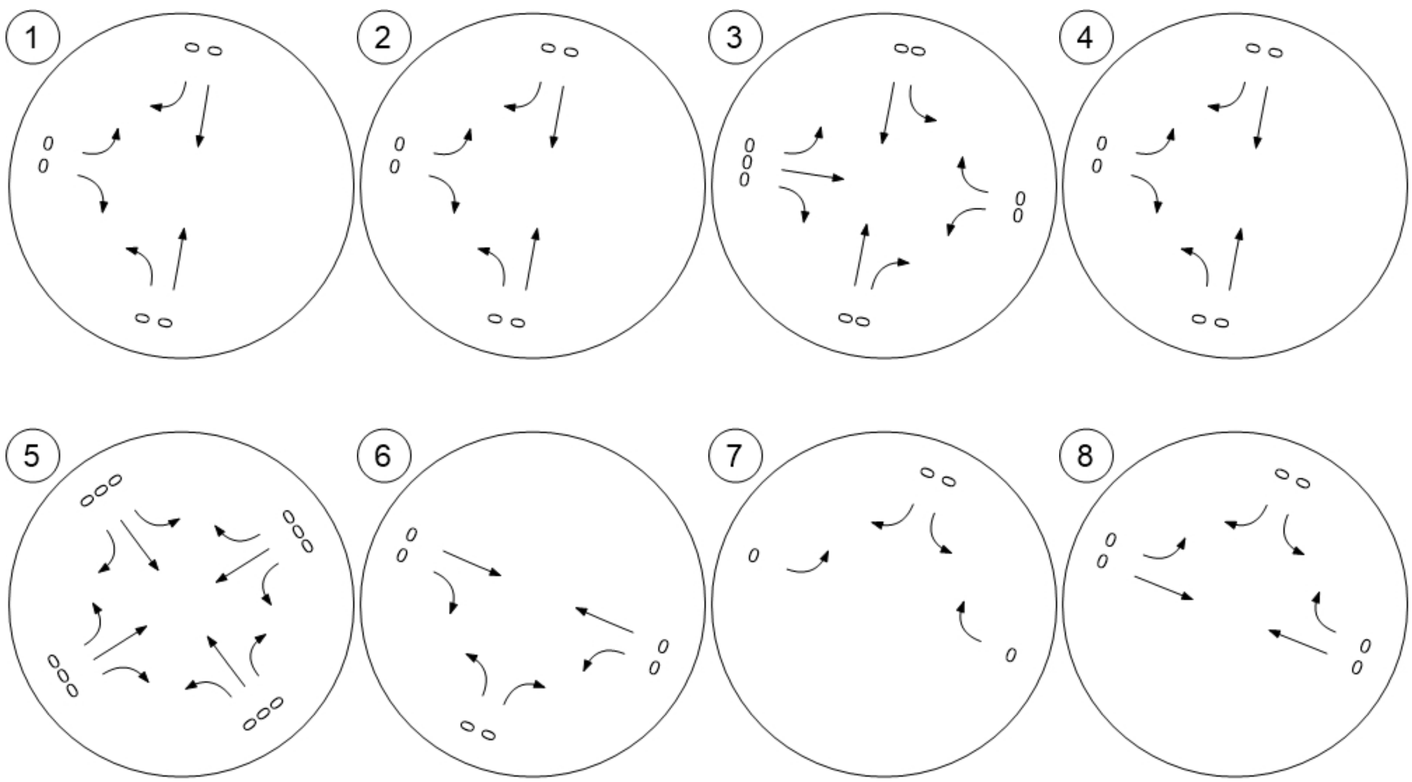



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

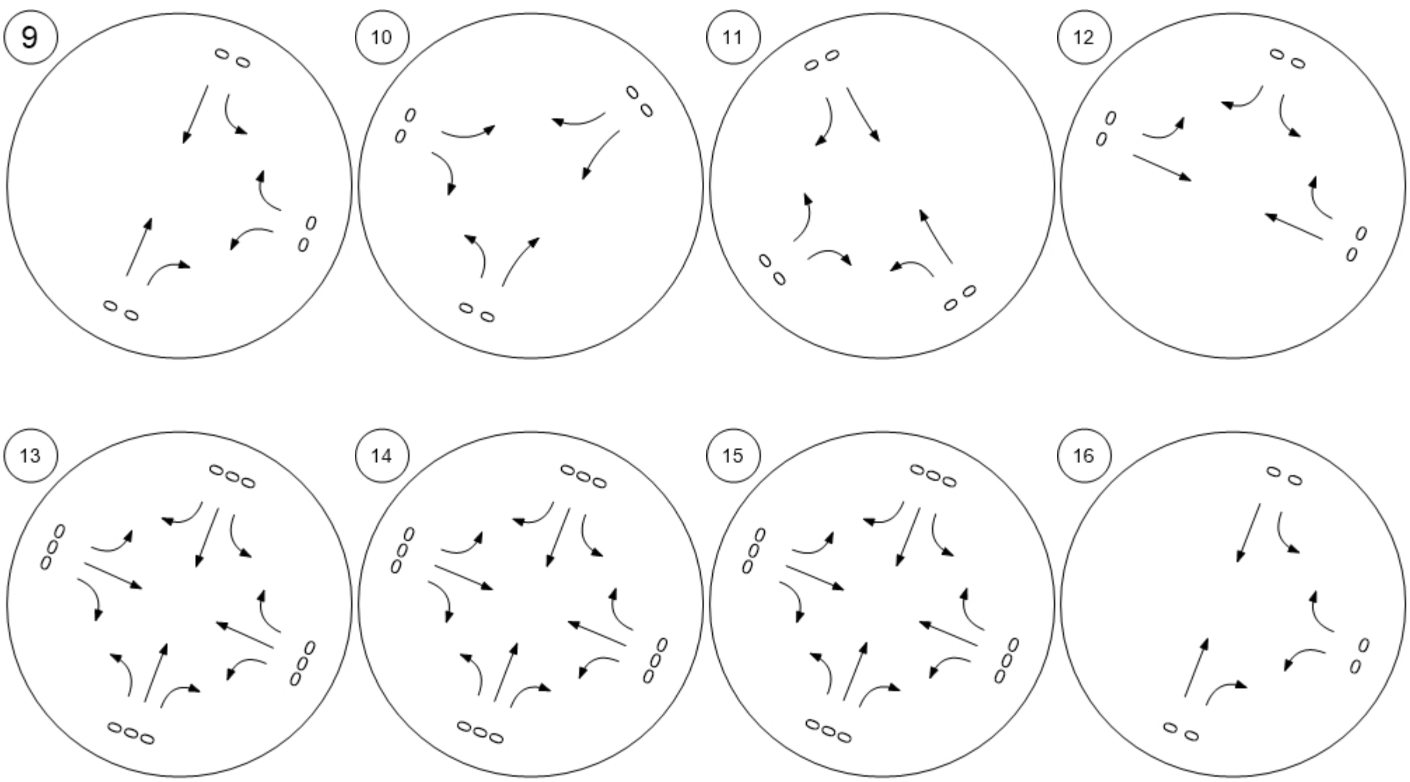


Generated with PTV VISTRO

Version 2021 (SP 0-4)

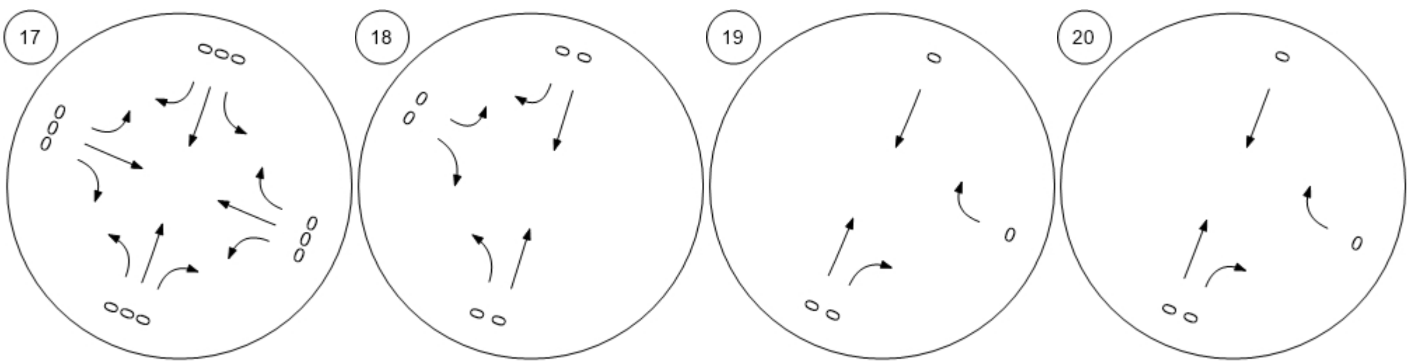
## Traffic Volume - Net New Site Trips

Generated with PTV VISTRO

Version 2021 (SP 0-4)

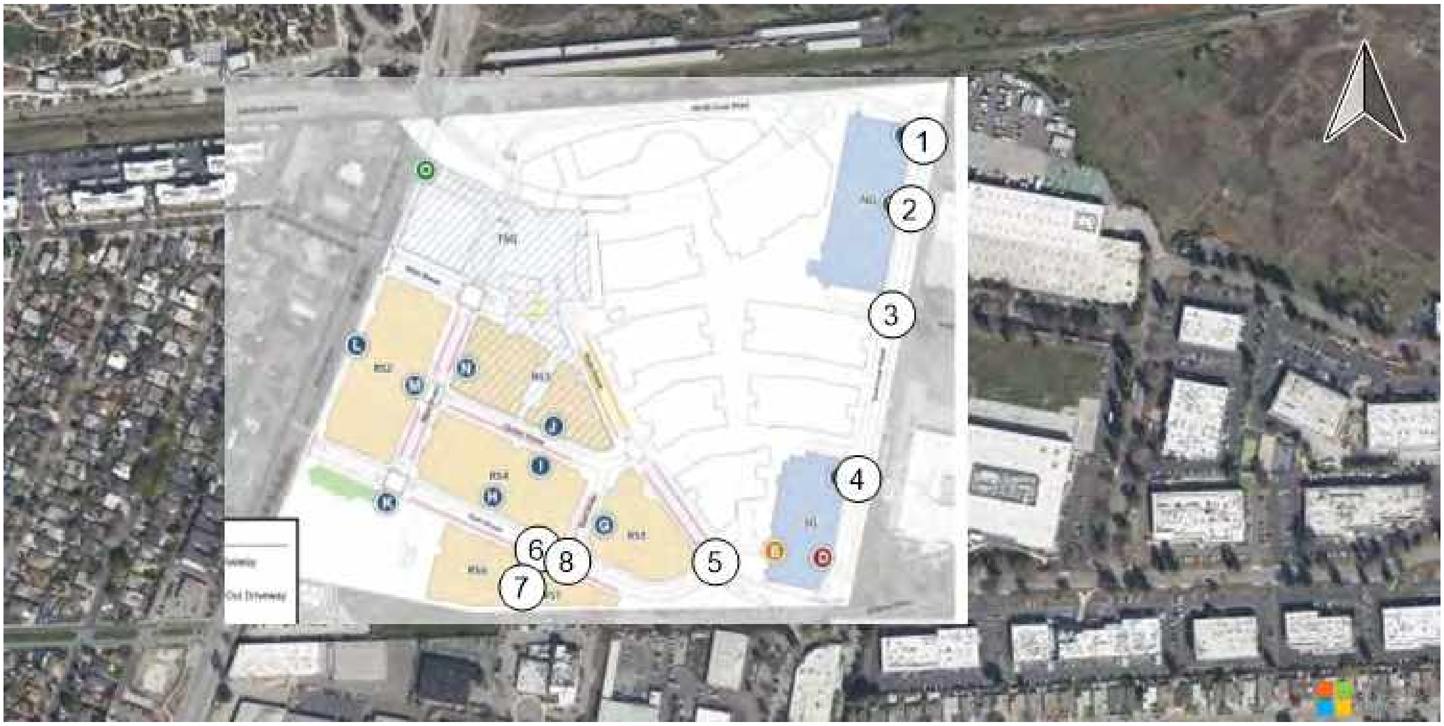
## Traffic Volume - Net New Site Trips

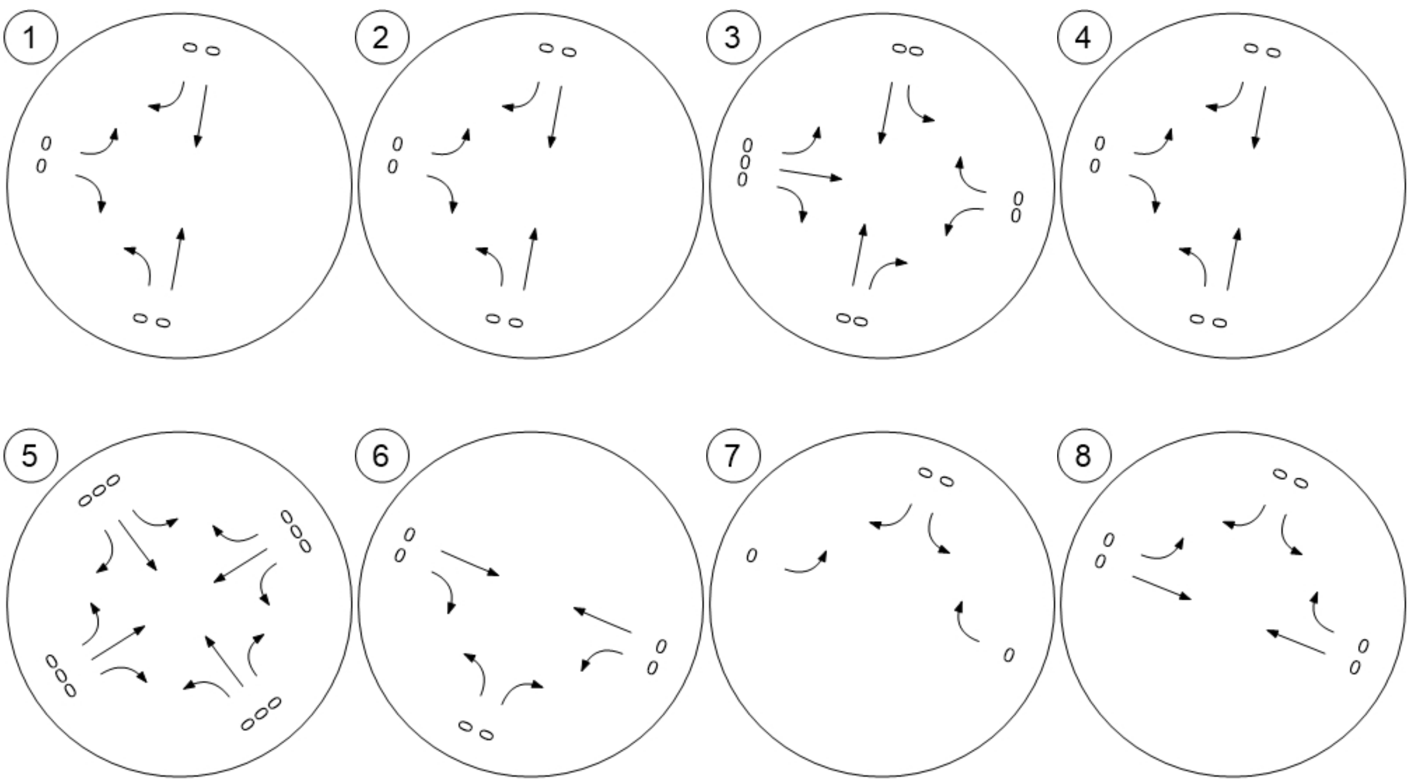



Generated with PTV VISTRO

Version 2021 (SP 0-4)

## Traffic Volume - Other Volume

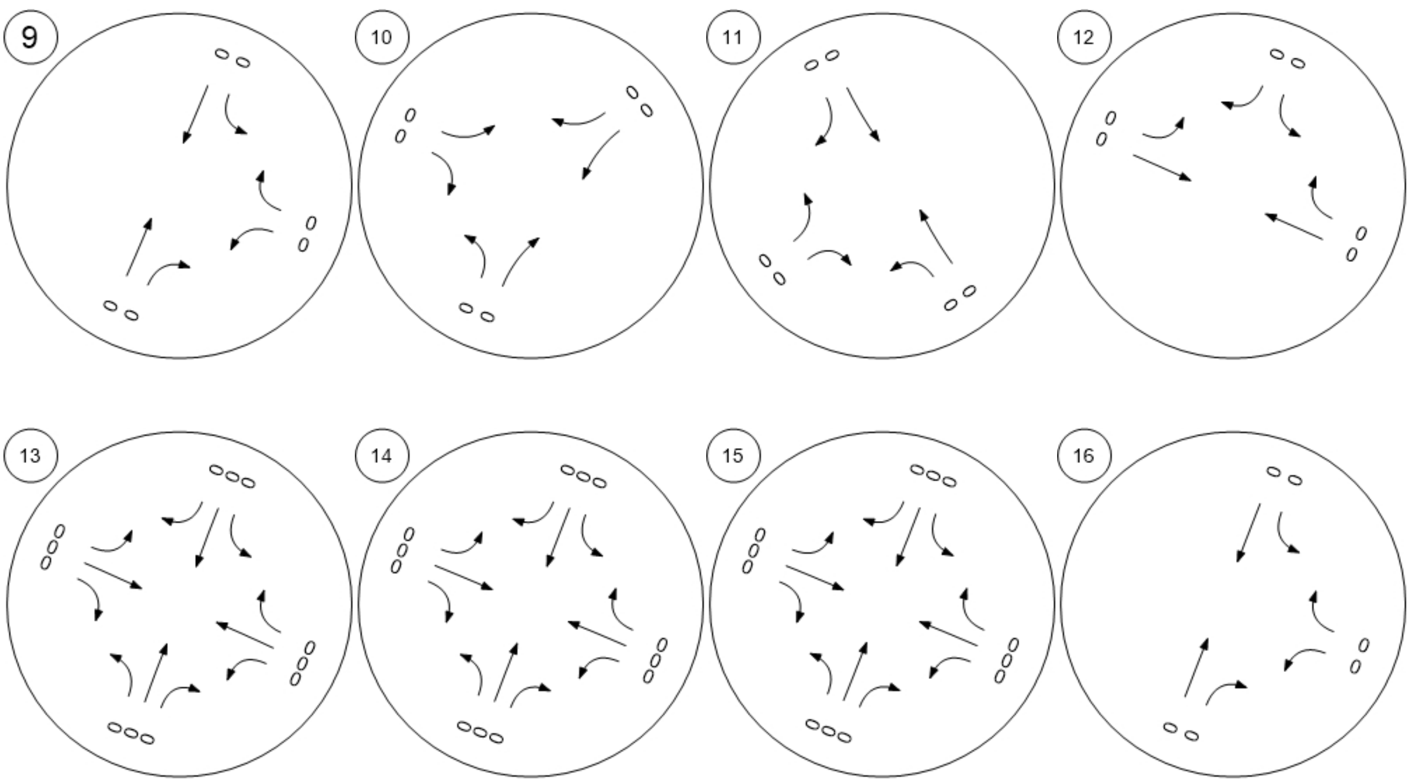


Generated with PTV VISTRO

Version 2021 (SP 0-4)

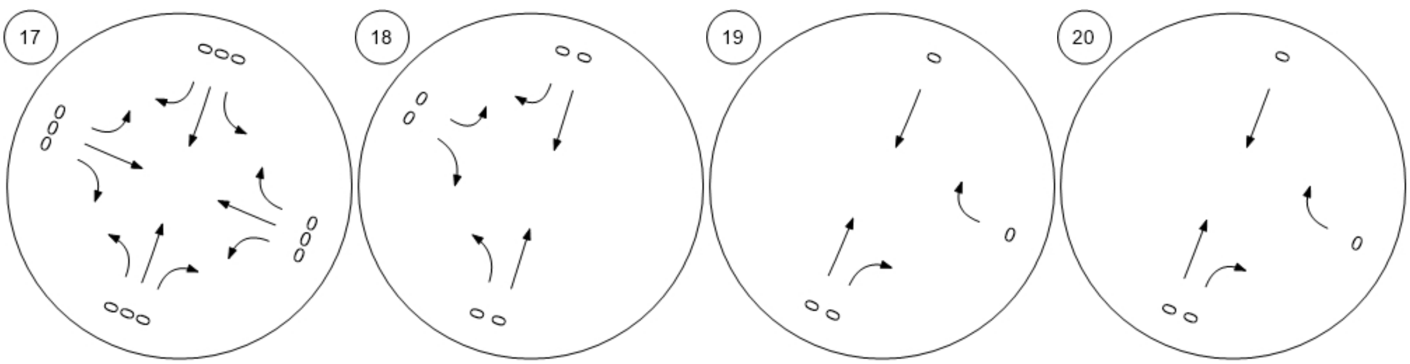
## Traffic Volume - Other Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

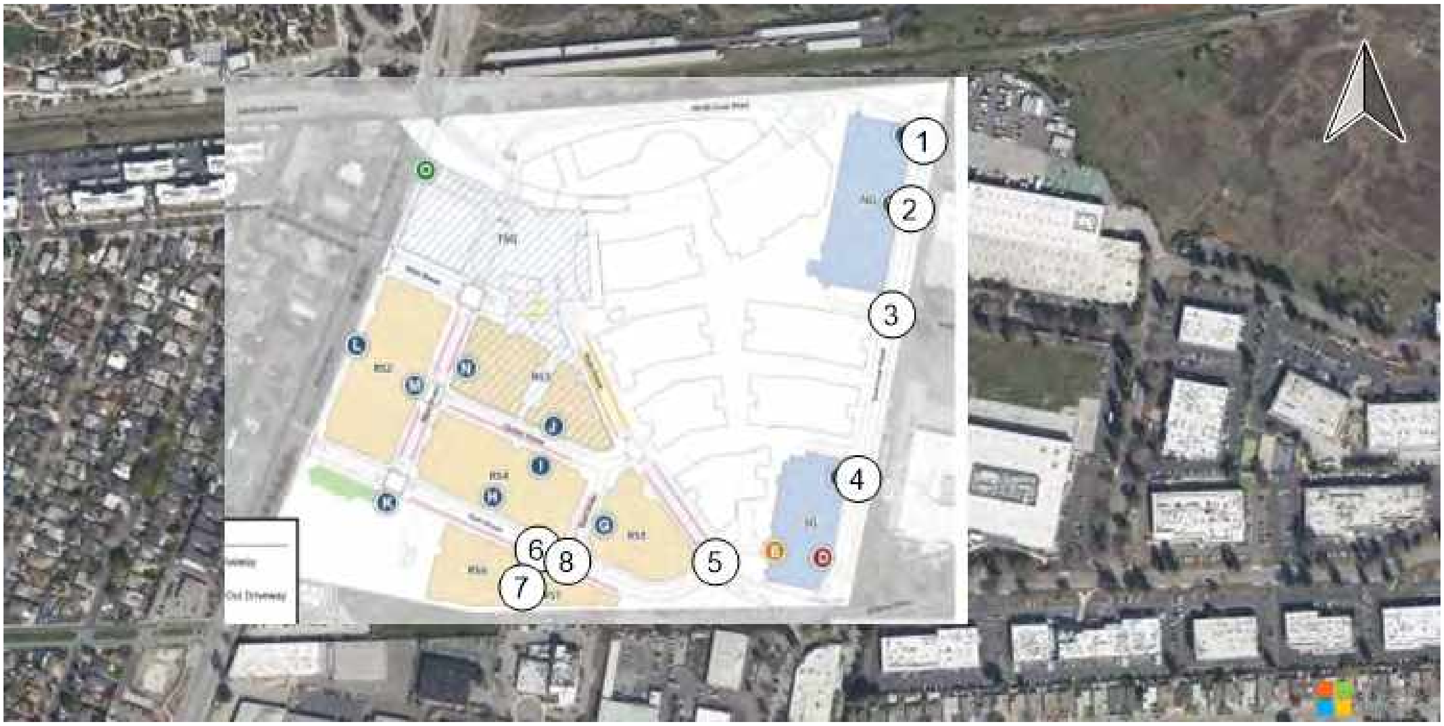
Traffic Volume - Other Volume

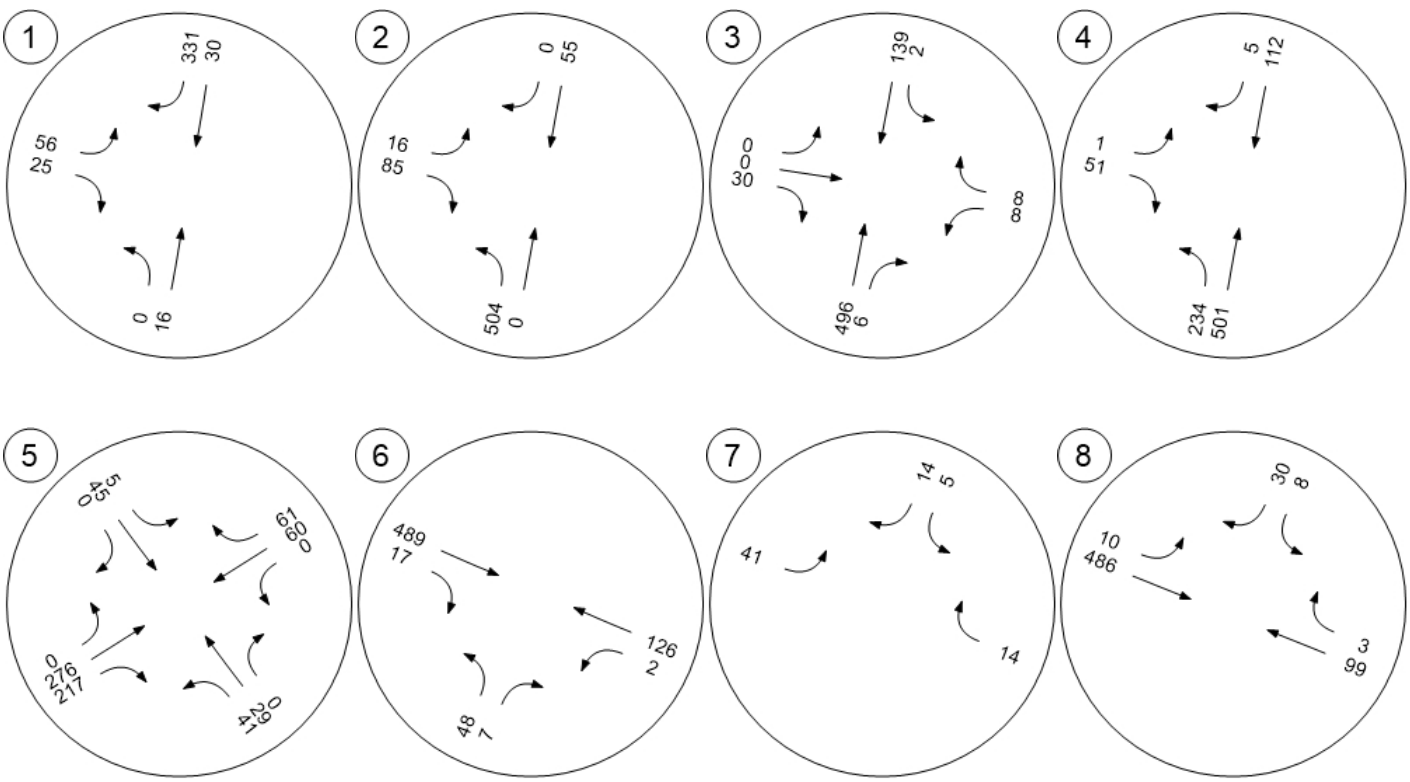



Generated with PTV VISTRO

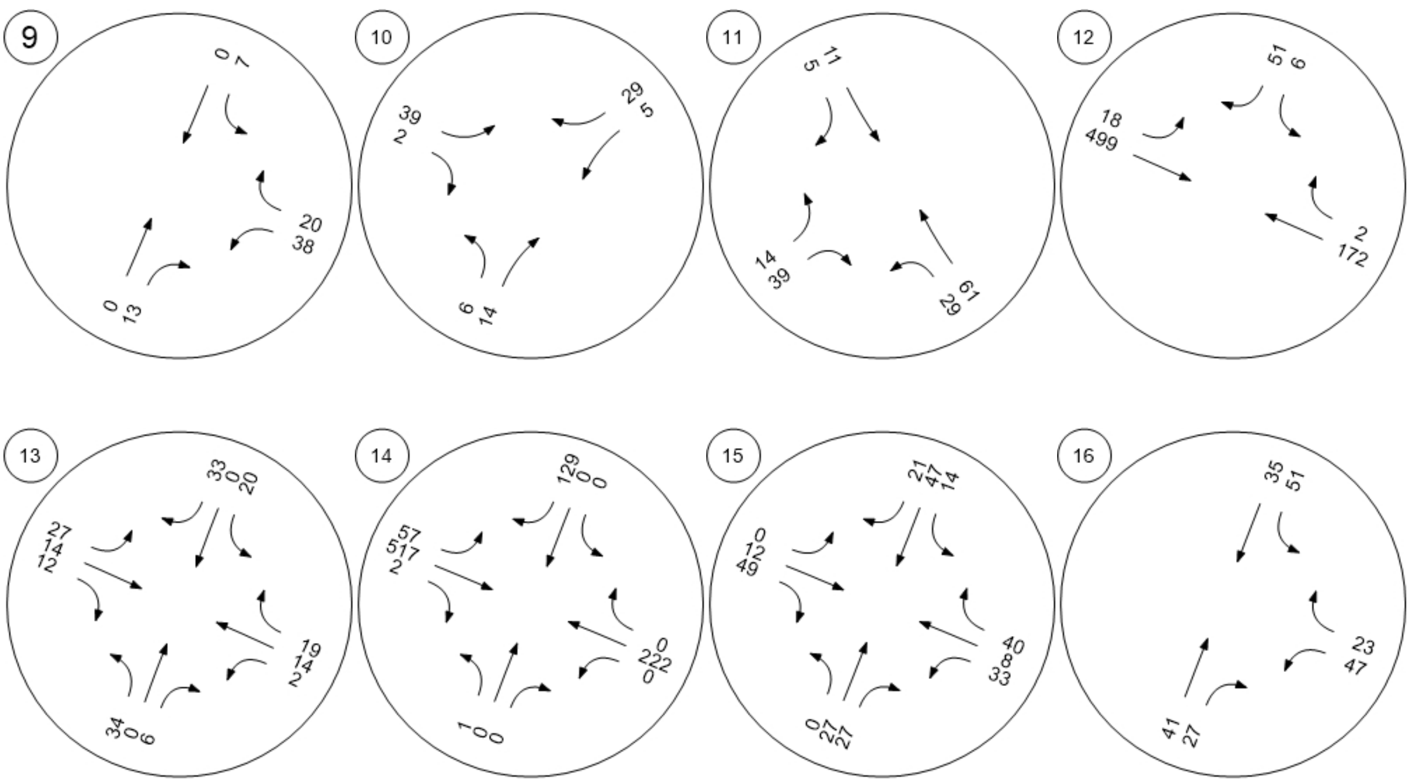
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume



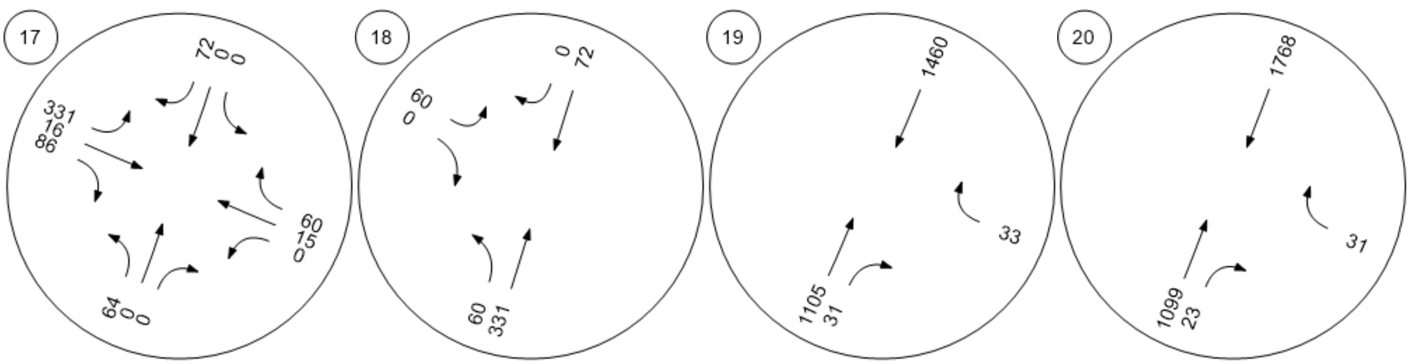
Traffic Volume - Future Total Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

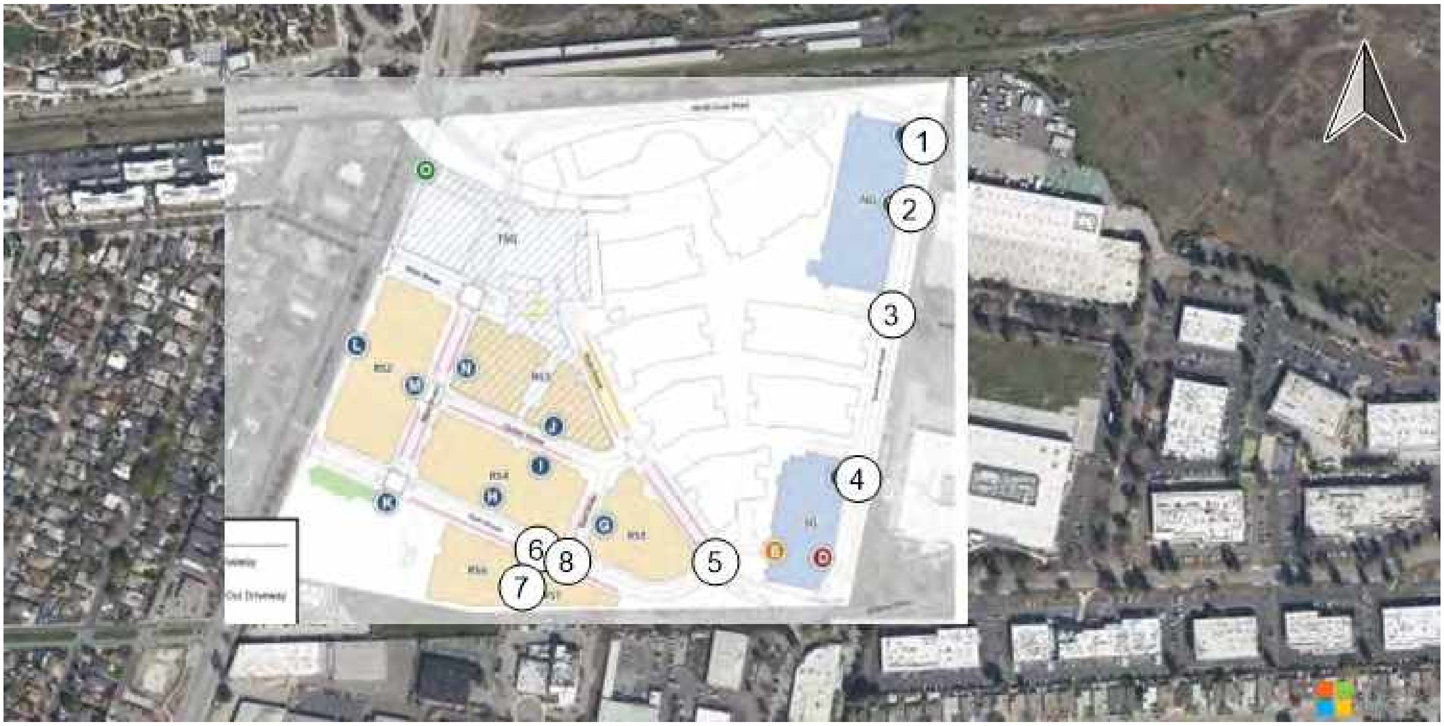
Traffic Volume - Future Total Volume

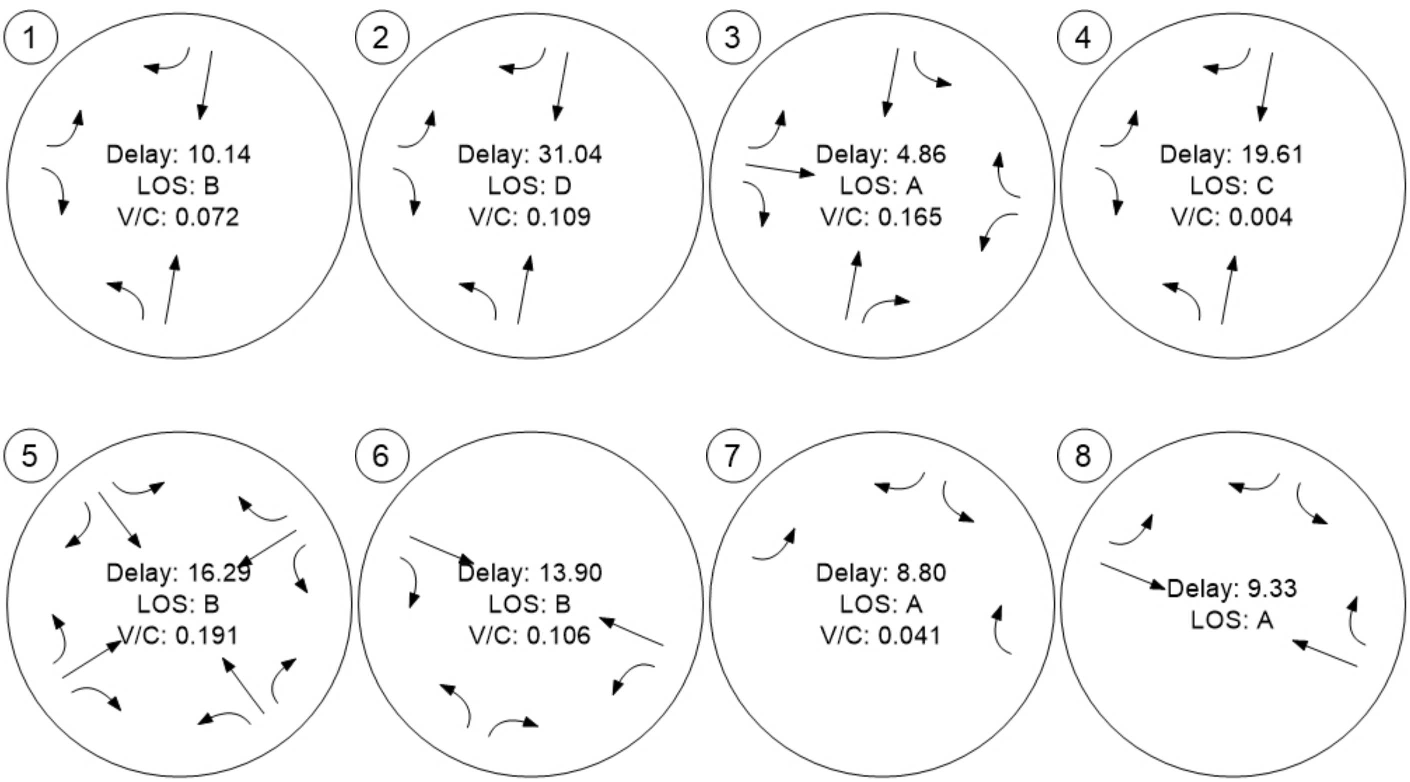



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions

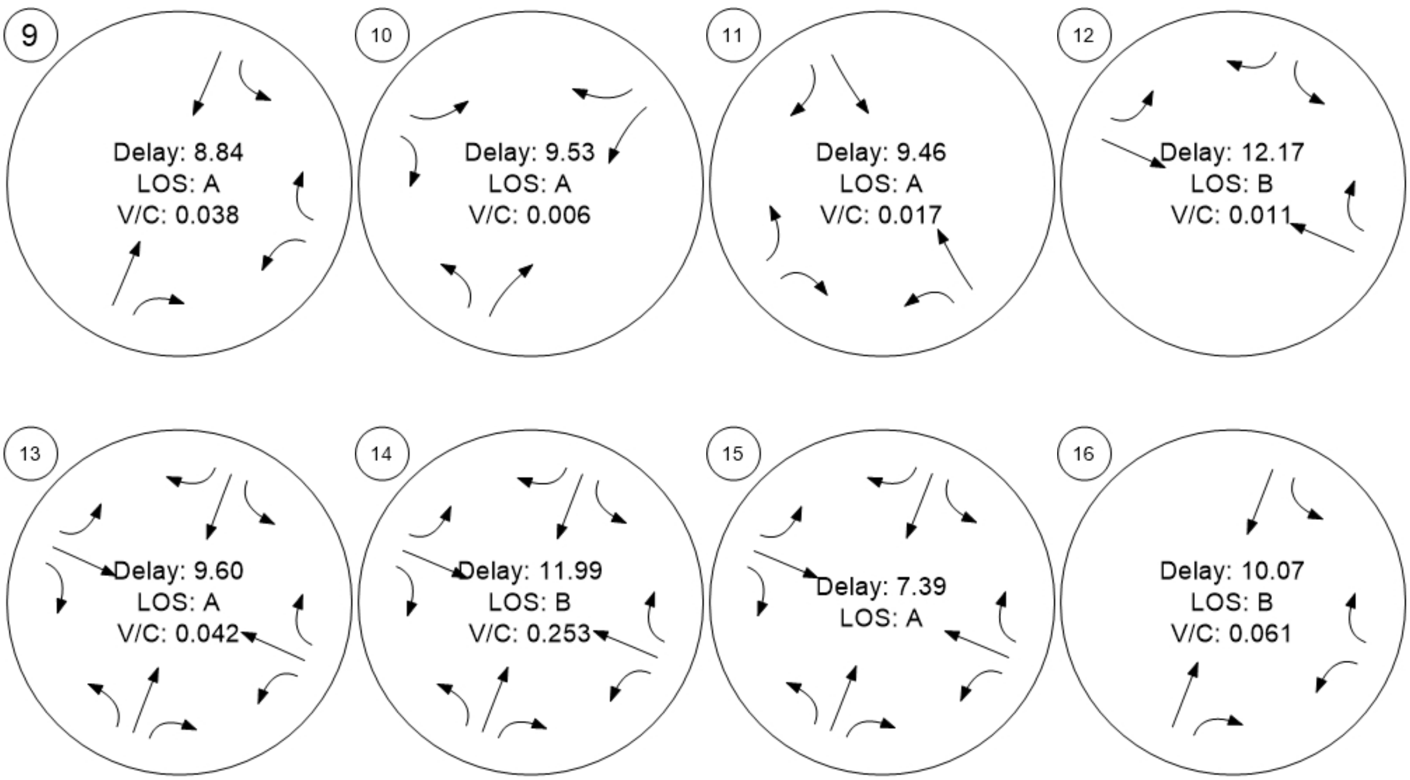


Generated with PTV VISTRO

Version 2021 (SP 0-4)

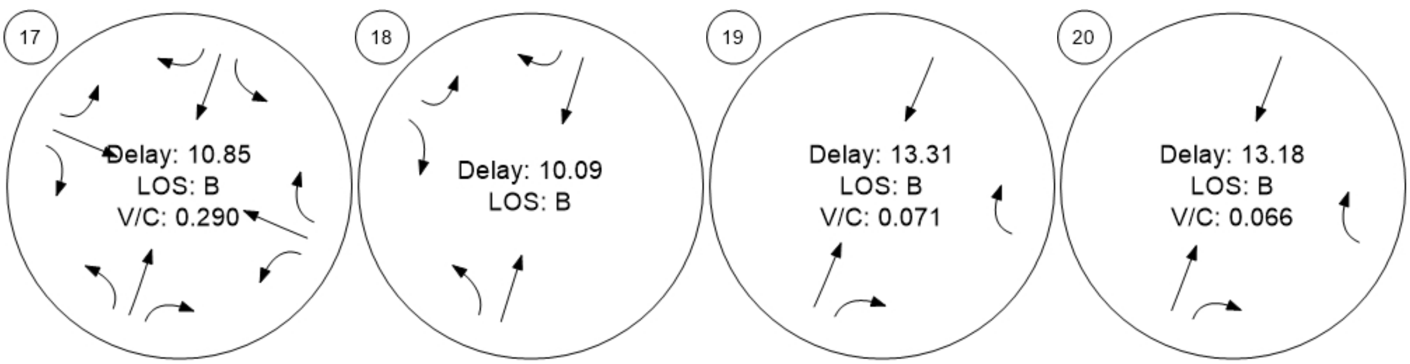
## Traffic Conditions

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions

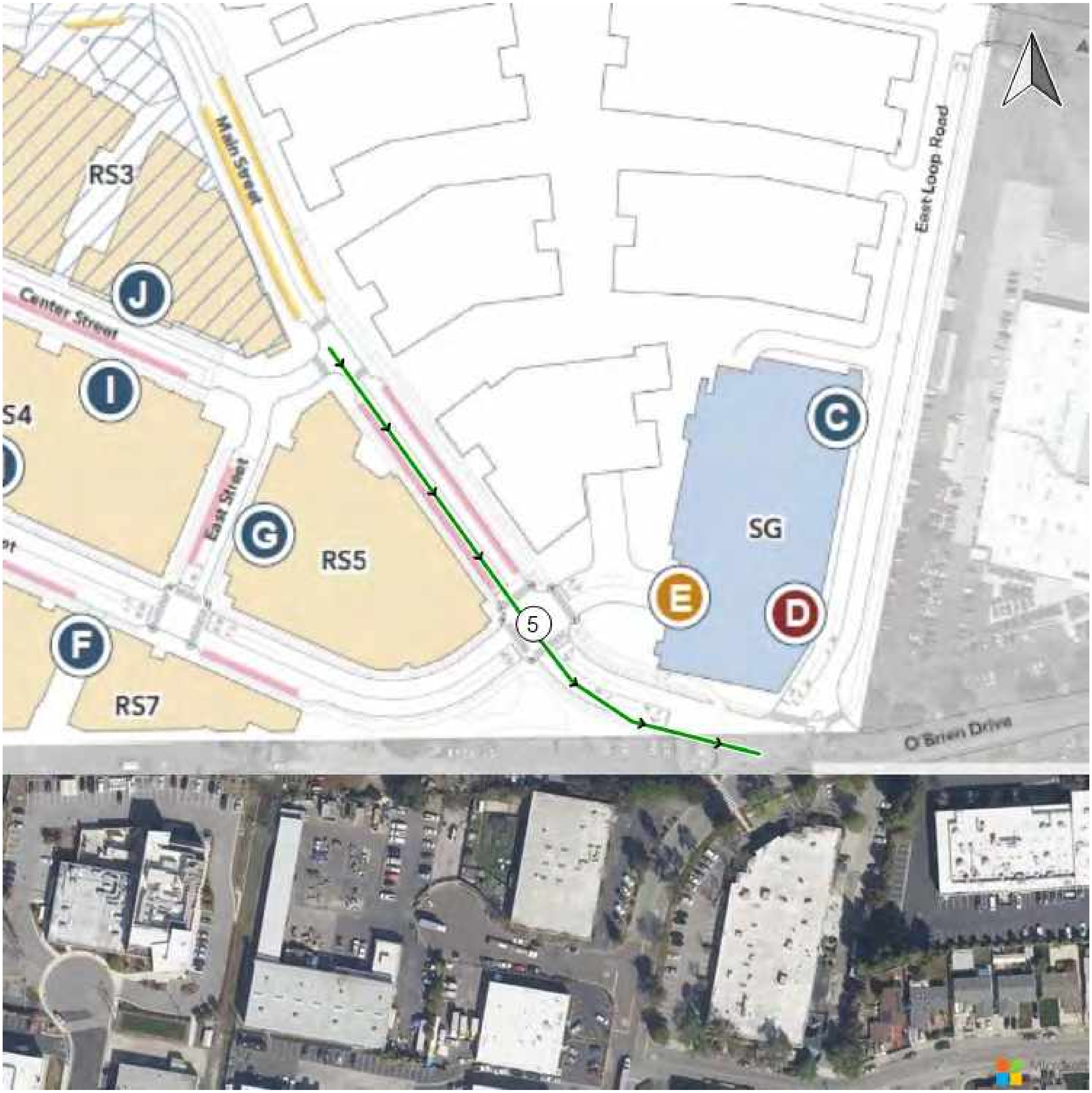



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2:



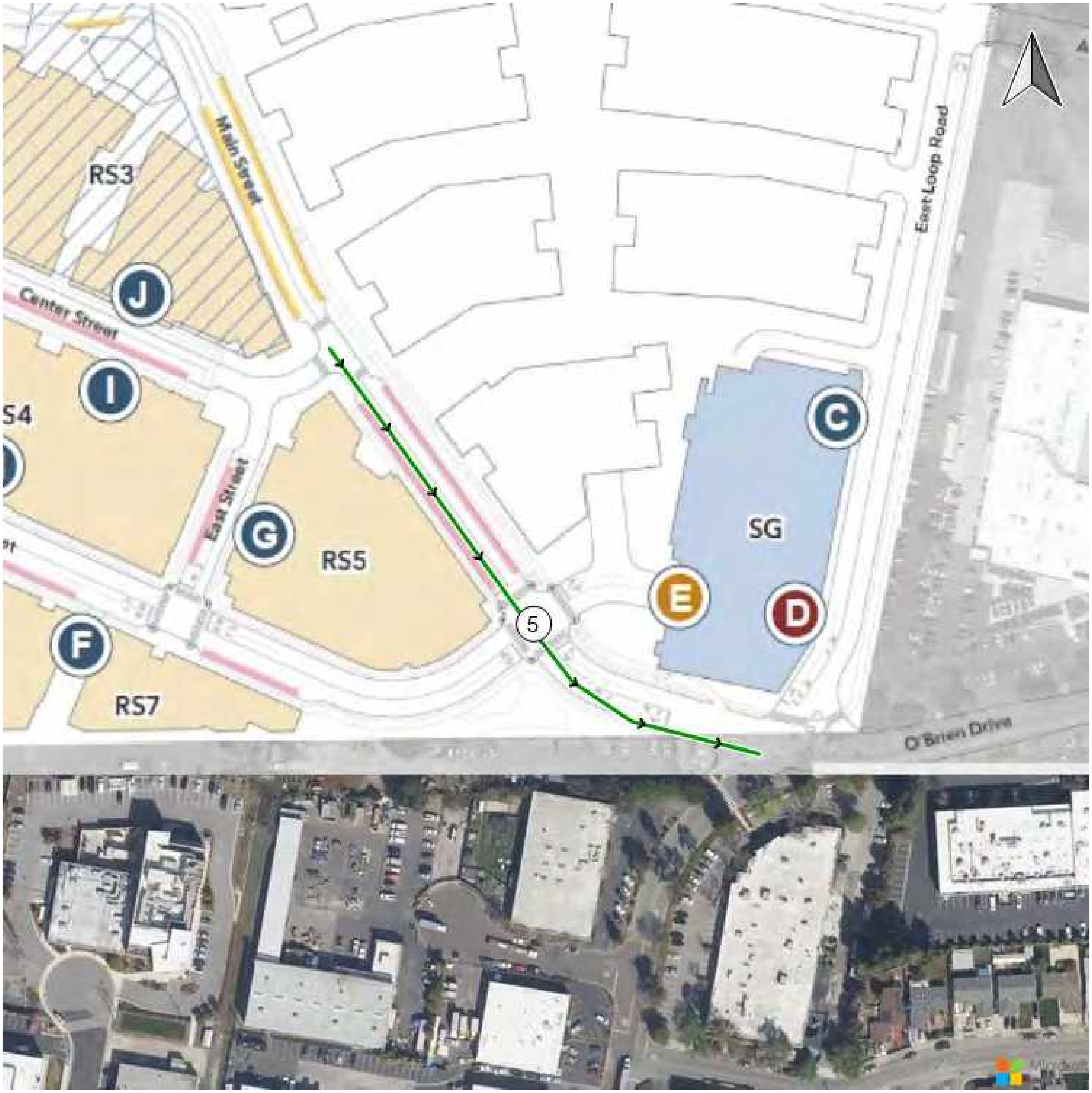
Route 2:

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2:



Route 2:

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro
Report File: \...\Internal Site Analysis PM.pdf

Scenario 2 Internal Analysis PM
12/6/2021

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | East Loop Road and Driveway A | Two-way stop | HCM 6th Edition | EB Left | 0.284 | 11.9 | B |
| 2 | East Loop Road and Driveway B | Two-way stop | HCM 6th Edition | EB Left | 0.141 | 16.5 | C |
| 3 | East Loop Road and Adams Court | Signalized | HCM 6th Edition | SB Thru | 0.172 | 15.2 | B |
| 4 | East Loop Road and Driveway C | Two-way stop | HCM 6th Edition | EB Left | 0.014 | 17.0 | C |
| 5 | Main Street and Park Street/Driveway D | Signalized | HCM 6th Edition | WB Left | 0.205 | 17.1 | B |
| 6 | Park Street and Driveway E | Two-way stop | HCM 6th Edition | NB Left | 0.059 | 12.7 | B |
| 7 | Driveway E and RS6/RS7 | Two-way stop | HCM 6th Edition | EB Left | 0.025 | 8.8 | A |
| 8 | Park Street and East Street | All-way stop | HCM 6th Edition | WB Thru | 0.290 | 9.1 | A |
| 9 | East Street and Driveway F | Two-way stop | HCM 6th Edition | WB Left | 0.024 | 8.9 | A |
| 10 | Center Street and East Street | Two-way stop | HCM 6th Edition | SB Thru | 0.016 | 9.7 | A |
| 11 | Main Street and East Street | Two-way stop | HCM 6th Edition | NB Left | 0.012 | 10.0 | A |
| 12 | Driveway G and Park Street | Two-way stop | HCM 6th Edition | SB Left | 0.011 | 15.4 | C |
| 13 | Dwy H/DwI and Center Street | Two-way stop | HCM 6th Edition | NB Left | 0.029 | 10.4 | B |
| 14 | West Street/Dwy J and Park Street | Signalized | HCM 6th Edition | SB Right | 0.352 | 15.7 | B |
| 15 | West Street and Dwy K/Center Street | All-way stop | HCM 6th Edition | SB Thru | 0.235 | 8.3 | A |
| 16 | West Street/Dwy L | Two-way stop | HCM 6th Edition | WB Left | 0.170 | 12.8 | B |
| 17 | Main Street and West Street | Signalized | HCM 6th Edition | EB Right | 0.339 | 16.9 | B |
| 18 | North loop Road/West Street and Willow Road Tunnel | All-way stop | HCM 6th Edition | SB Thru | 0.367 | 9.3 | A |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 | Willow Road and Driveway M | Two-way stop | HCM 6th Edition | WB Right | 0.150 | 16.0 | C |
| 20 | Willow Road and Driveway N | Two-way stop | HCM 6th Edition | WB Right | 0.211 | 20.2 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 1: East Loop Road and Driveway A**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.284 |

**Intersection Setup**

| Name | East Loop Road | | East Loop Road | | Driveway A | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Loop Road | | East Loop Road | | Driveway A | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 71 | 30 | 93 | 240 | 108 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 71 | 30 | 93 | 240 | 108 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 18 | 8 | 23 | 60 | 27 |
| Total Analysis Volume [veh/h] | 0 | 71 | 30 | 93 | 240 | 108 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 |
| d_M, Delay for Movement [s/veh] | 7.46 | 0.00 | 0.00 | 0.00 | 11.88 | 11.28 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 1.90 | 1.90 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 47.39 | 47.39 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 11.70 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 7.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 2: East Loop Road and Driveway B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.5 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.141 |

**Intersection Setup**

| Name | East Loop Road | | East Loop Road | | Driveway B | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Loop Road | | East Loop Road | | Driveway B | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 142 | 0 | 138 | 0 | 71 | 365 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 142 | 0 | 138 | 0 | 71 | 365 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 36 | 0 | 35 | 0 | 18 | 91 |
| Total Analysis Volume [veh/h] | 142 | 0 | 138 | 0 | 71 | 365 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.10 | 0.00 | 0.00 | 0.00 | 0.14 | 0.37 |
| d_M, Delay for Movement [s/veh] | 7.77 | 0.00 | 0.00 | 0.00 | 16.51 | 13.05 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 0.16 | 0.00 | 0.00 | 2.99 | 2.99 |
| 95th-Percentile Queue Length [ft/ln] | 8.17 | 4.08 | 0.00 | 0.00 | 74.74 | 74.74 |
| d_A, Approach Delay [s/veh] | 7.77 | | 0.00 | | 13.62 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 9.83 | | | | | |
| Intersection LOS | C | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 3: East Loop Road and Adams Court**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.172 |

**Intersection Setup**

| Name | East Loop Road | | | East Loop Road | | | Adams Court | | | Adams Court | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | East Loop Road | | | East Loop Road | | | Adams Court | | | Adams Court | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 140 | 10 | 8 | 496 | 0 | 0 | 0 | 30 | 7 | 0 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 140 | 10 | 8 | 496 | 0 | 0 | 0 | 30 | 7 | 0 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 35 | 3 | 2 | 124 | 0 | 0 | 0 | 8 | 2 | 0 | 1 |
| Total Analysis Volume [veh/h] | 0 | 140 | 10 | 8 | 496 | 0 | 0 | 0 | 30 | 7 | 0 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 6.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 44 | 0 | 0 | 44 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | | |
| Maximum Recall | | No | | | No | | | No | | | | |
| Pedestrian Recall | | No | | | No | | | No | | | | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | R | |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | |
| g_i, Effective Green Time [s] | 42 | 42 | 42 | 42 | 40 | 40 | |
| g / C, Green / Cycle | 0.47 | 0.47 | 0.47 | 0.47 | 0.44 | 0.44 | |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.04 | 0.14 | 0.14 | 0.00 | 0.02 | |
| s, saturation flow rate [veh/h] | 1870 | 1827 | 1861 | 1702 | 1870 | 1589 | |
| c, Capacity [veh/h] | 873 | 853 | 910 | 794 | 831 | 706 | |
| d1, Uniform Delay [s] | 13.33 | 13.35 | 14.90 | 14.91 | 0.00 | 14.16 | |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| d2, Incremental Delay [s] | 0.19 | 0.20 | 0.81 | 0.98 | 0.00 | 0.11 | |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.09 | 0.09 | 0.29 | 0.30 | 0.00 | 0.04 | |
| d, Delay for Lane Group [s/veh] | 13.53 | 13.55 | 15.71 | 15.89 | 0.00 | 14.27 | |
| Lane Group LOS | B | B | B | B | A | B | |
| Critical Lane Group | No | No | Yes | No | No | Yes | |
| 50th-Percentile Queue Length [veh/ln] | 0.86 | 0.87 | 3.41 | 3.14 | 0.00 | 0.36 | |
| 50th-Percentile Queue Length [ft/ln] | 21.59 | 21.64 | 85.24 | 78.55 | 0.00 | 8.97 | |
| 95th-Percentile Queue Length [veh/ln] | 1.55 | 1.56 | 6.14 | 5.66 | 0.00 | 0.65 | |
| 95th-Percentile Queue Length [ft/ln] | 38.85 | 38.94 | 153.43 | 141.38 | 0.00 | 16.14 | |

**Movement, Approach, & Intersection Results**

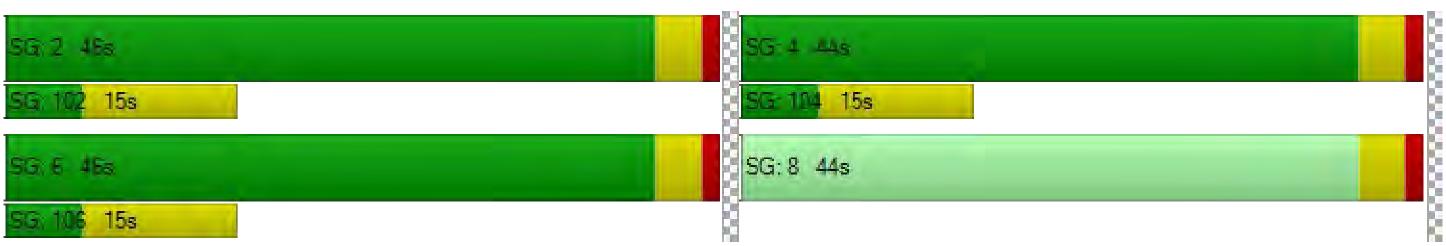
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 13.54 | 13.55 | 15.71 | 15.79 | 0.00 | 0.00 | 0.00 | 14.27 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | B | B | B | B | | A | A | B | | | |
| d_A, Approach Delay [s/veh] | 13.54 | | | 15.79 | | | 14.27 | | | 0.00 | | |
| Approach LOS | B | | | B | | | B | | | A | | |
| d_I, Intersection Delay [s/veh] | 15.23 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.172 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.297 | 2.290 | 1.951 | 1.959 |
| Crosswalk LOS | B | B | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 933 | 933 | 889 | 0 |
| d_b, Bicycle Delay [s] | 12.80 | 12.80 | 13.89 | 45.00 |
| I_b,int, Bicycle LOS Score for Intersection | 1.683 | 1.975 | 1.609 | 1.560 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Level Of Service Report**
**Intersection 4: East Loop Road and Driveway C**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.014 |

**Intersection Setup**

| Name | East Loop Road | | East Loop Road | | Driveway C | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Loop Road | | East Loop Road | | Driveway C | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 66 | 144 | 472 | 1 | 5 | 220 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 66 | 144 | 472 | 1 | 5 | 220 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 36 | 118 | 0 | 1 | 55 |
| Total Analysis Volume [veh/h] | 66 | 144 | 472 | 1 | 5 | 220 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.06 | 0.00 | 0.00 | 0.00 | 0.01 | 0.29 |
| d_M, Delay for Movement [s/veh] | 8.53 | 0.00 | 0.00 | 0.00 | 17.01 | 11.77 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.19 | 0.10 | 0.00 | 0.00 | 1.27 | 1.27 |
| 95th-Percentile Queue Length [ft/ln] | 4.85 | 2.42 | 0.00 | 0.00 | 31.74 | 31.74 |
| d_A, Approach Delay [s/veh] | 2.68 | | 0.00 | | 11.89 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 3.57 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 5: Main Street and Park Street/Driveway D**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.205 |

**Intersection Setup**

| Name | Park Street | | | Driveway D | | | Main Street | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Park Street | | | Driveway D | | | Main Street | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 77 | 151 | 0 | 259 | 65 | 1 | 48 | 0 | 176 | 81 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 77 | 151 | 0 | 259 | 65 | 1 | 48 | 0 | 176 | 81 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 19 | 38 | 0 | 65 | 16 | 0 | 12 | 0 | 44 | 20 | 0 |
| Total Analysis Volume [veh/h] | 0 | 77 | 151 | 0 | 259 | 65 | 1 | 48 | 0 | 176 | 81 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 6.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 4 | 0 | 0 | 8 | 0 | 0 | 6 | 0 | 2 | 2 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | Lag | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 5 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 30 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Split [s] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 35 | 0 | 35 | 35 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 5 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 10 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | L | C |
|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 42 | 42 | 42 | 42 | 31 | 31 | 31 |
| g / C, Green / Cycle | 0.47 | 0.47 | 0.47 | 0.47 | 0.34 | 0.34 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.10 | 0.09 | 0.10 | 0.03 | 0.08 | 0.09 |
| s, saturation flow rate [veh/h] | 1870 | 1446 | 1870 | 1582 | 1898 | 1357 | 1660 |
| c, Capacity [veh/h] | 913 | 675 | 913 | 738 | 694 | 494 | 629 |
| d1, Uniform Delay [s] | 13.35 | 14.29 | 14.10 | 14.15 | 19.85 | 21.18 | 20.95 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.18 | 0.77 | 0.46 | 0.63 | 0.20 | 1.08 | 0.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.22 | 0.19 | 0.20 | 0.07 | 0.23 | 0.23 |
| d, Delay for Lane Group [s/veh] | 13.53 | 15.06 | 14.57 | 14.78 | 20.05 | 22.26 | 21.80 |
| Lane Group LOS | B | B | B | B | C | C | C |
| Critical Lane Group | No | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.89 | 1.91 | 2.11 | 1.87 | 0.72 | 1.82 | 2.26 |
| 50th-Percentile Queue Length [ft/ln] | 22.13 | 47.64 | 52.71 | 46.83 | 17.93 | 45.47 | 56.40 |
| 95th-Percentile Queue Length [veh/ln] | 1.59 | 3.43 | 3.80 | 3.37 | 1.29 | 3.27 | 4.06 |
| 95th-Percentile Queue Length [ft/ln] | 39.83 | 85.75 | 94.88 | 84.29 | 32.27 | 81.85 | 101.51 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.53 | 13.53 | 15.06 | 14.57 | 14.64 | 14.78 | 20.05 | 20.05 | 20.05 | 22.11 | 21.80 | 21.80 |
| Movement LOS | B | B | B | B | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 14.54 | | | 14.66 | | | 20.05 | | | 22.00 | | |
| Approach LOS | B | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 17.14 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.205 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 2.567 | 2.232 | 1.811 | 2.090 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 933 | 933 | 689 | 689 |
| d_b, Bicycle Delay [s] | 12.80 | 12.80 | 19.34 | 19.34 |
| I_b,int, Bicycle LOS Score for Intersection | 1.748 | 1.827 | 1.640 | 1.984 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 6: Park Street and Driveway E**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.059 |

**Intersection Setup**

| Name | Dwy E | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Dwy E | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 4 | 247 | 43 | 7 | 440 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 29 | 4 | 247 | 43 | 7 | 440 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 1 | 62 | 11 | 2 | 110 |
| Total Analysis Volume [veh/h] | 29 | 4 | 247 | 43 | 7 | 440 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.06 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.73 | 9.57 | 0.00 | 0.00 | 7.85 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.20 | 0.20 | 0.00 | 0.00 | 0.02 | 0.01 |
| 95th-Percentile Queue Length [ft/ln] | 5.04 | 5.04 | 0.00 | 0.00 | 0.42 | 0.21 |
| d_A, Approach Delay [s/veh] | 12.35 | | 0.00 | | 0.12 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.60 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 7: Driveway E and RS6/RS7**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.025 |

**Intersection Setup**

| Name | Dwy E | | RS6 | | RS7 | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Dwy E | | RS6 | | RS7 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 13 | 37 | 24 | 0 | 0 | 9 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 37 | 24 | 0 | 0 | 9 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 9 | 6 | 0 | 0 | 2 |
| Total Analysis Volume [veh/h] | 13 | 37 | 24 | 0 | 0 | 9 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Stop | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | No | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 8.80 | 0.00 | 0.00 | 0.00 |
| Movement LOS | A | A | A | | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 1.90 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | | 8.80 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 2.55 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Park Street and East Street**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 9.1 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.290 |

**Intersection Setup**

| Name | East Street | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 18 | 27 | 224 | 429 | 7 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 18 | 27 | 224 | 429 | 7 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 5 | 7 | 56 | 107 | 2 |
| Total Analysis Volume [veh/h] | 5 | 18 | 27 | 224 | 429 | 7 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | | | |
|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 735 | 712 | 727 | 751 | 754 |
| Degree of Utilization, x | 0.03 | 0.18 | 0.17 | 0.29 | 0.29 |

**Movement, Approach, & Intersection Results**

| | | | | | |
|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.10 | 0.64 | 0.62 | 1.21 | 1.20 |
| 95th-Percentile Queue Length [ft] | 2.42 | 15.91 | 15.51 | 30.15 | 29.96 |
| Approach Delay [s/veh] | 8.06 | 8.76 | | 9.42 | |
| Approach LOS | A | A | | A | |
| Intersection Delay [s/veh] | 9.14 | | | | |
| Intersection LOS | A | | | | |

**Intersection Level Of Service Report**
**Intersection 9: East Street and Driveway F**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.024 |

**Intersection Setup**

| Name | East Street | | East Street | | Driveway F | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | East Street | | Driveway F | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 34 | 18 | 0 | 23 | 12 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 34 | 18 | 0 | 23 | 12 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 9 | 5 | 0 | 6 | 3 |
| Total Analysis Volume [veh/h] | 0 | 34 | 18 | 0 | 23 | 12 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.01 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.31 | 0.00 | 8.95 | 8.53 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.11 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.87 | 0.87 | 2.77 | 2.77 |
| d_A, Approach Delay [s/veh] | 0.00 | | 7.31 | | 8.80 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.05 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Center Street and East Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.016 |

**Intersection Setup**

| Name | East Street | | East Street | | Center Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | East Street | | Center Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 4 | 9 | 13 | 54 | 48 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 4 | 9 | 13 | 54 | 48 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 2 | 3 | 14 | 12 | 1 |
| Total Analysis Volume [veh/h] | 4 | 9 | 13 | 54 | 48 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Stop | Free |
| Flared Lane | | No | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | No | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.02 | 0.05 | 0.03 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 9.73 | 8.61 | 7.30 | 0.00 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.21 | 0.21 | 0.09 | 0.09 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 5.33 | 5.33 | 2.30 | 2.30 |
| d_A, Approach Delay [s/veh] | 0.00 | | 8.83 | | 6.61 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.08 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: Main Street and East Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.012 |

**Intersection Setup**

| Name | East Street | | Main Street | | Main Street | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | East Street | | Main Street | | Main Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 9 | 48 | 1 | 13 | 54 | 92 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 48 | 1 | 13 | 54 | 92 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 12 | 0 | 3 | 14 | 23 |
| Total Analysis Volume [veh/h] | 9 | 48 | 1 | 13 | 54 | 92 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.04 | 0.00 | 0.00 | 0.03 | 0.00 |
| d_M, Delay for Movement [s/veh] | 9.99 | 8.56 | 0.00 | 0.00 | 7.32 | 0.00 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.18 | 0.18 | 0.00 | 0.00 | 0.10 | 0.10 |
| 95th-Percentile Queue Length [ft/ln] | 4.49 | 4.49 | 0.00 | 0.00 | 2.61 | 2.61 |
| d_A, Approach Delay [s/veh] | 8.79 | | 0.00 | | 2.71 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.13 | | | | | |
| Intersection LOS | A | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 12: Driveway G and Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Driveway G | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Driveway G | | Park Street | | Park Street | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 4 | 30 | 46 | 287 | 463 | 6 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 4 | 30 | 46 | 287 | 463 | 6 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 8 | 12 | 72 | 116 | 2 |
| Total Analysis Volume [veh/h] | 4 | 30 | 46 | 287 | 463 | 6 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 15.41 | 9.97 | 8.45 | 0.00 | 0.00 | 0.00 |
| Movement LOS | C | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.16 | 0.16 | 0.13 | 0.07 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 3.97 | 3.97 | 3.30 | 1.65 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 10.61 | | 1.17 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.90 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 13: Dwy H/Dwl and Center Street**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.4 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.029 |

**Intersection Setup**

| Name | Dwy H | | | Dwy I | | | Center Street | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | ╋ | | | ╋ | | | ╋ | | | ╋ | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Dwy H | | | Dwy I | | | Center Street | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 0 | 4 | 29 | 0 | 48 | 52 | 20 | 31 | 6 | 21 | 31 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 0 | 4 | 29 | 0 | 48 | 52 | 20 | 31 | 6 | 21 | 31 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 0 | 1 | 7 | 0 | 12 | 13 | 5 | 8 | 2 | 5 | 8 |
| Total Analysis Volume [veh/h] | 20 | 0 | 4 | 29 | 0 | 48 | 52 | 20 | 31 | 6 | 21 | 31 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.04 | 0.00 | 0.05 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 10.39 | 10.57 | 8.64 | 10.21 | 10.78 | 8.85 | 7.40 | 0.00 | 0.00 | 7.32 | 0.00 | 0.00 |
| Movement LOS | B | B | A | B | B | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.10 | 0.10 | 0.10 | 0.28 | 0.28 | 0.28 | 0.10 | 0.10 | 0.10 | 0.01 | 0.01 | 0.01 |
| 95th-Percentile Queue Length [ft/ln] | 2.55 | 2.55 | 2.55 | 6.97 | 6.97 | 6.97 | 2.60 | 2.60 | 2.60 | 0.29 | 0.29 | 0.29 |
| d_A, Approach Delay [s/veh] | 10.10 | | | 9.36 | | | 3.73 | | | 0.76 | | |
| Approach LOS | B | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.31 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: West Street/Dwy J and Park Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.7 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.352 |

**Intersection Setup**

| Name | Dwy J | | | West Street | | | Park Street | | | Park Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Dwy J | | | West Street | | | Park Street | | | Park Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 12 | 0 | 2 | 0 | 0 | 218 | 136 | 330 | 22 | 3 | 490 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 12 | 0 | 2 | 0 | 0 | 218 | 136 | 330 | 22 | 3 | 490 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 0 | 1 | 0 | 0 | 55 | 34 | 83 | 6 | 1 | 123 | 0 |
| Total Analysis Volume [veh/h] | 12 | 0 | 2 | 0 | 0 | 218 | 136 | 330 | 22 | 3 | 490 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 40 | 0 | 0 | 40 | 0 | 0 | 50 | 0 | 0 | 50 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | C |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 46 | 46 | 46 | 46 |
| g / C, Green / Cycle | 0.40 | 0.40 | 0.51 | 0.51 | 0.51 | 0.51 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.14 | 0.22 | 0.18 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1381 | 1589 | 888 | 1680 | 1866 | 1702 |
| c, Capacity [veh/h] | 627 | 676 | 522 | 859 | 994 | 870 |
| d1, Uniform Delay [s] | 16.33 | 18.78 | 17.35 | 13.06 | 12.48 | 12.48 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.07 | 1.26 | 1.98 | 1.10 | 0.63 | 0.76 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.02 | 0.32 | 0.37 | 0.35 | 0.26 | 0.27 |
| d, Delay for Lane Group [s/veh] | 16.39 | 20.04 | 19.32 | 14.17 | 13.11 | 13.24 |
| Lane Group LOS | B | C | B | B | B | B |
| Critical Lane Group | No | Yes | Yes | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.18 | 3.30 | 2.96 | 3.63 | 2.97 | 2.73 |
| 50th-Percentile Queue Length [ft/ln] | 4.56 | 82.45 | 73.93 | 90.72 | 74.24 | 68.27 |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 5.94 | 5.32 | 6.53 | 5.35 | 4.92 |
| 95th-Percentile Queue Length [ft/ln] | 8.21 | 148.42 | 133.07 | 163.30 | 133.63 | 122.88 |

**Movement, Approach, & Intersection Results**

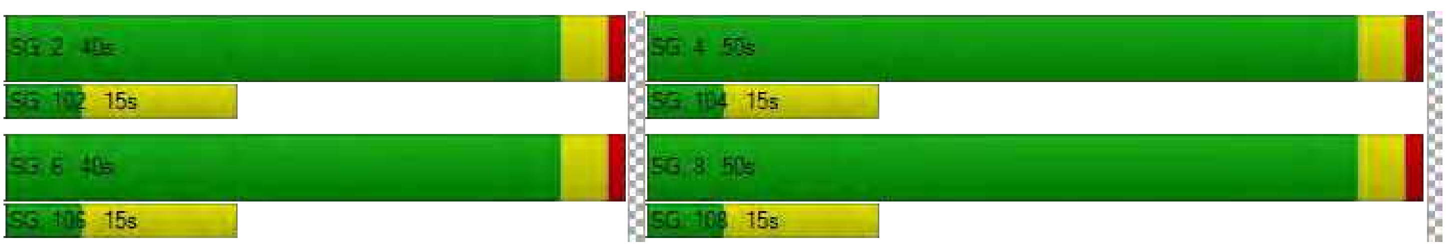
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.39 | 16.39 | 16.39 | 20.04 | 20.04 | 20.04 | 19.32 | 15.03 | 14.17 | 13.11 | 13.17 | 13.24 |
| Movement LOS | B | B | B | C | C | C | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 16.39 | | | 20.04 | | | 16.19 | | | 13.17 | | |
| Approach LOS | B | | | C | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 15.66 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.352 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.740 | 2.082 | 2.444 | 2.334 |
| Crosswalk LOS | A | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 800 | 800 | 1022 | 1022 |
| d_b, Bicycle Delay [s] | 16.20 | 16.20 | 10.76 | 10.76 |
| I_b,int, Bicycle LOS Score for Intersection | 1.583 | 1.919 | 1.962 | 1.966 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 15: West Street and Dwy K/Center Street**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 8.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.235 |

**Intersection Setup**

| Name | West Street | | | West Street | | | Dwy K | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | West Street | | | West Street | | | Dwy K | | | Center Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 85 | 52 | 36 | 97 | 61 | 0 | 14 | 74 | 48 | 17 | 24 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 85 | 52 | 36 | 97 | 61 | 0 | 14 | 74 | 48 | 17 | 24 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 21 | 13 | 9 | 24 | 15 | 0 | 4 | 19 | 12 | 4 | 6 |
| Total Analysis Volume [veh/h] | 0 | 85 | 52 | 36 | 97 | 61 | 0 | 14 | 74 | 48 | 17 | 24 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

**Lanes**

| | | | | |
|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 829 | 827 | 839 | 761 |
| Degree of Utilization, x | 0.17 | 0.23 | 0.10 | 0.12 |

**Movement, Approach, & Intersection Results**

| | | | | |
|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.59 | 0.91 | 0.35 | 0.40 |
| 95th-Percentile Queue Length [ft] | 14.75 | 22.74 | 8.76 | 9.89 |
| Approach Delay [s/veh] | 8.20 | 8.68 | 7.79 | 8.36 |
| Approach LOS | A | A | A | A |
| Intersection Delay [s/veh] | 8.34 | | | |
| Intersection LOS | A | | | |

**Intersection Level Of Service Report**
**Intersection 16: West Street/Dwy L**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.170 |

**Intersection Setup**

| Name | West Street | | West Street | | Driveway L | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | West Street | | West Street | | Driveway L | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 85 | 110 | 97 | 97 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 85 | 110 | 97 | 97 | 50 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 21 | 28 | 24 | 24 | 13 |
| Total Analysis Volume [veh/h] | 24 | 85 | 110 | 97 | 97 | 50 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.07 | 0.00 | 0.17 | 0.05 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.63 | 0.00 | 12.82 | 10.13 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.24 | 0.24 | 0.84 | 0.84 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 6.01 | 6.01 | 20.90 | 20.90 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.05 | | 11.91 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.59 | | | | | |
| Intersection LOS | B | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 17: Main Street and West Street**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.9 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.339 |

**Intersection Setup**

| Name | West Street | | | West Street | | | Driveway N | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | West Street | | | West Street | | | Driveway N | | | Main Street | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 75 | 0 | 0 | 0 | 0 | 310 | 93 | 14 | 208 | 0 | 40 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 75 | 0 | 0 | 0 | 0 | 310 | 93 | 14 | 208 | 0 | 40 | 60 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 19 | 0 | 0 | 0 | 0 | 78 | 23 | 4 | 52 | 0 | 10 | 15 |
| Total Analysis Volume [veh/h] | 75 | 0 | 0 | 0 | 0 | 310 | 93 | 14 | 208 | 0 | 40 | 60 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Maximum Green [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 30 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Split [s] | 0 | 50 | 0 | 0 | 50 | 0 | 0 | 40 | 0 | 0 | 40 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | C | C | C | R |
|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 46 | 46 | 36 | 36 | 36 | 36 |
| g / C, Green / Cycle | 0.51 | 0.51 | 0.40 | 0.40 | 0.40 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.06 | 0.20 | 0.08 | 0.14 | 0.02 | 0.04 |
| s, saturation flow rate [veh/h] | 1265 | 1589 | 1307 | 1446 | 1870 | 1589 |
| c, Capacity [veh/h] | 727 | 852 | 598 | 579 | 788 | 636 |
| d1, Uniform Delay [s] | 11.23 | 13.36 | 19.21 | 18.92 | 16.55 | 16.84 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.28 | 1.20 | 0.66 | 1.74 | 0.12 | 0.29 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 0.36 | 0.18 | 0.36 | 0.05 | 0.09 |
| d, Delay for Lane Group [s/veh] | 11.51 | 14.56 | 19.87 | 20.66 | 16.68 | 17.13 |
| Lane Group LOS | B | B | B | C | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.79 | 3.88 | 1.60 | 3.22 | 0.52 | 0.81 |
| 50th-Percentile Queue Length [ft/ln] | 19.72 | 97.02 | 40.02 | 80.56 | 13.05 | 20.19 |
| 95th-Percentile Queue Length [veh/ln] | 1.42 | 6.99 | 2.88 | 5.80 | 0.94 | 1.45 |
| 95th-Percentile Queue Length [ft/ln] | 35.49 | 174.63 | 72.03 | 145.00 | 23.49 | 36.34 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 11.51 | 11.51 | 11.51 | 14.56 | 14.56 | 14.56 | 19.87 | 19.87 | 20.66 | 16.68 | 16.68 | 17.13 |
| Movement LOS | B | B | B | B | B | B | B | B | C | B | B | B |
| d_A, Approach Delay [s/veh] | 11.51 | | | 14.56 | | | 20.39 | | | 16.95 | | |
| Approach LOS | B | | | B | | | C | | | B | | |
| d_I, Intersection Delay [s/veh] | 16.87 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.339 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.854 | 2.074 | 2.289 | 2.160 |
| Crosswalk LOS | A | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1022 | 1022 | 800 | 800 |
| d_b, Bicycle Delay [s] | 10.76 | 10.76 | 16.20 | 16.20 |
| I_b,int, Bicycle LOS Score for Intersection | 1.683 | 2.071 | 1.819 | 1.725 |
| Bicycle LOS | A | B | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 2 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 6 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 18: North loop Road/West Street and Willow Road Tunnel**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 9.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.367 |

**Intersection Setup**

| Name | West Street | | North Loop Road | | Willow Road Tunnel | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | West Street | | North Loop Road | | Willow Road Tunnel | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 60 | 93 | 310 | 0 | 60 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 60 | 93 | 310 | 0 | 60 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 15 | 23 | 78 | 0 | 15 | 0 |
| Total Analysis Volume [veh/h] | 60 | 93 | 310 | 0 | 60 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | |
|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 801 | 844 | 698 |
| Degree of Utilization, x | 0.19 | 0.37 | 0.09 |

**Movement, Approach, & Intersection Results**

| | | | |
|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.70 | 1.70 | 0.28 |
| 95th-Percentile Queue Length [ft] | 17.57 | 42.48 | 7.03 |
| Approach Delay [s/veh] | 8.56 | 9.72 | 8.65 |
| Approach LOS | A | A | A |
| Intersection Delay [s/veh] | 9.26 | | |
| Intersection LOS | A | | |

**Intersection Level Of Service Report**
**Intersection 19: Willow Road and Driveway M**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.0 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.150 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Driveway M | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 1 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 100.00 | 0.00 | 100.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Driveway M | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1301 | 86 | 0 | 1056 | 0 | 58 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1301 | 86 | 0 | 1056 | 0 | 58 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 325 | 22 | 0 | 264 | 0 | 15 |
| Total Analysis Volume [veh/h] | 1301 | 86 | 0 | 1056 | 0 | 58 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.15 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.98 |
| Movement LOS | A | A | | A | | C |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.52 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.11 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 15.98 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 0.37 | | | | | |
| Intersection LOS | C | | | | | |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

**Intersection Level Of Service Report**

**Intersection 20: Willow Road and Driveway N**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 20.2 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.211 |

**Intersection Setup**

| Name | Willow Road | | Willow Road | | Driveway N | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Willow Road | | Willow Road | | Driveway N | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1698 | 23 | 0 | 1283 | 0 | 63 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1698 | 23 | 0 | 1283 | 0 | 63 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 425 | 6 | 0 | 321 | 0 | 16 |
| Total Analysis Volume [veh/h] | 1698 | 23 | 0 | 1283 | 0 | 63 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.21 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.22 |
| Movement LOS | A | A | | A | | C |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.50 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.00 | | 20.22 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 0.42 | | | | | |
| Intersection LOS | C | | | | | |

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro | Scenario 2 Internal Analysis PM
Report File: \...\Internal Site Analysis PM.pdf | 12/6/2021

## Turning Movement Volume: Summary

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 1 | East Loop Road and Driveway A | 0 | 71 | 30 | 93 | 240 | 108 | 542 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 2 | East Loop Road and Driveway B | 142 | 0 | 138 | 0 | 71 | 365 | 716 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Thru | Right | Left | Right | |
| 3 | East Loop Road and Adams Court | 140 | 10 | 8 | 496 | 0 | 0 | 30 | 7 | 2 | 693 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 4 | East Loop Road and Driveway C | 66 | 144 | 472 | 1 | 5 | 220 | 908 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 5 | Main Street and Park Street/Driveway D | 0 | 77 | 151 | 0 | 259 | 65 | 1 | 48 | 0 | 176 | 81 | 0 | 858 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 6 | Park Street and Driveway E | 29 | 4 | 247 | 43 | 7 | 440 | 770 |

| ID | Intersection Name | Southbound | | Eastbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Left | Right | Left | Right | |
| 7 | Driveway E and RS6/RS7 | 13 | 37 | 24 | 9 | 83 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 8 | Park Street and East Street | 5 | 18 | 27 | 224 | 429 | 7 | 710 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 9 | East Street and Driveway F | 0 | 34 | 18 | 0 | 23 | 12 | 87 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 10 | Center Street and East Street | 4 | 9 | 13 | 54 | 48 | 5 | 133 |

| ID | Intersection Name | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Thru | Right | Left | Thru | |
| 11 | Main Street and East Street | 9 | 48 | 1 | 13 | 54 | 92 | 217 |

| ID | Intersection Name | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Right | Left | Thru | Thru | Right | |
| 12 | Driveway G and Park Street | 4 | 30 | 46 | 287 | 463 | 6 | 836 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 13 | Dwy H/Dwl and Center Street | 20 | 0 | 4 | 29 | 0 | 48 | 52 | 20 | 31 | 6 | 21 | 31 | 262 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 14 | West Street/Dwy J and Park Street | 12 | 0 | 2 | 0 | 0 | 218 | 136 | 330 | 22 | 3 | 490 | 0 | 1213 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 15 | West Street and Dwy K/Center Street | 0 | 85 | 52 | 36 | 97 | 61 | 0 | 14 | 74 | 48 | 17 | 24 | 508 |

| ID | Intersection Name | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Thru | Right | Left | Thru | Left | Right | |
| 16 | West Street/Dwy L | 24 | 85 | 110 | 97 | 97 | 50 | 463 |

| ID | Intersection Name | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Main Street and West Street | 75 | 0 | 0 | 0 | 0 | 310 | 93 | 14 | 208 | 0 | 40 | 60 | 800 |

| ID | Intersection Name | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|
| | | Left | Thru | Thru | Right | Left | Right | |
| 18 | North loop Road/West Street and Willow Road Tunnel | 60 | 93 | 310 | 0 | 60 | 0 | 523 |

| ID | Intersection Name | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | |
| 19 | Willow Road and Driveway M | 1301 | 86 | 1056 | 58 | 2501 |

| ID | Intersection Name | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|
| | | Thru | Right | Thru | Right | |
| 20 | Willow Road and Driveway N | 1698 | 23 | 1283 | 63 | 3067 |

Vistro File: \...\Internal Site Analysis_12.6.2021.vistro | Scenario 2 Internal Analysis PM
Report File: \...\Internal Site Analysis PM.pdf | 12/6/2021

## Turning Movement Volume: Detail

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 1 | East Loop Road and Driveway A | Final Base | 0 | 71 | 30 | 93 | 240 | 108 | 542 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **71** | **30** | **93** | **240** | **108** | **542** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 2 | East Loop Road and Driveway B | Final Base | 142 | 0 | 138 | 0 | 71 | 365 | 716 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **142** | **0** | **138** | **0** | **71** | **365** | **716** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Thru | Right | Left | Right | |
| 3 | East Loop Road and Adams Court | Final Base | 140 | 10 | 8 | 496 | 0 | 0 | 30 | 7 | 2 | 693 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **140** | **10** | **8** | **496** | **0** | **0** | **30** | **7** | **2** | **693** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 4 | East Loop Road and Driveway C | Final Base | 66 | 144 | 472 | 1 | 5 | 220 | 908 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **66** | **144** | **472** | **1** | **5** | **220** | **908** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 5 | Main Street and Park Street/Driveway D | Final Base | 0 | 77 | 151 | 0 | 259 | 65 | 1 | 48 | 0 | 176 | 81 | 0 | 858 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **77** | **151** | **0** | **259** | **65** | **1** | **48** | **0** | **176** | **81** | **0** | **858** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 6 | Park Street and Driveway E | Final Base | 29 | 4 | 247 | 43 | 7 | 440 | 770 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **29** | **4** | **247** | **43** | **7** | **440** | **770** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Right | |
| 7 | Driveway E and RS6/RS7 | Final Base | 13 | 37 | 24 | 9 | 83 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **13** | **37** | **24** | **9** | **83** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 8 | Park Street and East Street | Final Base | 5 | 18 | 27 | 224 | 429 | 7 | 710 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **5** | **18** | **27** | **224** | **429** | **7** | **710** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 9 | East Street and Driveway F | Final Base | 0 | 34 | 18 | 0 | 23 | 12 | 87 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **34** | **18** | **0** | **23** | **12** | **87** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 10 | Center Street and East Street | Final Base | 4 | 9 | 13 | 54 | 48 | 5 | 133 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **4** | **9** | **13** | **54** | **48** | **5** | **133** |

| ID | Intersection Name | Volume Type | Northbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Thru | Right | Left | Thru | |
| 11 | Main Street and East Street | Final Base | 9 | 48 | 1 | 13 | 54 | 92 | 217 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **9** | **48** | **1** | **13** | **54** | **92** | **217** |

| ID | Intersection Name | Volume Type | Southbound | | Eastbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Right | Left | Thru | Thru | Right | |
| 12 | Driveway G and Park Street | Final Base | 4 | 30 | 46 | 287 | 463 | 6 | 836 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **4** | **30** | **46** | **287** | **463** | **6** | **836** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 13 | Dwy H/Dwl and Center Street | Final Base | 20 | 0 | 4 | 29 | 0 | 48 | 52 | 20 | 31 | 6 | 21 | 31 | 262 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **20** | **0** | **4** | **29** | **0** | **48** | **52** | **20** | **31** | **6** | **21** | **31** | **262** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 14 | West Street/Dwy J and Park Street | Final Base | 12 | 0 | 2 | 0 | 0 | 218 | 136 | 330 | 22 | 3 | 490 | 0 | 1213 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **12** | **0** | **2** | **0** | **0** | **218** | **136** | **330** | **22** | **3** | **490** | **0** | **1213** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 15 | West Street and Dwy K/Center Street | Final Base | 0 | 85 | 52 | 36 | 97 | 61 | 0 | 14 | 74 | 48 | 17 | 24 | 508 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **0** | **85** | **52** | **36** | **97** | **61** | **0** | **14** | **74** | **48** | **17** | **24** | **508** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Westbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Left | Thru | Left | Right | |
| 16 | West Street/Dwy L | Final Base | 24 | 85 | 110 | 97 | 97 | 50 | 463 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **24** | **85** | **110** | **97** | **97** | **50** | **463** |

| ID | Intersection Name | Volume Type | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 17 | Main Street and West Street | Final Base | 75 | 0 | 0 | 0 | 0 | 310 | 93 | 14 | 208 | 0 | 40 | 60 | 800 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **75** | **0** | **0** | **0** | **0** | **310** | **93** | **14** | **208** | **0** | **40** | **60** | **800** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | | Eastbound | | Total Volume |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left | Thru | Thru | Right | Left | Right | |
| 18 | North loop Road/West Street and Willow Road Tunnel | Final Base | 60 | 93 | 310 | 0 | 60 | 0 | 523 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **60** | **93** | **310** | **0** | **60** | **0** | **523** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | |
| 19 | Willow Road and Driveway M | Final Base | 1301 | 86 | 1056 | 58 | 2501 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1301** | **86** | **1056** | **58** | **2501** |

| ID | Intersection Name | Volume Type | Northbound | | Southbound | Westbound | Total Volume |
|---|---|---|---|---|---|---|---|
| | | | Thru | Right | Thru | Right | |
| 20 | Willow Road and Driveway N | Final Base | 1698 | 23 | 1283 | 63 | 3067 |
| | | Growth Factor | 1.00 | 1.00 | 1.00 | 1.00 | - |
| | | In Process | 0 | 0 | 0 | 0 | 0 |
| | | Net New Trips | 0 | 0 | 0 | 0 | 0 |
| | | Other | 0 | 0 | 0 | 0 | 0 |
| | | **Future Total** | **1698** | **23** | **1283** | **63** | **3067** |

Generated with PTV VISTRO

Version 2021 (SP 0-4)

# Signal Warrants Report For Intersection 1: East Loop Road and Driveway A

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 123 | 71 | 348 |
| 2 | 119 | 69 | 338 |
| 3 | 117 | 67 | 331 |
| 4 | 109 | 63 | 310 |
| 5 | 97 | 56 | 275 |
| 6 | 96 | 55 | 271 |
| 7 | 95 | 55 | 268 |
| 8 | 86 | 50 | 244 |
| 9 | 85 | 49 | 240 |
| 10 | 84 | 48 | 237 |
| 11 | 73 | 42 | 205 |
| 12 | 68 | 39 | 191 |
| 13 | 66 | 38 | 188 |
| 14 | 49 | 28 | 139 |
| 15 | 49 | 28 | 139 |
| 16 | 34 | 20 | 97 |
| 17 | 20 | 11 | 56 |
| 18 | 20 | 11 | 56 |
| 19 | 11 | 6 | 31 |
| 20 | 6 | 4 | 17 |
| 21 | 4 | 2 | 10 |
| 22 | 1 | 1 | 3 |
| 23 | 1 | 1 | 3 |
| 24 | 1 | 1 | 3 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 194 | 1 | 348 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 188 | 1 | 338 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 184 | 1 | 331 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 172 | 1 | 310 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 153 | 1 | 275 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 151 | 1 | 271 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 150 | 1 | 268 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 136 | 1 | 244 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 134 | 1 | 240 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 132 | 1 | 237 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 115 | 1 | 205 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 107 | 1 | 191 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 104 | 1 | 188 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 77 | 1 | 139 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 77 | 1 | 139 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 54 | 1 | 97 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 31 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 31 | 1 | 56 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 17 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 10 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 6 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 2 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 2 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 2 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.7 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:07 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 348 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 542 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 2: East Loop Road and Driveway B

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 138 | 142 | 436 |
| 2 | 134 | 138 | 423 |
| 3 | 131 | 135 | 414 |
| 4 | 123 | 126 | 388 |
| 5 | 109 | 112 | 344 |
| 6 | 108 | 111 | 340 |
| 7 | 106 | 109 | 336 |
| 8 | 97 | 99 | 305 |
| 9 | 95 | 98 | 301 |
| 10 | 94 | 97 | 296 |
| 11 | 81 | 84 | 257 |
| 12 | 76 | 78 | 240 |
| 13 | 75 | 77 | 235 |
| 14 | 55 | 57 | 174 |
| 15 | 55 | 57 | 174 |
| 16 | 39 | 40 | 122 |
| 17 | 22 | 23 | 70 |
| 18 | 22 | 23 | 70 |
| 19 | 12 | 13 | 39 |
| 20 | 7 | 7 | 22 |
| 21 | 4 | 4 | 13 |
| 22 | 1 | 1 | 4 |
| 23 | 1 | 1 | 4 |
| 24 | 1 | 1 | 4 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 280 | 1 | 436 | No | No | No | No | No | No | No | No | Yes | No |
| 2 | 2 | 272 | 1 | 423 | No | No | No | No | No | No | No | No | Yes | No |
| 3 | 2 | 266 | 1 | 414 | No | No | No | No | No | No | No | No | Yes | No |
| 4 | 2 | 249 | 1 | 388 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 221 | 1 | 344 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 219 | 1 | 340 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 215 | 1 | 336 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 196 | 1 | 305 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 193 | 1 | 301 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 191 | 1 | 296 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 165 | 1 | 257 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 154 | 1 | 240 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 152 | 1 | 235 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 112 | 1 | 174 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 112 | 1 | 174 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 79 | 1 | 122 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 45 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 45 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 25 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 14 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 8 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 2 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 2 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 2 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 13.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 1:38 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 436 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 716 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 4: East Loop Road and Driveway C

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 473 | 210 | 225 |
| 2 | 459 | 204 | 218 |
| 3 | 449 | 200 | 214 |
| 4 | 421 | 187 | 200 |
| 5 | 374 | 166 | 178 |
| 6 | 369 | 164 | 176 |
| 7 | 364 | 162 | 173 |
| 8 | 331 | 147 | 158 |
| 9 | 326 | 145 | 155 |
| 10 | 322 | 143 | 153 |
| 11 | 279 | 124 | 133 |
| 12 | 260 | 116 | 124 |
| 13 | 255 | 113 | 122 |
| 14 | 189 | 84 | 90 |
| 15 | 189 | 84 | 90 |
| 16 | 132 | 59 | 63 |
| 17 | 76 | 34 | 36 |
| 18 | 76 | 34 | 36 |
| 19 | 43 | 19 | 20 |
| 20 | 24 | 11 | 11 |
| 21 | 14 | 6 | 7 |
| 22 | 5 | 2 | 2 |
| 23 | 5 | 2 | 2 |
| 24 | 5 | 2 | 2 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 683 | 1 | 225 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 2 | 2 | 663 | 1 | 218 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 3 | 2 | 649 | 1 | 214 | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No |
| 4 | 2 | 608 | 1 | 200 | Yes | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 5 | 2 | 540 | 1 | 178 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 6 | 2 | 533 | 1 | 176 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 7 | 2 | 526 | 1 | 173 | No | Yes | Yes | Yes | No | No | No | Yes | No | No |
| 8 | 2 | 478 | 1 | 158 | No | No | Yes | Yes | No | No | No | No | No | No |
| 9 | 2 | 471 | 1 | 155 | No | No | Yes | Yes | No | No | No | No | No | No |
| 10 | 2 | 465 | 1 | 153 | No | No | Yes | Yes | No | No | No | No | No | No |
| 11 | 2 | 403 | 1 | 133 | No | No | No | Yes | No | No | No | No | No | No |
| 12 | 2 | 376 | 1 | 124 | No | No | No | Yes | No | No | No | No | No | No |
| 13 | 2 | 368 | 1 | 122 | No | No | No | Yes | No | No | No | No | No | No |
| 14 | 2 | 273 | 1 | 90 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 273 | 1 | 90 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 191 | 1 | 63 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 110 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 110 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 62 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 35 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 20 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 7 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 4 | 7 | 10 | 13 | 0 | 0 | 3 | 7 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:44 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 225 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 908 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 6: Park Street and Driveway E

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | S |
| 1 | 447 | 290 | 33 |
| 2 | 434 | 281 | 32 |
| 3 | 425 | 276 | 31 |
| 4 | 398 | 258 | 29 |
| 5 | 353 | 229 | 26 |
| 6 | 349 | 226 | 26 |
| 7 | 344 | 223 | 25 |
| 8 | 313 | 203 | 23 |
| 9 | 308 | 200 | 23 |
| 10 | 304 | 197 | 22 |
| 11 | 264 | 171 | 19 |
| 12 | 246 | 160 | 18 |
| 13 | 241 | 157 | 18 |
| 14 | 179 | 116 | 13 |
| 15 | 179 | 116 | 13 |
| 16 | 125 | 81 | 9 |
| 17 | 72 | 46 | 5 |
| 18 | 72 | 46 | 5 |
| 19 | 40 | 26 | 3 |
| 20 | 22 | 15 | 2 |
| 21 | 13 | 9 | 1 |
| 22 | 4 | 3 | 0 |
| 23 | 4 | 3 | 0 |
| 24 | 4 | 3 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 737 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 715 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 701 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 656 | 1 | 29 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 582 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 575 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 567 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 516 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 508 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 501 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 435 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 406 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 398 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 295 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 295 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 206 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 118 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 118 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 66 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 37 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 22 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | S |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 12.4 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:06 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 33 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 770 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 7: Driveway E and RS6/RS7

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, N |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | N | W |
| 1 | 9 | 50 | 24 |
| 2 | 9 | 49 | 23 |
| 3 | 9 | 48 | 23 |
| 4 | 8 | 45 | 21 |
| 5 | 7 | 40 | 19 |
| 6 | 7 | 39 | 19 |
| 7 | 7 | 39 | 18 |
| 8 | 6 | 35 | 17 |
| 9 | 6 | 35 | 17 |
| 10 | 6 | 34 | 16 |
| 11 | 5 | 30 | 14 |
| 12 | 5 | 28 | 13 |
| 13 | 5 | 27 | 13 |
| 14 | 4 | 20 | 10 |
| 15 | 4 | 20 | 10 |
| 16 | 3 | 14 | 7 |
| 17 | 1 | 8 | 4 |
| 18 | 1 | 8 | 4 |
| 19 | 1 | 5 | 2 |
| 20 | 0 | 3 | 1 |
| 21 | 0 | 2 | 1 |
| 22 | 0 | 1 | 0 |
| 23 | 0 | 1 | 0 |
| 24 | 0 | 1 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 59 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 58 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 57 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 53 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 47 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 46 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 46 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 41 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 41 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 40 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 35 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 33 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 32 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 24 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 24 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 17 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 6 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 1 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 1 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 1 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:03 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 24 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 83 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 8: Park Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 436 | 251 | 23 |
| 2 | 423 | 243 | 22 |
| 3 | 414 | 238 | 22 |
| 4 | 388 | 223 | 20 |
| 5 | 344 | 198 | 18 |
| 6 | 340 | 196 | 18 |
| 7 | 336 | 193 | 18 |
| 8 | 305 | 176 | 16 |
| 9 | 301 | 173 | 16 |
| 10 | 296 | 171 | 16 |
| 11 | 257 | 148 | 14 |
| 12 | 240 | 138 | 13 |
| 13 | 235 | 136 | 12 |
| 14 | 174 | 100 | 9 |
| 15 | 174 | 100 | 9 |
| 16 | 122 | 70 | 6 |
| 17 | 70 | 40 | 4 |
| 18 | 70 | 40 | 4 |
| 19 | 39 | 23 | 2 |
| 20 | 22 | 13 | 1 |
| 21 | 13 | 8 | 1 |
| 22 | 4 | 3 | 0 |
| 23 | 4 | 3 | 0 |
| 24 | 4 | 3 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 687 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 666 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 652 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 611 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 542 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 536 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 529 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 481 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 474 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 467 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 405 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 378 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 371 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 274 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 274 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 192 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 110 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 110 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 62 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 35 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 21 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 7 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.1 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:03 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 23 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 710 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 9: East Street and Driveway F

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 18 | 34 | 35 |
| 2 | 17 | 33 | 34 |
| 3 | 17 | 32 | 33 |
| 4 | 16 | 30 | 31 |
| 5 | 14 | 27 | 28 |
| 6 | 14 | 27 | 27 |
| 7 | 14 | 26 | 27 |
| 8 | 13 | 24 | 25 |
| 9 | 12 | 23 | 24 |
| 10 | 12 | 23 | 24 |
| 11 | 11 | 20 | 21 |
| 12 | 10 | 19 | 19 |
| 13 | 10 | 18 | 19 |
| 14 | 7 | 14 | 14 |
| 15 | 7 | 14 | 14 |
| 16 | 5 | 10 | 10 |
| 17 | 3 | 5 | 6 |
| 18 | 3 | 5 | 6 |
| 19 | 2 | 3 | 3 |
| 20 | 1 | 2 | 2 |
| 21 | 1 | 1 | 1 |
| 22 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 52 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 50 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 49 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 46 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 41 | 1 | 28 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 41 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 40 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 37 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 35 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 35 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 31 | 1 | 21 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 29 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 28 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 21 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 21 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 15 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 8 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 8 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 5 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 3 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 0 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:05 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 35 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 87 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 10: Center Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | W, S |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | W | S | N |
| 1 | 53 | 13 | 67 |
| 2 | 51 | 13 | 65 |
| 3 | 50 | 12 | 64 |
| 4 | 47 | 12 | 60 |
| 5 | 42 | 10 | 53 |
| 6 | 41 | 10 | 52 |
| 7 | 41 | 10 | 52 |
| 8 | 37 | 9 | 47 |
| 9 | 37 | 9 | 46 |
| 10 | 36 | 9 | 46 |
| 11 | 31 | 8 | 40 |
| 12 | 29 | 7 | 37 |
| 13 | 29 | 7 | 36 |
| 14 | 21 | 5 | 27 |
| 15 | 21 | 5 | 27 |
| 16 | 15 | 4 | 19 |
| 17 | 8 | 2 | 11 |
| 18 | 8 | 2 | 11 |
| 19 | 5 | 1 | 6 |
| 20 | 3 | 1 | 3 |
| 21 | 2 | 0 | 2 |
| 22 | 1 | 0 | 1 |
| 23 | 1 | 0 | 1 |
| 24 | 1 | 0 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 66 | 1 | 67 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 64 | 1 | 65 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 62 | 1 | 64 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 59 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 52 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 51 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 51 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 46 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 46 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 45 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 39 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 36 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 36 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 26 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 26 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 19 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 10 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 10 | 1 | 11 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 6 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 4 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 2 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | N |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:09 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 67 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 133 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 11: Main Street and East Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | S |
| 1 | 146 | 14 | 57 |
| 2 | 142 | 14 | 55 |
| 3 | 139 | 13 | 54 |
| 4 | 130 | 12 | 51 |
| 5 | 115 | 11 | 45 |
| 6 | 114 | 11 | 44 |
| 7 | 112 | 11 | 44 |
| 8 | 102 | 10 | 40 |
| 9 | 101 | 10 | 39 |
| 10 | 99 | 10 | 39 |
| 11 | 86 | 8 | 34 |
| 12 | 80 | 8 | 31 |
| 13 | 79 | 8 | 31 |
| 14 | 58 | 6 | 23 |
| 15 | 58 | 6 | 23 |
| 16 | 41 | 4 | 16 |
| 17 | 23 | 2 | 9 |
| 18 | 23 | 2 | 9 |
| 19 | 13 | 1 | 5 |
| 20 | 7 | 1 | 3 |
| 21 | 4 | 0 | 2 |
| 22 | 1 | 0 | 1 |
| 23 | 1 | 0 | 1 |
| 24 | 1 | 0 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 160 | 1 | 57 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 156 | 1 | 55 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 152 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 142 | 1 | 51 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 126 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 125 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 123 | 1 | 44 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 112 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 111 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 109 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 94 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 88 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 87 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 64 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 64 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 45 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 25 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 25 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 14 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 8 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 4 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 1 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | S |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.8 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 57 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 217 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 12: Driveway G and Park Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | E | W | N |
| 1 | 469 | 333 | 34 |
| 2 | 455 | 323 | 33 |
| 3 | 446 | 316 | 32 |
| 4 | 417 | 296 | 30 |
| 5 | 371 | 263 | 27 |
| 6 | 366 | 260 | 27 |
| 7 | 361 | 256 | 26 |
| 8 | 328 | 233 | 24 |
| 9 | 324 | 230 | 23 |
| 10 | 319 | 226 | 23 |
| 11 | 277 | 196 | 20 |
| 12 | 258 | 183 | 19 |
| 13 | 253 | 180 | 18 |
| 14 | 188 | 133 | 14 |
| 15 | 188 | 133 | 14 |
| 16 | 131 | 93 | 10 |
| 17 | 75 | 53 | 5 |
| 18 | 75 | 53 | 5 |
| 19 | 42 | 30 | 3 |
| 20 | 23 | 17 | 2 |
| 21 | 14 | 10 | 1 |
| 22 | 5 | 3 | 0 |
| 23 | 5 | 3 | 0 |
| 24 | 5 | 3 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 802 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 2 | 2 | 778 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 3 | 2 | 762 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 4 | 2 | 713 | 1 | 30 | No | No | No | No | No | No | No | No | No | No |
| 5 | 2 | 634 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 6 | 2 | 626 | 1 | 27 | No | No | No | No | No | No | No | No | No | No |
| 7 | 2 | 617 | 1 | 26 | No | No | No | No | No | No | No | No | No | No |
| 8 | 2 | 561 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 554 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 545 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 473 | 1 | 20 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 441 | 1 | 19 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 433 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 321 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 321 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 224 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 128 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 128 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 72 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 40 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 24 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 8 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 8 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 8 | 1 | 0 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 10.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:06 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 34 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 836 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 13: Dwy H/Dwl and Center Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | E, W |
| Minor Approaches | N, S |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | E | W | N | S |
| 1 | 58 | 103 | 77 | 24 |
| 2 | 56 | 100 | 75 | 23 |
| 3 | 55 | 98 | 73 | 23 |
| 4 | 52 | 92 | 69 | 21 |
| 5 | 46 | 81 | 61 | 19 |
| 6 | 45 | 80 | 60 | 19 |
| 7 | 45 | 79 | 59 | 18 |
| 8 | 41 | 72 | 54 | 17 |
| 9 | 40 | 71 | 53 | 17 |
| 10 | 39 | 70 | 52 | 16 |
| 11 | 34 | 61 | 45 | 14 |
| 12 | 32 | 57 | 42 | 13 |
| 13 | 31 | 56 | 42 | 13 |
| 14 | 23 | 41 | 31 | 10 |
| 15 | 23 | 41 | 31 | 10 |
| 16 | 16 | 29 | 22 | 7 |
| 17 | 9 | 16 | 12 | 4 |
| 18 | 9 | 16 | 12 | 4 |
| 19 | 5 | 9 | 7 | 2 |
| 20 | 3 | 5 | 4 | 1 |
| 21 | 2 | 3 | 2 | 1 |
| 22 | 1 | 1 | 1 | 0 |
| 23 | 1 | 1 | 1 | 0 |
| 24 | 1 | 1 | 1 | 0 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 161 | 1 | 77 | No | No | No | No | No | No | No | No | No | No |
| 2 | 1 | 156 | 1 | 75 | No | No | No | No | No | No | No | No | No | No |
| 3 | 1 | 153 | 1 | 73 | No | No | No | No | No | No | No | No | No | No |
| 4 | 1 | 144 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 127 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 125 | 1 | 60 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 124 | 1 | 59 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 113 | 1 | 54 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 111 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 109 | 1 | 52 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 95 | 1 | 45 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 89 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 87 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 64 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 64 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 45 | 1 | 22 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 25 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 25 | 1 | 12 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 14 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 8 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 5 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 2 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | N | S |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 9.4 | 10.1 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:12 | 0:04 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 77 | 24 |
| High Minor Volume Condition Met | No | No |
| Total Entering Volume on All Approaches During Same Hour | 262 | 262 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 15: West Street and Dwy K/Center Street

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E, W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets | |
|---|---|---|---|---|
| | N | S | E | W |
| 1 | 194 | 137 | 89 | 88 |
| 2 | 188 | 133 | 86 | 85 |
| 3 | 184 | 130 | 85 | 84 |
| 4 | 173 | 122 | 79 | 78 |
| 5 | 153 | 108 | 70 | 70 |
| 6 | 151 | 107 | 69 | 69 |
| 7 | 149 | 105 | 69 | 68 |
| 8 | 136 | 96 | 62 | 62 |
| 9 | 134 | 95 | 61 | 61 |
| 10 | 132 | 93 | 61 | 60 |
| 11 | 114 | 81 | 53 | 52 |
| 12 | 107 | 75 | 49 | 48 |
| 13 | 105 | 74 | 48 | 48 |
| 14 | 78 | 55 | 36 | 35 |
| 15 | 78 | 55 | 36 | 35 |
| 16 | 54 | 38 | 25 | 25 |
| 17 | 31 | 22 | 14 | 14 |
| 18 | 31 | 22 | 14 | 14 |
| 19 | 17 | 12 | 8 | 8 |
| 20 | 10 | 7 | 4 | 4 |
| 21 | 6 | 4 | 3 | 3 |
| 22 | 2 | 1 | 1 | 1 |
| 23 | 2 | 1 | 1 | 1 |
| 24 | 2 | 1 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 331 | 1 | 89 | No | No | No | Yes | No | No | No | No | No | No |
| 2 | 1 | 321 | 1 | 86 | No | No | No | Yes | No | No | No | No | No | No |
| 3 | 1 | 314 | 1 | 85 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 295 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 261 | 1 | 70 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 258 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 254 | 1 | 69 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 232 | 1 | 62 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 229 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 225 | 1 | 61 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 195 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 182 | 1 | 49 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 179 | 1 | 48 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 133 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 133 | 1 | 36 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 92 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 53 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 53 | 1 | 14 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 29 | 1 | 8 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 17 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 10 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E | W |
|---|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.4 | 7.8 |
| Number of Lanes on Minor Street Approach | 1 | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:12 | 0:11 |
| Delay Condition Met | No | No |
| Volume on Minor Street Approach During Same Hour | 89 | 88 |
| High Minor Volume Condition Met | No | No |
| Total Entering Volume on All Approaches During Same Hour | 508 | 508 |
| Number of Approaches on Intersection | 4 | 4 |
| Total Volume Condition Met | No | No |
| Warrant Met for Approach | No | No |
| **Warrant Met for Intersection** | **No** | |

# Signal Warrants Report For Intersection 16: West Street/Dwy L

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 207 | 109 | 147 |
| 2 | 201 | 106 | 143 |
| 3 | 197 | 104 | 140 |
| 4 | 184 | 97 | 131 |
| 5 | 164 | 86 | 116 |
| 6 | 161 | 85 | 115 |
| 7 | 159 | 84 | 113 |
| 8 | 145 | 76 | 103 |
| 9 | 143 | 75 | 101 |
| 10 | 141 | 74 | 100 |
| 11 | 122 | 64 | 87 |
| 12 | 114 | 60 | 81 |
| 13 | 112 | 59 | 79 |
| 14 | 83 | 44 | 59 |
| 15 | 83 | 44 | 59 |
| 16 | 58 | 31 | 41 |
| 17 | 33 | 17 | 24 |
| 18 | 33 | 17 | 24 |
| 19 | 19 | 10 | 13 |
| 20 | 10 | 5 | 7 |
| 21 | 6 | 3 | 4 |
| 22 | 2 | 1 | 1 |
| 23 | 2 | 1 | 1 |
| 24 | 2 | 1 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 316 | 1 | 147 | No | No | No | Yes | No | No | No | No | No | No |
| 2 | 1 | 307 | 1 | 143 | No | No | No | Yes | No | No | No | No | No | No |
| 3 | 1 | 301 | 1 | 140 | No | No | No | Yes | No | No | No | No | No | No |
| 4 | 1 | 281 | 1 | 131 | No | No | No | Yes | No | No | No | No | No | No |
| 5 | 1 | 250 | 1 | 116 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 246 | 1 | 115 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 243 | 1 | 113 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 221 | 1 | 103 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 218 | 1 | 101 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 215 | 1 | 100 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 186 | 1 | 87 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 174 | 1 | 81 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 171 | 1 | 79 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 127 | 1 | 59 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 127 | 1 | 59 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 89 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 50 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 50 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 29 | 1 | 13 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 15 | 1 | 7 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 9 | 1 | 4 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 3 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |

## Warrant 3 Condition A

| | |
|---|---|
| Orientation | E |
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 11.9 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:29 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 147 |
| High Minor Volume Condition Met | Yes |
| Total Entering Volume on All Approaches During Same Hour | 463 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 18: North loop Road/West Street and Willow Road Tunnel

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | W |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | W |
| 1 | 310 | 153 | 60 |
| 2 | 301 | 148 | 58 |
| 3 | 295 | 145 | 57 |
| 4 | 276 | 136 | 53 |
| 5 | 245 | 121 | 47 |
| 6 | 242 | 119 | 47 |
| 7 | 239 | 118 | 46 |
| 8 | 217 | 107 | 42 |
| 9 | 214 | 106 | 41 |
| 10 | 211 | 104 | 41 |
| 11 | 183 | 90 | 35 |
| 12 | 171 | 84 | 33 |
| 13 | 167 | 83 | 32 |
| 14 | 124 | 61 | 24 |
| 15 | 124 | 61 | 24 |
| 16 | 87 | 43 | 17 |
| 17 | 50 | 24 | 10 |
| 18 | 50 | 24 | 10 |
| 19 | 28 | 14 | 5 |
| 20 | 16 | 8 | 3 |
| 21 | 9 | 5 | 2 |
| 22 | 3 | 2 | 1 |
| 23 | 3 | 2 | 1 |
| 24 | 3 | 2 | 1 |

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 1 | 463 | 1 | 60 | No | No | No | No | No | No | No | Yes | No | No |
| 2 | 1 | 449 | 1 | 58 | No | No | No | No | No | No | No | Yes | No | No |
| 3 | 1 | 440 | 1 | 57 | No | No | No | No | No | No | No | Yes | No | No |
| 4 | 1 | 412 | 1 | 53 | No | No | No | No | No | No | No | No | No | No |
| 5 | 1 | 366 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 6 | 1 | 361 | 1 | 47 | No | No | No | No | No | No | No | No | No | No |
| 7 | 1 | 357 | 1 | 46 | No | No | No | No | No | No | No | No | No | No |
| 8 | 1 | 324 | 1 | 42 | No | No | No | No | No | No | No | No | No | No |
| 9 | 1 | 320 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 10 | 1 | 315 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 11 | 1 | 273 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 12 | 1 | 255 | 1 | 33 | No | No | No | No | No | No | No | No | No | No |
| 13 | 1 | 250 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 14 | 1 | 185 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 15 | 1 | 185 | 1 | 24 | No | No | No | No | No | No | No | No | No | No |
| 16 | 1 | 130 | 1 | 17 | No | No | No | No | No | No | No | No | No | No |
| 17 | 1 | 74 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 18 | 1 | 74 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 19 | 1 | 42 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 1 | 24 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 1 | 14 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 1 | 5 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | W |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 8.6 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:08 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 60 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 523 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | No |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 19: Willow Road and Driveway M

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 1056 | 1387 | 58 |
| 2 | 1024 | 1345 | 56 |
| 3 | 1003 | 1318 | 55 |
| 4 | 940 | 1234 | 52 |
| 5 | 834 | 1096 | 46 |
| 6 | 824 | 1082 | 45 |
| 7 | 813 | 1068 | 45 |
| 8 | 739 | 971 | 41 |
| 9 | 729 | 957 | 40 |
| 10 | 718 | 943 | 39 |
| 11 | 623 | 818 | 34 |
| 12 | 581 | 763 | 32 |
| 13 | 570 | 749 | 31 |
| 14 | 422 | 555 | 23 |
| 15 | 422 | 555 | 23 |
| 16 | 296 | 388 | 16 |
| 17 | 169 | 222 | 9 |
| 18 | 169 | 222 | 9 |
| 19 | 95 | 125 | 5 |
| 20 | 53 | 69 | 3 |
| 21 | 32 | 42 | 2 |
| 22 | 11 | 14 | 1 |
| 23 | 11 | 14 | 1 |
| 24 | 11 | 14 | 1 |

Generated with PTV VISTRO
Version 2021 (SP 0-4)

## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 2443 | 1 | 58 | No | No | No | No | No | No | Yes | Yes | No | No |
| 2 | 2 | 2369 | 1 | 56 | No | No | No | No | No | No | Yes | Yes | No | No |
| 3 | 2 | 2321 | 1 | 55 | No | No | No | No | No | No | Yes | Yes | No | No |
| 4 | 2 | 2174 | 1 | 52 | No | No | No | No | No | No | Yes | Yes | No | No |
| 5 | 2 | 1930 | 1 | 46 | No | No | No | No | No | No | No | Yes | No | No |
| 6 | 2 | 1906 | 1 | 45 | No | No | No | No | No | No | No | Yes | No | No |
| 7 | 2 | 1881 | 1 | 45 | No | No | No | No | No | No | No | Yes | No | No |
| 8 | 2 | 1710 | 1 | 41 | No | No | No | No | No | No | No | No | No | No |
| 9 | 2 | 1686 | 1 | 40 | No | No | No | No | No | No | No | No | No | No |
| 10 | 2 | 1661 | 1 | 39 | No | No | No | No | No | No | No | No | No | No |
| 11 | 2 | 1441 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 1344 | 1 | 32 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 1319 | 1 | 31 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 977 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 977 | 1 | 23 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 684 | 1 | 16 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 391 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 391 | 1 | 9 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 220 | 1 | 5 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 122 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 74 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 25 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 25 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 25 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 7 | 0 | 0 |

## Warrant 3 Condition A

| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 16 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:15 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 58 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 2501 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

# Signal Warrants Report For Intersection 20: Willow Road and Driveway N

## Warrants Summary

| Warrant | Name | Met? |
|---|---|---|
| #1 | Eight Hour Vehicular Volume | No |
| #2 | Four Hour Vehicular Volume | No |
| #3 | Peak Hour | No |

## Intersection Warrants Parameters

| | |
|---|---|
| Major Approaches | N, S |
| Minor Approaches | E |
| Speed > 40mph | No |
| Population < 10,000 | No |
| Warrant Factor | 100% |

## Warrant Analysis Traffic Volumes

| Hour | Major Streets | | Minor Streets |
|---|---|---|---|
| | N | S | E |
| 1 | 1283 | 1721 | 63 |
| 2 | 1245 | 1669 | 61 |
| 3 | 1219 | 1635 | 60 |
| 4 | 1142 | 1532 | 56 |
| 5 | 1014 | 1360 | 50 |
| 6 | 1001 | 1342 | 49 |
| 7 | 988 | 1325 | 49 |
| 8 | 898 | 1205 | 44 |
| 9 | 885 | 1187 | 43 |
| 10 | 872 | 1170 | 43 |
| 11 | 757 | 1015 | 37 |
| 12 | 706 | 947 | 35 |
| 13 | 693 | 929 | 34 |
| 14 | 513 | 688 | 25 |
| 15 | 513 | 688 | 25 |
| 16 | 359 | 482 | 18 |
| 17 | 205 | 275 | 10 |
| 18 | 205 | 275 | 10 |
| 19 | 115 | 155 | 6 |
| 20 | 64 | 86 | 3 |
| 21 | 38 | 52 | 2 |
| 22 | 13 | 17 | 1 |
| 23 | 13 | 17 | 1 |
| 24 | 13 | 17 | 1 |

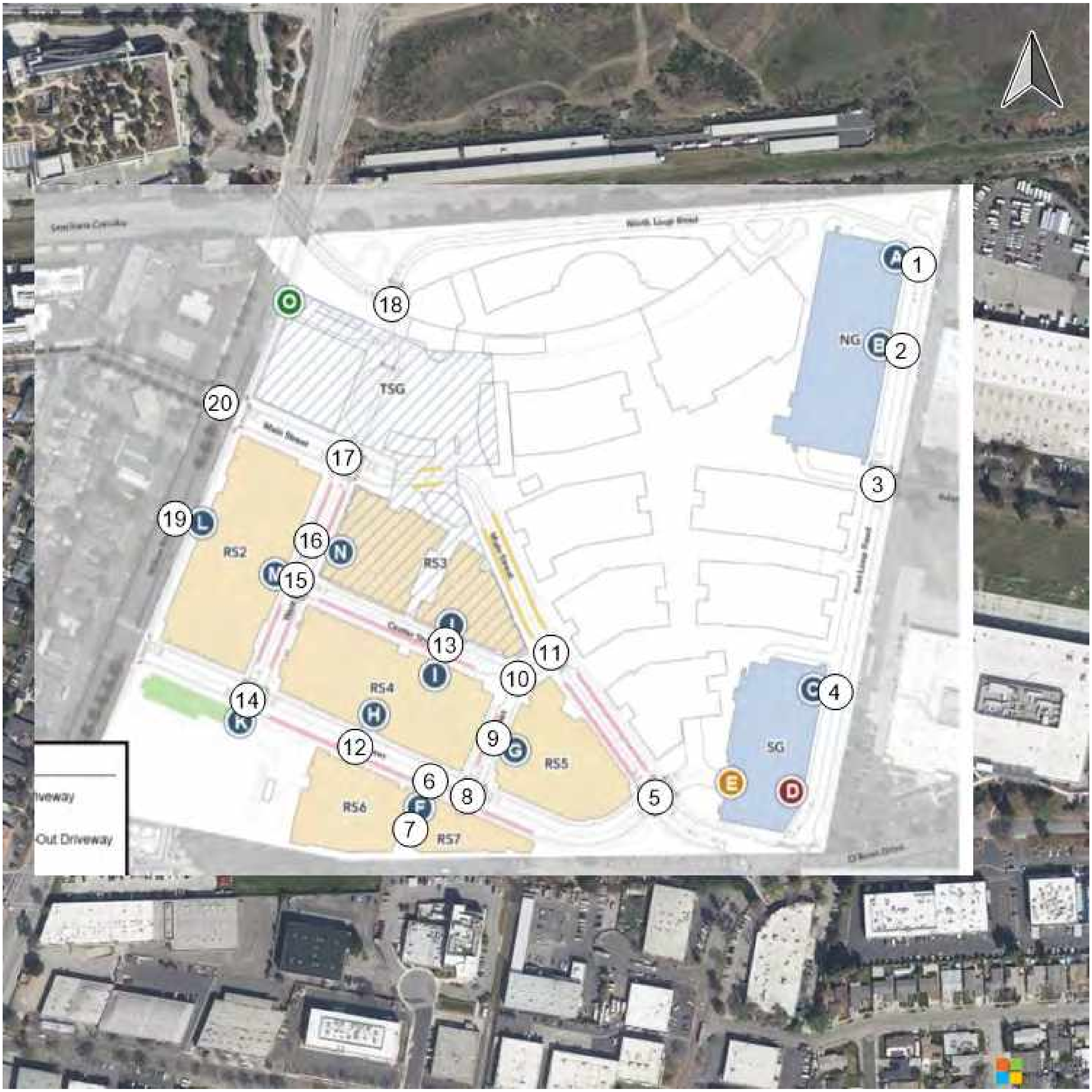
## Warrant Analysis by Hour

| Hour | Major Streets | | Minor Street | | Warrant 1 Condition A | | | | Warrant 1 Condition B | | | | Warrant 2 | Warrant 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Volume | Number | Volume | 100% | 80% | 70% | 56% | 100% | 80% | 70% | 56% | | Condition B |
| 1 | 2 | 3004 | 1 | 63 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 2 | 2 | 2914 | 1 | 61 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 3 | 2 | 2854 | 1 | 60 | No | No | No | No | No | Yes | Yes | Yes | No | No |
| 4 | 2 | 2674 | 1 | 56 | No | No | No | No | No | No | Yes | Yes | No | No |
| 5 | 2 | 2374 | 1 | 50 | No | No | No | No | No | No | No | Yes | No | No |
| 6 | 2 | 2343 | 1 | 49 | No | No | No | No | No | No | No | Yes | No | No |
| 7 | 2 | 2313 | 1 | 49 | No | No | No | No | No | No | No | Yes | No | No |
| 8 | 2 | 2103 | 1 | 44 | No | No | No | No | No | No | No | Yes | No | No |
| 9 | 2 | 2072 | 1 | 43 | No | No | No | No | No | No | No | Yes | No | No |
| 10 | 2 | 2042 | 1 | 43 | No | No | No | No | No | No | No | Yes | No | No |
| 11 | 2 | 1772 | 1 | 37 | No | No | No | No | No | No | No | No | No | No |
| 12 | 2 | 1653 | 1 | 35 | No | No | No | No | No | No | No | No | No | No |
| 13 | 2 | 1622 | 1 | 34 | No | No | No | No | No | No | No | No | No | No |
| 14 | 2 | 1201 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 15 | 2 | 1201 | 1 | 25 | No | No | No | No | No | No | No | No | No | No |
| 16 | 2 | 841 | 1 | 18 | No | No | No | No | No | No | No | No | No | No |
| 17 | 2 | 480 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 18 | 2 | 480 | 1 | 10 | No | No | No | No | No | No | No | No | No | No |
| 19 | 2 | 270 | 1 | 6 | No | No | No | No | No | No | No | No | No | No |
| 20 | 2 | 150 | 1 | 3 | No | No | No | No | No | No | No | No | No | No |
| 21 | 2 | 90 | 1 | 2 | No | No | No | No | No | No | No | No | No | No |
| 22 | 2 | 30 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 23 | 2 | 30 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| 24 | 2 | 30 | 1 | 1 | No | No | No | No | No | No | No | No | No | No |
| Hours Met | | | | | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 10 | 0 | 0 |

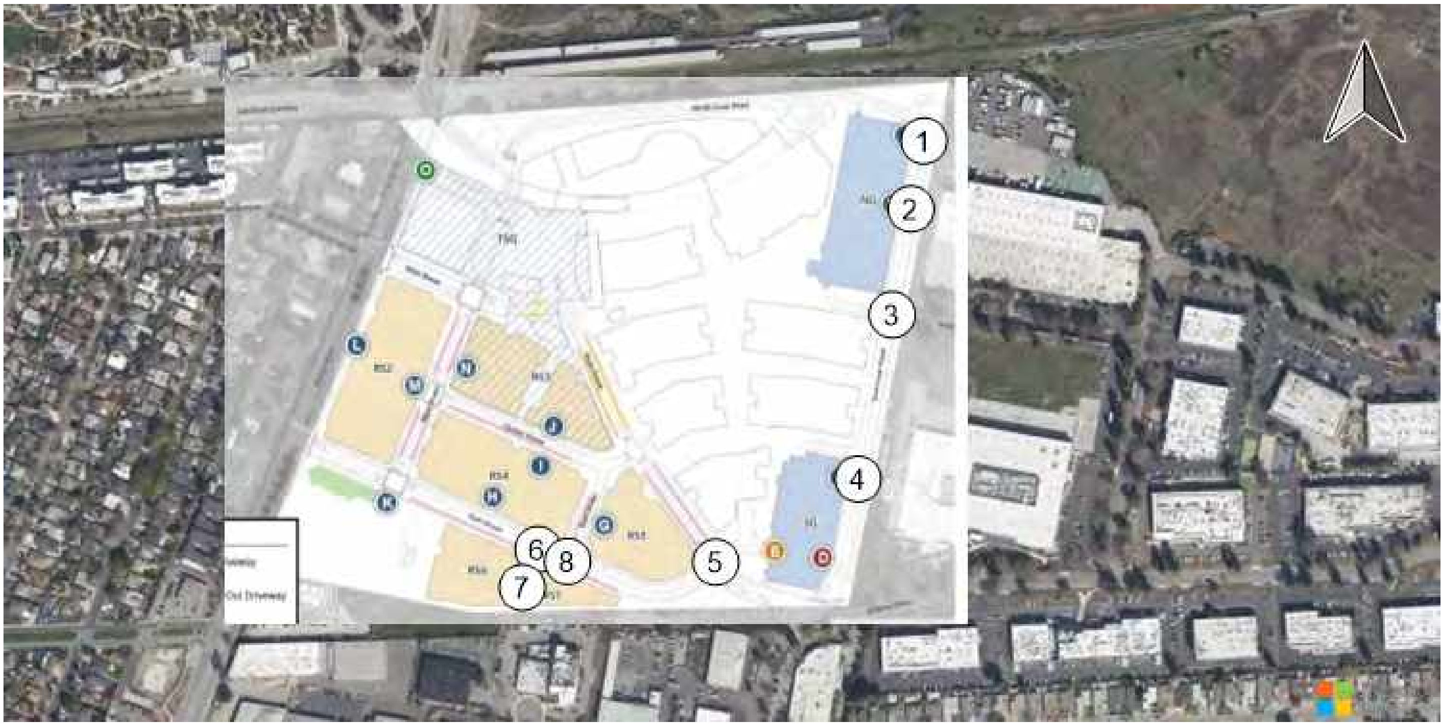
## Warrant 3 Condition A

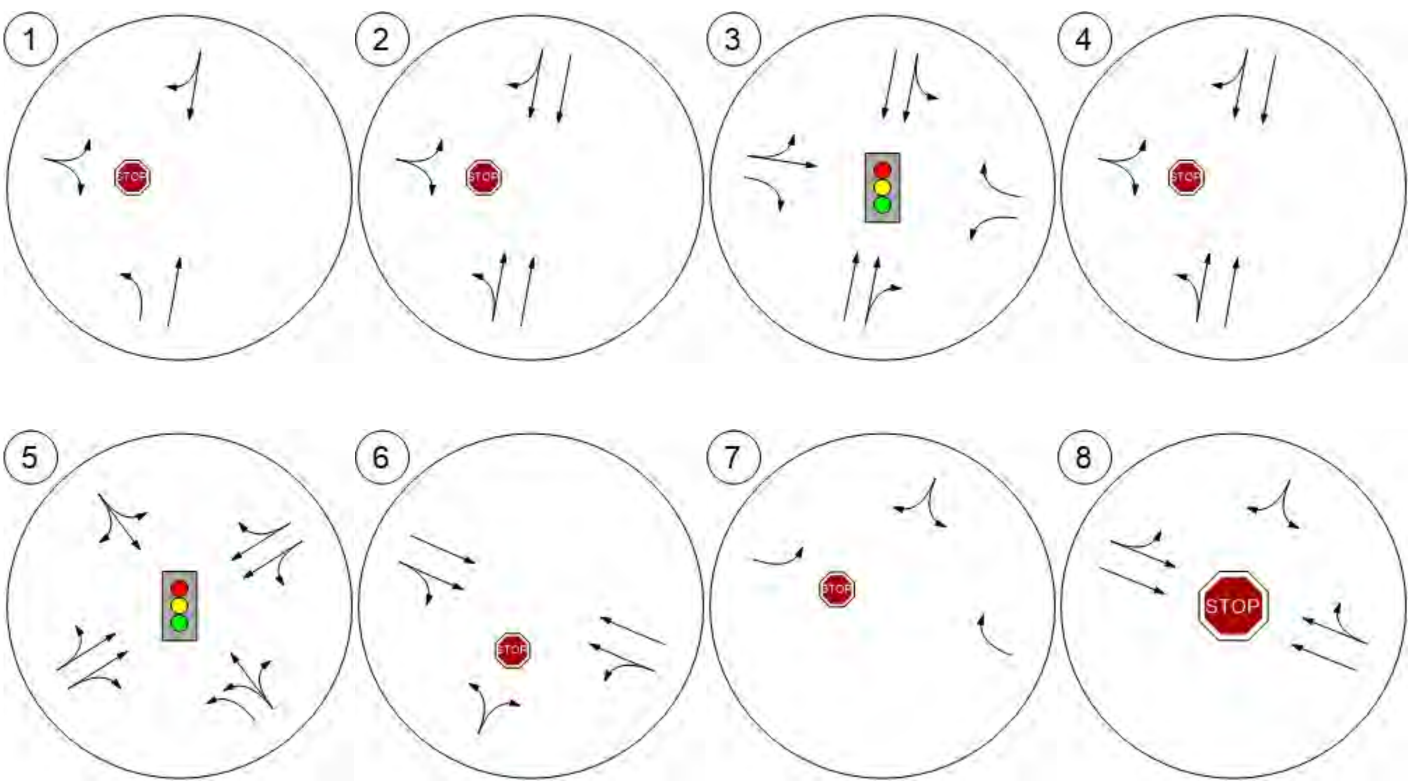
| Orientation | E |
|---|---|
| Total Stopped Delay Per Vehicle on Minor Approach (s) | 20.2 |
| Number of Lanes on Minor Street Approach | 1 |
| VehicleHours of Stopped Delay on Minor Approach ([h]h:mm) | 0:21 |
| Delay Condition Met | No |
| Volume on Minor Street Approach During Same Hour | 63 |
| High Minor Volume Condition Met | No |
| Total Entering Volume on All Approaches During Same Hour | 3067 |
| Number of Approaches on Intersection | 3 |
| Total Volume Condition Met | Yes |
| Warrant Met for Approach | No |
| **Warrant Met for Intersection** | **No** |

Study Intersections



## Lane Configuration and Traffic Control

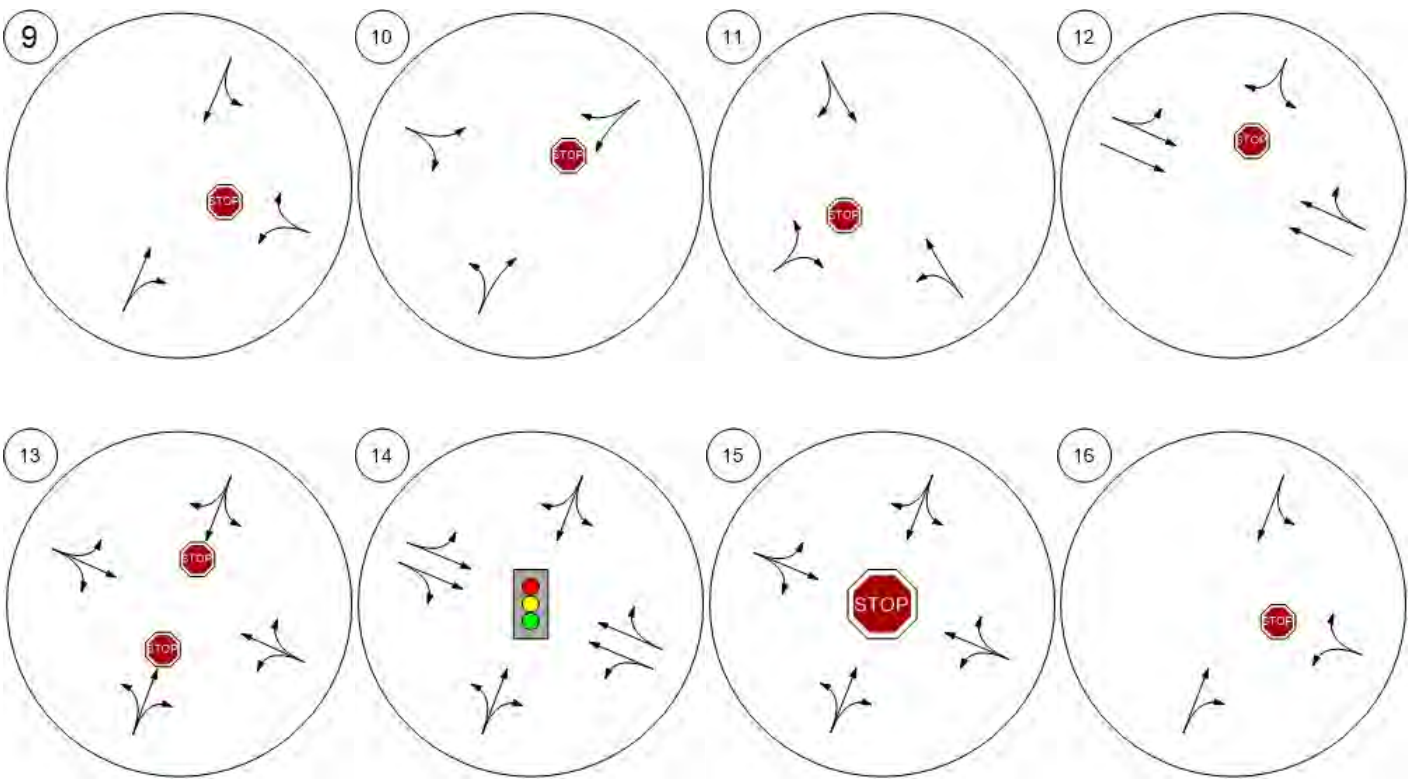


Generated with PTV VISTRO

Version 2021 (SP 0-4)

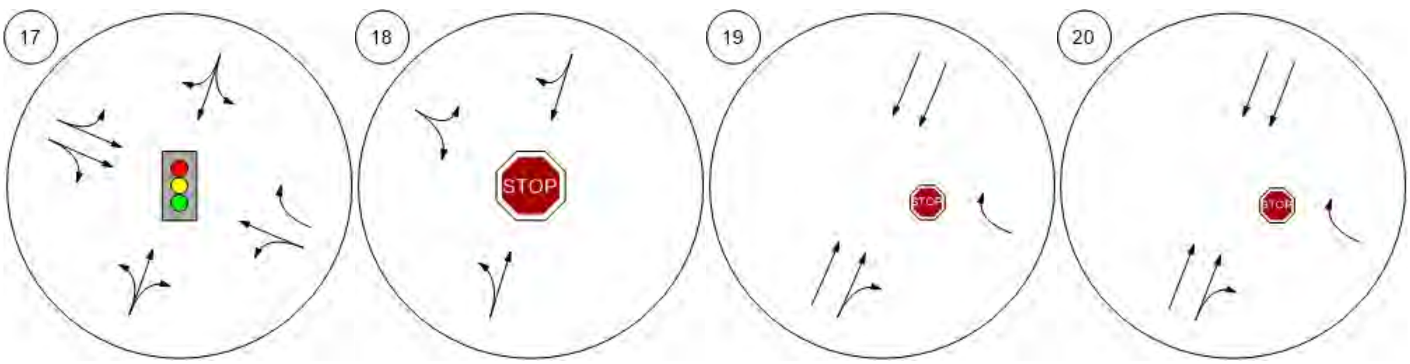
## Lane Configuration and Traffic Control

Generated with PTV VISTRO

Version 2021 (SP 0-4)

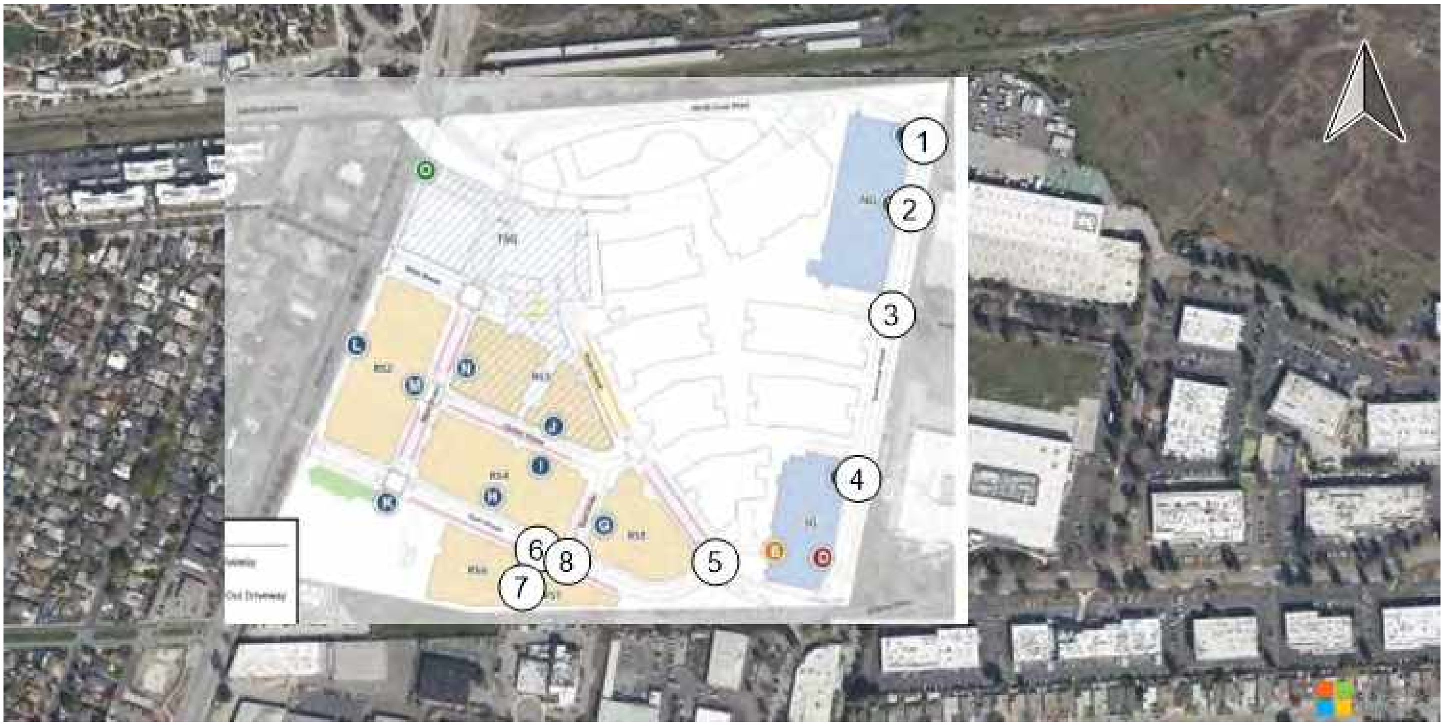
## Lane Configuration and Traffic Control

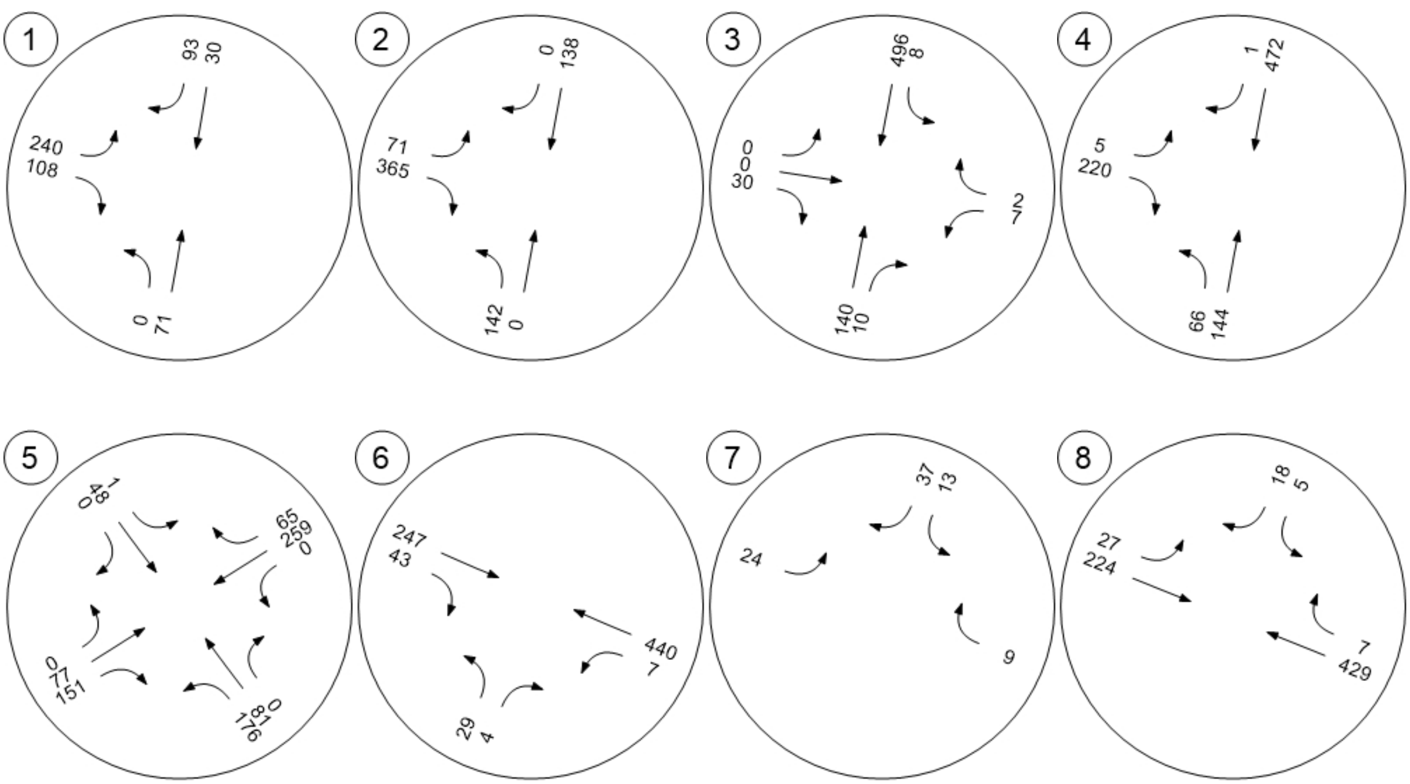



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Base Volume

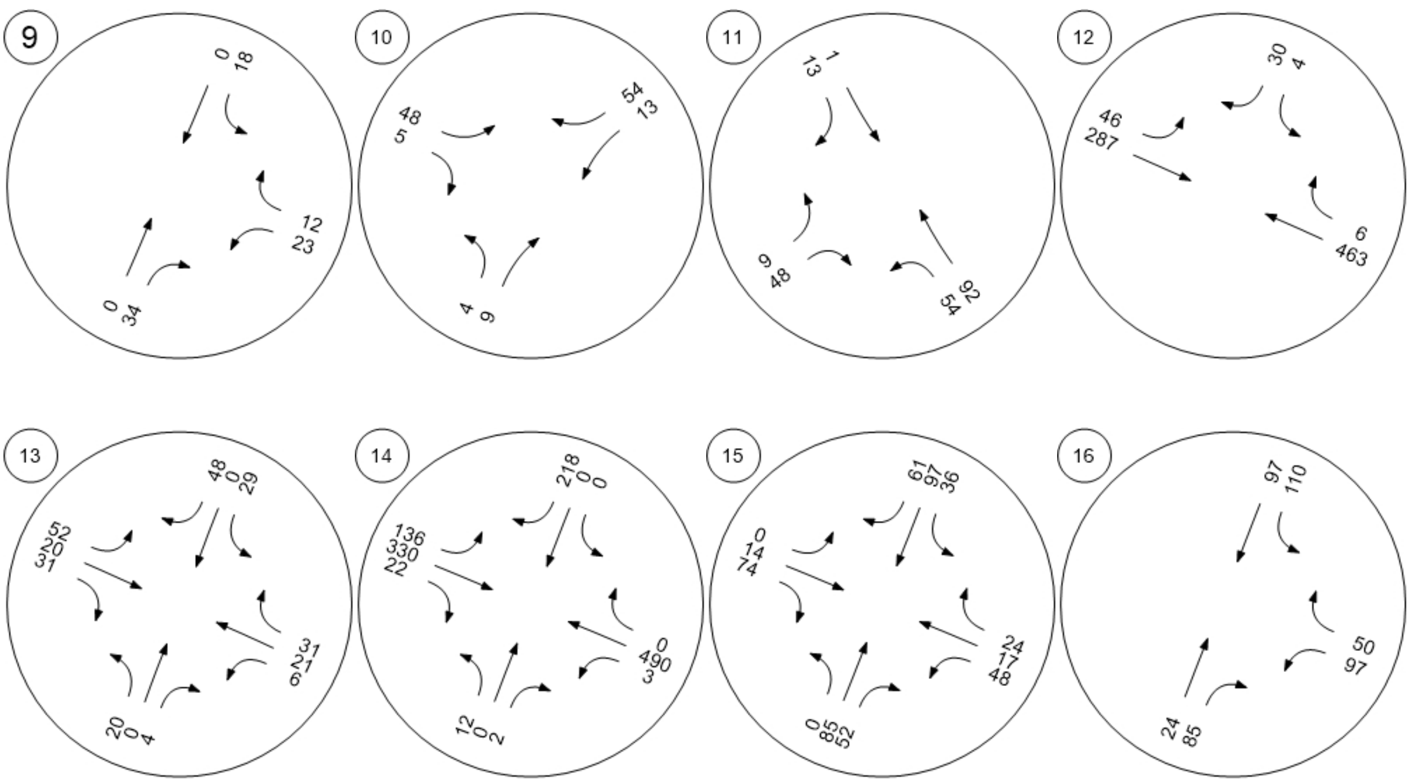




Generated with PTV VISTRO

Version 2021 (SP 0-4)

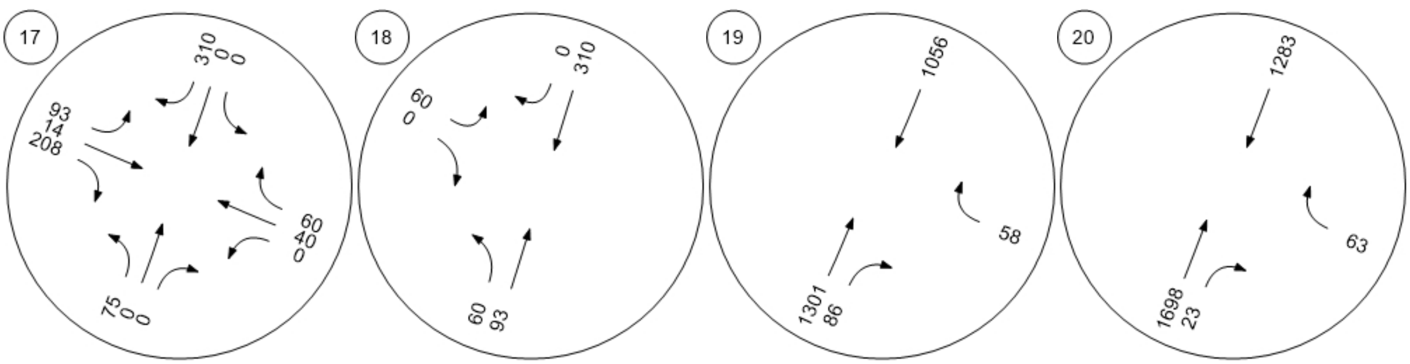
Traffic Volume - Base Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

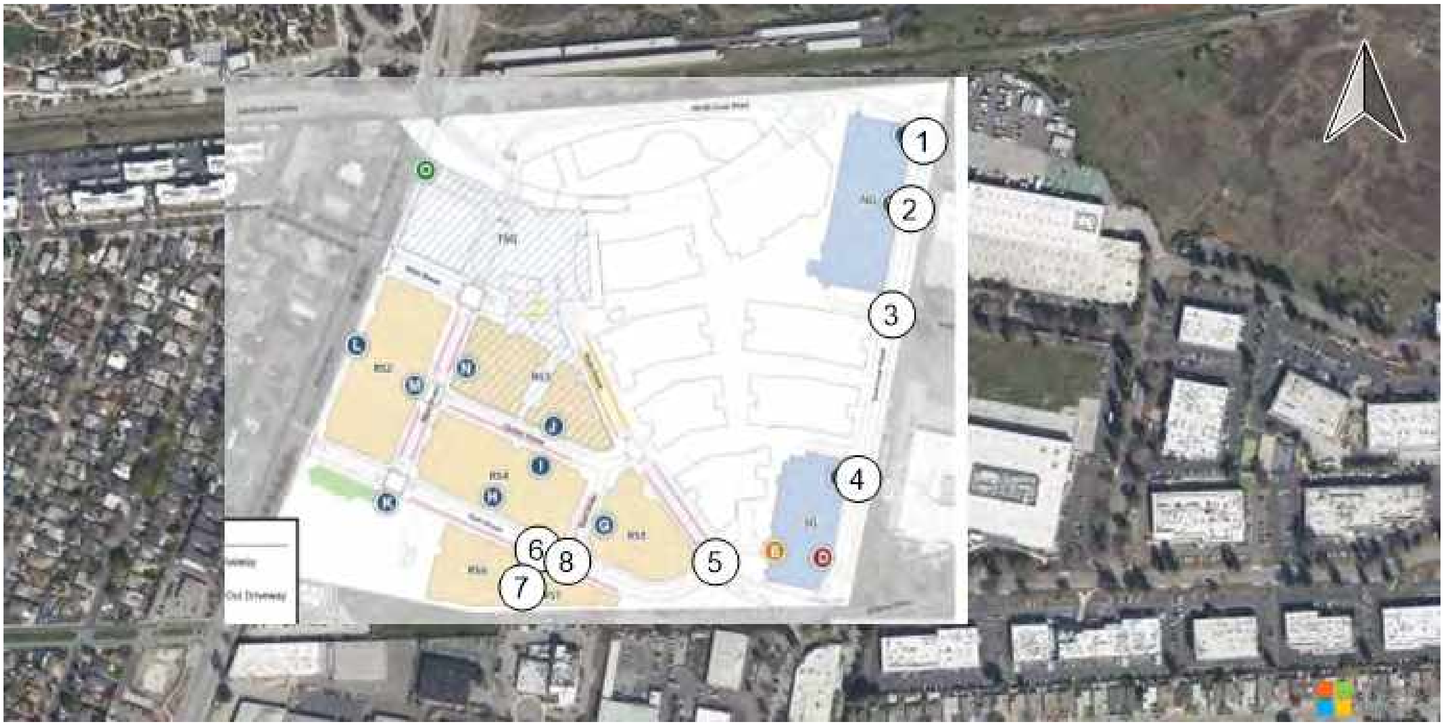
## Traffic Volume - Base Volume

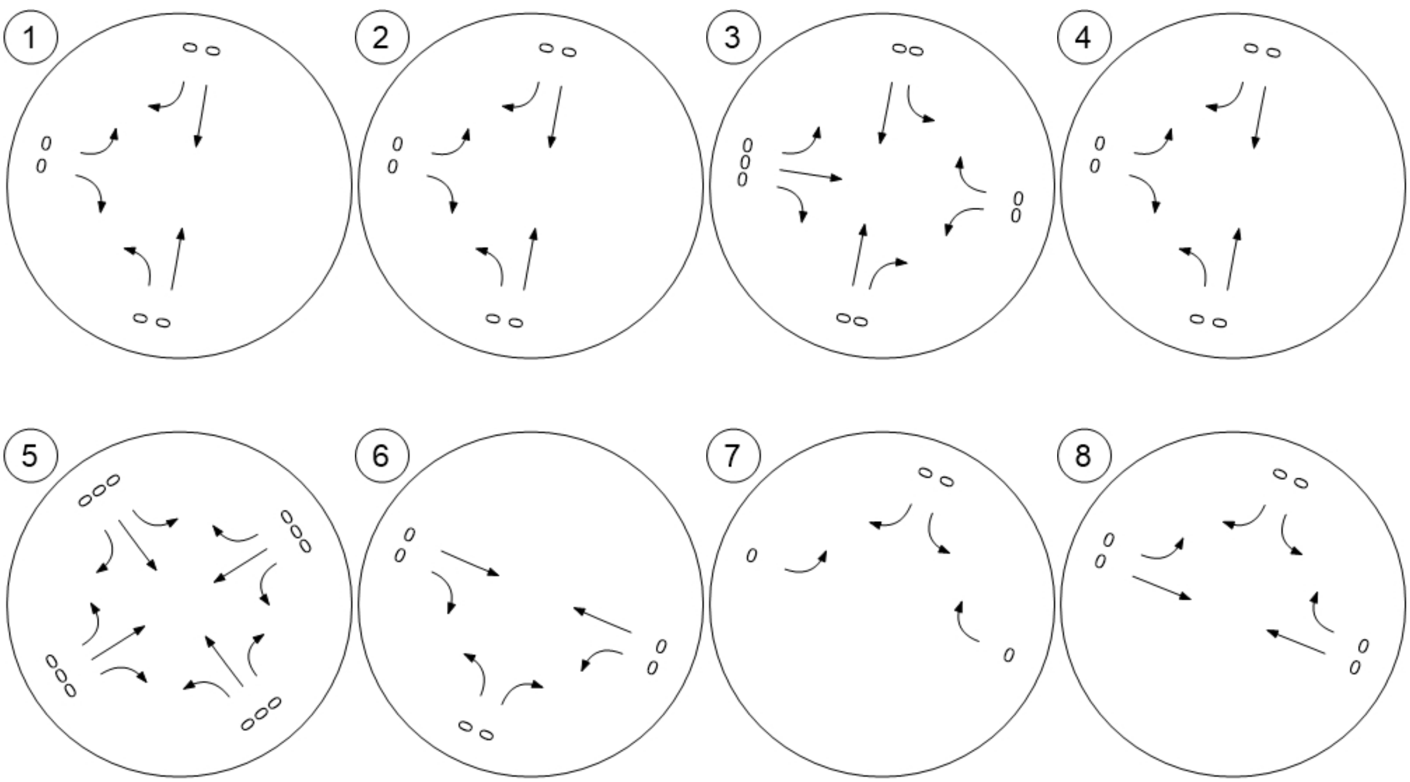



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - In-Process Volume

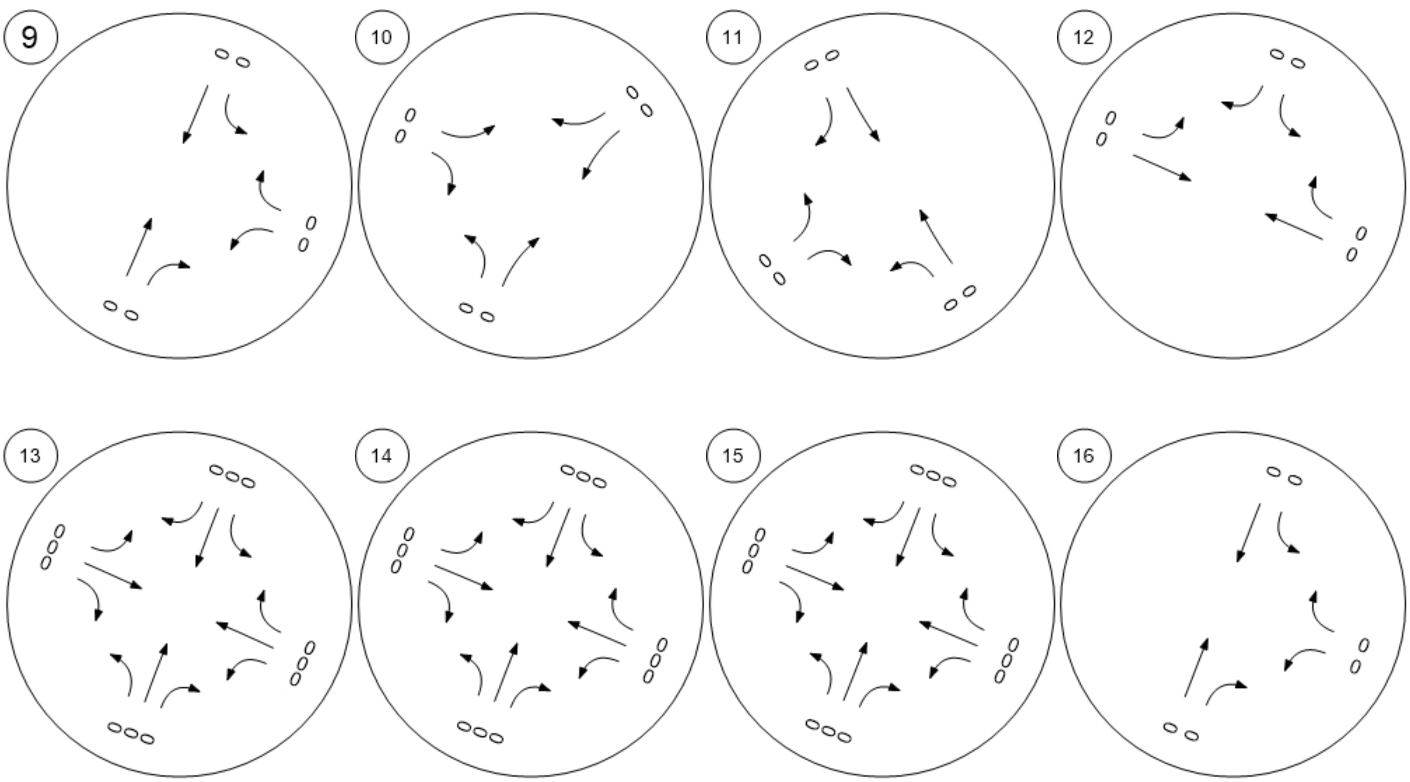


Generated with PTV VISTRO

Version 2021 (SP 0-4)

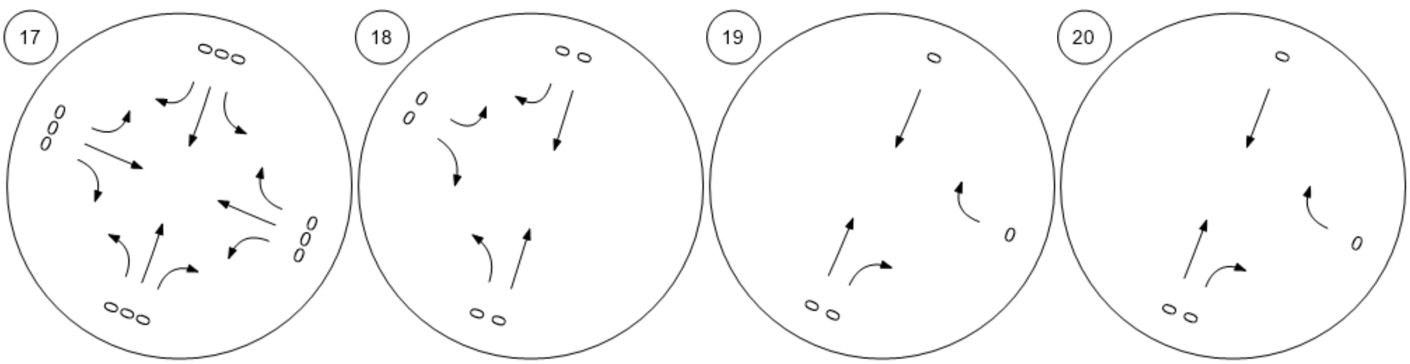
Traffic Volume - In-Process Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

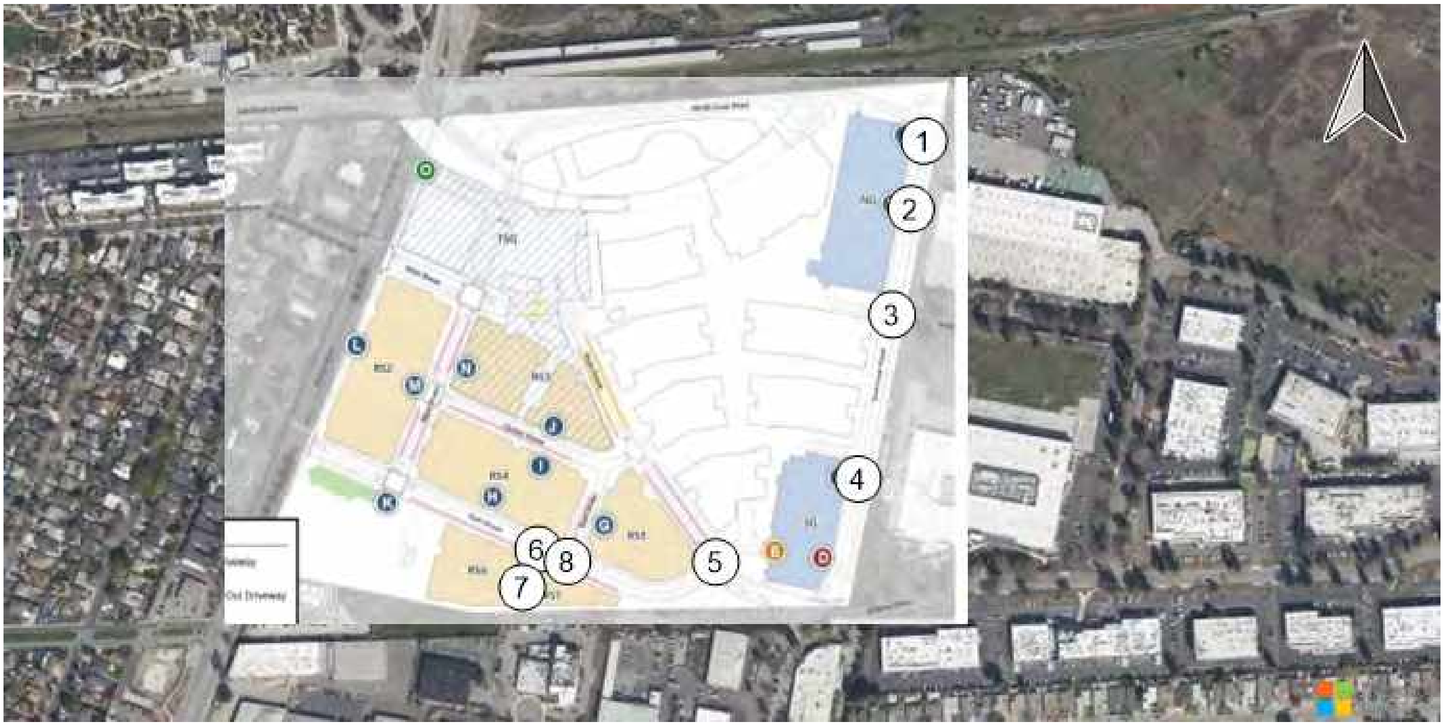
Traffic Volume - In-Process Volume

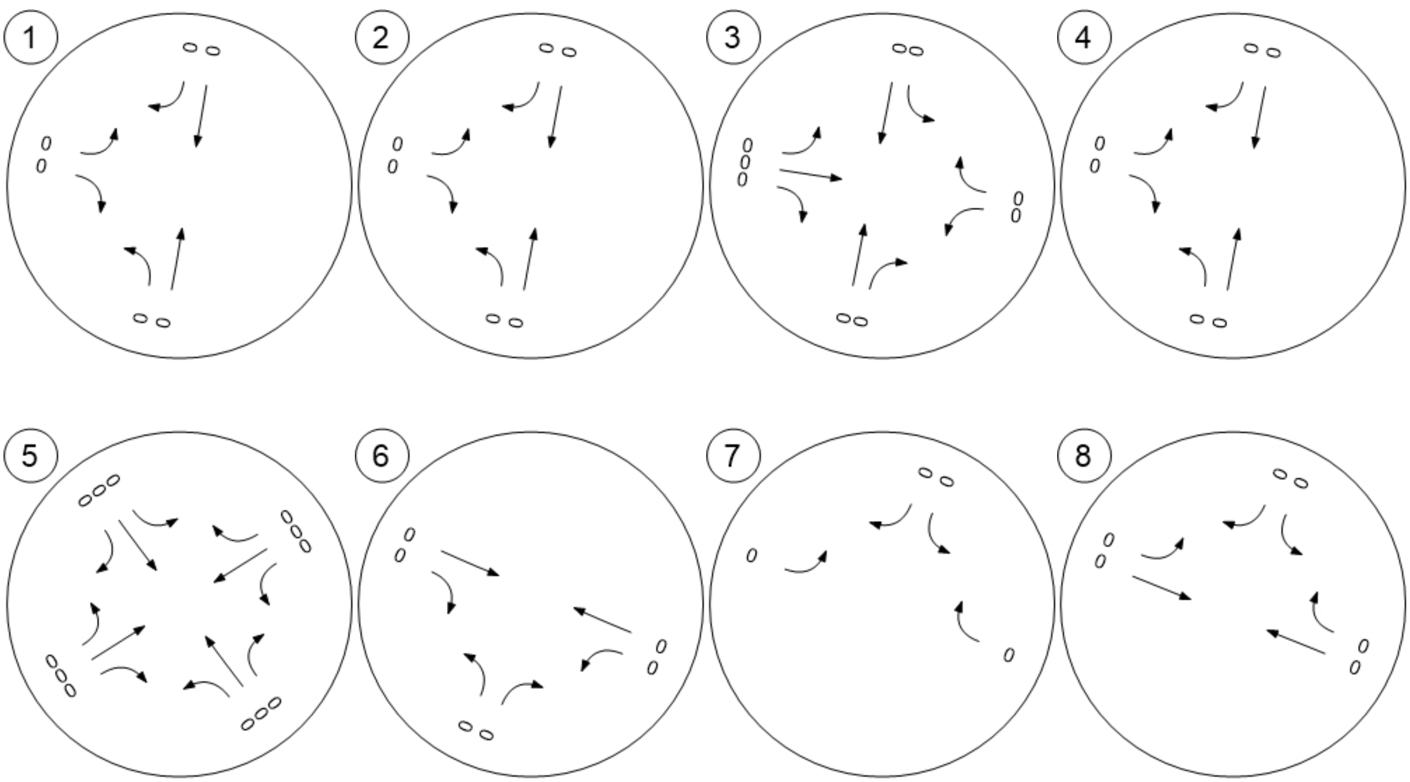



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Net New Site Trips

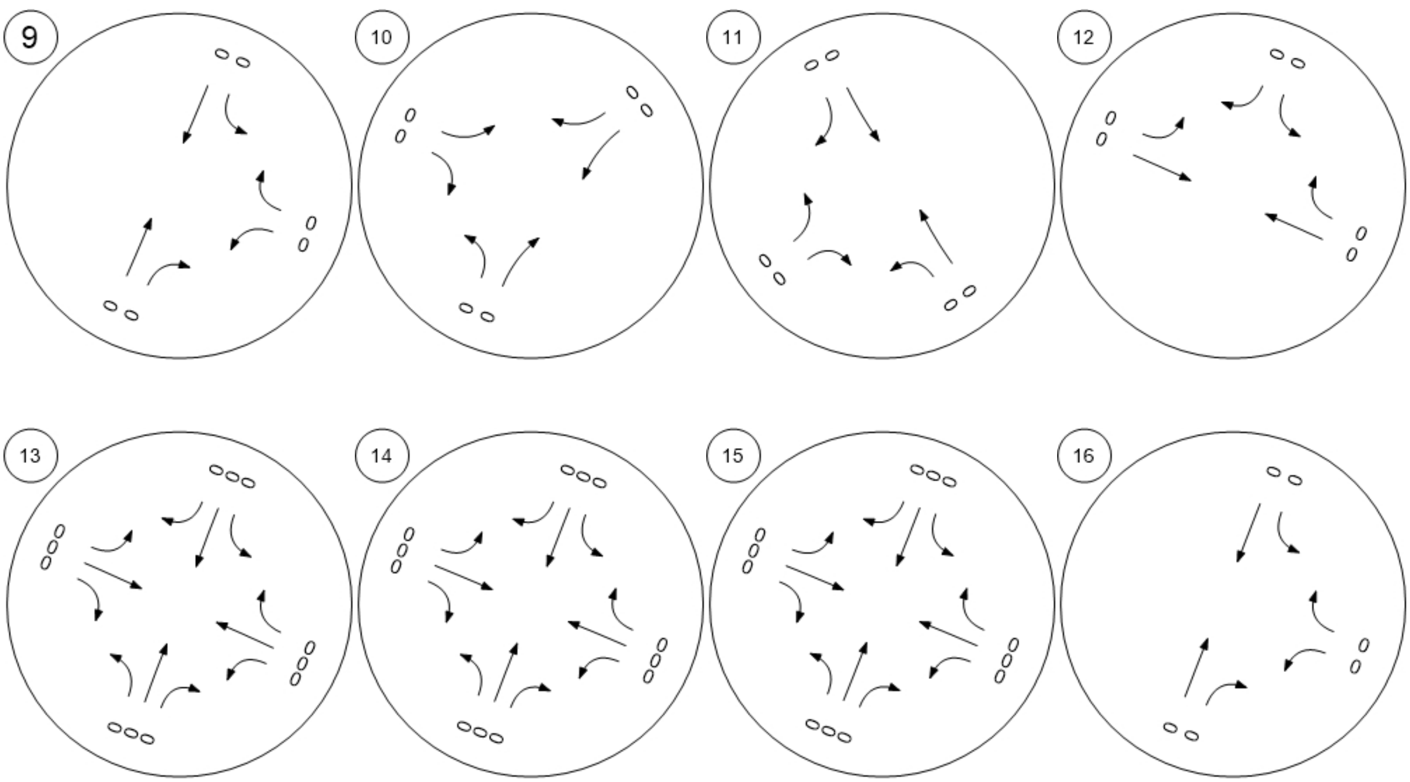




Generated with PTV VISTRO

Version 2021 (SP 0-4)

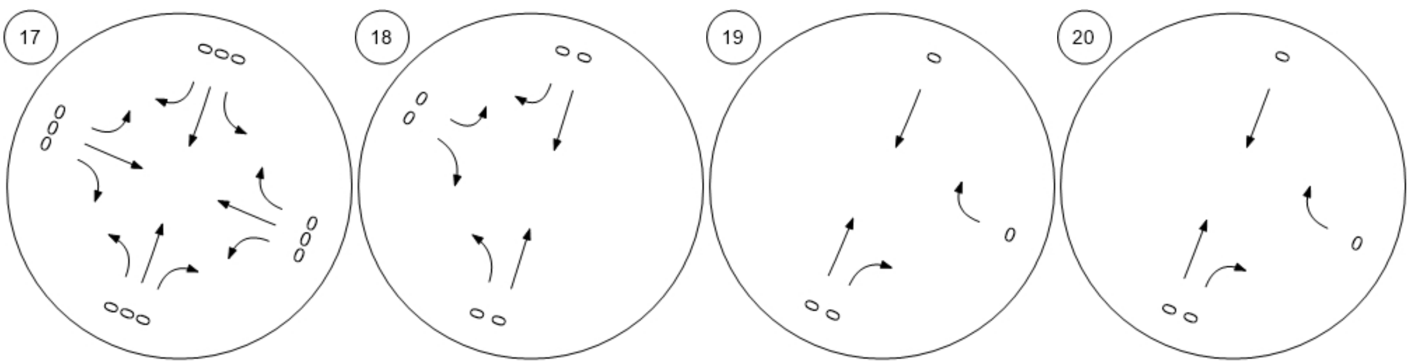
Traffic Volume - Net New Site Trips

Generated with PTV VISTRO

Version 2021 (SP 0-4)

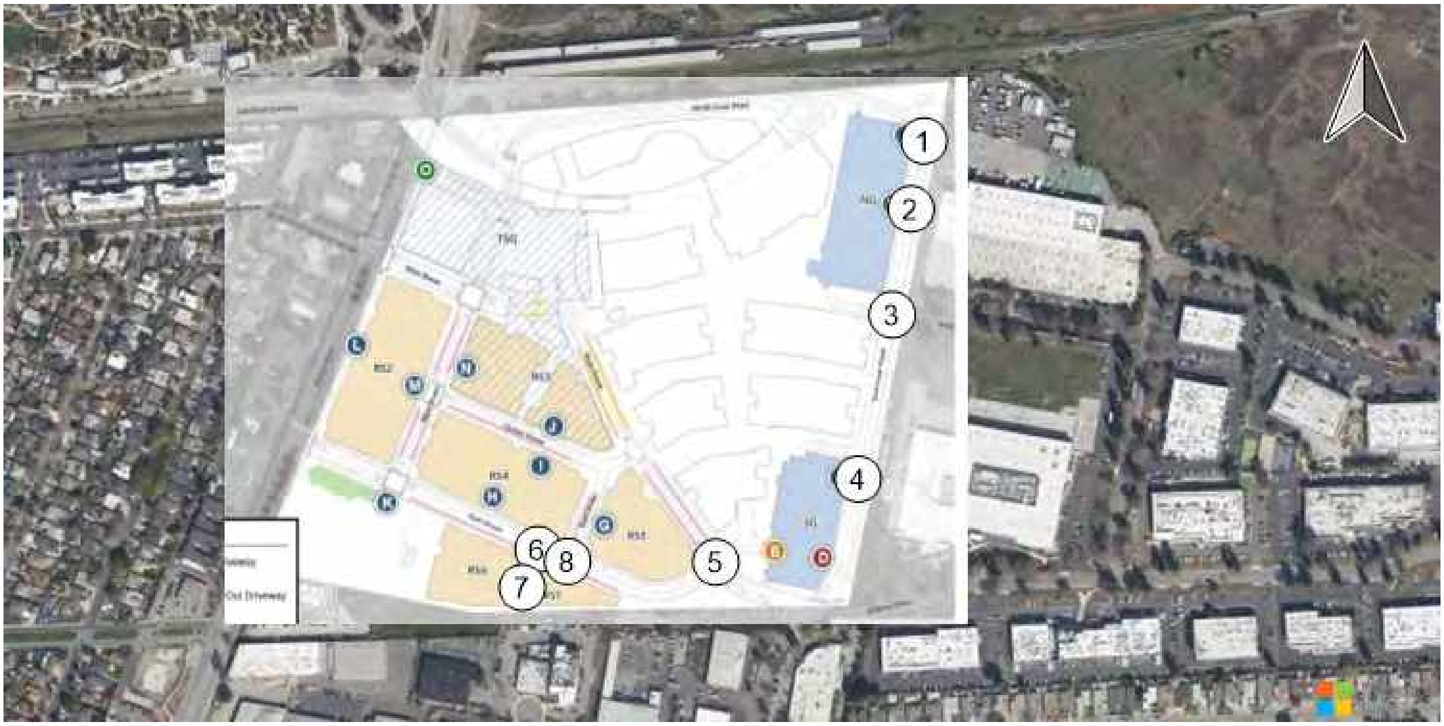
## Traffic Volume - Net New Site Trips

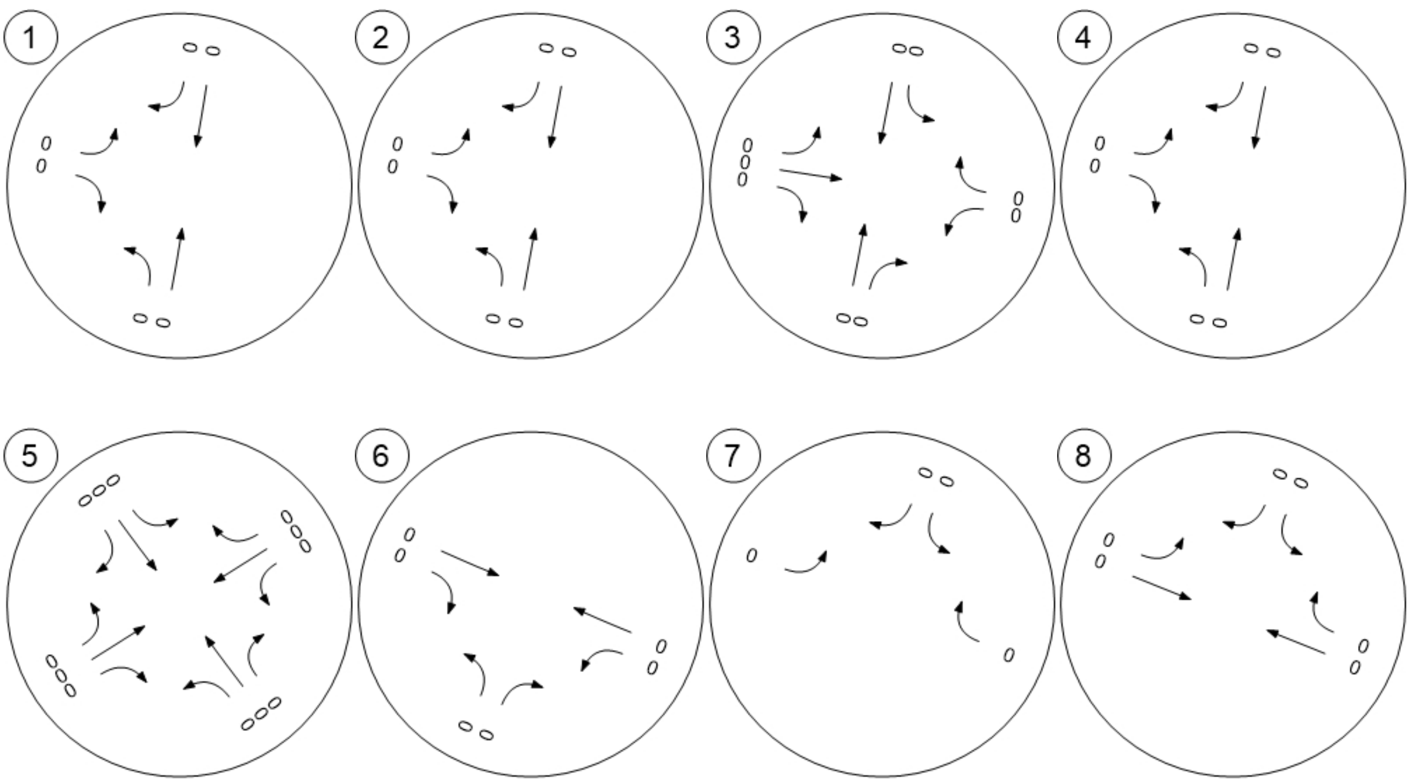



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Other Volume

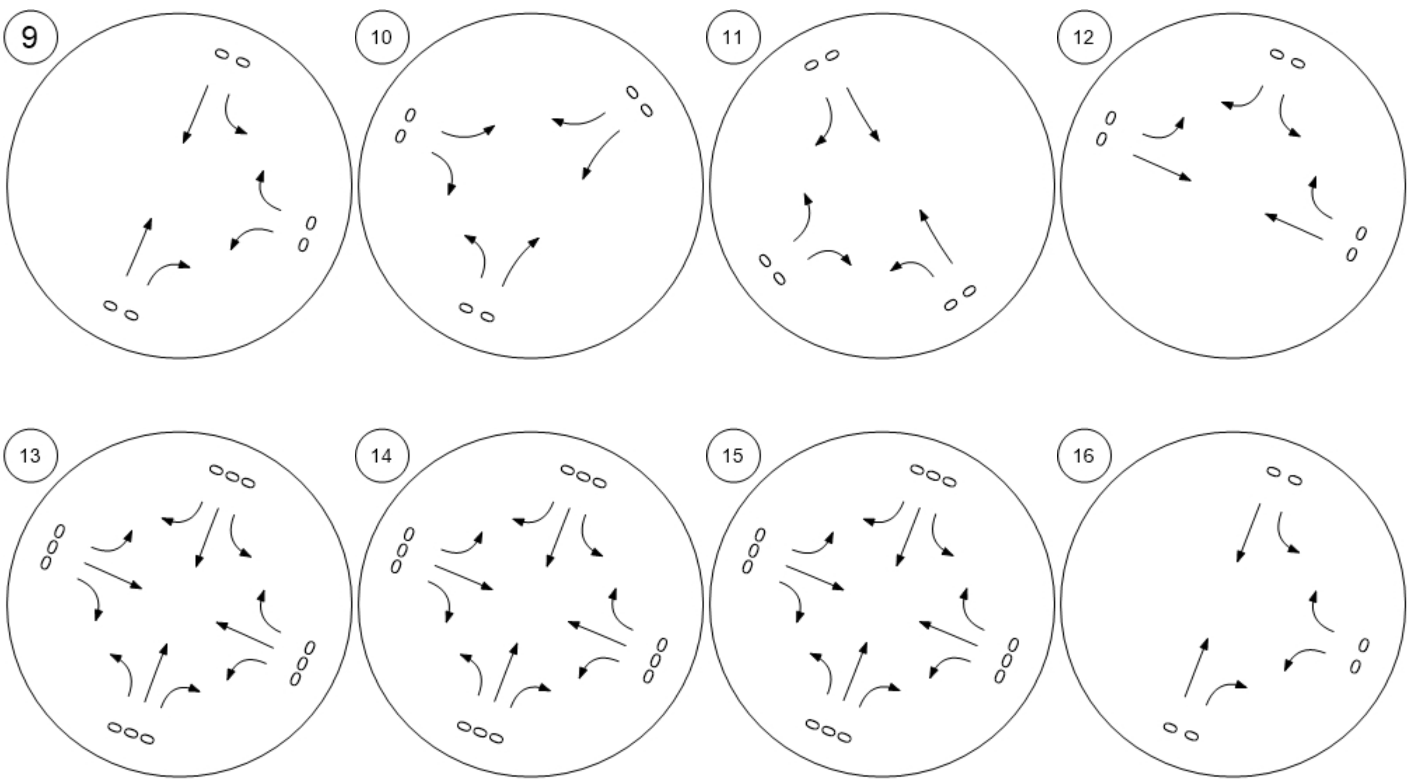


Generated with PTV VISTRO

Version 2021 (SP 0-4)

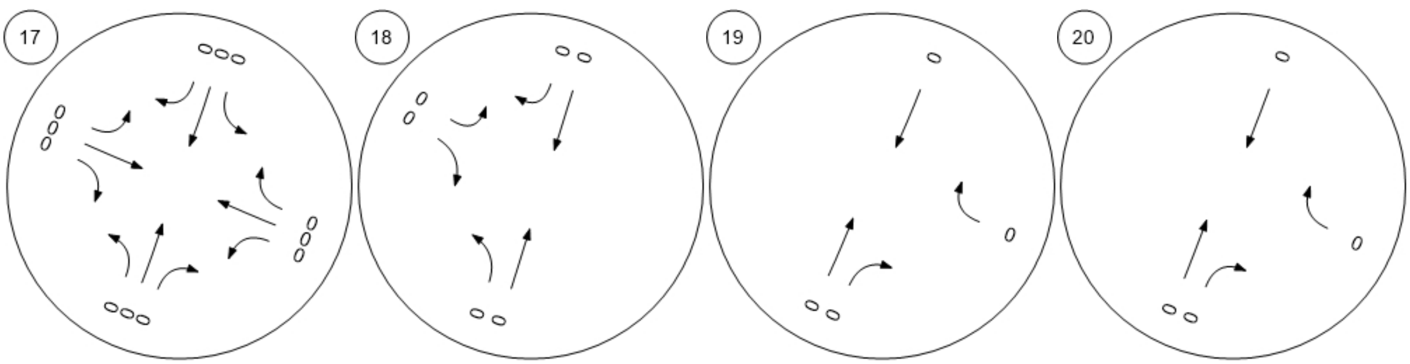
Traffic Volume - Other Volume

Generated with PTV VISTRO

Version 2021 (SP 0-4)

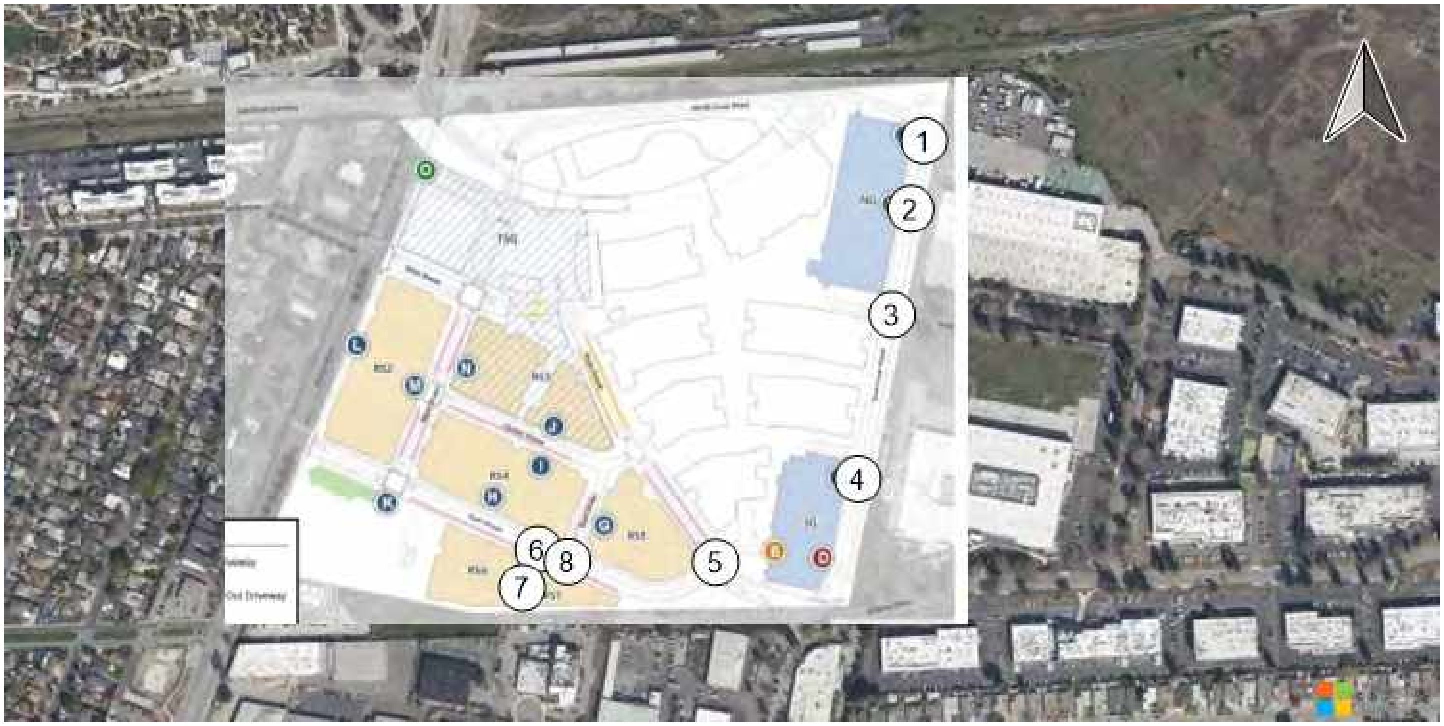
## Traffic Volume - Other Volume

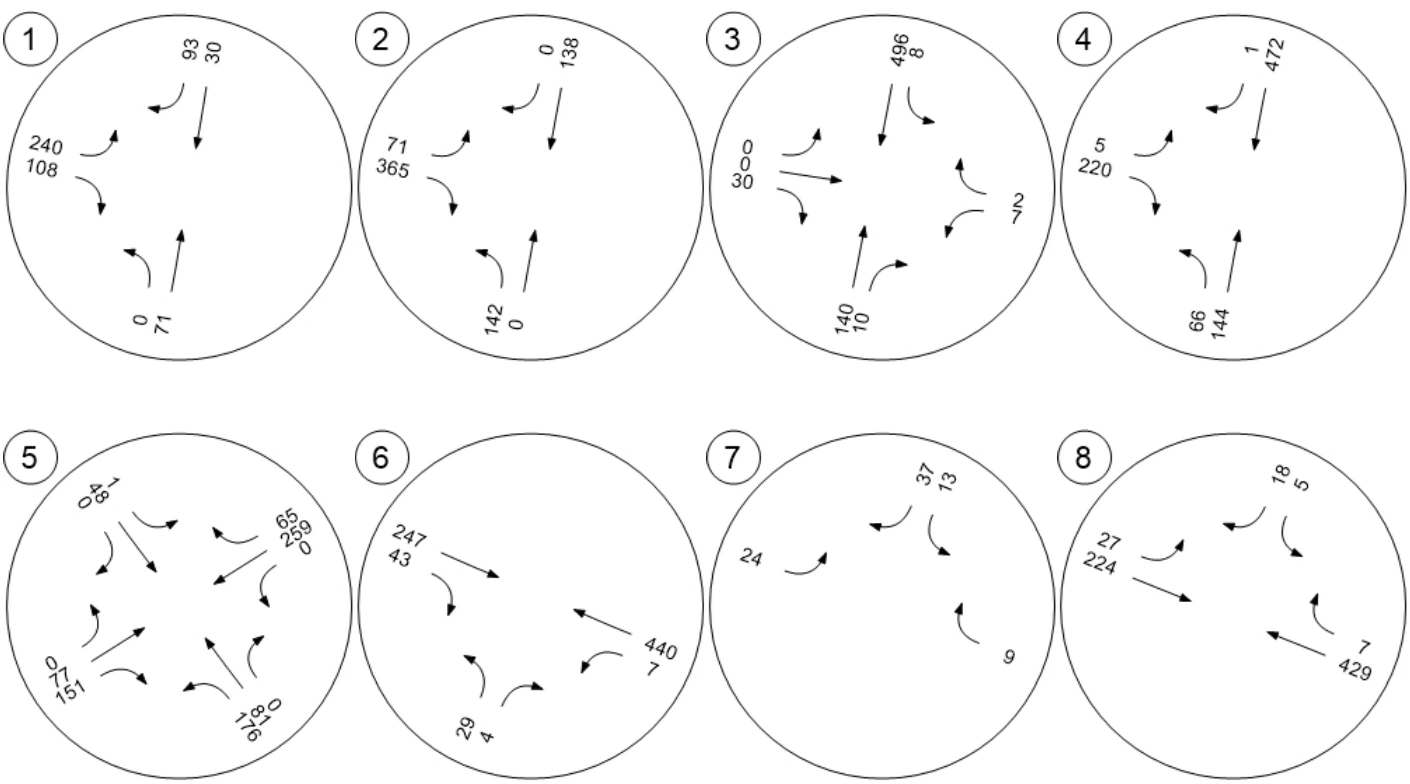



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

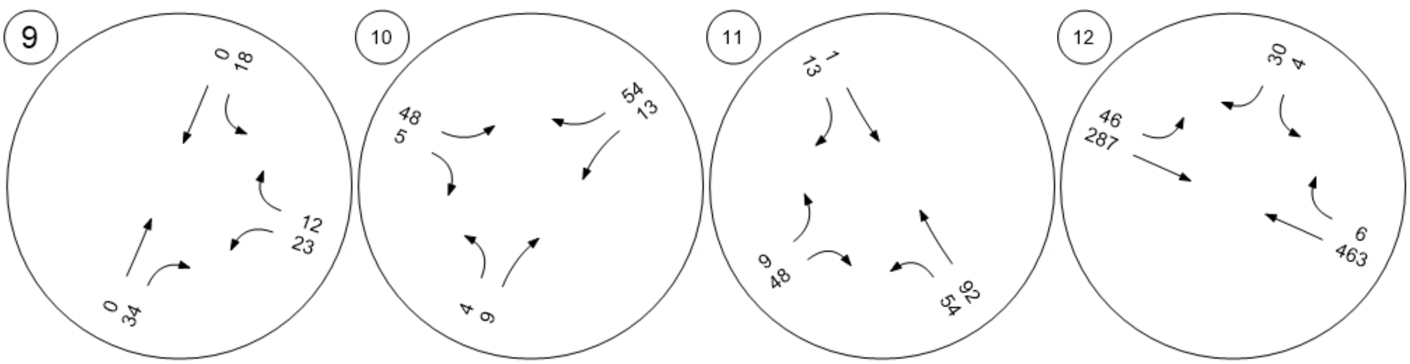


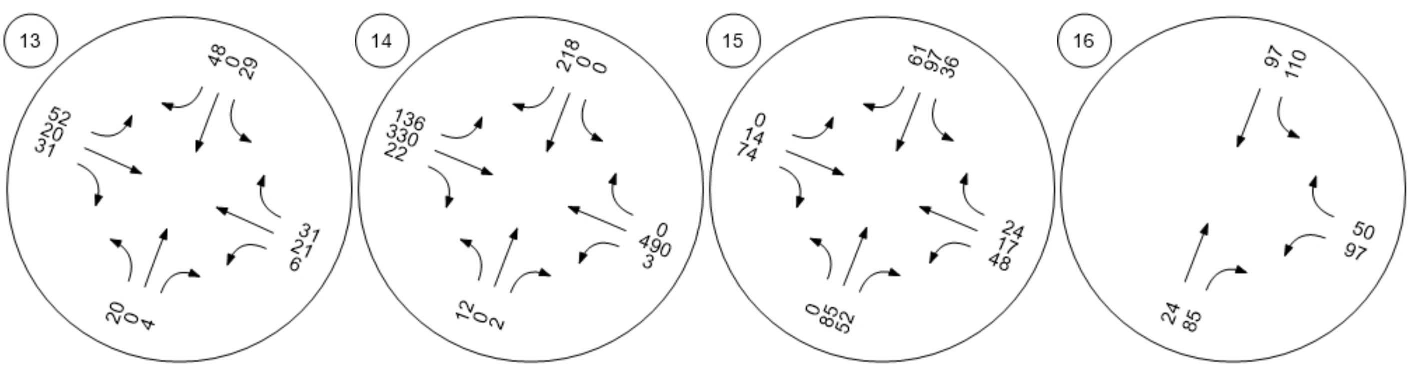



Generated with PTV VISTRO

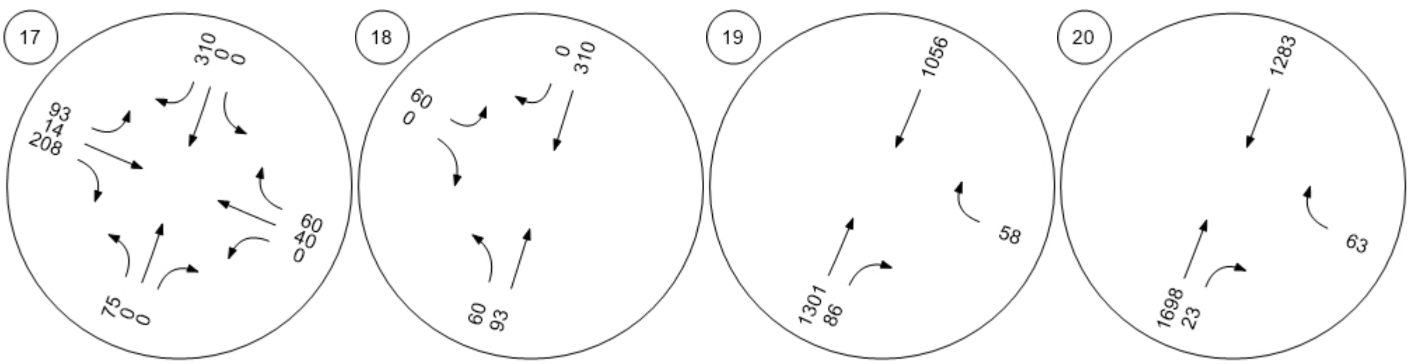
Version 2021 (SP 0-4)

Traffic Volume - Future Total Volume

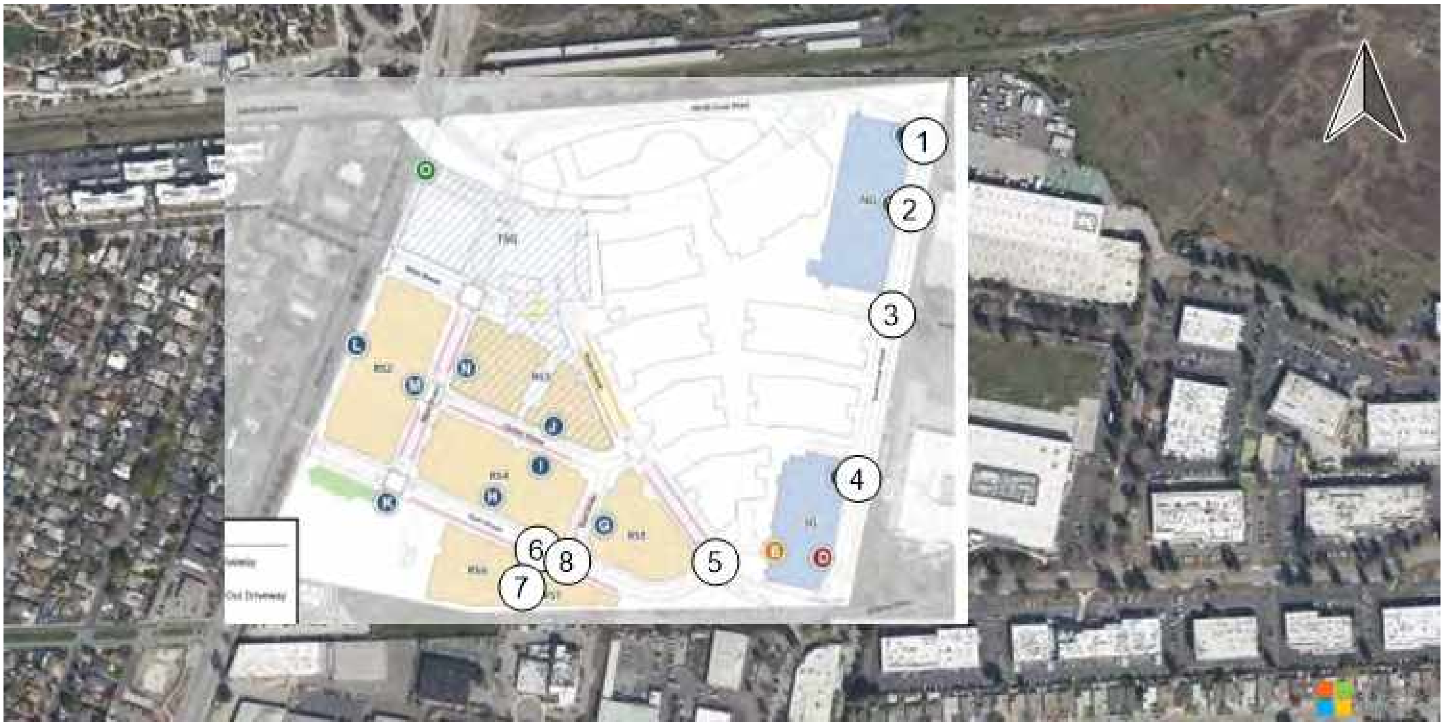
Traffic Volume - Future Total Volume

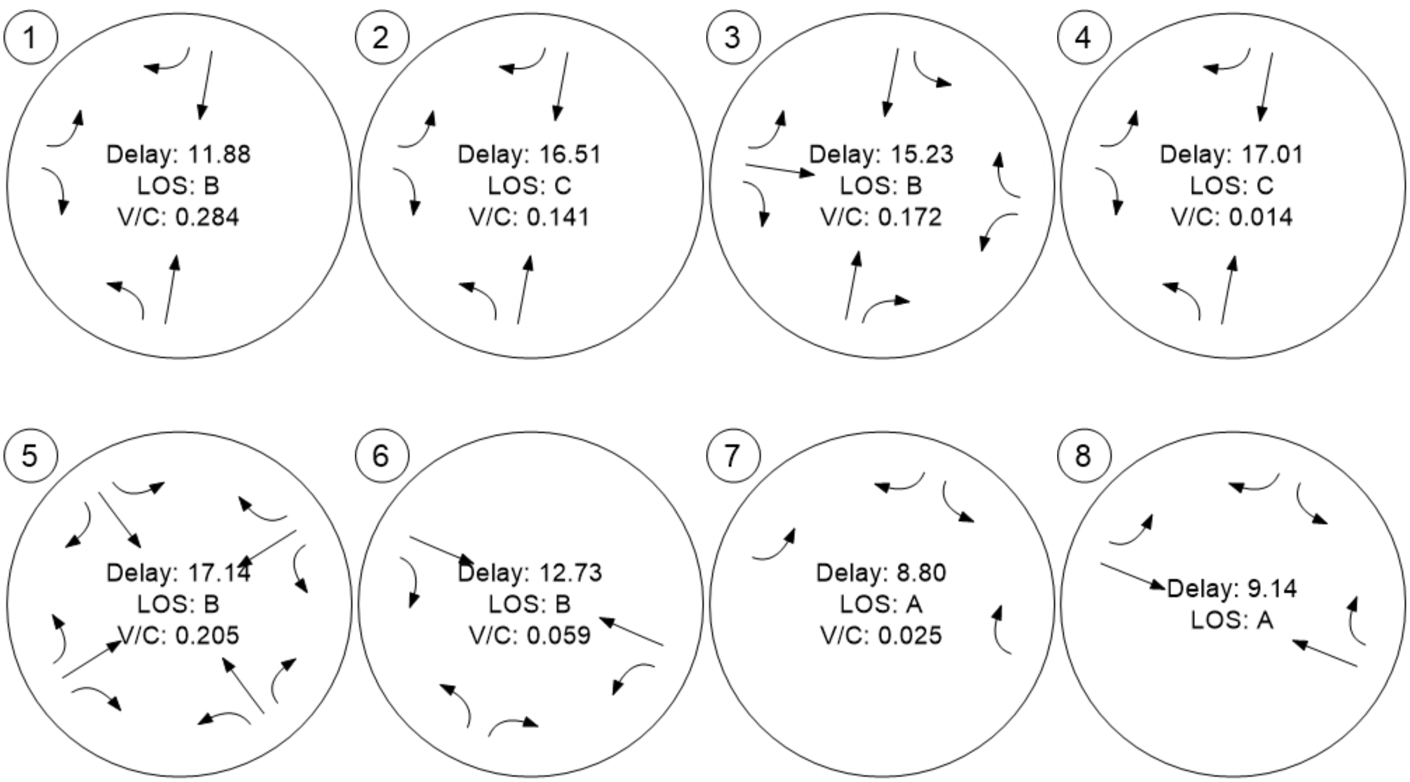



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Traffic Conditions

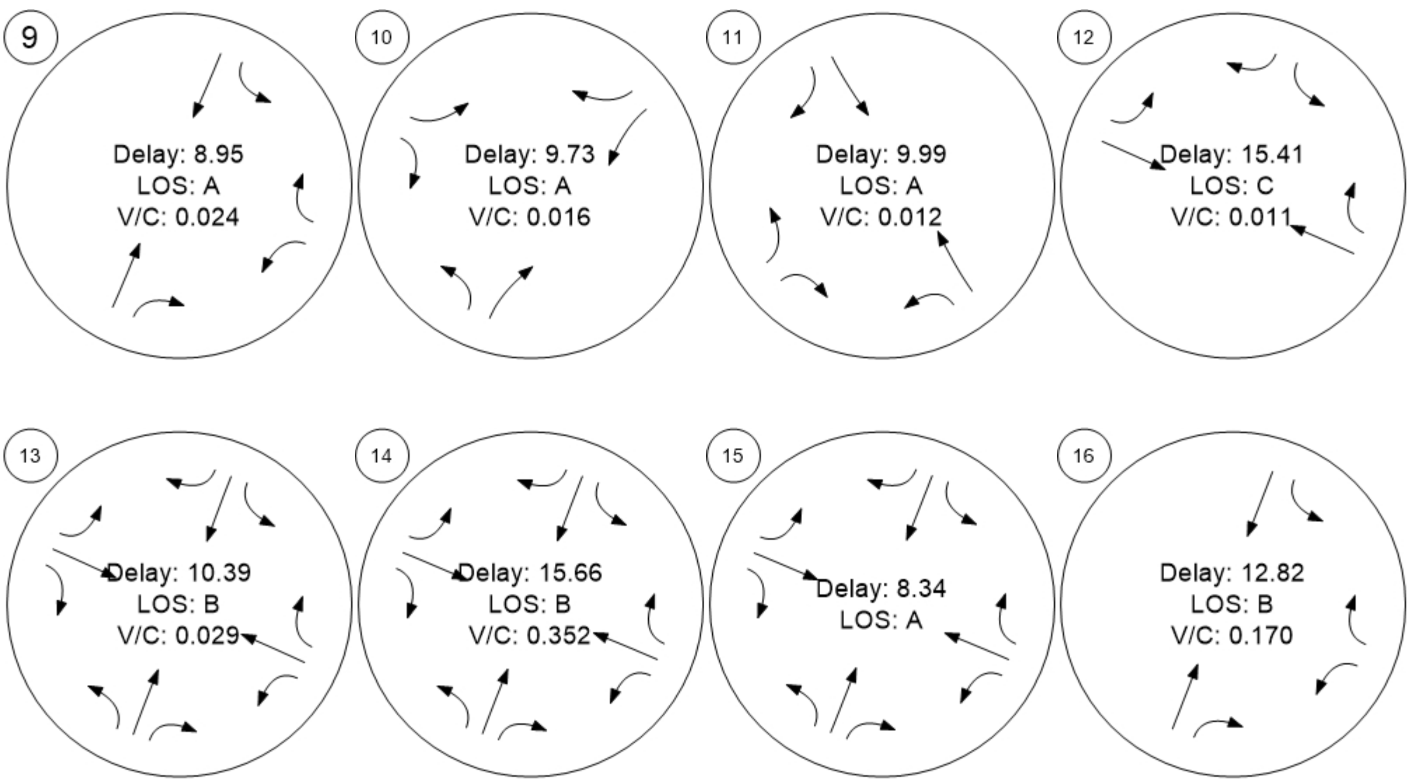




Generated with PTV VISTRO

Version 2021 (SP 0-4)

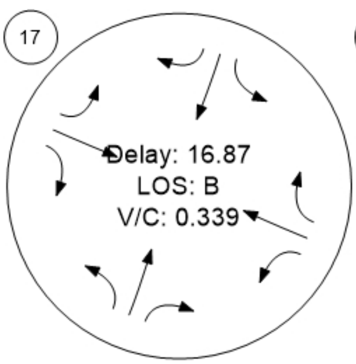
## Traffic Conditions

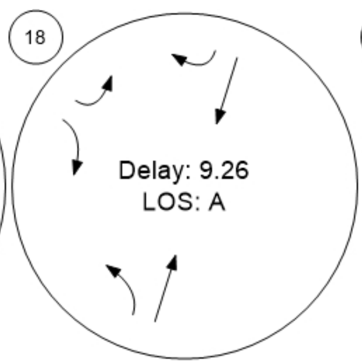



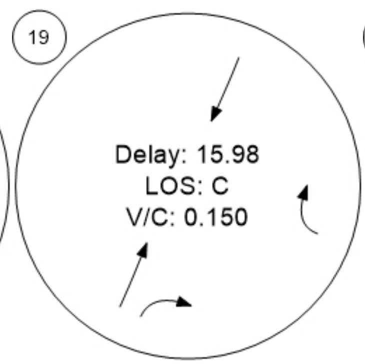
Generated with PTV VISTRO

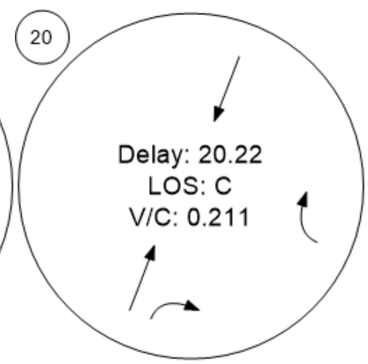
Version 2021 (SP 0-4)

Traffic Conditions

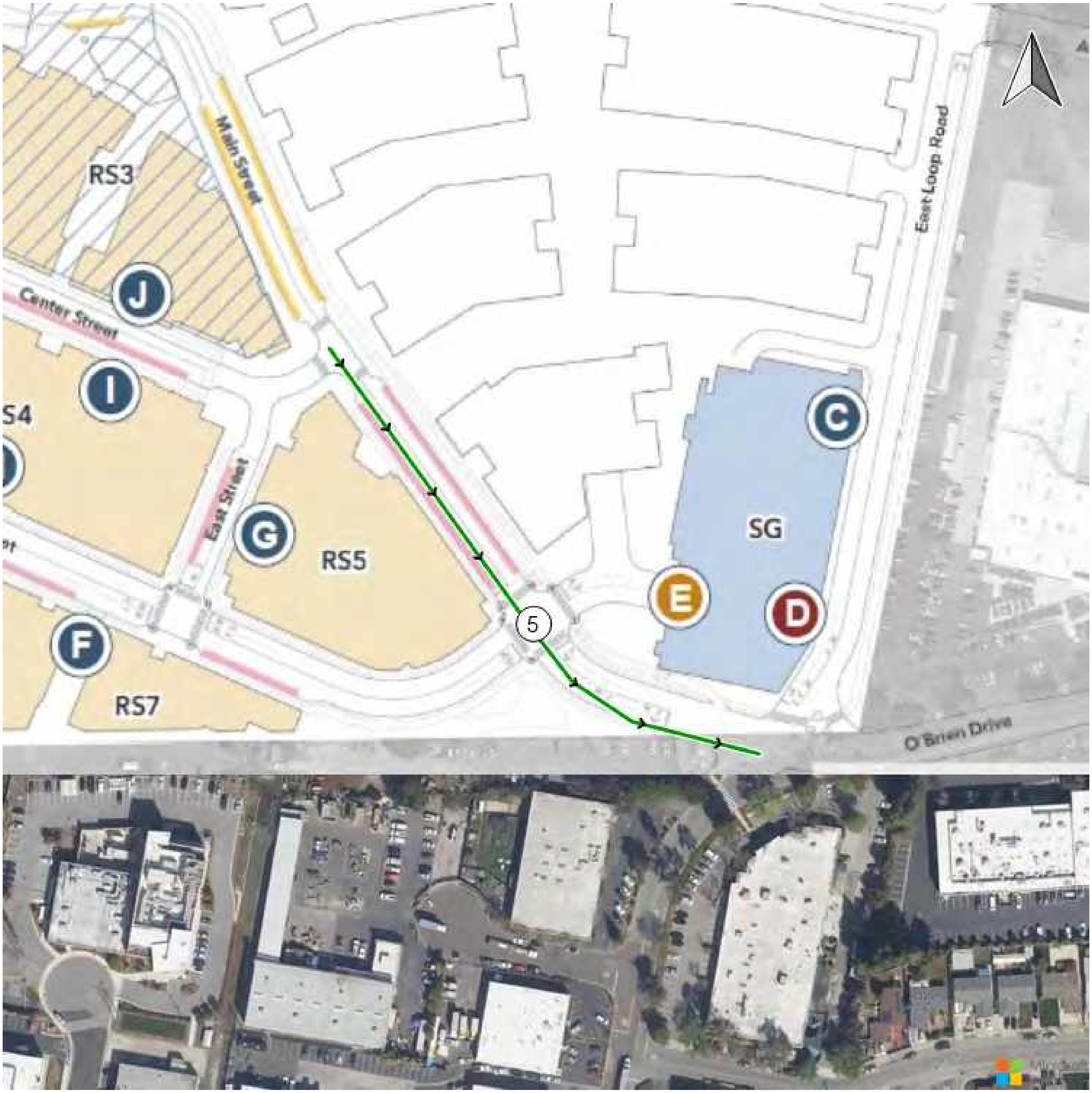



Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Flowing Off

Route 2:



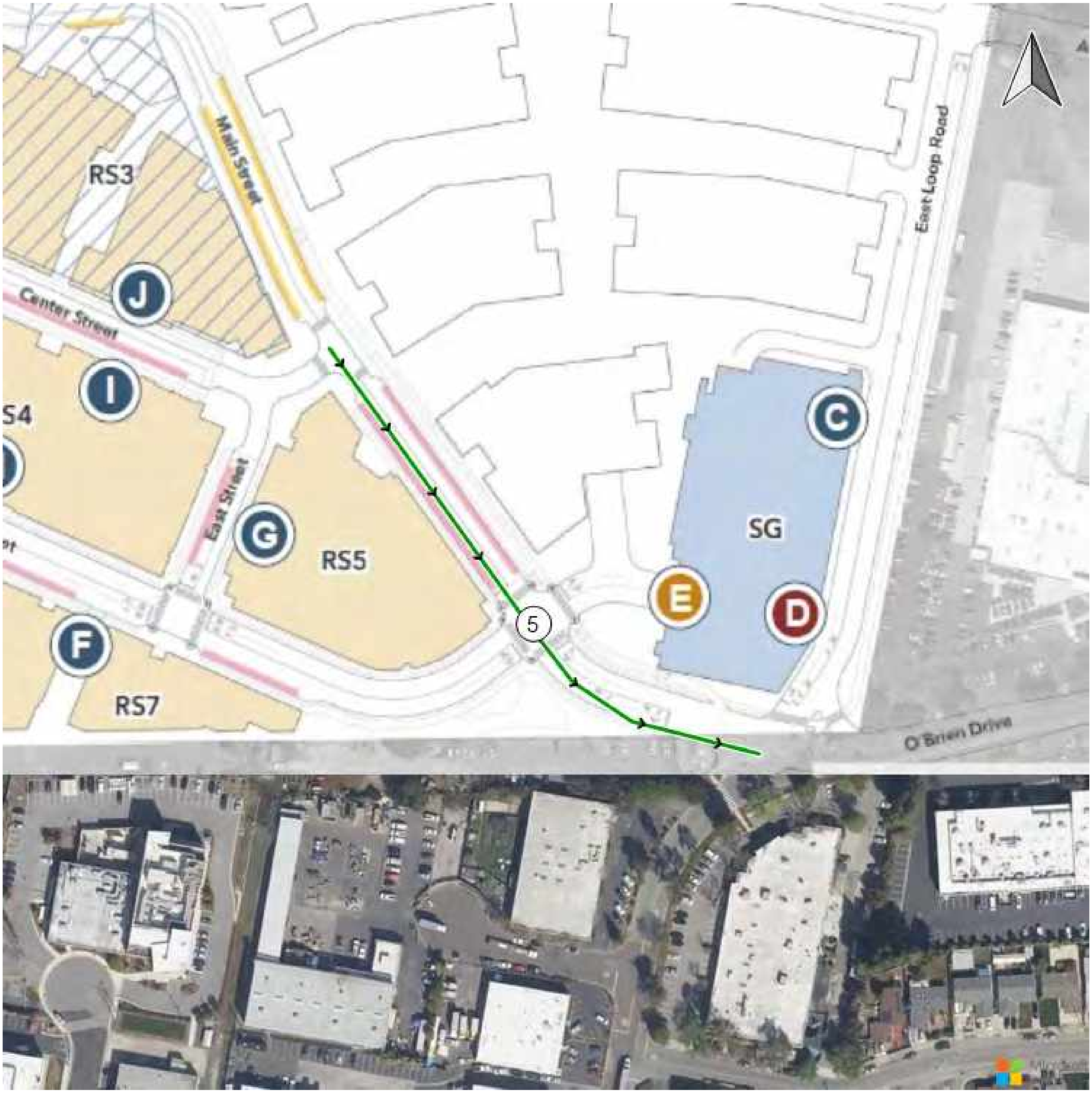
Route 2:

Generated with PTV VISTRO

Version 2021 (SP 0-4)

Time Space Diagram - Arterial Band

Route 2:



Route 2:

# Appendix I
## Facebook/Meta’s Tram and Shuttle Services

# Memorandum

Date: January 17, 2020

To: Eric Harrison, Signature Development

From: Robert Eckols

**Subject: Facebook Menlo Park Campus Tram Operations**

*SJ18-1860*

This memorandum transmits the existing data related to the Facebook intercampus tram operations. Facebook operates five intercampus tram lines that employees use to move between the four Menlo Park campuses: Willow, Classic, Bayfront, and Chilco. **Figure 1** shows the routes and stops used by each of the five existing Menlo Park tram lines.

Currently, three of the intercampus tram lines serve the Willow Campus - Teal, Gold, and Orange lines. All three of the Willow Campus trams operate on public roadways using: Willow Road, Hamilton Avenue, and Hamilton Court. **Table 1** shows the campuses served by each intercampus line. The tram lines connect two or three of the four Menlo Park campuses. None of the tram lines serve all four campuses.

**Table 1: Facebook Intercampus Tram Routes & Coverage**

| Route | Willow Campus | Classic Campus | Bayfront Campus | Chilco Campus |
|---|---|---|---|---|
| Red Line | | ✓ | ✓ | ✓ |
| Purple Line | | ✓ | ✓ | ✓ |
| Teal Line | ✓ | | ✓ | ✓ |
| Gold Line | ✓ | ✓ | | |
| Orange Line | ✓ | | ✓ | |

Source: Fehr & Peers, 2020

The Teal Line that serves the Willow, Bayfront, and Chilco campuses operates on westbound Bayfront Expressway between Willow Road and Chilco Street. The Orange Line that serves the

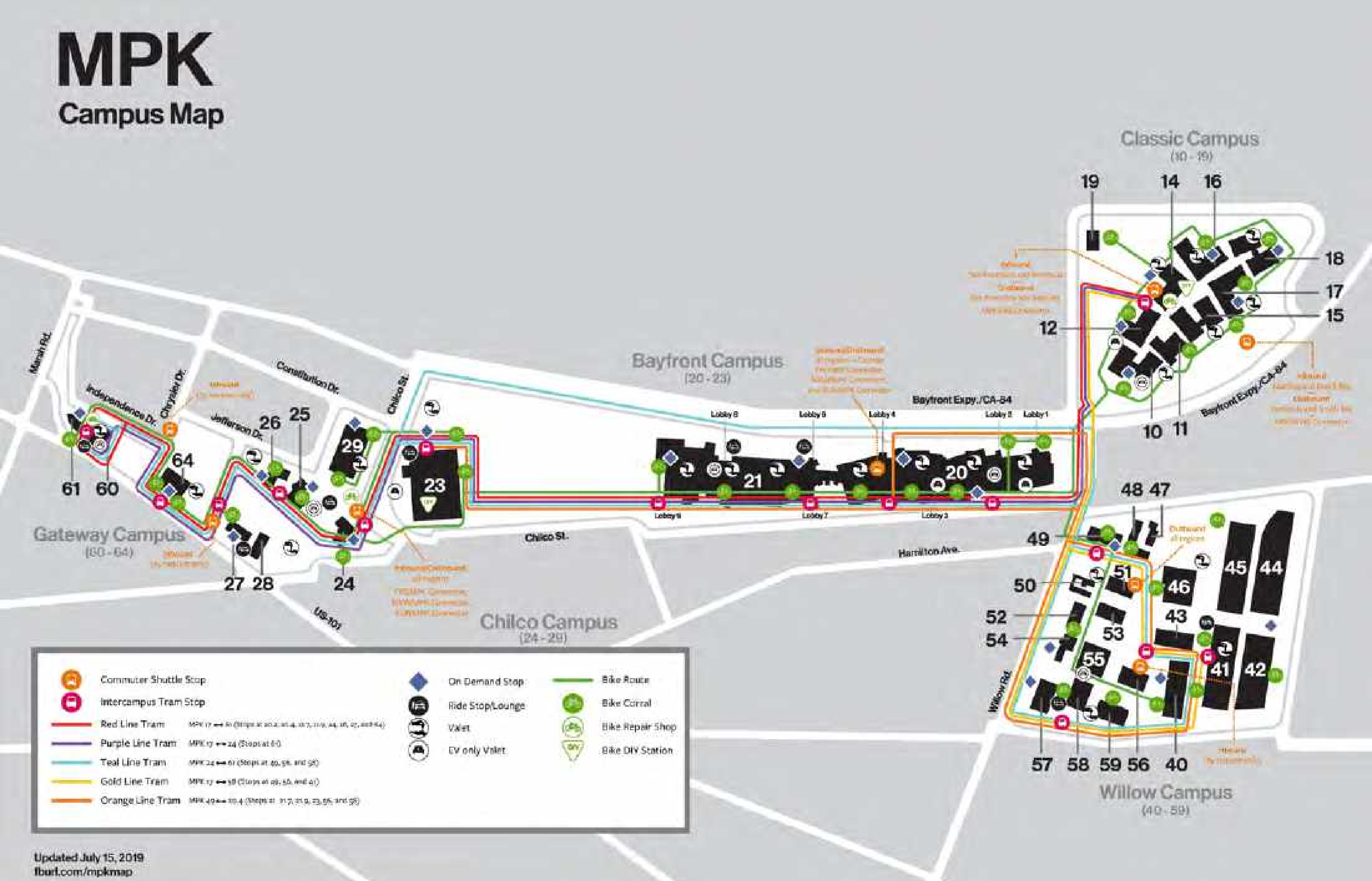
Willow and Bayfront campuses operates on westbound Bayfront Expressway between Willow Road and the Building 20 driveway. Within the Willow campus the trams circulate on the public roadways and through the surface parking lots on the South side of the campus to connect between Hamilton Court and Willow Road.

**Table 2** summarizes the hours of operations and headways of the Willow Campus trams. The Teal and Orange trams operate during normal business hours (7:30 am to 6:30 pm) on 5-minute headways. The Gold trams has extended hours from 4:55 AM to 9:55 PM on 5-minute headways. While there is demand for the trams throughout the day, peak usage of the trams occurs during the morning and evening commute peak periods when employees use the trams to access the employee shuttles and mid-day when employees use the trams to travel to lunch venues.

**Table 2: Facebook Willow Campus Tram - Hours of Operations & Headways**

| Route | Hours of Operation | Hours per Day | Headway |
|---|---|---|---|
| Teal Line | 7:30 AM - 6:30 PM | 11 hours | 5 minutes |
| Gold Line | 4:55 AM - 9:55 PM | 17 hours | 5 minutes |
| Orange Line | 7:30 AM - 6:30 PM | 11 hours | 5 minutes |

Source: Fehr & Peers, 2020




Source: Facebook Transportation, 2019

FEHR & PEERS

Figure 1

Facebook Menlo Park Transportation Services

## Facebook Regional Shuttle Vehicle Trips, Ridership, Capacity and Load Factors

| | Trip | Vehicle Trips | | Riders | | Capacity | | Load Factors | |
|---|---|---|---|---|---|---|---|---|---|
| Region / Routes | Length* | Inbound | Outbound | Inbound | Outbound | Inbound | Outbound | Inbound | Outbound |
| **South Bay** | | **110** | **117** | **2,050** | **2,209** | **4,807** | **5,412** | **0.43** | **0.41** |
| Blossom Hill/Camden | 36.0 | 7 | 8 | 224 | 189 | 321 | 387 | 0.70 | 0.49 |
| Cupertino | 22.0 | 4 | 4 | 62 | 99 | 160 | 227 | 0.39 | 0.44 |
| Great Mall/Hostetter | 29.0 | 6 | 6 | 185 | 177 | 276 | 339 | 0.67 | 0.52 |
| Japantown/Curtner | 33.0 | 6 | 5 | 132 | 145 | 195 | 201 | 0.68 | 0.72 |
| Lawrence/Santa Clara | 23.0 | 4 | 6 | 74 | 84 | 180 | 275 | 0.41 | 0.31 |
| Los Gatos/Campbell | 30.0 | 7 | 7 | 128 | 126 | 273 | 277 | 0.47 | 0.45 |
| Middlefield/Central Station | 16.0 | 7 | 7 | 93 | 94 | 268 | 357 | 0.35 | 0.26 |
| Milpitas/North San Jose/Agnew | 25.0 | 7 | 7 | 152 | 177 | 213 | 327 | 0.71 | 0.54 |
| Moonlite/Santa Clara | 19.0 | 3 | 3 | 78 | 62 | 157 | 162 | 0.50 | 0.38 |
| Morgan Hill | 55.0 | 3 | 3 | 38 | 39 | 157 | 168 | 0.24 | 0.23 |
| Mountain View/El Camino Real | 14.0 | 10 | 11 | 146 | 150 | 511 | 483 | 0.29 | 0.31 |
| Mountain View/El Camino, Sunnyvale/El Camin | 18.0 | | 1 | | 15 | | 45 | | 0.33 |
| Mountain View/Rengstorff | 23.0 | 5 | 6 | 60 | 103 | 202 | 312 | 0.30 | 0.33 |
| Mountain View/West Middlefield | 15.0 | 3 | 5 | 23 | 39 | 95 | 208 | 0.24 | 0.19 |
| San Jose/Eastridge | 39.0 | 6 | 5 | 100 | 99 | 287 | 211 | 0.35 | 0.47 |
| Saratoga | 25.0 | 4 | 4 | 38 | 62 | 153 | 178 | 0.25 | 0.35 |
| Stevens Creek/Santa Clara | 24.0 | 3 | 4 | 42 | 47 | 157 | 182 | 0.27 | 0.26 |
| Sunnyvale/El Camino Real | 17.0 | 13 | 13 | 258 | 265 | 618 | 527 | 0.42 | 0.50 |
| Sunnyvale/Mathilda | 18.0 | 4 | 4 | 33 | 40 | 182 | 188 | 0.18 | 0.21 |
| Sunnyvale/North Fair Oaks | 19.0 | 4 | 4 | 102 | 114 | 211 | 184 | 0.48 | 0.62 |
| Sunnyvale/South Fair Oaks | 19.0 | 4 | 4 | 82 | 83 | 191 | 174 | 0.43 | 0.48 |
| **San Francisco** | | **122** | **116** | **1,992** | **2,031** | **5,685** | **5,317** | **0.35** | **0.38** |
| Colma/SF 19th Ave | 35.0 | | 1 | | 11 | | 44 | | 0.25 |
| Geary | 39.0 | 7 | 6 | 110 | 102 | 287 | 257 | 0.38 | 0.40 |
| Glen Park/Colma | 46.0 | 8 | 7 | 131 | 117 | 399 | 314 | 0.33 | 0.37 |
| Marin County/SF 19th Ave | 60.0 | 11 | 9 | 174 | 161 | 554 | 442 | 0.31 | 0.36 |
| Market/Polk | 32.0 | 12 | 12 | 213 | 211 | 557 | 608 | 0.38 | 0.35 |
| Mission | 47.0 | 18 | 17 | 349 | 311 | 960 | 907 | 0.36 | 0.34 |
| Mission/Haight | 35.0 | | 1 | | 23 | | 67 | | 0.34 |
| Mission/Van Ness | 36.0 | | 1 | | 14 | | 67 | | 0.21 |
| Noe Valley | 40.0 | 12 | 12 | 135 | 176 | 421 | 421 | 0.32 | 0.42 |
| North Beach/SoMa | 39.0 | 13 | 15 | 277 | 276 | 653 | 670 | 0.42 | 0.41 |
| Panhandle | 39.0 | 12 | 12 | 170 | 239 | 614 | 517 | 0.28 | 0.46 |
| Potrero Hill | 45.0 | 11 | 9 | 160 | 153 | 355 | 289 | 0.45 | 0.53 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Van Ness | 39.0 | 18 | 14 | 273 | 237 | 885 | 714 | 0.31 | 0.33 |
| **East Bay** | | **72** | **80** | **1,589** | **1,503** | **3,164** | **3,557** | **0.50** | **0.42** |
| Alameda | 33.0 | 3 | 4 | 65 | 56 | 179 | 151 | 0.36 | 0.37 |
| Berkeley/Oakland | 40.0 | 19 | 18 | 398 | 397 | 819 | 909 | 0.49 | 0.44 |
| Blacow/Cedar | 20.0 | 3 | 5 | 56 | 59 | 160 | 245 | 0.35 | 0.24 |
| Danville/San Ramon | 49.0 | 4 | 4 | 97 | 99 | 198 | 135 | 0.49 | 0.73 |
| Dublin/Castro Valley | 45.0 | 8 | 7 | 306 | 211 | 302 | 301 | 1.01 | 0.70 |
| Fremont BART/ACE | 24.0 | 7 | 8 | 197 | 207 | 264 | 407 | 0.75 | 0.51 |
| Hayward/Union City/West Fremont | 20.0 | 6 | 6 | 130 | 123 | 277 | 252 | 0.47 | 0.49 |
| Stevenson Blvd/Thornton Ave | 17.0 | 8 | 8 | 159 | 153 | 398 | 326 | 0.40 | 0.47 |
| SUN Dublin/Castro Valley | 45.0 | 1 | 1 | 8 | 10 | 43 | 34 | 0.19 | 0.29 |
| Union City BART/Decoto | 14.0 | 11 | 16 | 134 | 147 | 461 | 699 | 0.29 | 0.21 |
| Walnut Creek/Orinda | 51.0 | 2 | 3 | 39 | 41 | 63 | 98 | 0.62 | 0.42 |
| **Peninsula** | | **51** | **47** | **624** | **595** | **2,204** | **2,049** | **0.28** | **0.29** |
| Belmont/San Carlos | 12.0 | 3 | 3 | 36 | 42 | 137 | 124 | 0.26 | 0.34 |
| Foster City | 15.0 | 4 | 4 | 90 | 83 | 245 | 236 | 0.37 | 0.35 |
| Menlo Park/Haven | 4.0 | 5 | 4 | 105 | 73 | 130 | 128 | 0.81 | 0.57 |
| Menlo Park/Sand Hill | 10.0 | 3 | 3 | 5 | 5 | 151 | 155 | 0.03 | 0.03 |
| Millbrae/San Mateo | 19.0 | 4 | 4 | 75 | 85 | 145 | 191 | 0.52 | 0.45 |
| Palo Alto/El Camino Real | 14.0 | 4 | 4 | 55 | 47 | 196 | 184 | 0.28 | 0.26 |
| Palo Alto/Midtown | 12.0 | 4 | 4 | 25 | 27 | 117 | 134 | 0.21 | 0.20 |
| Redwood City/Blu Harbor | 9.0 | 3 | 3 | 29 | 31 | 102 | 92 | 0.28 | 0.34 |
| Redwood Shores | 14.0 | 3 | 4 | 28 | 31 | 113 | 195 | 0.25 | 0.16 |
| San Mateo/HWY 92 | 14.0 | 5 | 3 | 49 | 49 | 283 | 103 | 0.17 | 0.48 |
| Whipple/Veterans | 13.0 | 8 | 6 | 91 | 79 | 384 | 306 | 0.24 | 0.26 |
| Woodside/El Camino Real | 21.0 | 5 | 5 | 36 | 43 | 201 | 201 | 0.18 | 0.21 |
| **Santa Cruz** | | **3** | **2** | **42** | **41** | **127** | **80** | **0.33** | **0.51** |
| Santa Cruz/Scotts Valley | 47.0 | 3 | 2 | 42 | 41 | 127 | 80 | 0.33 | 0.51 |
| **North Bay** | | **1** | **1** | **13** | **12** | **45** | **45** | **0.29** | **0.27** |
| Marin Direct | 48.0 | 1 | 1 | 13 | 12 | 45 | 45 | 0.29 | 0.27 |
| **Totals** | | **359** | **363** | **6,310** | **6,391** | **16,032** | **16,460** | **0.39** | **0.39** |

* Route length is average trip length that accounts for variation in the routes depending on the time of day. Route length does not include deadhead mileage before / after run.

**Source:** Facebook Transportation, March 2020 prior to work from home began.

# Appendix J
## Model Validation Memo

HEXAGON TRANSPORTATION CONSULTANTS, INC.

## Memorandum

**Date:** November 10, 2021

**To:** Ms. Kristiann Choy, City of Menlo Park

**From:** Ollie Zhou

**Subject:** Menlo Park Travel Demand Forecasting Model Validation

Hexagon Transportation Consultants, Inc. has completed a model calibration and validation for the City of Menlo Park's travel demand forecast model (ConnectMenlo model) to a base year of year 2019. The ConnectMenlo model is a computerized representation of travel patterns of 14 counties within the larger Bay Area: the nine Bay Area counties, County of Santa Cruz, County of San Benito, County of Monterey, County of San Joaquin, and County of Stanislaus. The ConnectMenlo model was originally developed based on the 2013 update of the City/County Association of Governments travel demand model. It included additional network details as well as a refined traffic analysis zone (TAZ) system within the City of Menlo Park.

The purpose of re-calibrating and validating the ConnectMenlo to year 2019 conditions is to use this model to inform City's VMT policies, and conduct land use and transportation related studies. This model effort is part of the transportation study for the proposed Willow Village project.

## Network System Refinement

The previous ConnectMenlo model employed an enhanced roadway network layer developed from the TomTom North America routable network database for roadways within the City of Menlo Park. While the network layer provided detail in terms of having all roadways within the City coded in the model, major roadways are coded as two one-direction links, which created challenges for extracting turning movement volumes. With the immediate needs of the Willow Village project in mind, the roadway network is simplified to bi-direction links for the roadways and intersections under evaluation.

Hexagon conducted a review of the critical link-level attributes such as number of lanes, lane types, and turn penalties specifically within the Willow Village study areas. In particular, the US 101 interchange at Willow Road is updated to reflect the configuration current as of May 2019, when field work was conducted and approximately when most of the counts were collected (March/April 2019). It is worth noting that in May 2019, the interchange was still under construction and the US 101 northbound off-ramp had only 1 lane of capacity coming off the freeway. This was reflected in the updated base network. This ramp has since opened up to have 2 lanes of capacity coming off the freeway, which will be reflected in a future network.

The transit network in the previous ConnectMenlo model was not coded along the roadway links, meaning their travel speeds were not affected by roadway congestions. The transit network is revised to travel on roadway links.

## Traffic Analysis Zone System Refinement

The 2013 C/CAG model originally had 24 traffic analysis zones (TAZs) covering the City of Menlo Park. The previous ConnectMenlo model provided enhanced detail and split the 24 TAZs into 81 TAZs. Hexagon reviewed the TAZ area coverages and found several coverage lapses surrounding the City of Menlo Park. The TAZ coverages were revised accordingly (see Figure 1).

In preparation for the proposed Willow Village project, additional TAZ details were provided within the project area. To maintain the overall 81-TAZ system, several TAZs throughout the rest of the City were aggregated to free up the necessary TAZs to cover the Willow Village area.

## Development of 2019 Land Use Inputs

Primary inputs to the travel demand model are land use and demographic data. The ConnectMenlo model requires land use and demographic inputs at the appropriate traffic analysis zone level. The main land use inputs variables are:

- Number of single and multi-family households
- Household population
- Employed residents
- Jobs by type (retail, service, other, manufacturing, wholesale and agriculture)
- School enrollment

The previous ConnectMenlo model had land uses for a base year of 2013 and a future year of 2040. For TAZs outside of the City of Menlo Park, the year 2019 land uses were developed via a straight-line interpolation of the previous base year and future year land uses. For TAZs within the City of Menlo Park, land uses were grown based on a list of approved and developed projects since year 2013, supplied by City staff.

### Facebook Buildings

Facebook's Classics campus and Bayfront campus were previously not coded with land uses in the model. Facebook since year 2013 has also occupied numerous other buildings in the Bayfront area. These include buildings MPK 24 to MPK 29, MPK 60, MPK 61 and MPK 64 in the area west of Chilco Street, and buildings MPK 40 to MPK 59 in the Menlo Science and Technology Park. Hexagon adjusted employment data in these zones to reflect the higher employee density characteristic of Facebook buildings. Figures 2 and 3 show the year 2019 residential and employment data by zone for City of Menlo Park zones. Table 1 below summarizes the key land use data for the nine Bay Area counties and for the City of Menlo Park.

**Figure 1**
**Menlo Park TAZ System**

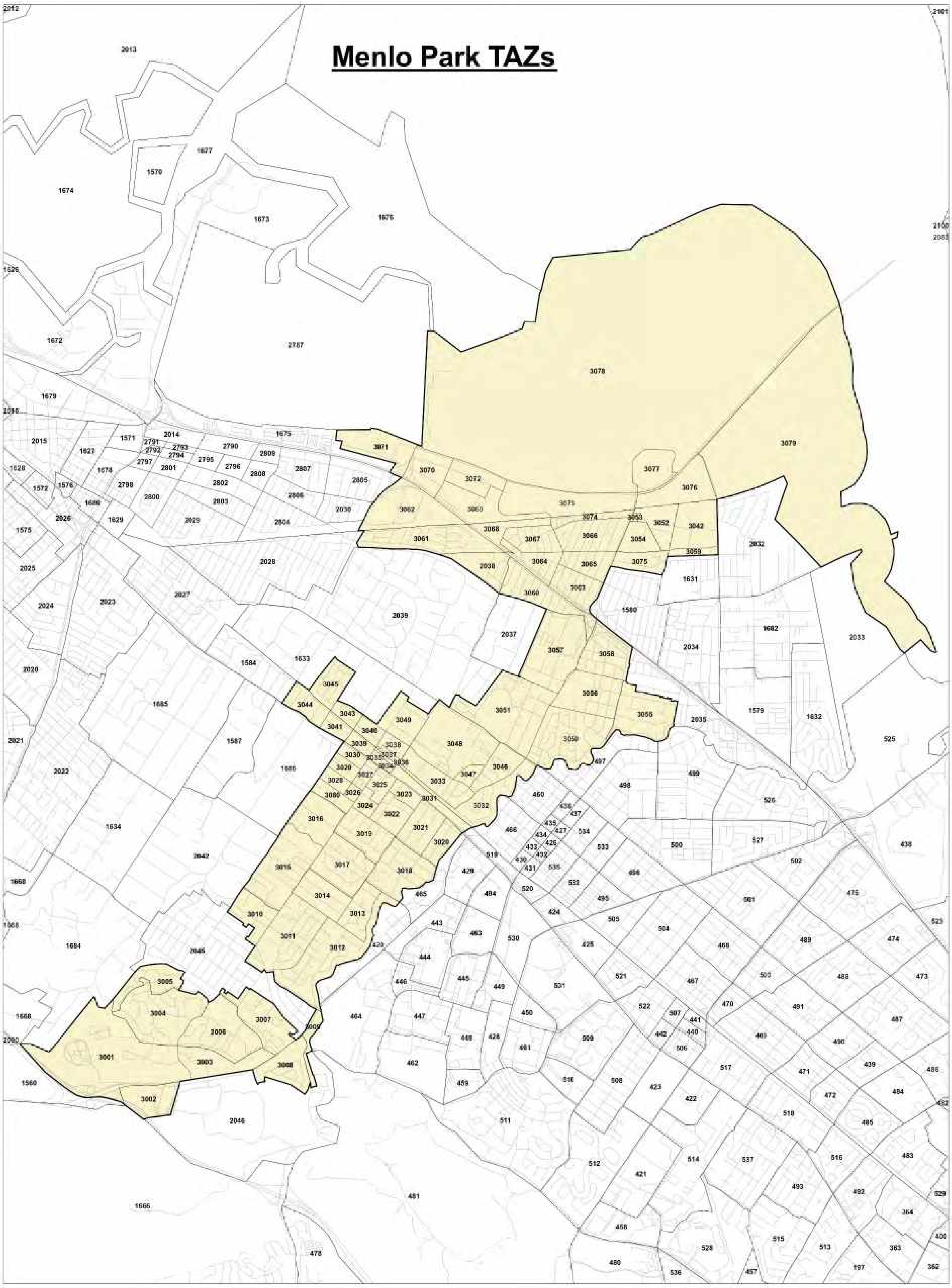


**Figure 2**
**Year 2019 Land Use Inputs – Households**

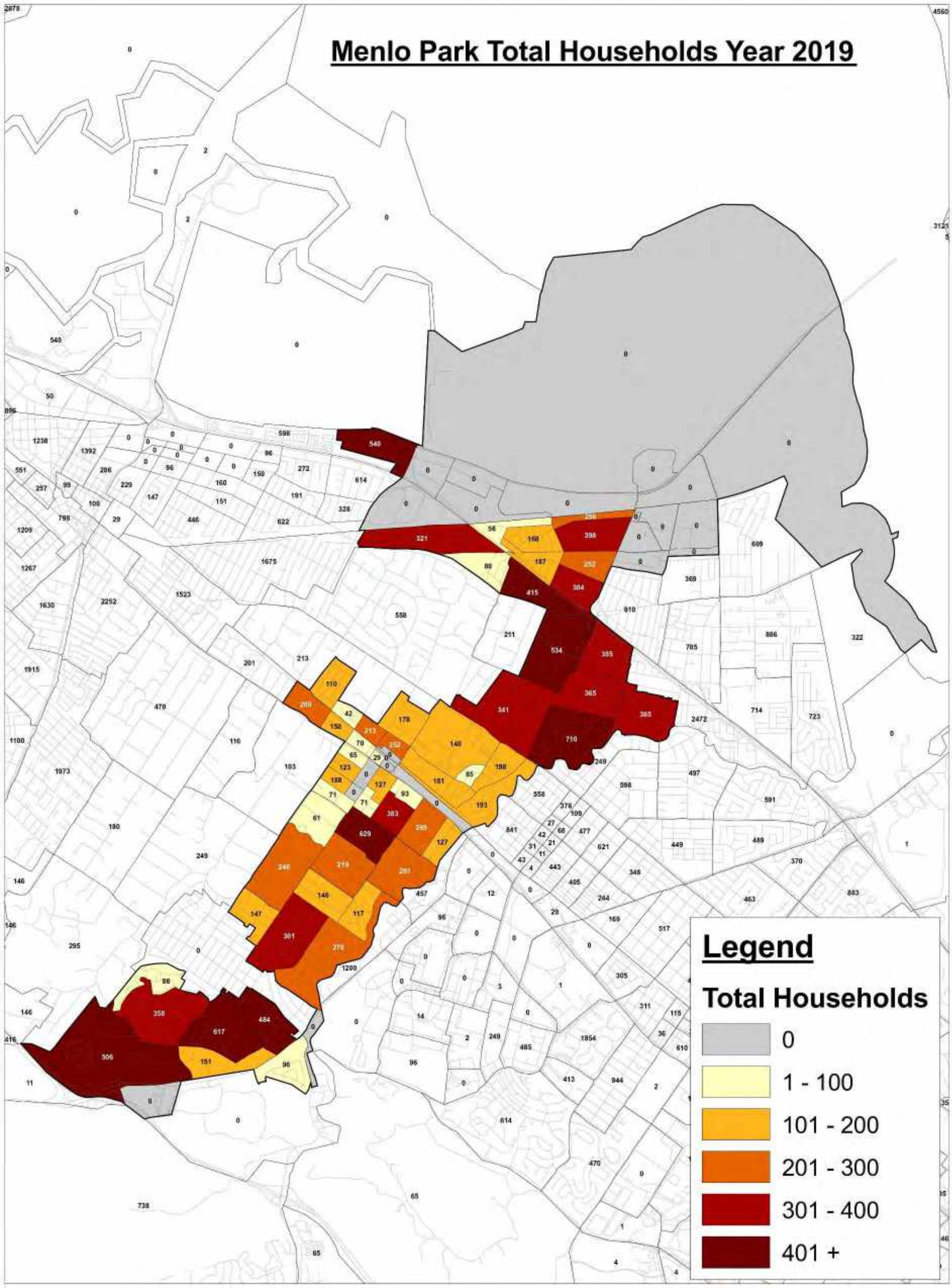


**Figure 3**
**Year 2019 Land Use Inputs – Total Employment**

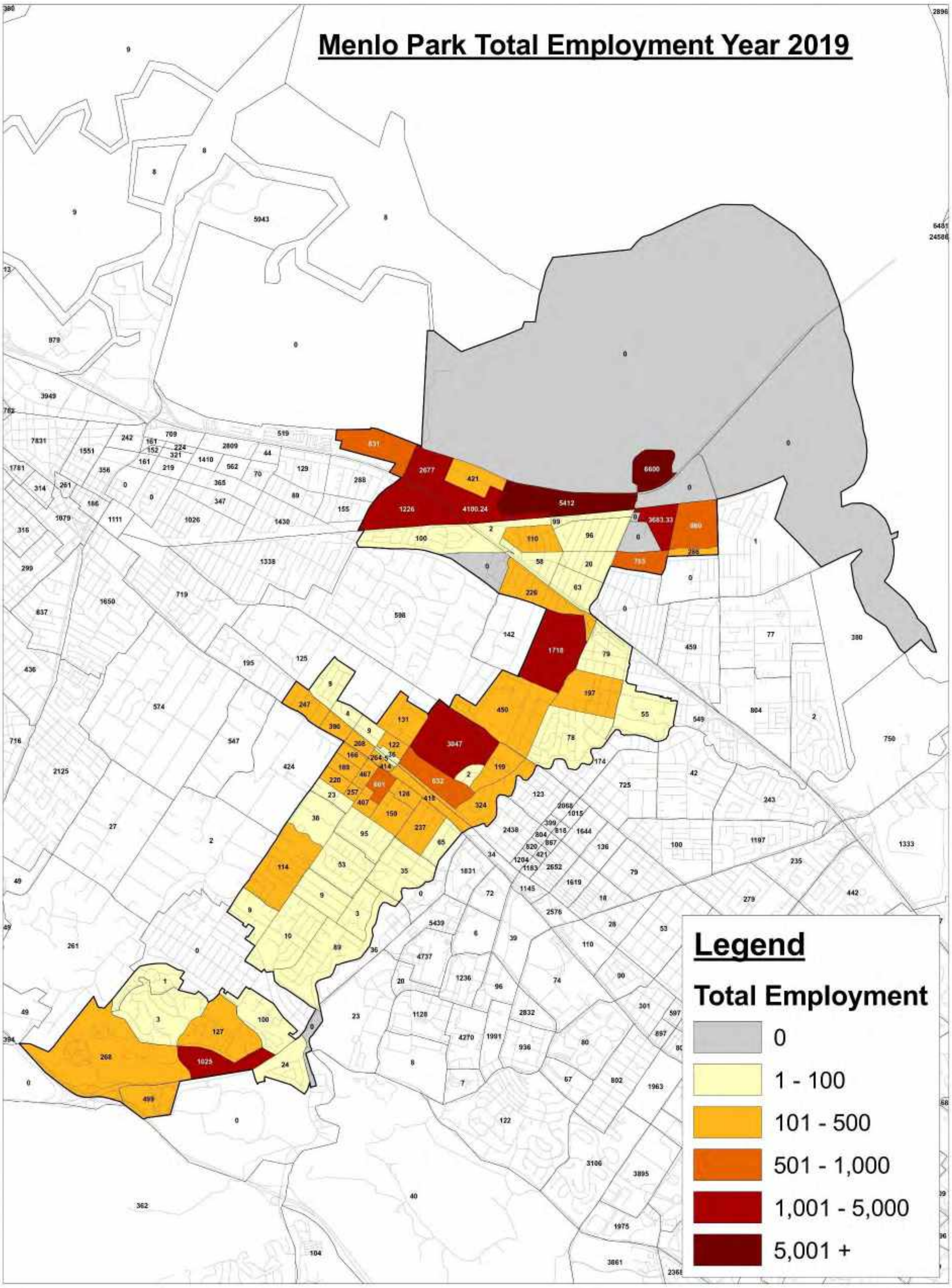


**Table 1**
**2019 ConnectMenlo Land Use Summary**

| County | Year 2019 Model Land Use Data | | | |
|---|---|---|---|---|
| | Total Households | Total Population | Employed Residents | Total Jobs |
| San Francisco | 375,982 | 880,235 | 467,641 | 633,914 |
| San Mateo | 274,743 | 767,106 | 360,057 | 391,547 |
| Santa Clara | 667,403 | 1,957,085 | 894,436 | 1,034,479 |
| Alameda | 592,728 | 1,633,472 | 742,799 | 780,003 |
| Contra Costa | 400,746 | 1,123,666 | 487,731 | 385,759 |
| Solano | 149,764 | 429,836 | 191,463 | 147,984 |
| Napa | 51,084 | 140,907 | 63,841 | 77,204 |
| Sonoma | 196,195 | 512,325 | 233,027 | 214,146 |
| Marin | 105,829 | 254,222 | 118,113 | 116,851 |
| City of Menlo Park | 13,937 | 35,840 | 15,110 | 42,013 |

# Trip Generation and Distribution Calibration

## Trip Generation Calibration

A trip generation and distribution calibration was conducted for the home-based work trip purpose since the previous model didn't include Facebook land uses. Hexagon obtained person-level work-related trip generation data at the county-level from 2019 American Community Survey (ACS) 5-year estimates. The proportions of county-level productions (work trips based on home locations) and attractions (work trips based on employment locations) were used to calibrate the model estimated county-level production and attractions. After calibration, the model-estimated production and attraction proportions well-matched the latest ACS data (see Table 2).

**Table 2**
**Trip Generation Comparison Between Model and Survey Data**

| County | Modelled Proportions | | 2019 ACS 5-Year Estimates | |
|---|---|---|---|---|
| | Productions | Attractions | Productions | Attractions |
| San Francisco | 11.2% | 16.6% | 11.3% | 16.6% |
| San Mateo | 9.0% | 9.1% | 9.1% | 9.1% |
| Santa Clara | 21.6% | 24.5% | 21.6% | 24.3% |
| Alameda | 17.2% | 16.2% | 17.2% | 16.2% |
| Contra Costa | 12.0% | 8.5% | 12.0% | 8.4% |
| Solano | 4.6% | 3.3% | 4.6% | 3.3% |
| Napa | 1.5% | 1.7% | 1.5% | 1.7% |
| Sonoma | 5.5% | 5.0% | 5.4% | 5.0% |
| Marin | 2.6% | 2.5% | 2.6% | 2.5% |
| Rest of Modelled Area | 14.6% | 12.7% | 14.6% | 12.9% |

## Trip Distribution Calibration

Latest county-to-county flow information were obtained from AASHTO's Census Transportation Planning Product (CTPP) 2012-2016 data. The year 2019 flow estimates were derived using the iterative proportional fitting method, with the model-estimated county-level productions and attractions as the targets, seeded with the CTPP data. As shown on Table 3 below, the model-estimated county-level flows well-matched the fitted flow data from surveys.

**Table 3**
**Trip Distribution Calibration**

| Comparison of Model Flows to Survey Flows | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Attraction | | | | | | | | |
| Production | San Franciso | San Mateo | Santa Clara | Alameda | Contra Costa | Solano | Napa | Sonoma | Marin |
| **San Franciso** | 0.99 | 1.00 | 1.03 | 1.11 | 1.07 | | | | 0.99 |
| **San Mateo** | 1.00 | 1.01 | 0.96 | 1.01 | | | | | |
| **Santa Clara** | 0.96 | 0.96 | 1.01 | 0.94 | | | | | |
| **Alameda** | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | | | | 0.92 |
| **Contra Costa** | 1.03 | 0.96 | 0.99 | 1.01 | 1.00 | 0.98 | | | 0.94 |
| **Solano** | 1.00 | | | 1.03 | 1.04 | 1.00 | 0.98 | | 0.96 |
| **Napa** | | | | | | 1.04 | 1.00 | | |
| **Sonoma** | 1.02 | | | | | | 0.97 | 0.99 | 0.98 |
| **Marin** | 0.99 | | | 1.05 | | | | 0.90 | 1.01 |

Notes:
Ratios are provided only for county-to-county person-level flows with more than 5,000 trips

Based on aggregated data supplied by Facebook for employee's residing cities, Hexagon specifically calibrated the k-factors associated with the Facebook zones. As shown on Table 4, the resulting county-level distributions for the Facebook zones well-represent Facebook employees' residential patterns.

**Table 4**
**Facebook Employee Home-Location Distribution**

| | Facebook Employee Home-Location Distribution | |
|---|---|---|
| County | Model Estimate | Survey Data |
| San Francisco | 14.3% | 15.7% |
| San Mateo | 27.3% | 26.8% |
| Santa Clara | 35.9% | 37.4% |
| Alameda | 18.6% | 15.2% |
| Contra Costa | 2.3% | 1.6% |
| Rest | 1.7% | 3.4% |

# Mode Choice Calibration

## Facebook Mode Splits

Facebook provided 2015 survey results of employee travel mode by County. Because the Facebook Classic campus, the Bayfront campus, and the Facebook buildings (MPK 40 to MPK 59) in the Menlo Science and Technology Park are interconnected via pedestrian/bicycle facilities and enjoy essentially the same TDM benefits, it is assumed that the surveyed employee mode splits would apply to all three areas. As shown on Table 5, factors were developed so that the resulting mode splits for these three areas of Facebook campuses would reflect the surveyed data.

**Table 5**
**Facebook Home-Based Work Mode Split**

| County | Facebook HBW Driving Mode Split | |
|---|---|---|
| | Modeled | Survey |
| San Francisco | 17.2% | 17.4% |
| San Mateo | 75.9% | 75.6% |
| Santa Clara | 62.4% | 62.4% |
| Alameda | 48.9% | 49.4% |
| Contra Costa | 40.5% | 40.8% |
| Marin | 79.0% | 81.3% |

*Source: CHS Consulting Group*

## Menlo Park and San Mateo County Transit Mode Splits

According to 2019 ACS 5-year estimates, San Mateo County's work trip transit mode split was approximately 10% of all work trips. The model estimated transit mode split for San Mateo County work trips was approximately 9%, which well reflects existing conditions.

Using a combination of 2019 ACS 5-year estimates and CTPP data, it was estimated the City of Menlo Park's work trip transit mode split was approximately 9%. The model estimated transit mode split for the City of Menlo Park work trips was approximately 5% prior to adjusting for Facebook's mode split, and approximately 14% afterwards (assuming all shuttle trips are transit trips). Given that ACS surveys do not explicitly specify inclusion of shuttles under public transportation, the slight discrepancies could be due to the way shuttle is interpreted on the survey. Overall, the model results generally reflects existing conditions,

## Caltrain Coding

According to the *Caltrain 2019 Annual Passenger Count Key Findings*, the Menlo Park Caltrain station had on average 1,639 boarding during a typical weekday. After making refinements in the model to the specific access coding at the Menlo Park Caltrain station and surrounding Caltrain stations, the modelled daily boarding at the Menlo Park Caltrain station was 1,722, which is close to the actual observed boarding. At a system level, the model estimated the Caltrain system boarding within 8% of observed boarding.

## Highway Model Validation

Highway assignment validation is the process in which the traffic volumes estimated by the model are compared with observed traffic count data. Because of the excessive congestion issues experienced along major arterials, expressways and freeways within and around the City of Menlo Park during the AM and PM peak periods, this model is set up for 4-hour AM and PM peak period assignments. The 4-hour peak period assignments would allow the model to capture the shoulders of the commute peak hours. The City of Menlo Park conducted extensive daily roadway counts in March 2019. These volumes along with Caltrans PeMS data were used to derive conversion factors between the peak hour and the 4-hour peak period (see Table 6 for the factors).

**Table 6**
**AM and PM Peak 1-hour to 4-hour Volume Conversion Factors**

| | 1-hour to 4-hour Factors | |
|---|---|---|
| Roadway | AM Peak | PM Peak |
| Freeway | 3.65 | 3.71 |
| Expressway | 3.64 | 3.66 |
| Arterial | 3.14 | 3.57 |
| Ramps | 3.33 | 3.43 |
| Local | 2.82 | 3.42 |

Notes:
Freeway factors derived from Caltrans PeMS data

Peak hour volumes are important for forecasting turning movement volumes for intersection level-of-service analysis. The factors shown in Table 6 above would allow the 4-hour peak period model forecasts to be converted to peak 1-hour volumes. Therefore, the 2019 model validation presented in this memo is a system-level validation of the factored 1-hour AM and PM peak period volumes based on statistic validation targets set forth in the *2010 California Regional Transportation Plan Guidelines*, as well as validation by facility type (freeways, expressways, arterials and collectors) following the targets recommended in FHWA's *Travel Model Validation and Reasonableness Checking Manual, Second Edition*.

The specific model validation targets are listed below:

**System Level Validation Targets**

- Percent of links with volume-to-count ratios within Caltrans deviation allowance: over 75%
- Correlation coefficient: over 0.88
- Percent Root Mean Squared Error: 40% or less

**Facility Type Validation Targets**

- All Facility Types: less than 5 percent absolute error compared to observed counts
- Freeways: less than 7 percent absolute error compared to observed counts
- Expressways: less than 10 percent absolute error compared to observed counts
- Arterials: less than 15 percent absolute error compared to observed counts
- Collectors: less than 25 percent absolute error compared to observed counts

**Intersection Level Validation Targets**

In addition, the model was validated at the intersection turning movement level, based on validation criteria used by the Contra Costa Transportation Authority. The goal was to achieve the following tolerances for intersections turning movements:

- 50 percent of all study intersection movements greater than 1,000 vehicles should be within 20% of the count
- 30 percent of all study intersection movements greater than 500 but less than 1,000 vehicles should be within 20% of the count

The discussions below detail the adjustments made during the validation process.

## Traffic Assignment Methodology

The original C/CAG model employed the equilibrium traffic assignment methodology. The equilibrium methodology is an iterative assignment process in which the previous assignment iteration's information (such as travel time, vehicular speed, volume-to-capacity ratios) is used to inform the next iteration's assignment. The network is said to reach an equilibrium if the difference in roadway volumes between successive iterations meet specific targets. However, this method was found to result in considerable "noise" or "random error" when small network changes are made. In recent model work completed by Hexagon, this equilibrium traffic assignment methodology was supplemented with the Bi-conjugate Frank-Wolfe algorithm (ENHANCE = 2, SMOOTH = 10). This assignment method has shown more stable assignments and is therefore used in this model.

## AM and PM Peak Hour Validation Results

Hexagon collected counts conducted by the City of Menlo Park in April/May 2019, as well as Caltrans freeway volumes from the PeMS database for the same time period (see Figure 4). System wide highway validation results for the AM and PM peak-hour peak traffic assignments are summarized in Tables 7 and 8, respectively. The peak-hour model volumes are compared to the counts, stratified by facility type. The tables show that the only suggested target that was not met was the maximum deviation target. Differences in peak-hour modelled and count volumes for the AM and PM peak hours are shown on Figures 5 and 6. Locations that do not meet the maximum deviation target are also shown separately on Figures 7 and 8. As shown, a large portion of the segments exceeding the maximum deviation are local streets that are known to experience cut-through traffic during the peak hour congestion. This is typical of a 4-hour model assignment where local streets are generally low on model assigned volumes. Efforts were made to correct for these via modifying capacity and travel time functions.

**Figure 4**
**Traffic Count Locations and Volumes**

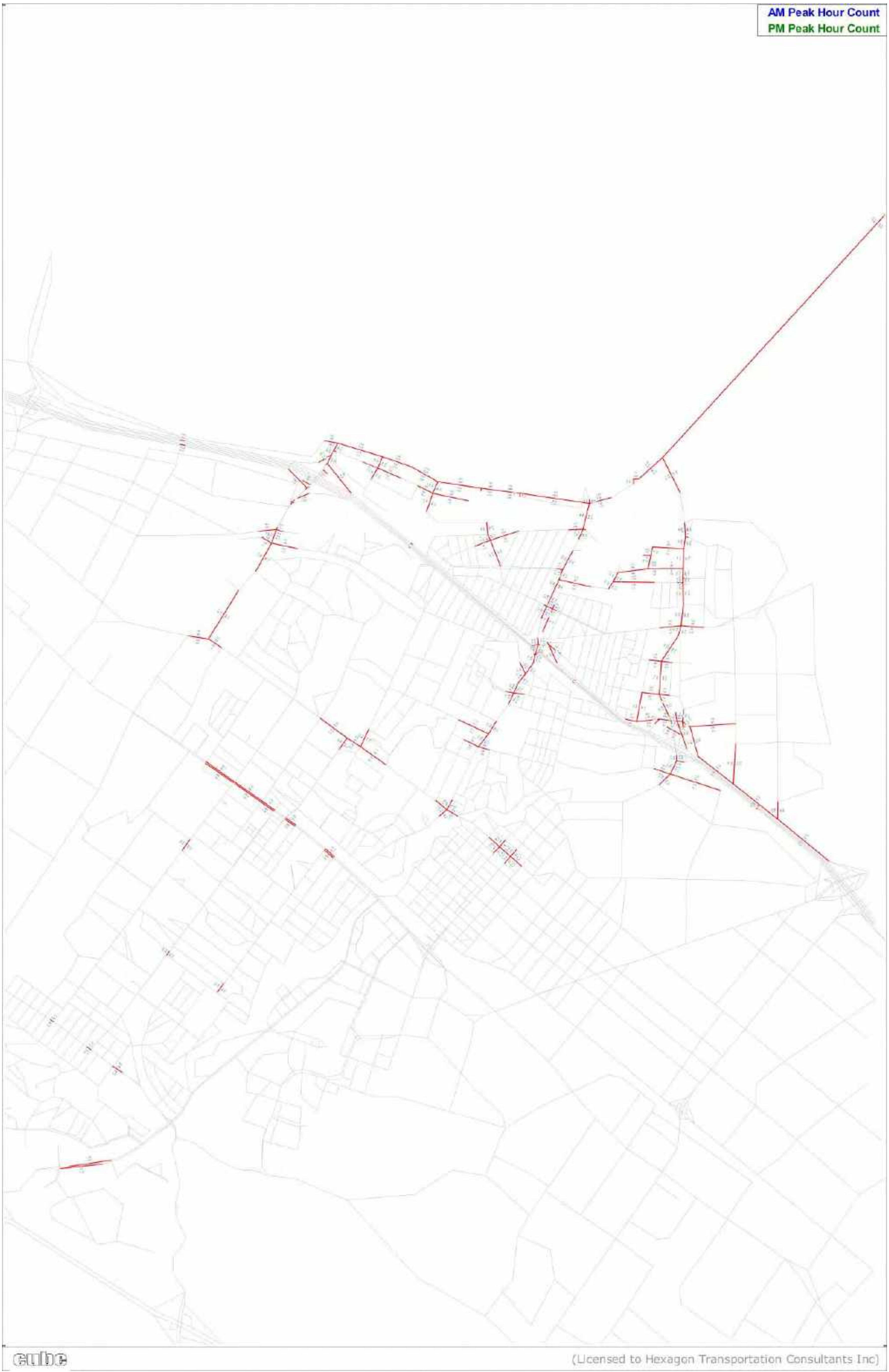


**Figure 5**
**Model Validation – AM Peak Hour**

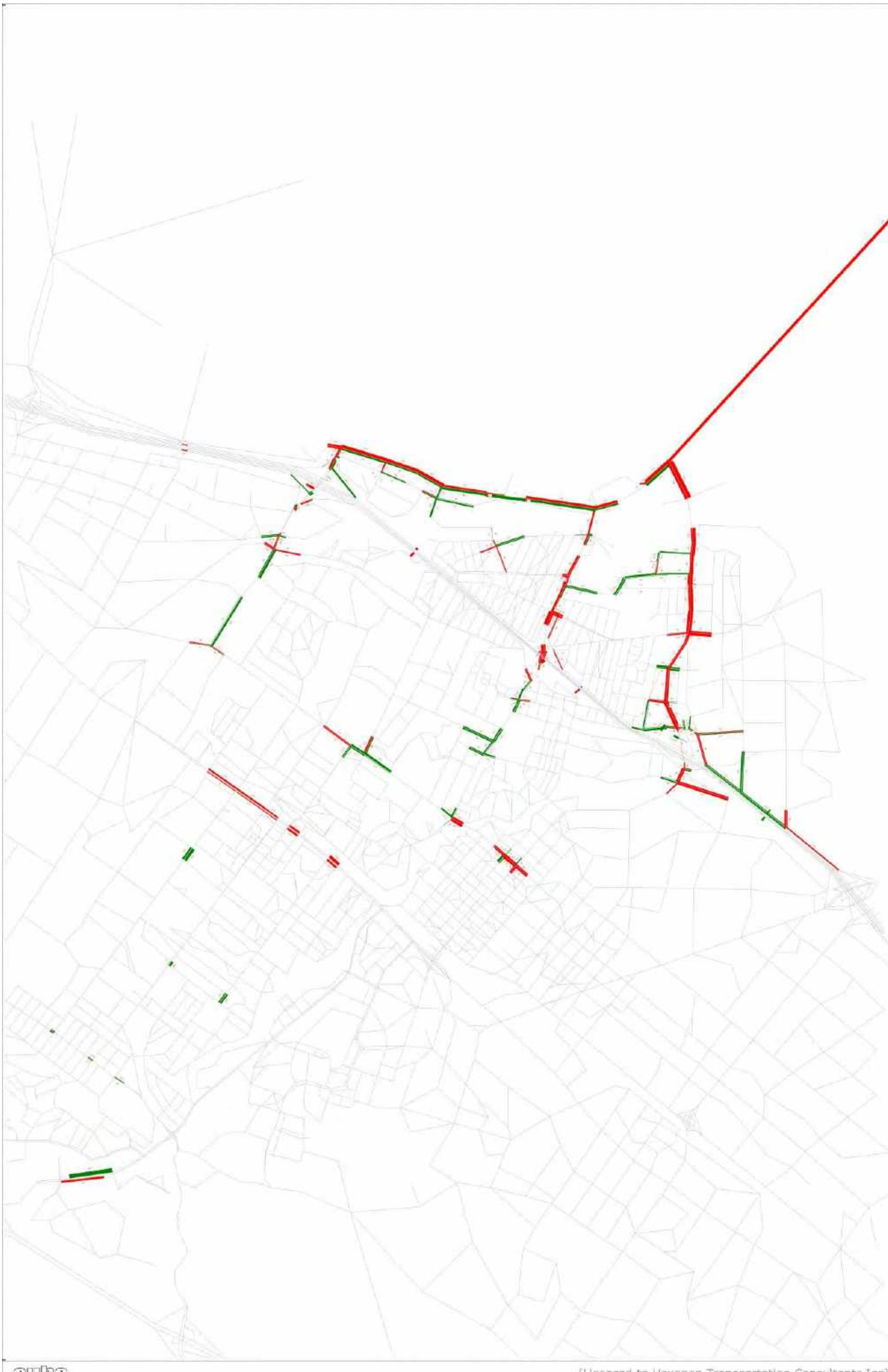


**Figure 6**
**Model Validation – PM Peak Hour**

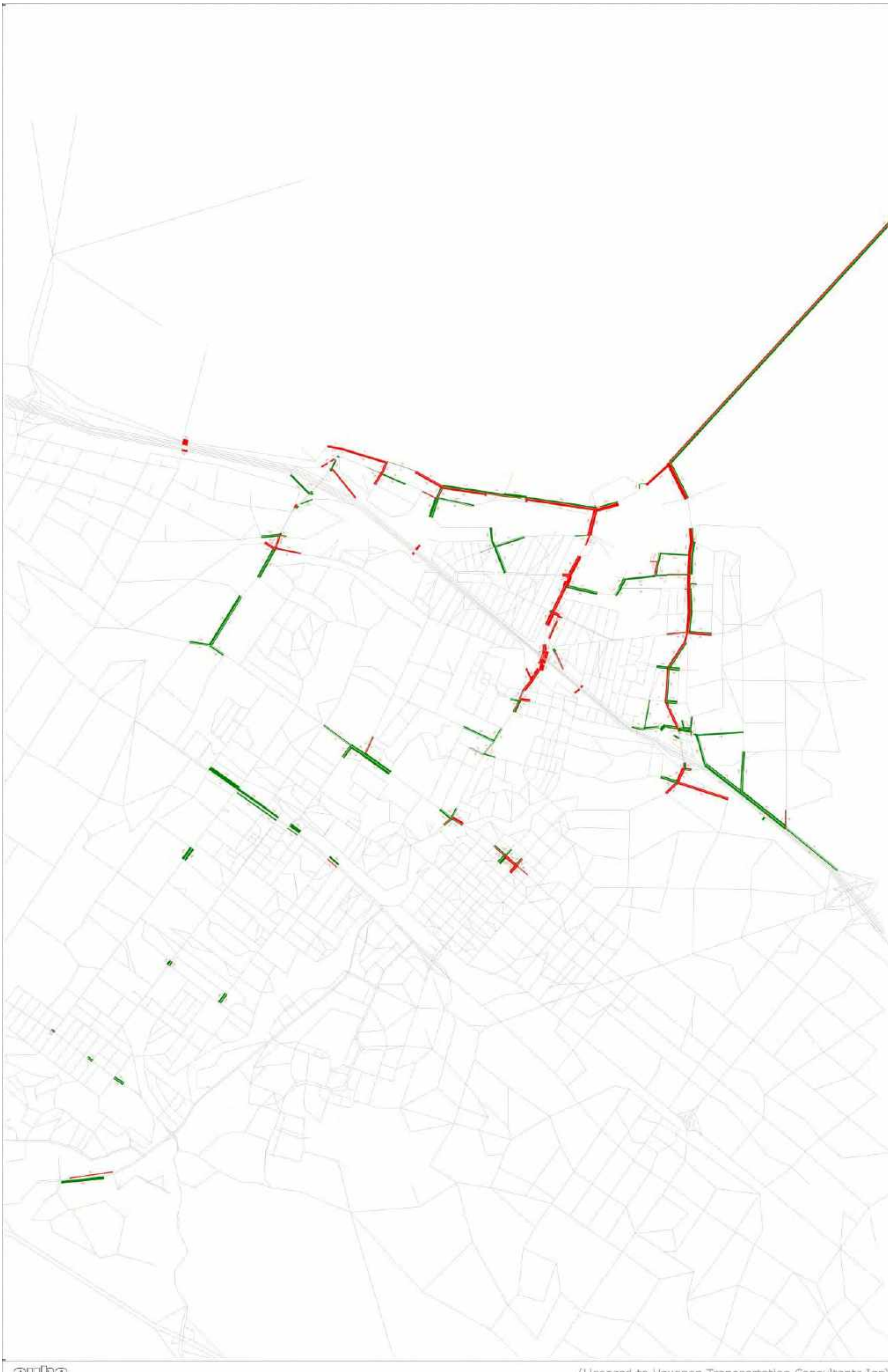


**Figure 7**
**Locations Exceeding Maximum Deviations – AM Peak Hour**

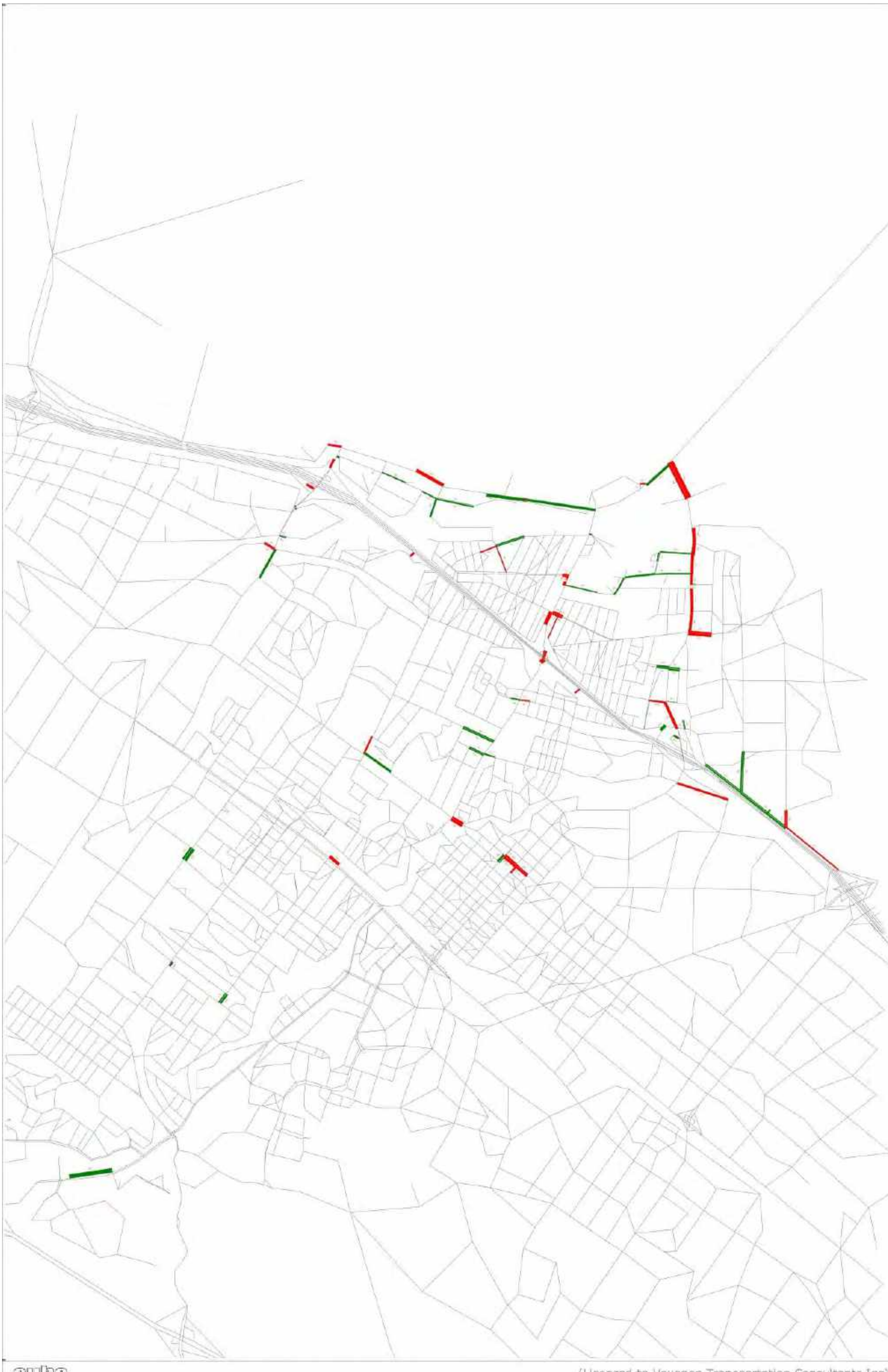


**Figure 8**
**Locations Exceeding Maximum Deviations – PM Peak Hour**

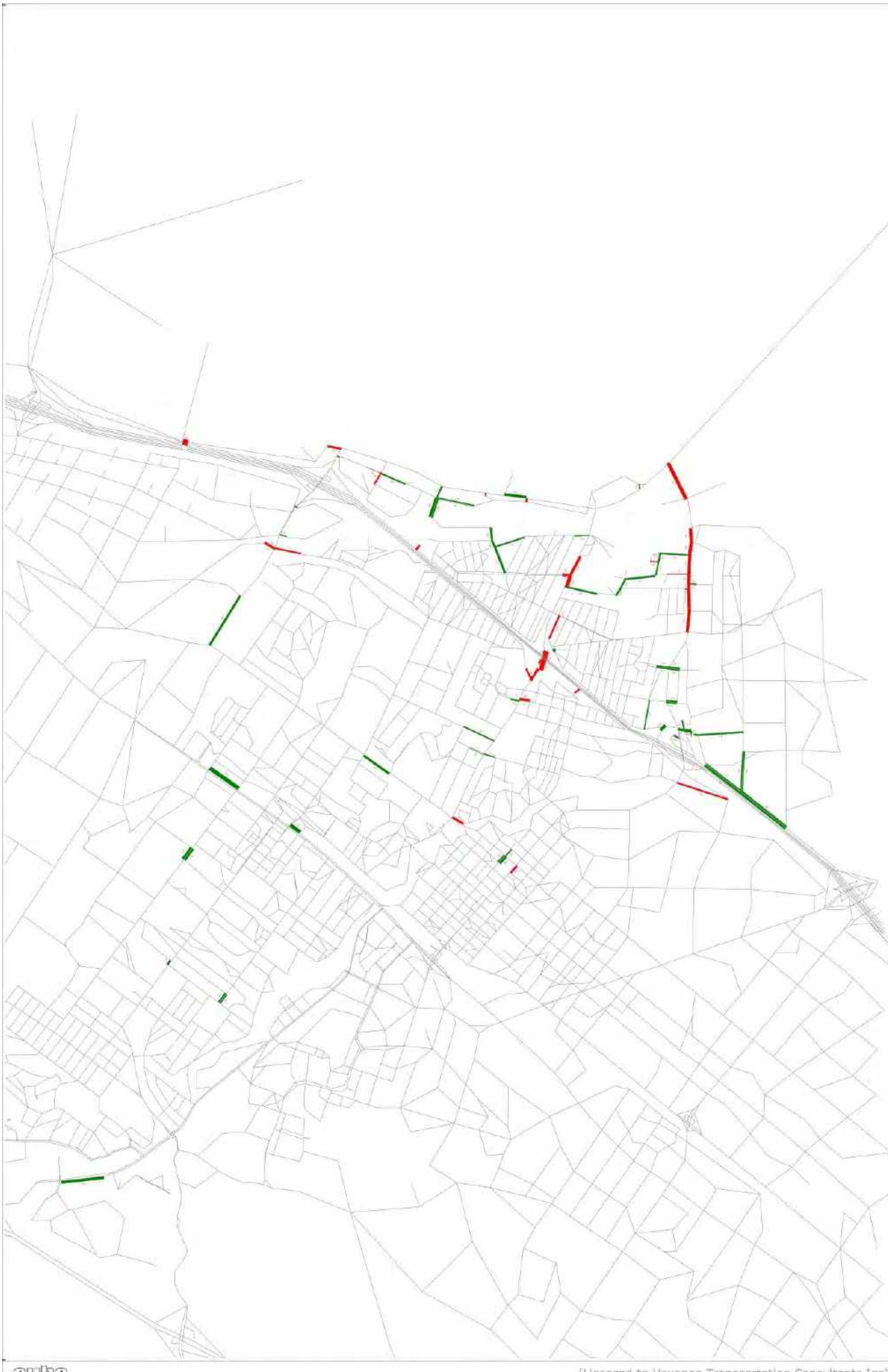


**Table 7**
**Facility Type Validation**

| | | AM Peak Hour | | | | | PM Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Roadway Facility | # of Locations | Traffic Count | Model Volume | Difference | Target | Target Met? | Traffic Count | Model Volume | Difference | Target | Target Met? |
| Freeway and Ramps | 25 | 82,030 | 81,083 | -1% | +/- 7% | Yes | 74,263 | 77,532 | 4% | +/- 7% | Yes |
| Expressway | 23 | 43,763 | 44,431 | 2% | +/- 10% | Yes | 42,118 | 42,736 | 1% | +/- 10% | Yes |
| Arterials | 156 | 151,425 | 161,800 | 7% | +/- 15% | Yes | 149,057 | 145,366 | -2% | +/- 15% | Yes |
| Collectors | 148 | 36,819 | 33,813 | -8% | +/- 25% | Yes | 36,865 | 30,257 | -18% | +/- 25% | Yes |
| All Facilities | | 314,037 | 321,127 | 2% | +/- 5% | Yes | 302,303 | 295,891 | -2% | +/- 5% | Yes |

**Table 8**
**System Level Validation**

| | % Root Mean Squared Error | Target | Target Met? | Correlation Coefficient | Target | Target Met? | Max Deviation | Target | Target Met? |
|---|---|---|---|---|---|---|---|---|---|
| **AM** | 32% | 40% | Yes | 98% | 88% | Yes | 65% | 75% | **No** |
| **PM** | 32% | 40% | Yes | 98% | 88% | Yes | 68% | 75% | **No** |

Table 9 presents the intersection level validation results for the AM and PM peak hours. The table shows that the percent of model estimated turning movements at intersections exceed the targets for both volume levels and for both peak hours (also see Appendix).

**Table 9**
**Intersection Level Validation**

| | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| **Turning Movement Volumes** | **Model** | **Target** | **Target Met?** | **Model** | **Target** | **Target Met?** |
| Volumes >1,000 within 20% of count | 60.5% | 50% | Yes | 77.8% | 50% | Yes |
| Volumes between 500 and 1,000 within 20% of count | 35.6% | 30% | Yes | 32.7% | 30% | Yes |

## Screenlines

Focusing in on the Bayfront area, Hexagon conducted two screenline analysis given the limited access points in the area:

1. Traffic Volumes entering and leaving the general Bayfront area bounded by Marsh Avenue to the west, US 101 to the south, the San Mateo County line to the east, and the Bay to the north.
2. Traffic volumes on Marsh Avenue, Willow Road and University Avenue immediately south of the US 101.

As shown on Tables 10 to 12 below, the total model assigned volumes along the screenlines were all within 15% of the total screenline count volumes. In comparison, the FHWA's *Travel Model Validation and Reasonableness Checking Manual, Second Edition* suggested maximum percentage error for screenlines in this volume range would be around 20%.

**Table 10**
**Screenline #1 – Bayfront Area – Inbound**

| Bayfront Area - N of US 101, IN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| Street | Count | Model | Count | Model | Diff | % Diff | Diff | % Diff |
| Haven W. of Marsh | 500 | 734 | 722 | 1039 | 234 | 47% | 317 | 44% |
| Marsh N. of US 101 | 2072 | 1746 | 2262 | 2030 | -326 | -16% | -232 | -10% |
| Willow N. of US 101 | 1756 | 2029 | 1686 | 2111 | 273 | 16% | 425 | 25% |
| University N. of US 101 | 909 | 910 | 1595 | 1275 | 1 | 0% | -320 | -20% |
| US 101 NB Off-Ramp to Donohoe | 857 | 849 | 1326 | 1299 | -8 | -1% | -27 | -2% |
| Bayshore W. of Pulgas | 207 | 341 | 827 | 758 | 134 | 65% | -69 | -8% |
| **Total** | 6301 | 6609 | 8418 | 8512 | **308** | **5%** | **94** | **1%** |

**Table 11**
**Screenline #1 – Bayfront Area – Outbound**

| Bayfront Area - N of US 101, OUT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| Street | Count | Model | Count | Model | Diff | % Diff | Diff | % Diff |
| Haven W. of Marsh | 540 | 892 | 303 | 298 | 352 | 65% | -5 | -2% |
| Marsh N. of US 101 | 2224 | 2515 | 2021 | 2052 | 291 | 13% | 31 | 2% |
| Willow N. of US 101 | 1935 | 2475 | 1689 | 1833 | 540 | 28% | 144 | 9% |
| University N. of US 101 | 1816 | 2013 | 1223 | 1292 | 197 | 11% | 69 | 6% |
| US 101 NB On-Ramp fr. Donohoe | 1473 | 890 | 960 | 364 | -583 | -40% | -596 | -62% |
| Bayshore W. of Pulgas | 922 | 923 | 467 | 312 | 1 | 0% | -155 | -33% |
| **Total** | 8910 | 9708 | 6663 | 6151 | **798** | **9%** | **-512** | **-8%** |

**Table 12**
**Screenline #2 – Menlo Park towards US 101 – NB**

| Menlo Park towards US 101, NB | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| Street | Count | Model | Count | Model | Diff | % Diff | Diff | % Diff |
| Marsh Rd | 1333 | 1425 | 1970 | 1670 | 92 | 7% | -300 | -15% |
| Willow Rd | 1461 | 1420 | 850 | 1663 | -41 | -3% | 813 | 96% |
| University Ave | 1250 | 1465 | 1453 | 1550 | 215 | 17% | 97 | 7% |
| **Total** | 4044 | 4310 | 4273 | 4883 | **266** | **7%** | **610** | **14%** |

**Table 13**
**Screenline #2 – Menlo Park towards US 101 – SB**

| | Menlo Park towards US 101, SB | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| Street | Count | Model | Count | Model | Diff | % Diff | Diff | % Diff |
| Marsh Rd | 1909 | 1688 | 1063 | 1277 | -221 | -12% | 214 | 20% |
| Willow Rd | 1444 | 1601 | 1118 | 1143 | 157 | 11% | 25 | 2% |
| University Ave | 1538 | 1871 | 1077 | 1369 | 333 | 22% | 292 | 27% |
| **Total** | 4891 | 5160 | 3258 | 3789 | **269** | **5%** | **531** | **16%** |

# Year 2040 General Plan Scenario

## Network System Refinement

The Year 2040 roadway network included the following improvements compared to year 2019 existing conditions:

- Full build-out of the US 101/Willow Road interchange (assumed partial completion under existing conditions)
- US 101 managed lane project from Whipple Avenue to I-380
- US 101 2-lane managed lane in each direction from Cochrane Road to Embarcadero Road, per latest bi-county model
- BART extension into Santa Clara, per latest bi-county model
- Increased frequency for existing BART lines from 15-minute to 12-minute headways, per latest bi-county model
- Opening of Caltrain San Francisco Downtown station, per latest bi-county model

## Development of 2040 Land Use Inputs

The previous ConnectMenlo model had land uses for a future year of 2040. This was the primary data source for land uses within the City of Menlo Park. Adjustments were made to buildings that will be occupied by Facebook to reflect the higher employee density characteristic of Facebook buildings.

For TAZs outside of the City of Menlo Park, the year 2040 land uses mainly referenced the future year land uses coded in the previous ConnectMenlo model. For TAZs within the City of East Palo Alto, Hexagon obtained a list of approved and pending projects and ensured that the land uses reflected these developments. Figures 9 and 10 show the year 2040 general plan conditions residential and employment land use growth by zone for City of Menlo Park zones. Table 14 below summarizes the key land use data for the nine Bay Area counties and for the City of Menlo Park. Table 15 below compares the City of Menlo Park's land uses between year 2019 and year 2040.

**Figure 9**
**Year 2040 Land Use Growth – Households**

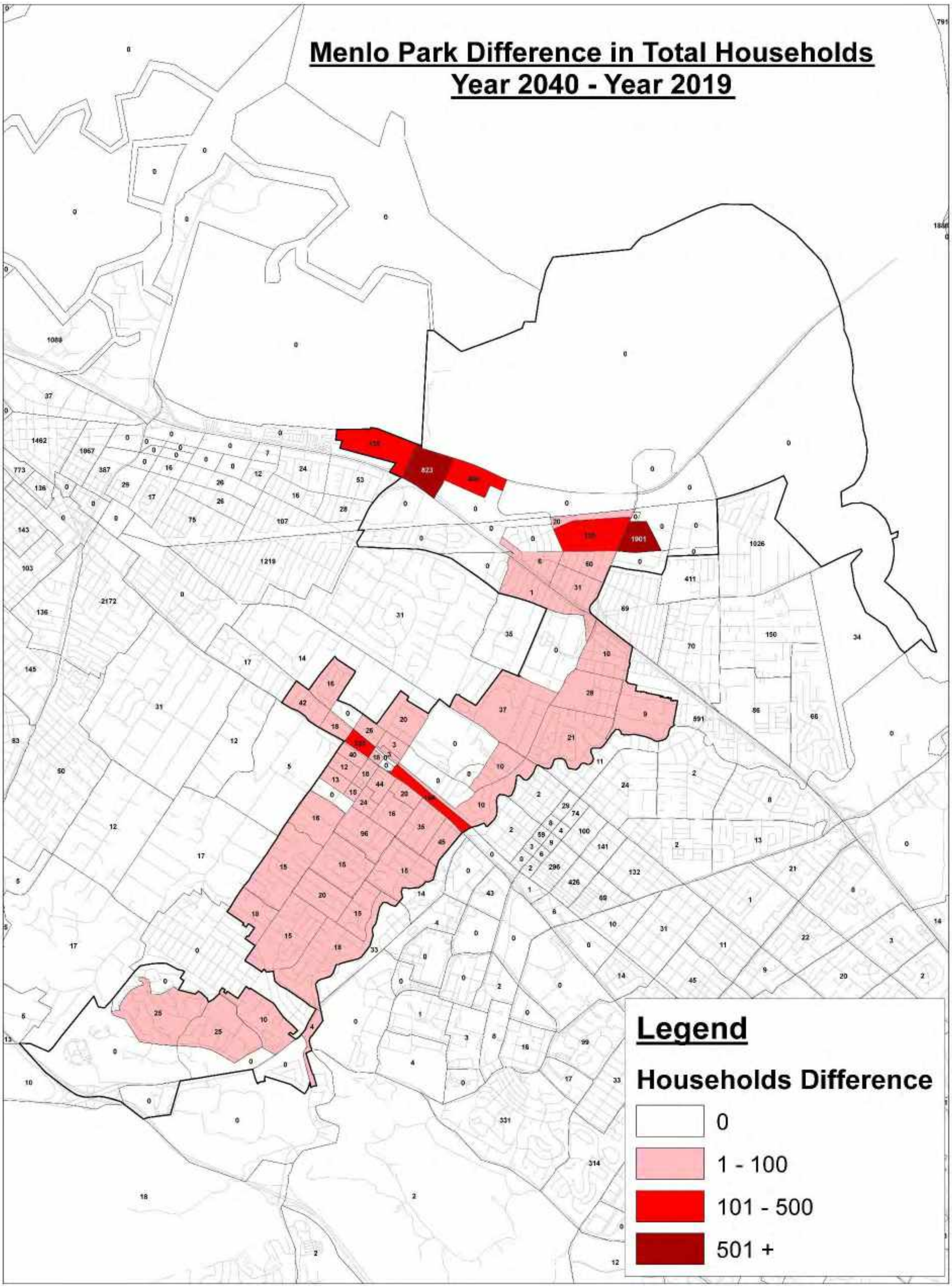


**Figure 10**
**Year 2040 Land Use Growth – Total Employment**

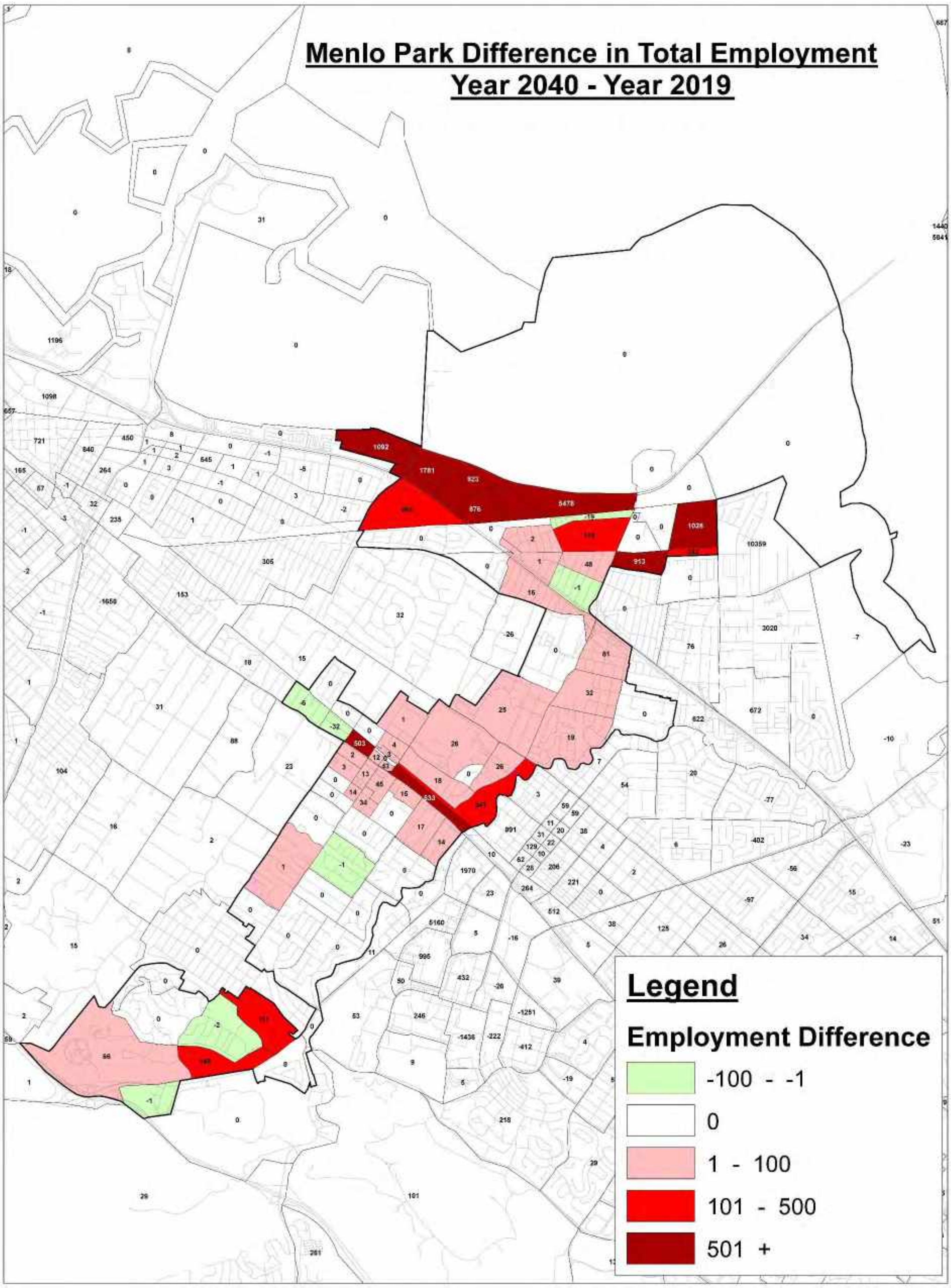


**Table 14**
**Year 2040 Land Use Summary**

| County | Year 2040 Model Land Use Data | | | |
|---|---|---|---|---|
| | Total Households | Total Population | Employed Residents | Total Jobs |
| San Francisco | 447,340 | 1,076,365 | 559,923 | 759,509 |
| San Mateo | 320,548 | 910,879 | 443,628 | 477,039 |
| Santa Clara | 818,369 | 2,406,587 | 1,158,389 | 1,229,995 |
| Alameda | 705,337 | 1,965,356 | 891,473 | 947,642 |
| Contra Costa | 464,151 | 1,328,458 | 579,757 | 467,333 |
| Solano | 168,706 | 494,363 | 224,059 | 179,946 |
| Napa | 56,312 | 158,792 | 69,450 | 89,554 |
| Sonoma | 220,740 | 591,546 | 284,856 | 257,466 |
| Marin | 112,046 | 274,489 | 136,554 | 129,150 |
| Bay Area Total | 3,313,549 | 9,206,835 | 4,348,089 | 4,537,634 |
| City of Menlo Park | 18,703 | 48,109 | 20,519 | 56,892 |

**Table 15**
**Menlo Park Land Use Growth**

| County | Menlo Park - Model Land Use Comparison | | | |
|---|---|---|---|---|
| | Total Households | Total Population | Employed Residents | Total Jobs |
| Year 2019 | 13,937 | 35,840 | 15,110 | 42,013 |
| Year 2040 | 18,703 | 48,109 | 20,519 | 56,892 |
| **Growth** | **4,766** | **12,269** | **5,409** | **14,879** |

## Model Estimated Person-Level Trip Generation and Mode Split

Hexagon evaluated the person-level trip generation and mode split as estimated by the model for both year 2019 and year 2040. Table 16 and 17 below present the data for person trips generated by City of Menlo Park land uses, and by San Mateo County land uses, respectively.

**Table 16**
**Daily Person Trip Generation and Mode Split – City of Menlo Park**

| | Daily Person Trips | |
|---|---|---|
| | Existing (Yr 2019) | Future Scenario (Yr 2040) |
| *Mode Split* | | |
| DA | 57.7% | 56.5% |
| S2 | 11.7% | 11.7% |
| S3 | 16.3% | 15.8% |
| Bk | 1.6% | 1.7% |
| Wk | 6.5% | 7.0% |
| Transit | 6.2% | 7.3% |

**Table 17**
**Daily Person Trip Generation and Mode Split – County of San Mateo**

| | Daily Person Trips | |
|---|---|---|
| | Existing (Yr 2019) | Future Scenario (Yr 2040) |
| **Total** | **3,316,797** | **3,927,108** |
| *Mode Split* | | |
| Drive Alone | 56.6% | 55.3% |
| Shared Ride - 2 | 13.4% | 13.2% |
| Shared Ride - 3+ | 17.2% | 16.6% |
| Bike | 1.4% | 1.6% |
| Walk | 7.6% | 8.0% |
| Transit | 3.9% | 5.2% |

## Conclusion

The peak model assignment is set up to produce sensible future forecasts and inform locations of potential future roadway improvements to address peak-period congestions. Although the model validation results do not meet one of the suggested targets, the model balances accounting for a certain degree of cut-through traffic behavior, and accommodating additional traffic on major roadways (i.e. Willow Road, University Avenue, Bayfront Expressway) under future conditions. Therefore, the overall model validation is considered acceptable.

## APPENDIX

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

## AM Peak Hour Intersection-Level Turning Movement Validation

1 **24723**
Intersection Name: Marsh & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 162 | 27 | 1502 | 1691 | 10 | 30 | 7 | 47 | 8 | 196 | 296 | 500 | 1931 | 371 | 34 | 2336 | *4574* |
| **2019 Model 4Hr** | 687 | 0 | 5662 | 6349 | 0 | 0 | 0 | 0 | 0 | 1272 | 796 | 2068 | 8344 | 1828 | 0 | 10172 | *18589* |
| **Mdl Factored 1Hr** | 219 | 0 | 1802 | 2021 | 0 | 0 | 0 | 0 | 0 | 350 | 219 | 569 | 2295 | 503 | 0 | 2798 | *5388* |
| **Abs Diff** | 57 | 27 | 300 | 330 | 10 | 30 | 7 | 47 | 8 | 154 | 77 | 69 | 364 | 132 | 34 | 462 | 814 |
| **>1000** | - | - | **20%** | | - | - | - | | - | - | - | | **19%** | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

2 **60242**
Intersection Name: Marsh & 101 NB
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1415 | 0 | 1415 | 0 | 858 | 0 | 858 | 0 | 0 | 0 | 0 | 771 | 0 | 657 | 1428 | *3701* |
| **2019 Model 4Hr** | 0 | 4038 | 0 | 4038 | 0 | 4581 | 0 | 4581 | 0 | 0 | 0 | 0 | 1337 | 0 | 2308 | 3645 | *12264* |
| **Mdl Factored 1Hr** | 0 | 1285 | 0 | 1285 | 0 | 1458 | 0 | 1458 | 0 | 0 | 0 | 0 | 401 | 0 | 693 | 1094 | *3837* |
| **Abs Diff** | 0 | 130 | 0 | 130 | 0 | 600 | 0 | 600 | 0 | 0 | 0 | 0 | 370 | 0 | 36 | 334 | 136 |
| **>1000** | - | **9%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **70%** | - | | - | - | - | | **48%** | - | **5%** | | |

3 **24715**
Intersection Name: Marsh & 101 SB
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 891 | 0 | 891 | 0 | 1462 | 0 | 1462 | 1123 | 0 | 436 | 1559 | 0 | 0 | 0 | 0 | *3912* |
| **2019 Model 4Hr** | 0 | 1863 | 0 | 1863 | 0 | 4005 | 0 | 4005 | 3209 | 0 | 1297 | 4506 | 0 | 0 | 0 | 0 | *10374* |
| **Mdl Factored 1Hr** | 0 | 593 | 0 | 593 | 0 | 1275 | 0 | 1275 | 963 | 0 | 389 | 1352 | 0 | 0 | 0 | 0 | *3220* |
| **Abs Diff** | 0 | 298 | 0 | 298 | 0 | 187 | 0 | 187 | 160 | 0 | 47 | 207 | 0 | 0 | 0 | 0 | 692 |
| **>1000** | - | - | - | | - | **13%** | - | | **14%** | - | - | | - | - | - | | |
| **>500** | - | **33%** | - | | - | - | - | | - | - | - | | - | - | - | | |

4 **55651**
Intersection Name: Marsh & Scott
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 24 | 1050 | 7 | 1081 | 448 | 1189 | 272 | 1909 | 225 | 19 | 0 | 244 | 13 | 4 | 58 | 75 | *3309* |
| **2019 Model 4Hr** | 153 | 3733 | 0 | 3886 | 511 | 3233 | 1559 | 5303 | 681 | 0 | 0 | 681 | 0 | 3 | 62 | 65 | *9935* |
| **Mdl Factored 1Hr** | 49 | 1188 | 0 | 1237 | 163 | 1029 | 496 | 1688 | 242 | 0 | 0 | 242 | 0 | 1 | 22 | 23 | *3190* |
| **Abs Diff** | 25 | 138 | 7 | 156 | 285 | 160 | 224 | 221 | 17 | 19 | 0 | 2 | 13 | 3 | 36 | 52 | 119 |
| **>1000** | - | **13%** | - | | - | **13%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

5 **31808**
Intersection Name: Marsh & Bohannon
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 114 | 804 | 80 | 998 | 29 | 1007 | 413 | 1449 | 496 | 47 | 137 | 680 | 35 | 15 | 25 | 75 | *3202* |
| **2019 Model 4Hr** | 378 | 2594 | 146 | 3118 | 0 | 3653 | 787 | 4440 | 1291 | 16 | 249 | 1556 | 14 | 10 | 0 | 24 | *9138* |
| **Mdl Factored 1Hr** | 120 | 826 | 46 | 992 | 0 | 1163 | 250 | 1413 | 458 | 6 | 88 | 552 | 5 | 4 | 0 | 9 | *2966* |
| **Abs Diff** | 6 | 22 | 34 | 6 | 29 | 156 | 163 | 36 | 38 | 41 | 49 | 128 | 30 | 11 | 25 | 66 | 236 |
| **>1000** | - | - | - | | - | **15%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **3%** | - | | - | - | - | | - | - | - | | - | - | - | | |

## PM Peak Hour Intersection-Level Turning Movement Validation

1 **24723**
Intersection Name: Marsh & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 179 | 40 | 1834 | 2053 | 12 | 31 | 5 | 48 | 9 | 505 | 208 | 722 | 1822 | 119 | 14 | 1955 | *4778* |
| **2019 Model 4Hr** | 709 | 0 | 6722 | 7431 | 0 | 0 | 0 | 0 | 0 | 2830 | 724 | 3554 | 6792 | 311 | 0 | 7103 | *18088* |
| **Mdl Factored 1Hr** | 226 | 0 | 2139 | 2365 | 0 | 0 | 0 | 0 | 0 | 778 | 199 | 977 | 1868 | 86 | 0 | 1954 | *5296* |
| **Abs Diff** | 47 | 40 | 305 | 312 | 12 | 31 | 5 | 48 | 9 | 273 | 9 | 255 | 46 | 33 | 14 | 1 | 518 |
| **>1000** | - | - | **17%** | | - | - | - | | - | - | - | | **3%** | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **54%** | - | | - | - | - | | |

2 **60242**
Intersection Name: Marsh & 101 NB
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1842 | 0 | 1842 | 0 | 824 | 0 | 824 | 0 | 0 | 0 | 0 | 570 | 0 | 420 | 990 | *3656* |
| **2019 Model 4Hr** | 0 | 5014 | 0 | 5014 | 0 | 2943 | 0 | 2943 | 0 | 0 | 0 | 0 | 1754 | 0 | 2411 | 4165 | *12122* |
| **Mdl Factored 1Hr** | 0 | 1596 | 0 | 1596 | 0 | 937 | 0 | 937 | 0 | 0 | 0 | 0 | 526 | 0 | 723 | 1249 | *3782* |
| **Abs Diff** | 0 | 246 | 0 | 246 | 0 | 113 | 0 | 113 | 0 | 0 | 0 | 0 | 44 | 0 | 303 | 259 | 126 |
| **>1000** | - | **13%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **14%** | - | | - | - | - | | **8%** | - | - | | |

3 **24715**
Intersection Name: Marsh & 101 SB
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 959 | 0 | 959 | 0 | 1000 | 0 | 1000 | 1176 | 0 | 296 | 1472 | 0 | 0 | 0 | 0 | *3431* |
| **2019 Model 4Hr** | 0 | 3601 | 0 | 3601 | 0 | 2898 | 0 | 2898 | 2524 | 0 | 1672 | 4196 | 0 | 0 | 0 | 0 | *10695* |
| **Mdl Factored 1Hr** | 0 | 1146 | 0 | 1146 | 0 | 922 | 0 | 922 | 757 | 0 | 502 | 1259 | 0 | 0 | 0 | 0 | *3327* |
| **Abs Diff** | 0 | 187 | 0 | 187 | 0 | 78 | 0 | 78 | 419 | 0 | 206 | 213 | 0 | 0 | 0 | 0 | 104 |
| **>1000** | - | - | - | | - | **8%** | - | | **36%** | - | - | | - | - | - | | |
| **>500** | - | **19%** | - | | - | - | - | | - | - | - | | - | - | - | | |

4 **55651**
Intersection Name: Marsh & Scott
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 34 | 1326 | 7 | 1367 | 55 | 815 | 193 | 1063 | 256 | 6 | 4 | 266 | 15 | 5 | 388 | 408 | *3104* |
| **2019 Model 4Hr** | 191 | 4466 | 0 | 4657 | 150 | 2864 | 1552 | 4566 | 1030 | 1 | 0 | 1031 | 0 | 9 | 471 | 480 | *10734* |
| **Mdl Factored 1Hr** | 61 | 1421 | 0 | 1482 | 48 | 912 | 494 | 1454 | 366 | 0 | 0 | 366 | 0 | 3 | 167 | 170 | *3472* |
| **Abs Diff** | 27 | 95 | 7 | 115 | 7 | 97 | 301 | 391 | 110 | 6 | 4 | 100 | 15 | 2 | 221 | 238 | 368 |
| **>1000** | - | **7%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **12%** | - | | - | - | - | | - | - | - | | |

5 **31808**
Intersection Name: Marsh & Bohannon
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 180 | 675 | 38 | 893 | 13 | 773 | 354 | 1140 | 436 | 18 | 157 | 611 | 109 | 50 | 40 | 199 | *2843* |
| **2019 Model 4Hr** | 574 | 3484 | 58 | 4116 | 0 | 2797 | 955 | 3752 | 1169 | 15 | 228 | 1412 | 121 | 114 | 0 | 235 | *9515* |
| **Mdl Factored 1Hr** | 183 | 1109 | 18 | 1310 | 0 | 890 | 304 | 1194 | 415 | 5 | 81 | 501 | 43 | 40 | 0 | 83 | *3088* |
| **Abs Diff** | 3 | 434 | 20 | 417 | 13 | 117 | 50 | 54 | 21 | 13 | 76 | 110 | 66 | 10 | 40 | 116 | 245 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **64%** | - | | - | **15%** | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

6 **63557**
Intersection Name: Marsh & Bay
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 810 | 82 | 892 | 267 | 755 | 47 | 1069 | 139 | 63 | 2 | 204 | 39 | 19 | 202 | 260 | *2425* |
| **2019 Model 4Hr** | 0 | 1480 | 92 | 1572 | 1551 | 1948 | 419 | 3918 | 999 | 50 | 0 | 1049 | 64 | 69 | 639 | 772 | *7311* |
| **Mdl Factored 1Hr** | 0 | 471 | 29 | 500 | 494 | 620 | 133 | 1247 | 355 | 18 | 0 | 373 | 23 | 24 | 227 | 274 | *2394* |
| **Abs Diff** | 0 | 339 | 53 | 392 | 227 | 135 | 86 | 178 | 216 | 45 | 2 | 169 | 16 | 5 | 25 | 14 | 31 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **42%** | - | | - | **18%** | - | | - | - | - | | - | - | - | | |

6 **63557**
Intersection Name: Marsh & Bay
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 2 | 745 | 50 | 797 | 167 | 661 | 56 | 884 | 45 | 14 | 2 | 61 | 65 | 11 | 267 | 343 | *2085* |
| **2019 Model 4Hr** | 0 | 1792 | 51 | 1843 | 610 | 1629 | 906 | 3145 | 672 | 27 | 0 | 699 | 145 | 63 | 1650 | 1858 | *7545* |
| **Mdl Factored 1Hr** | 0 | 570 | 16 | 586 | 194 | 518 | 288 | 1000 | 239 | 10 | 0 | 249 | 51 | 22 | 586 | 659 | *2494* |
| **Abs Diff** | 2 | 175 | 34 | 211 | 27 | 143 | 232 | 116 | 194 | 4 | 2 | 188 | 14 | 11 | 319 | 316 | 409 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **23%** | - | | - | **22%** | - | | - | - | - | | - | - | - | | |

7 **55497**
Intersection Name: Marsh & Middlefield
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 492 | 0 | 279 | 771 | 421 | 305 | 0 | 726 | 0 | 223 | 469 | 692 | *2189* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 1340 | 0 | 872 | 2212 | 605 | 1377 | 0 | 1982 | 0 | 941 | 1094 | 2035 | *6229* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 426 | 0 | 278 | 704 | 193 | 438 | 0 | 631 | 0 | 299 | 348 | 647 | *1982* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 66 | 0 | 1 | 67 | 228 | 133 | 0 | 95 | 0 | 76 | 121 | 45 | 207 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

7 **55497**
Intersection Name: Marsh & Middlefield
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 505 | 0 | 402 | 907 | 268 | 252 | 0 | 520 | 0 | 358 | 453 | 811 | *2238* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 1246 | 0 | 599 | 1845 | 674 | 858 | 0 | 1532 | 0 | 1428 | 1349 | 2777 | *6154* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 397 | 0 | 191 | 588 | 215 | 273 | 0 | 488 | 0 | 454 | 429 | 883 | *1959* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 108 | 0 | 211 | 319 | 53 | 21 | 0 | 32 | 0 | 96 | 24 | 72 | 279 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | **21%** | - | - | | - | - | - | | - | - | - | | |

8 **60647**
Intersection Name: Chrysler & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 115 | 0 | 47 | 162 | 0 | 0 | 0 | 0 | 0 | 1510 | 617 | 2127 | 101 | 2050 | 0 | 2151 | *4440* |
| **2019 Model 4Hr** | 519 | 0 | 36 | 555 | 0 | 0 | 0 | 0 | 0 | 4711 | 2226 | 6937 | 219 | 9656 | 0 | 9875 | *17367* |
| **Mdl Factored 1Hr** | 184 | 0 | 13 | 197 | 0 | 0 | 0 | 0 | 0 | 1296 | 612 | 1908 | 60 | 2656 | 0 | 2716 | *4821* |
| **Abs Diff** | 69 | 0 | 34 | 35 | 0 | 0 | 0 | 0 | 0 | 214 | 5 | 219 | 41 | 606 | 0 | 565 | 381 |
| **>1000** | - | - | - | | - | - | - | | - | **14%** | - | | - | **30%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | **1%** | | - | - | - | | |

8 **60647**
Intersection Name: Chrysler & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 605 | 0 | 59 | 664 | 0 | 0 | 0 | 0 | 0 | 2320 | 225 | 2545 | 38 | 1242 | 0 | 1280 | *4489* |
| **2019 Model 4Hr** | 2323 | 0 | 278 | 2601 | 0 | 0 | 0 | 0 | 0 | 8404 | 1154 | 9558 | 61 | 4785 | 0 | 4846 | *17005* |
| **Mdl Factored 1Hr** | 825 | 0 | 99 | 924 | 0 | 0 | 0 | 0 | 0 | 2312 | 317 | 2629 | 17 | 1316 | 0 | 1333 | *4886* |
| **Abs Diff** | 220 | 0 | 40 | 260 | 0 | 0 | 0 | 0 | 0 | 8 | 92 | 84 | 21 | 74 | 0 | 53 | 397 |
| **>1000** | - | - | - | | - | - | - | | - | **0%** | - | | - | **6%** | - | | |
| **>500** | **36%** | - | - | | - | - | - | | - | - | - | | - | - | - | | |

9 **68646**
Intersection Name: Chilco & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 102 | 0 | 221 | 323 | 0 | 0 | 0 | 0 | 0 | 1174 | 492 | 1666 | 287 | 1963 | 0 | 2250 | *4239* |
| **2019 Model 4Hr** | 754 | 0 | 41 | 795 | 0 | 0 | 0 | 0 | 0 | 3409 | 1340 | 4749 | 382 | 9126 | 0 | 9508 | *15052* |
| **Mdl Factored 1Hr** | 268 | 0 | 15 | 283 | 0 | 0 | 0 | 0 | 0 | 938 | 369 | 1307 | 105 | 2510 | 0 | 2615 | *4205* |
| **Abs Diff** | 166 | 0 | 206 | 40 | 0 | 0 | 0 | 0 | 0 | 236 | 123 | 359 | 182 | 547 | 0 | 365 | 34 |
| **>1000** | - | - | - | | - | - | - | | - | **20%** | - | | - | **28%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

9 **68646**
Intersection Name: Chilco & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 234 | 0 | 245 | 479 | 0 | 0 | 0 | 0 | 0 | 2182 | 206 | 2388 | 129 | 1011 | 0 | 1140 | *4007* |
| **2019 Model 4Hr** | 1587 | 0 | 505 | 2092 | 0 | 0 | 0 | 0 | 0 | 8231 | 450 | 8681 | 74 | 3265 | 0 | 3339 | *14112* |
| **Mdl Factored 1Hr** | 563 | 0 | 179 | 742 | 0 | 0 | 0 | 0 | 0 | 2264 | 124 | 2388 | 20 | 898 | 0 | 918 | *4048* |
| **Abs Diff** | 329 | 0 | 66 | 263 | 0 | 0 | 0 | 0 | 0 | 82 | 82 | 0 | 109 | 113 | 0 | 222 | 41 |
| **>1000** | - | - | - | | - | - | - | | - | **4%** | - | | - | **11%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

10 **70458**
Intersection Name: MPK 21 & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 95 | 0 | 74 | 169 | 0 | 0 | 0 | 0 | 0 | 1055 | 449 | 1504 | 280 | 2198 | 0 | 2478 | *4151* |
| **2019 Model 4Hr** | 571 | 0 | 0 | 571 | 0 | 0 | 0 | 0 | 0 | 1969 | 1485 | 3454 | 0 | 8936 | 0 | 8936 | *12961* |
| **Mdl Factored 1Hr** | 203 | 0 | 0 | 203 | 0 | 0 | 0 | 0 | 0 | 542 | 408 | 950 | 0 | 2458 | 0 | 2458 | *3611* |
| **Abs Diff** | 108 | 0 | 74 | 34 | 0 | 0 | 0 | 0 | 0 | 513 | 41 | 554 | 280 | 260 | 0 | 20 | 540 |
| **>1000** | - | - | - | | - | - | - | | - | **49%** | - | | - | **12%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

10 **70458**
Intersection Name: MPK 21 & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 237 | 0 | 67 | 304 | 0 | 0 | 0 | 0 | 0 | 2049 | 73 | 2122 | 59 | 1017 | 0 | 1076 | *3502* |
| **2019 Model 4Hr** | 919 | 0 | 0 | 919 | 0 | 0 | 0 | 0 | 0 | 7909 | 832 | 8741 | 0 | 2420 | 0 | 2420 | *12080* |
| **Mdl Factored 1Hr** | 326 | 0 | 0 | 326 | 0 | 0 | 0 | 0 | 0 | 2175 | 229 | 2404 | 0 | 666 | 0 | 666 | *3396* |
| **Abs Diff** | 89 | 0 | 67 | 22 | 0 | 0 | 0 | 0 | 0 | 126 | 156 | 282 | 59 | 351 | 0 | 410 | 106 |
| **>1000** | - | - | - | | - | - | - | | - | **6%** | - | | - | **35%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

11 **70459**
Intersection Name: MPK 20 & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 70 | 70 | 0 | 0 | 0 | 0 | 0 | 909 | 265 | 1174 | 98 | 2486 | 0 | 2584 | *3828* |
| **2019 Model 4Hr** | 0 | 0 | 167 | 167 | 0 | 0 | 0 | 0 | 0 | 1973 | 0 | 1973 | 1646 | 8937 | 0 | 10583 | *12723* |
| **Mdl Factored 1Hr** | 0 | 0 | 59 | 59 | 0 | 0 | 0 | 0 | 0 | 543 | 0 | 543 | 453 | 2458 | 0 | 2911 | *3513* |
| **Abs Diff** | 0 | 0 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 366 | 265 | 631 | 355 | 28 | 0 | 327 | 315 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | **1%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | **40%** | - | | - | - | - | | |

11 **70459**
Intersection Name: MPK 20 & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 73 | 73 | 0 | 0 | 0 | 0 | 0 | 2101 | 29 | 2130 | 60 | 1085 | 0 | 1145 | *3348* |
| **2019 Model 4Hr** | 0 | 0 | 1258 | 1258 | 0 | 0 | 0 | 0 | 0 | 7906 | 0 | 7906 | 239 | 2423 | 0 | 2662 | *11826* |
| **Mdl Factored 1Hr** | 0 | 0 | 447 | 447 | 0 | 0 | 0 | 0 | 0 | 2175 | 0 | 2175 | 66 | 666 | 0 | 732 | *3354* |
| **Abs Diff** | 0 | 0 | 374 | 374 | 0 | 0 | 0 | 0 | 0 | 74 | 29 | 45 | 6 | 419 | 0 | 413 | 6 |
| **>1000** | - | - | - | | - | - | - | | - | **4%** | - | | - | **39%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

12 **60646**
Intersection Name: Chrysler & Constitution
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 153 | 19 | 172 | 79 | 718 | 0 | 797 | 11 | 3 | 9 | 23 | 36 | 0 | 100 | 136 | *1128* |
| **2019 Model 4Hr** | 0 | 536 | 4 | 540 | 351 | 2094 | 0 | 2445 | 0 | 0 | 0 | 0 | 17 | 0 | 18 | 35 | *3020* |
| **Mdl Factored 1Hr** | 0 | 190 | 1 | 191 | 125 | 743 | 0 | 868 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 12 | *1071* |
| **Abs Diff** | 0 | 37 | 18 | 19 | 46 | 25 | 0 | 71 | 11 | 3 | 9 | 23 | 30 | 0 | 94 | 124 | 57 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **3%** | - | | - | - | - | | - | - | - | | |

12 **60646**
Intersection Name: Chrysler & Constitution
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 490 | 14 | 504 | 194 | 134 | 0 | 328 | 28 | 5 | 3 | 36 | 13 | 0 | 114 | 127 | *995* |
| **2019 Model 4Hr** | 0 | 2236 | 10 | 2246 | 50 | 1170 | 0 | 1220 | 0 | 0 | 0 | 0 | 14 | 0 | 364 | 378 | *3844* |
| **Mdl Factored 1Hr** | 0 | 794 | 4 | 798 | 18 | 415 | 0 | 433 | 0 | 0 | 0 | 0 | 5 | 0 | 129 | 134 | *1365* |
| **Abs Diff** | 0 | 304 | 10 | 294 | 176 | 281 | 0 | 105 | 28 | 5 | 3 | 36 | 8 | 0 | 15 | 7 | 370 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

13 **68563**
Intersection Name: Chilco & Constitution
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 72 | 207 | 46 | 325 | 175 | 193 | 423 | 791 | 69 | 20 | 73 | 162 | 34 | 28 | 43 | 105 | *1383* |
| **2019 Model 4Hr** | 85 | 751 | 43 | 879 | 0 | 152 | 1570 | 1722 | 43 | 18 | 15 | 76 | 10 | 17 | 0 | 27 | *2704* |
| **Mdl Factored 1Hr** | 30 | 267 | 15 | 312 | 0 | 54 | 557 | 611 | 15 | 6 | 5 | 26 | 4 | 6 | 0 | 10 | *959* |
| **Abs Diff** | 42 | 60 | 31 | 13 | 175 | 139 | 134 | 180 | 54 | 14 | 68 | 136 | 30 | 22 | 43 | 95 | 424 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

13 **68563**
Intersection Name: Chilco & Constitution
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 13 | 237 | 51 | 301 | 22 | 327 | 36 | 385 | 221 | 37 | 240 | 498 | 33 | 18 | 109 | 160 | *1344* |
| **2019 Model 4Hr** | 40 | 322 | 25 | 387 | 0 | 451 | 74 | 525 | 1769 | 48 | 53 | 1870 | 14 | 33 | 0 | 47 | *2829* |
| **Mdl Factored 1Hr** | 14 | 114 | 9 | 137 | 0 | 160 | 26 | 186 | 628 | 17 | 19 | 664 | 5 | 12 | 0 | 17 | *1004* |
| **Abs Diff** | 1 | 123 | 42 | 164 | 22 | 167 | 10 | 199 | 407 | 20 | 221 | 166 | 28 | 6 | 109 | 143 | 340 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

14 **68590**
Intersection Name: Chilco & Hamilton
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 13 | 88 | 10 | 111 | 50 | 79 | 15 | 144 | 37 | 41 | 16 | 94 | 22 | 51 | 131 | 204 | *553* |
| **2019 Model 4Hr** | 164 | 402 | 0 | 566 | 3 | 116 | 106 | 225 | 307 | 6 | 229 | 542 | 0 | 6 | 144 | 150 | *1483* |
| **Mdl Factored 1Hr** | 58 | 143 | 0 | 201 | 1 | 41 | 38 | 80 | 109 | 2 | 81 | 192 | 0 | 2 | 51 | 53 | *526* |
| **Abs Diff** | 45 | 55 | 10 | 90 | 49 | 38 | 23 | 64 | 72 | 39 | 65 | 98 | 22 | 49 | 80 | 151 | 27 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

14 **68590**
Intersection Name: Chilco & Hamilton
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 19 | 63 | 18 | 100 | 71 | 407 | 36 | 514 | 21 | 124 | 21 | 166 | 7 | 16 | 47 | 70 | *850* |
| **2019 Model 4Hr** | 38 | 141 | 0 | 179 | 1 | 230 | 271 | 502 | 205 | 4 | 145 | 354 | 0 | 4 | 74 | 78 | *1113* |
| **Mdl Factored 1Hr** | 13 | 50 | 0 | 63 | 0 | 82 | 96 | 178 | 73 | 1 | 51 | 125 | 0 | 1 | 26 | 27 | *393* |
| **Abs Diff** | 6 | 13 | 18 | 37 | 71 | 325 | 60 | 336 | 52 | 123 | 30 | 41 | 7 | 15 | 21 | 43 | 457 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

15 **68395**
Intersection Name: Ravenswoc & Middlefield
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 87 | 0 | 422 | 509 | 0 | 0 | 0 | 0 | 0 | 416 | 104 | 520 | 456 | 400 | 0 | 856 | *1885* |
| **2019 Model 4Hr** | 674 | 0 | 576 | 1250 | 0 | 0 | 0 | 0 | 0 | 1444 | 560 | 2004 | 777 | 961 | 0 | 1738 | *4992* |
| **Mdl Factored 1Hr** | 239 | 0 | 205 | 444 | 0 | 0 | 0 | 0 | 0 | 460 | 178 | 638 | 247 | 306 | 0 | 553 | *1635* |
| **Abs Diff** | 152 | 0 | 217 | 65 | 0 | 0 | 0 | 0 | 0 | 44 | 74 | 118 | 209 | 94 | 0 | 303 | 250 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

15 **68395**
Intersection Name: Ravenswoc & Middlefield
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 137 | 0 | 460 | 597 | 0 | 0 | 0 | 0 | 0 | 369 | 104 | 473 | 380 | 526 | 0 | 906 | *1976* |
| **2019 Model 4Hr** | 487 | 0 | 827 | 1314 | 0 | 0 | 0 | 0 | 0 | 1056 | 510 | 1566 | 762 | 1447 | 0 | 2209 | *5089* |
| **Mdl Factored 1Hr** | 173 | 0 | 294 | 467 | 0 | 0 | 0 | 0 | 0 | 336 | 162 | 498 | 243 | 461 | 0 | 704 | *1669* |
| **Abs Diff** | 36 | 0 | 166 | 130 | 0 | 0 | 0 | 0 | 0 | 33 | 58 | 25 | 137 | 65 | 0 | 202 | 307 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | **12%** | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

16 **68351**
Intersection Name: Ringwood & Middlefield
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 6 | 11 | 9 | 26 | 129 | 28 | 269 | 426 | 193 | 619 | 56 | 868 | 21 | 561 | 114 | 696 | *2016* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 684 | 0 | 613 | 1297 | 378 | 1492 | 0 | 1870 | 0 | 1018 | 60 | 1078 | *4245* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 243 | 0 | 218 | 461 | 120 | 475 | 0 | 595 | 0 | 324 | 19 | 343 | *1399* |
| **Abs Diff** | 6 | 11 | 9 | 26 | 114 | 28 | 51 | 35 | 73 | 144 | 56 | 273 | 21 | 237 | 95 | 353 | 617 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **23%** | - | | - | **42%** | - | | |

16 **68351**
Intersection Name: Ringwood & Middlefield
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 34 | 32 | 32 | 98 | 67 | 0 | 168 | 235 | 254 | 561 | 2 | 817 | 2 | 662 | 107 | 771 | *1921* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 66 | 0 | 563 | 629 | 720 | 914 | 0 | 1634 | 0 | 1421 | 253 | 1674 | *3937* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 23 | 0 | 200 | 223 | 229 | 291 | 0 | 520 | 0 | 452 | 81 | 533 | *1276* |
| **Abs Diff** | 34 | 32 | 32 | 98 | 44 | 0 | 32 | 12 | 25 | 270 | 2 | 297 | 2 | 210 | 26 | 238 | 645 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **48%** | - | | - | **32%** | - | | |

17 **68293**
Intersection Name: Willow & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 195 | 425 | 277 | 897 | 35 | 67 | 72 | 174 | 341 | 410 | 172 | 923 | 1021 | 2217 | 72 | 3310 | *5304* |
| **2019 Model 4Hr** | 998 | 1052 | 780 | 2830 | 80 | 198 | 255 | 533 | 995 | 904 | 243 | 2142 | 4334 | 9344 | 0 | 13678 | *19183* |
| **Mdl Factored 1Hr** | 318 | 335 | 248 | 901 | 25 | 63 | 81 | 169 | 274 | 249 | 67 | 590 | 1192 | 2570 | 0 | 3762 | *5422* |
| **Abs Diff** | 123 | 90 | 29 | 4 | 10 | 4 | 9 | 5 | 67 | 161 | 105 | 333 | 171 | 353 | 72 | 452 | 118 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | **17%** | **16%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

17 **68293**
Intersection Name: Willow & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 88 | 95 | 1112 | 1295 | 159 | 204 | 133 | 496 | 76 | 1899 | 118 | 2093 | 559 | 704 | 34 | 1297 | *5181* |
| **2019 Model 4Hr** | 557 | 341 | 4683 | 5581 | 1151 | 432 | 837 | 2420 | 425 | 7874 | 865 | 9164 | 2754 | 1273 | 0 | 4027 | *21192* |
| **Mdl Factored 1Hr** | 177 | 109 | 1490 | 1776 | 366 | 137 | 266 | 769 | 117 | 2166 | 238 | 2521 | 757 | 350 | 0 | 1107 | *6173* |
| **Abs Diff** | 89 | 14 | 378 | 481 | 207 | 67 | 133 | 273 | 41 | 267 | 120 | 428 | 198 | 354 | 34 | 190 | 992 |
| **>1000** | - | - | **34%** | | - | - | - | | - | **14%** | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | **35%** | **50%** | - | | |

18 **68635**
Intersection Name: Willow & Hamilton
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 99 | 820 | 73 | 992 | 190 | 1023 | 37 | 1250 | 47 | 14 | 48 | 109 | 56 | 25 | 84 | 165 | *2516* |
| **2019 Model 4Hr** | 164 | 2562 | 0 | 2726 | 386 | 4275 | 123 | 4784 | 104 | 19 | 1 | 124 | 0 | 8 | 163 | 171 | *7805* |
| **Mdl Factored 1Hr** | 52 | 815 | 0 | 867 | 123 | 1361 | 39 | 1523 | 37 | 7 | 0 | 44 | 0 | 3 | 58 | 61 | *2495* |
| **Abs Diff** | 47 | 5 | 73 | 125 | 67 | 338 | 2 | 273 | 10 | 7 | 48 | 65 | 56 | 22 | 26 | 104 | 21 |
| **>1000** | - | - | - | | - | **33%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **1%** | - | | - | - | - | | - | - | - | | - | - | - | | |

18 **68635**
Intersection Name: Willow & Hamilton
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 43 | 1065 | 7 | 1115 | 138 | 707 | 54 | 899 | 83 | 17 | 35 | 135 | 193 | 18 | 99 | 310 | *2459* |
| **2019 Model 4Hr** | 1 | 4724 | 0 | 4725 | 292 | 3373 | 382 | 4047 | 98 | 16 | 0 | 114 | 0 | 24 | 758 | 782 | *9668* |
| **Mdl Factored 1Hr** | 0 | 1504 | 0 | 1504 | 93 | 1074 | 122 | 1289 | 35 | 6 | 0 | 41 | 0 | 9 | 269 | 278 | *3112* |
| **Abs Diff** | 43 | 439 | 7 | 389 | 45 | 367 | 68 | 390 | 48 | 11 | 35 | 94 | 193 | 9 | 170 | 32 | 653 |
| **>1000** | - | **41%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **52%** | - | | - | - | - | | - | - | - | | |

21 **68274**
Intersection Name: Willow & Ivy
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 49 | 1221 | 0 | 1270 | 0 | 1098 | 14 | 1112 | 11 | 0 | 95 | 106 | 0 | 0 | 0 | 0 | *2488* |
| **2019 Model 4Hr** | 675 | 3917 | 0 | 4592 | 0 | 4355 | 100 | 4455 | 109 | 0 | 869 | 978 | 0 | 0 | 0 | 0 | *10025* |
| **Mdl Factored 1Hr** | 215 | 1247 | 0 | 1462 | 0 | 1386 | 32 | 1418 | 39 | 0 | 309 | 348 | 0 | 0 | 0 | 0 | *3228* |
| **Abs Diff** | 166 | 26 | 0 | 192 | 0 | 288 | 18 | 306 | 28 | 0 | 214 | 242 | 0 | 0 | 0 | 0 | 740 |
| **>1000** | - | **2%** | - | | - | **26%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

21 **68274**
Intersection Name: Willow & Ivy
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 44 | 933 | 0 | 977 | 0 | 1106 | 24 | 1130 | 32 | 0 | 114 | 146 | 0 | 0 | 0 | 0 | *2253* |
| **2019 Model 4Hr** | 1008 | 5003 | 0 | 6011 | 0 | 4294 | 131 | 4425 | 57 | 0 | 979 | 1036 | 0 | 0 | 0 | 0 | *11472* |
| **Mdl Factored 1Hr** | 321 | 1592 | 0 | 1913 | 0 | 1367 | 42 | 1409 | 20 | 0 | 348 | 368 | 0 | 0 | 0 | 0 | *3690* |
| **Abs Diff** | 277 | 659 | 0 | 936 | 0 | 261 | 18 | 279 | 12 | 0 | 234 | 222 | 0 | 0 | 0 | 0 | 1437 |
| **>1000** | - | - | - | | - | **24%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **71%** | - | | - | - | - | | - | - | - | | - | - | - | | |

22 **68417**
Intersection Name: Willow & O'Brien
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1316 | 342 | 1658 | 42 | 1066 | 0 | 1108 | 0 | 0 | 0 | 0 | 237 | 0 | 45 | 282 | *3048* |
| **2019 Model 4Hr** | 0 | 4235 | 669 | 4904 | 0 | 5225 | 0 | 5225 | 0 | 0 | 0 | 0 | 0 | 0 | 354 | 354 | *10483* |
| **Mdl Factored 1Hr** | 0 | 1348 | 213 | 1561 | 0 | 1663 | 0 | 1663 | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 126 | *3350* |
| **Abs Diff** | 0 | 32 | 129 | 97 | 42 | 597 | 0 | 555 | 0 | 0 | 0 | 0 | 237 | 0 | 81 | 156 | 302 |
| **>1000** | - | **2%** | - | | - | **56%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

22 **68417**
Intersection Name: Willow & O'Brien
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1000 | 352 | 1352 | 57 | 1065 | 0 | 1122 | 0 | 0 | 0 | 0 | 274 | 0 | 45 | 319 | *2793* |
| **2019 Model 4Hr** | 0 | 5292 | 589 | 5881 | 0 | 5276 | 0 | 5276 | 0 | 0 | 0 | 0 | 0 | 0 | 713 | 713 | *11870* |
| **Mdl Factored 1Hr** | 0 | 1684 | 187 | 1871 | 0 | 1679 | 0 | 1679 | 0 | 0 | 0 | 0 | 0 | 0 | 253 | 253 | *3803* |
| **Abs Diff** | 0 | 684 | 165 | 519 | 57 | 614 | 0 | 557 | 0 | 0 | 0 | 0 | 274 | 0 | 208 | 66 | 1010 |
| **>1000** | - | **68%** | - | | - | **58%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

23 **68432**
Intersection Name: Willow & Newbridge
**AM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 143 | 1589 | 130 | 1862 | 40 | 1202 | 7 | 1249 | 17 | 93 | 281 | 391 | 260 | 79 | 36 | 375 | *3877* |
| **2019 Model 4Hr** | 471 | 4492 | 1413 | 6376 | 239 | 4986 | 0 | 5225 | 70 | 181 | 1176 | 1427 | 1611 | 112 | 334 | 2057 | *15085* |
| **Mdl Factored 1Hr** | 150 | 1430 | 450 | 2030 | 76 | 1587 | 0 | 1663 | 25 | 64 | 418 | 507 | 572 | 40 | 119 | 731 | *4931* |
| **Abs Diff** | 7 | 159 | 320 | 168 | 36 | 385 | 7 | 414 | 8 | 29 | 137 | 116 | 312 | 39 | 83 | 356 | 1054 |
| **>1000** | - | **10%** | - | | - | **32%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

23 **68432**
Intersection Name: Willow & Newbridge
**PM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 268 | 1310 | 138 | 1716 | 78 | 1171 | 26 | 1275 | 27 | 170 | 206 | 403 | 160 | 255 | 56 | 471 | *3865* |
| **2019 Model 4Hr** | 1015 | 4750 | 1784 | 7549 | 329 | 4948 | 1 | 5278 | 66 | 132 | 650 | 848 | 957 | 299 | 1044 | 2300 | *15975* |
| **Mdl Factored 1Hr** | 323 | 1512 | 568 | 2403 | 105 | 1575 | 0 | 1680 | 23 | 47 | 231 | 301 | 340 | 106 | 371 | 817 | *5201* |
| **Abs Diff** | 55 | 202 | 430 | 687 | 27 | 404 | 26 | 405 | 4 | 123 | 25 | 102 | 180 | 149 | 315 | 346 | 1336 |
| **>1000** | - | **15%** | - | | - | **35%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

24 **70443**
Intersection Name: Willow & 101 NB
**AM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 967 | 318 | 1285 | 1 | 1510 | 424 | 1935 | 0 | 0 | 0 | 0 | 364 | 0 | 789 | 1153 | *4373* |
| **2019 Model 4Hr** | 0 | 3906 | 1716 | 5622 | 0 | 6210 | 1565 | 7775 | 0 | 0 | 0 | 0 | 1003 | 0 | 2467 | 3470 | *16867* |
| **Mdl Factored 1Hr** | 0 | 1243 | 546 | 1789 | 0 | 1976 | 498 | 2474 | 0 | 0 | 0 | 0 | 301 | 0 | 740 | 1041 | *5304* |
| **Abs Diff** | 0 | 276 | 228 | 504 | 1 | 466 | 74 | 539 | 0 | 0 | 0 | 0 | 63 | 0 | 49 | 112 | 931 |
| **>1000** | - | - | - | | - | **31%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **29%** | - | | - | - | - | | - | - | - | | - | - | **6%** | | |

24 **70443**
Intersection Name: Willow & 101 NB
**PM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 827 | 122 | 949 | 0 | 1194 | 495 | 1689 | 0 | 0 | 0 | 0 | 196 | 0 | 859 | 1055 | *3693* |
| **2019 Model 4Hr** | 0 | 5135 | 1876 | 7011 | 0 | 4948 | 1606 | 6554 | 0 | 0 | 0 | 0 | 809 | 0 | 2407 | 3216 | *16781* |
| **Mdl Factored 1Hr** | 0 | 1634 | 597 | 2231 | 0 | 1575 | 511 | 2086 | 0 | 0 | 0 | 0 | 243 | 0 | 722 | 965 | *5282* |
| **Abs Diff** | 0 | 807 | 475 | 1282 | 0 | 381 | 16 | 397 | 0 | 0 | 0 | 0 | 47 | 0 | 137 | 90 | 1589 |
| **>1000** | - | - | - | | - | **32%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **98%** | - | | - | - | - | | - | - | - | | - | - | **16%** | | |

25 **61954**
Intersection Name: Willow & 101 SB
**AM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 838 | 623 | 1461 | 0 | 1053 | 739 | 1792 | 473 | 0 | 391 | 864 | 0 | 0 | 0 | 0 | *4117* |
| **2019 Model 4Hr** | 0 | 3532 | 931 | 4463 | 0 | 3660 | 3559 | 7219 | 2089 | 0 | 1376 | 3465 | 0 | 0 | 0 | 0 | *15147* |
| **Mdl Factored 1Hr** | 0 | 1124 | 296 | 1420 | 0 | 1165 | 1133 | 2298 | 627 | 0 | 413 | 1040 | 0 | 0 | 0 | 0 | *4758* |
| **Abs Diff** | 0 | 286 | 327 | 41 | 0 | 112 | 394 | 506 | 154 | 0 | 22 | 176 | 0 | 0 | 0 | 0 | 641 |
| **>1000** | - | - | - | | - | **11%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **34%** | **52%** | | - | - | **53%** | | - | - | - | | - | - | - | | |

25 **61954**
Intersection Name: Willow & 101 SB
**PM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 651 | 199 | 850 | 0 | 766 | 633 | 1399 | 285 | 0 | 352 | 637 | 0 | 0 | 0 | 0 | *2886* |
| **2019 Model 4Hr** | 0 | 4988 | 957 | 5945 | 0 | 2366 | 3402 | 5768 | 2021 | 0 | 1722 | 3743 | 0 | 0 | 0 | 0 | *15456* |
| **Mdl Factored 1Hr** | 0 | 1588 | 305 | 1893 | 0 | 753 | 1083 | 1836 | 606 | 0 | 517 | 1123 | 0 | 0 | 0 | 0 | *4852* |
| **Abs Diff** | 0 | 937 | 106 | 1043 | 0 | 13 | 450 | 437 | 321 | 0 | 165 | 486 | 0 | 0 | 0 | 0 | 1966 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **144%** | - | | - | **2%** | **71%** | | - | - | - | | - | - | - | | |

26 **68413**
Intersection Name: Willow & Bay
**AM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 65 | 1080 | 0 | 1145 | 0 | 1186 | 423 | 1609 | 352 | 0 | 60 | 412 | 0 | 0 | 0 | 0 | *3166* |
| **2019 Model 4Hr** | 294 | 3175 | 0 | 3469 | 0 | 3544 | 1487 | 5031 | 1287 | 0 | 0 | 1287 | 0 | 0 | 0 | 0 | *9787* |
| **Mdl Factored 1Hr** | 94 | 1011 | 0 | 1105 | 0 | 1128 | 473 | 1601 | 457 | 0 | 0 | 457 | 0 | 0 | 0 | 0 | *3163* |
| **Abs Diff** | 29 | 69 | 0 | 40 | 0 | 58 | 50 | 8 | 105 | 0 | 60 | 45 | 0 | 0 | 0 | 0 | 3 |
| **>1000** | - | **6%** | - | | - | **5%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

26 **68413**
Intersection Name: Willow & Bay
**PM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 20 | 1201 | 0 | 1221 | 1 | 678 | 100 | 779 | 241 | 0 | 40 | 281 | 0 | 0 | 0 | 0 | *2281* |
| **2019 Model 4Hr** | 256 | 5111 | 0 | 5367 | 0 | 2948 | 1138 | 4086 | 832 | 0 | 48 | 880 | 0 | 0 | 0 | 0 | *10333* |
| **Mdl Factored 1Hr** | 81 | 1627 | 0 | 1708 | 0 | 938 | 362 | 1300 | 295 | 0 | 17 | 312 | 0 | 0 | 0 | 0 | *3320* |
| **Abs Diff** | 61 | 426 | 0 | 487 | 1 | 260 | 262 | 521 | 54 | 0 | 23 | 31 | 0 | 0 | 0 | 0 | 1039 |
| **>1000** | - | **35%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **38%** | - | | - | - | - | | - | - | - | | |

27 **62837**
Intersection Name: Willow & Durham
**AM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 22 | 897 | 7 | 926 | 36 | 924 | 108 | 1068 | 65 | 7 | 30 | 102 | 59 | 11 | 62 | 132 | *2228* |
| **2019 Model 4Hr** | 0 | 2502 | 0 | 2502 | 0 | 2401 | 1 | 2402 | 13 | 16 | 8 | 37 | 3 | 1 | 698 | 702 | *5643* |
| **Mdl Factored 1Hr** | 0 | 796 | 0 | 796 | 0 | 764 | 0 | 764 | 5 | 6 | 3 | 14 | 1 | 0 | 248 | 249 | *1823* |
| **Abs Diff** | 22 | 101 | 7 | 130 | 36 | 160 | 108 | 304 | 60 | 1 | 27 | 88 | 58 | 11 | 186 | 117 | 405 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **11%** | - | | - | **17%** | - | | - | - | - | | - | - | - | | |

27 **62837**
Intersection Name: Willow & Durham
**PM**

| Scenario: | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 9 | 1029 | 4 | 1042 | 29 | 522 | 18 | 569 | 132 | 1 | 31 | 164 | 21 | 6 | 17 | 44 | *1819* |
| **2019 Model 4Hr** | 0 | 2542 | 0 | 2542 | 0 | 2330 | 0 | 2330 | 1 | 0 | 0 | 1 | 0 | 1 | 1515 | 1516 | *6389* |
| **Mdl Factored 1Hr** | 0 | 809 | 0 | 809 | 0 | 742 | 0 | 742 | 0 | 0 | 0 | 0 | 0 | 0 | 538 | 538 | *2089* |
| **Abs Diff** | 9 | 220 | 4 | 233 | 29 | 220 | 18 | 173 | 132 | 1 | 31 | 164 | 21 | 6 | 521 | 494 | 270 |
| **>1000** | - | **21%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **42%** | - | | - | - | - | | - | - | - | | |

28 **68570**
Intersection Name: Willow & Coleman
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 28 | 783 | 7 | 818 | 4 | 878 | 107 | 989 | 161 | 6 | 56 | 223 | 1 | 2 | 6 | 9 | *2039* |
| **2019 Model 4Hr** | 4 | 2359 | 0 | 2363 | 0 | 2310 | 22 | 2332 | 47 | 0 | 65 | 112 | 0 | 0 | 0 | 0 | *4807* |
| **Mdl Factored 1Hr** | 1 | 751 | 0 | 752 | 0 | 735 | 7 | 742 | 17 | 0 | 23 | 40 | 0 | 0 | 0 | 0 | *1534* |
| **Abs Diff** | 27 | 32 | 7 | 66 | 4 | 143 | 100 | 247 | 144 | 6 | 33 | 183 | 1 | 2 | 6 | 9 | 505 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **4%** | - | | - | **16%** | - | | - | - | - | | - | - | - | | |

28 **68570**
Intersection Name: Willow & Coleman
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 13 | 693 | 5 | 711 | 2 | 685 | 100 | 787 | 73 | 2 | 36 | 111 | 15 | 4 | 6 | 25 | *1634* |
| **2019 Model 4Hr** | 26 | 2202 | 0 | 2228 | 0 | 2324 | 0 | 2324 | 262 | 0 | 4 | 266 | 0 | 0 | 0 | 0 | *4818* |
| **Mdl Factored 1Hr** | 8 | 701 | 0 | 709 | 0 | 740 | 0 | 740 | 93 | 0 | 1 | 94 | 0 | 0 | 0 | 0 | *1543* |
| **Abs Diff** | 5 | 8 | 5 | 2 | 2 | 55 | 100 | 47 | 20 | 2 | 35 | 17 | 15 | 4 | 6 | 25 | 91 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **1%** | - | | - | **8%** | - | | - | - | - | | - | - | - | | |

29 **68505**
Intersection Name: Willow & Gilbert
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 7 | 686 | 68 | 761 | 52 | 905 | 0 | 957 | 20 | 82 | 11 | 113 | 88 | 94 | 93 | 275 | *2106* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 259 | 0 | 0 | 259 | 0 | 6 | 0 | 6 | 0 | 11 | 154 | 165 | *430* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 82 | 0 | 0 | 82 | 0 | 2 | 0 | 2 | 0 | 4 | 55 | 59 | *143* |
| **Abs Diff** | 7 | 686 | 68 | 761 | 30 | 905 | 0 | 875 | 20 | 80 | 11 | 111 | 88 | 90 | 38 | 216 | 1963 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **100%** | - | | - | **100%** | - | | - | - | - | | - | - | - | | |

29 **68505**
Intersection Name: Willow & Gilbert
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 3 | 656 | 63 | 722 | 54 | 657 | 10 | 721 | 14 | 31 | 5 | 50 | 75 | 50 | 58 | 183 | *1676* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 279 | 0 | 0 | 279 | 0 | 5 | 0 | 5 | 0 | 2 | 64 | 66 | *350* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 89 | 0 | 0 | 89 | 0 | 2 | 0 | 2 | 0 | 1 | 23 | 24 | *115* |
| **Abs Diff** | 3 | 656 | 63 | 722 | 35 | 657 | 10 | 632 | 14 | 29 | 5 | 48 | 75 | 49 | 35 | 159 | 1561 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **100%** | - | | - | **100%** | - | | - | - | - | | - | - | - | | |

30 **68470**
Intersection Name: Willow & Middlefield
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 27 | 271 | 112 | 410 | 374 | 92 | 416 | 882 | 314 | 329 | 19 | 662 | 101 | 344 | 170 | 615 | *2569* |
| **2019 Model 4Hr** | 33 | 518 | 532 | 1083 | 1444 | 420 | 171 | 2035 | 153 | 1965 | 35 | 2153 | 280 | 1383 | 1404 | 3067 | *8338* |
| **Mdl Factored 1Hr** | 11 | 165 | 169 | 345 | 460 | 134 | 54 | 648 | 49 | 625 | 11 | 685 | 89 | 440 | 447 | 976 | *2654* |
| **Abs Diff** | 16 | 106 | 57 | 65 | 86 | 42 | 362 | 234 | 265 | 296 | 8 | 23 | 12 | 96 | 277 | 361 | 85 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

30 **68470**
Intersection Name: Willow & Middlefield
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 30 | 198 | 203 | 431 | 372 | 86 | 277 | 735 | 277 | 416 | 14 | 707 | 101 | 439 | 184 | 724 | *2597* |
| **2019 Model 4Hr** | 42 | 524 | 451 | 1017 | 1272 | 513 | 253 | 2038 | 294 | 1322 | 26 | 1642 | 451 | 2034 | 1397 | 3882 | *8579* |
| **Mdl Factored 1Hr** | 13 | 167 | 144 | 324 | 405 | 163 | 81 | 649 | 94 | 421 | 8 | 523 | 144 | 647 | 445 | 1236 | *2732* |
| **Abs Diff** | 17 | 31 | 59 | 107 | 33 | 77 | 196 | 86 | 183 | 5 | 6 | 184 | 43 | 208 | 261 | 512 | 135 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

32 **62495**
Intersection Name: O'Brien & Kavanaugh
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 1 | 199 | 96 | 296 | 9 | 319 | 0 | 328 | 0 | 0 | 0 | 0 | 128 | 0 | 16 | 144 | *768* |
| **2019 Model 4Hr** | 0 | 276 | 215 | 491 | 2 | 161 | 0 | 163 | 0 | 0 | 0 | 0 | 433 | 0 | 0 | 433 | *1087* |
| **Mdl Factored 1Hr** | 0 | 98 | 76 | 174 | 1 | 57 | 0 | 58 | 0 | 0 | 0 | 0 | 154 | 0 | 0 | 154 | *386* |
| **Abs Diff** | 1 | 101 | 20 | 122 | 8 | 262 | 0 | 270 | 0 | 0 | 0 | 0 | 26 | 0 | 16 | 10 | 382 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

32 **62495**
Intersection Name: O'Brien & Kavanaugh
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 376 | 153 | 529 | 18 | 185 | 0 | 203 | 0 | 0 | 0 | 0 | 45 | 0 | 17 | 62 | *794* |
| **2019 Model 4Hr** | 0 | 433 | 283 | 716 | 0 | 354 | 0 | 354 | 0 | 0 | 0 | 0 | 150 | 0 | 8 | 158 | *1228* |
| **Mdl Factored 1Hr** | 0 | 154 | 100 | 254 | 0 | 126 | 0 | 126 | 0 | 0 | 0 | 0 | 53 | 0 | 3 | 56 | *436* |
| **Abs Diff** | 0 | 222 | 53 | 275 | 18 | 59 | 0 | 77 | 0 | 0 | 0 | 0 | 8 | 0 | 14 | 6 | 358 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

33 **70439**
Intersection Name: Adams Dr & Adams Ct
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 38 | 42 | 0 | 80 | 0 | 60 | 103 | 163 | 13 | 0 | 65 | 78 | 0 | 0 | 0 | 0 | *321* |
| **2019 Model 4Hr** | 437 | 0 | 0 | 437 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 107 | 0 | 0 | 0 | 0 | *544* |
| **Mdl Factored 1Hr** | 155 | 0 | 0 | 155 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 38 | 0 | 0 | 0 | 0 | *193* |
| **Abs Diff** | 117 | 42 | 0 | 75 | 0 | 60 | 103 | 163 | 13 | 0 | 27 | 40 | 0 | 0 | 0 | 0 | 128 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

33 **70439**
Intersection Name: Adams Dr & Adams Ct
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 30 | 209 | 0 | 239 | 0 | 35 | 15 | 50 | 30 | 0 | 48 | 78 | 0 | 0 | 0 | 0 | *367* |
| **2019 Model 4Hr** | 247 | 0 | 0 | 247 | 0 | 0 | 0 | 0 | 0 | 0 | 574 | 574 | 0 | 0 | 0 | 0 | *821* |
| **Mdl Factored 1Hr** | 88 | 0 | 0 | 88 | 0 | 0 | 0 | 0 | 0 | 0 | 204 | 204 | 0 | 0 | 0 | 0 | *292* |
| **Abs Diff** | 58 | 209 | 0 | 151 | 0 | 35 | 15 | 50 | 30 | 0 | 156 | 126 | 0 | 0 | 0 | 0 | 75 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

34 **62832**
Intersection Name: Adams & O'Brien
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 29 | 0 | 72 | 101 | 86 | 80 | 0 | 166 | 0 | 276 | 28 | 304 | *571* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 53 | 0 | 54 | 107 | 202 | 74 | 0 | 276 | 0 | 108 | 237 | 345 | *728* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 38 | 72 | 26 | 0 | 98 | 0 | 38 | 84 | 122 | *258* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 10 | 0 | 53 | 63 | 14 | 54 | 0 | 68 | 0 | 238 | 56 | 182 | 313 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

34 **62832**
Intersection Name: Adams & O'Brien
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 73 | 0 | 63 | 136 | 226 | 214 | 0 | 440 | 0 | 70 | 15 | 85 | *661* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 286 | 0 | 288 | 574 | 122 | 319 | 0 | 441 | 0 | 65 | 125 | 190 | *1205* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 102 | 0 | 102 | 204 | 43 | 113 | 0 | 156 | 0 | 23 | 44 | 67 | *427* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 29 | 0 | 39 | 68 | 183 | 101 | 0 | 284 | 0 | 47 | 29 | 18 | 234 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

35 **68294**
Intersection Name: University & Bayfront
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 205 | 0 | 416 | 621 | 0 | 0 | 0 | 0 | 0 | 829 | 67 | 896 | 1148 | 2695 | 0 | 3843 | *5360* |
| **2019 Model 4Hr** | 975 | 0 | 3154 | 4129 | 0 | 0 | 0 | 0 | 0 | 1713 | 63 | 1776 | 5149 | 13943 | 0 | 19092 | *24997* |
| **Mdl Factored 1Hr** | 310 | 0 | 1004 | 1314 | 0 | 0 | 0 | 0 | 0 | 471 | 17 | 488 | 1416 | 3835 | 0 | 5251 | *7053* |
| **Abs Diff** | 105 | 0 | 588 | 693 | 0 | 0 | 0 | 0 | 0 | 358 | 50 | 408 | 268 | 1140 | 0 | 1408 | 1693 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | **23%** | **42%** | - | | |
| **>500** | - | - | - | | - | - | - | | - | **43%** | - | | - | - | - | | |

35 **68294**
Intersection Name: University & Bayfront
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 68 | 0 | 1803 | 1871 | 0 | 0 | 0 | 0 | 0 | 3307 | 20 | 3327 | 359 | 970 | 0 | 1329 | *6527* |
| **2019 Model 4Hr** | 30 | 0 | 5924 | 5954 | 0 | 0 | 0 | 0 | 0 | 11930 | 1783 | 13713 | 1834 | 3876 | 0 | 5710 | *25377* |
| **Mdl Factored 1Hr** | 10 | 0 | 1885 | 1895 | 0 | 0 | 0 | 0 | 0 | 3281 | 490 | 3771 | 504 | 1066 | 0 | 1570 | *7236* |
| **Abs Diff** | 58 | 0 | 82 | 24 | 0 | 0 | 0 | 0 | 0 | 26 | 470 | 444 | 145 | 96 | 0 | 241 | 709 |
| **>1000** | - | - | **5%** | | - | - | - | | - | **1%** | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | **10%** | - | | |

36 **68398**
Intersection Name: University & Purdue
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 614 | 56 | 670 | 99 | 1430 | 0 | 1529 | 0 | 0 | 0 | 0 | 26 | 0 | 52 | 78 | *2277* |
| **2019 Model 4Hr** | 0 | 4024 | 6 | 4030 | 42 | 5184 | 0 | 5226 | 0 | 0 | 0 | 0 | 7 | 0 | 105 | 112 | *9368* |
| **Mdl Factored 1Hr** | 0 | 1281 | 2 | 1283 | 13 | 1650 | 0 | 1663 | 0 | 0 | 0 | 0 | 2 | 0 | 37 | 39 | *2985* |
| **Abs Diff** | 0 | 667 | 54 | 613 | 86 | 220 | 0 | 134 | 0 | 0 | 0 | 0 | 24 | 0 | 15 | 39 | 708 |
| **>1000** | - | - | - | | - | **15%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **109%** | - | | - | - | - | | - | - | - | | - | - | - | | |

36 **68398**
Intersection Name: University & Purdue
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1695 | 10 | 1705 | 20 | 437 | 0 | 457 | 0 | 0 | 0 | 0 | 29 | 0 | 124 | 153 | *2315* |
| **2019 Model 4Hr** | 0 | 5291 | 0 | 5291 | 154 | 3474 | 0 | 3628 | 0 | 0 | 0 | 0 | 22 | 0 | 662 | 684 | *9603* |
| **Mdl Factored 1Hr** | 0 | 1684 | 0 | 1684 | 49 | 1106 | 0 | 1155 | 0 | 0 | 0 | 0 | 8 | 0 | 235 | 243 | *3082* |
| **Abs Diff** | 0 | 11 | 10 | 21 | 29 | 669 | 0 | 698 | 0 | 0 | 0 | 0 | 21 | 0 | 111 | 90 | 767 |
| **>1000** | - | **1%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

37 **68453**
Intersection Name: University & Adams
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 90 | 667 | 0 | 757 | 1 | 1559 | 163 | 1723 | 6 | 0 | 4 | 10 | 0 | 0 | 0 | 0 | *2490* |
| **2019 Model 4Hr** | 0 | 4008 | 0 | 4008 | 0 | 5058 | 133 | 5191 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | *9220* |
| **Mdl Factored 1Hr** | 0 | 1276 | 0 | 1276 | 0 | 1610 | 42 | 1652 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | *2935* |
| **Abs Diff** | 90 | 609 | 0 | 519 | 1 | 51 | 121 | 71 | 1 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 445 |
| **>1000** | - | - | - | | - | **3%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **91%** | - | | - | - | - | | - | - | - | | - | - | - | | |

37 **68453**
Intersection Name: University & Adams
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 7 | 1802 | 0 | 1809 | 0 | 374 | 13 | 387 | 201 | 0 | 44 | 245 | 0 | 0 | 0 | 0 | *2441* |
| **2019 Model 4Hr** | 0 | 5177 | 0 | 5177 | 0 | 3429 | 70 | 3499 | 113 | 0 | 0 | 113 | 0 | 0 | 0 | 0 | *8789* |
| **Mdl Factored 1Hr** | 0 | 1648 | 0 | 1648 | 0 | 1091 | 22 | 1113 | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | *2801* |
| **Abs Diff** | 7 | 154 | 0 | 161 | 0 | 717 | 9 | 726 | 161 | 0 | 44 | 205 | 0 | 0 | 0 | 0 | 360 |
| **>1000** | - | **9%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

38 **68627**
Intersection Name: University & O'Brien
**AM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 110 | 733 | 0 | 843 | 0 | 1184 | 275 | 1459 | 32 | 0 | 20 | 52 | 0 | 0 | 0 | 0 | *2354* |
| **2019 Model 4Hr** | 324 | 3984 | 0 | 4308 | 0 | 4926 | 132 | 5058 | 17 | 0 | 68 | 85 | 0 | 0 | 0 | 0 | *9451* |
| **Mdl Factored 1Hr** | 103 | 1268 | 0 | 1371 | 0 | 1568 | 42 | 1610 | 6 | 0 | 24 | 30 | 0 | 0 | 0 | 0 | *3011* |
| **Abs Diff** | 7 | 535 | 0 | 528 | 0 | 384 | 233 | 151 | 26 | 0 | 4 | 22 | 0 | 0 | 0 | 0 | 657 |
| **>1000** | - | - | - | | - | **32%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **73%** | - | | - | - | - | | - | - | - | | - | - | - | | |

38 **68627**
Intersection Name: University & O'Brien
**PM**

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 6 | 1522 | 0 | 1528 | 1 | 464 | 9 | 474 | 185 | 0 | 141 | 326 | 0 | 0 | 0 | 0 | *2328* |
| **2019 Model 4Hr** | 162 | 5123 | 0 | 5285 | 0 | 3361 | 69 | 3430 | 52 | 0 | 713 | 765 | 0 | 0 | 0 | 0 | *9480* |
| **Mdl Factored 1Hr** | 52 | 1631 | 0 | 1683 | 0 | 1070 | 22 | 1092 | 18 | 0 | 253 | 271 | 0 | 0 | 0 | 0 | *3046* |
| **Abs Diff** | 46 | 109 | 0 | 155 | 1 | 606 | 13 | 618 | 167 | 0 | 112 | 55 | 0 | 0 | 0 | 0 | 718 |
| **>1000** | - | **7%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

39.1 68591
Intersection Name: University & Notre Dame
AM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1061 | 25 | 1086 | 10 | 1180 | 0 | 1190 | 0 | 0 | 0 | 0 | 31 | 0 | 12 | 43 | *2319* |
| **2019 Model 4Hr** | 0 | 4308 | 0 | 4308 | 1 | 4995 | 0 | 4996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *9304* |
| **Mdl Factored 1Hr** | 0 | 1371 | 0 | 1371 | 0 | 1590 | 0 | 1590 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *2961* |
| **Abs Diff** | 0 | 310 | 25 | 285 | 10 | 410 | 0 | 400 | 0 | 0 | 0 | 0 | 31 | 0 | 12 | 43 | 642 |
| **>1000** | - | **29%** | - | | - | **35%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

39.1 68591
Intersection Name: University & Notre Dame
PM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 0 | 1445 | 29 | 1474 | 18 | 581 | 0 | 599 | 0 | 0 | 0 | 0 | 79 | 0 | 34 | 113 | *2186* |
| **2019 Model 4Hr** | 0 | 5281 | 0 | 5281 | 0 | 4075 | 0 | 4075 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 5 | *9361* |
| **Mdl Factored 1Hr** | 0 | 1681 | 0 | 1681 | 0 | 1297 | 0 | 1297 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | *2979* |
| **Abs Diff** | 0 | 236 | 29 | 207 | 18 | 716 | 0 | 698 | 0 | 0 | 0 | 0 | 79 | 0 | 33 | 112 | 793 |
| **>1000** | - | **16%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **123%** | - | | - | - | - | | - | - | - | | |

39.2 68381
Intersection Name: University & Kavanaugh
AM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 44 | 883 | 0 | 927 | 0 | 1283 | 161 | 1444 | 34 | 0 | 28 | 62 | 0 | 0 | 0 | 0 | *2433* |
| **2019 Model 4Hr** | 330 | 4280 | 0 | 4610 | 0 | 4968 | 26 | 4994 | 22 | 0 | 43 | 65 | 0 | 0 | 0 | 0 | *9669* |
| **Mdl Factored 1Hr** | 105 | 1362 | 0 | 1467 | 0 | 1581 | 8 | 1589 | 8 | 0 | 15 | 23 | 0 | 0 | 0 | 0 | *3079* |
| **Abs Diff** | 61 | 479 | 0 | 540 | 0 | 298 | 153 | 145 | 26 | 0 | 13 | 39 | 0 | 0 | 0 | 0 | 646 |
| **>1000** | - | - | - | | - | **23%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **54%** | - | | - | - | - | | - | - | - | | - | - | - | | |

39.2 68381
Intersection Name: University & Kavanaugh
PM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 11 | 1627 | 0 | 1638 | 0 | 530 | 47 | 577 | 89 | 0 | 63 | 152 | 0 | 0 | 0 | 0 | *2367* |
| **2019 Model 4Hr** | 21 | 5247 | 0 | 5268 | 0 | 4003 | 73 | 4076 | 33 | 0 | 1 | 34 | 0 | 0 | 0 | 0 | *9378* |
| **Mdl Factored 1Hr** | 7 | 1670 | 0 | 1677 | 0 | 1274 | 23 | 1297 | 12 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | *2986* |
| **Abs Diff** | 4 | 43 | 0 | 39 | 0 | 744 | 24 | 720 | 77 | 0 | 63 | 140 | 0 | 0 | 0 | 0 | 619 |
| **>1000** | - | **3%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **140%** | - | | - | - | - | | - | - | - | | |

40 68269
Intersection Name: University & Bay
AM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 90 | 774 | 57 | 921 | 123 | 1052 | 60 | 1235 | 60 | 191 | 56 | 307 | 84 | 257 | 146 | 487 | *2950* |
| **2019 Model 4Hr** | 86 | 3483 | 122 | 3691 | 1468 | 3449 | 74 | 4991 | 64 | 820 | 297 | 1181 | 493 | 735 | 923 | 2151 | *12014* |
| **Mdl Factored 1Hr** | 27 | 1109 | 39 | 1175 | 467 | 1098 | 24 | 1589 | 23 | 291 | 105 | 419 | 175 | 261 | 328 | 764 | *3947* |
| **Abs Diff** | 63 | 335 | 18 | 254 | 344 | 46 | 36 | 354 | 37 | 100 | 49 | 112 | 91 | 4 | 182 | 277 | 997 |
| **>1000** | - | - | - | | - | **4%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **43%** | - | | - | - | - | | - | - | - | | - | - | - | | |

40 68269
Intersection Name: University & Bay
PM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 50 | 1200 | 74 | 1324 | 115 | 450 | 42 | 607 | 107 | 249 | 77 | 433 | 147 | 194 | 439 | 780 | *3144* |
| **2019 Model 4Hr** | 337 | 4013 | 419 | 4769 | 621 | 3039 | 200 | 3860 | 1 | 1052 | 123 | 1176 | 180 | 563 | 1223 | 1966 | *11771* |
| **Mdl Factored 1Hr** | 107 | 1277 | 133 | 1517 | 198 | 967 | 64 | 1229 | 0 | 374 | 44 | 418 | 64 | 200 | 434 | 698 | *3862* |
| **Abs Diff** | 57 | 77 | 59 | 193 | 83 | 517 | 22 | 622 | 107 | 125 | 33 | 15 | 83 | 6 | 5 | 82 | 718 |
| **>1000** | - | **6%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

41 68464
Intersection Name: University & Runnymede
AM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 12 | 805 | 33 | 850 | 247 | 854 | 132 | 1233 | 7 | 89 | 4 | 100 | 10 | 148 | 32 | 190 | *2373* |
| **2019 Model 4Hr** | 0 | 3240 | 0 | 3240 | 161 | 4067 | 0 | 4228 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | *7470* |
| **Mdl Factored 1Hr** | 0 | 1031 | 0 | 1031 | 51 | 1294 | 0 | 1345 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *2376* |
| **Abs Diff** | 12 | 226 | 33 | 181 | 196 | 440 | 132 | 112 | 7 | 89 | 4 | 100 | 10 | 148 | 32 | 190 | 3 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **28%** | - | | - | **52%** | - | | - | - | - | | - | - | - | | |

41 68464
Intersection Name: University & Runnymede
PM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 31 | 1115 | 64 | 1210 | 34 | 641 | 20 | 695 | 10 | 71 | 26 | 107 | 40 | 114 | 121 | 275 | *2287* |
| **2019 Model 4Hr** | 9 | 3811 | 0 | 3820 | 0 | 3338 | 0 | 3338 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | *7159* |
| **Mdl Factored 1Hr** | 3 | 1213 | 0 | 1216 | 0 | 1062 | 0 | 1062 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *2278* |
| **Abs Diff** | 28 | 98 | 64 | 6 | 34 | 421 | 20 | 367 | 10 | 71 | 26 | 107 | 40 | 114 | 121 | 275 | 9 |
| **>1000** | - | **9%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **66%** | - | | - | - | - | | - | - | - | | |

42 68642
Intersection Name: University & Bell
AM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 25 | 856 | 35 | 916 | 33 | 985 | 36 | 1054 | 10 | 42 | 12 | 64 | 38 | 76 | 20 | 134 | *2168* |
| **2019 Model 4Hr** | 358 | 3235 | 1 | 3594 | 1 | 4067 | 0 | 4068 | 0 | 170 | 519 | 689 | 8 | 125 | 0 | 133 | *8484* |
| **Mdl Factored 1Hr** | 114 | 1030 | 0 | 1144 | 0 | 1294 | 0 | 1294 | 0 | 60 | 184 | 244 | 3 | 44 | 0 | 47 | *2729* |
| **Abs Diff** | 89 | 174 | 35 | 228 | 33 | 309 | 36 | 240 | 10 | 18 | 172 | 180 | 35 | 32 | 20 | 87 | 561 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **20%** | - | | - | **31%** | - | | - | - | - | | - | - | - | | |

42 68642
Intersection Name: University & Bell
PM

| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
| **Existing 1Hr Cnt** | 75 | 1181 | 141 | 1397 | 48 | 649 | 24 | 721 | 14 | 74 | 43 | 131 | 75 | 168 | 23 | 266 | *2515* |
| **2019 Model 4Hr** | 753 | 3812 | 20 | 4585 | 163 | 3172 | 4 | 3339 | 0 | 107 | 368 | 475 | 2 | 106 | 1 | 109 | *8508* |
| **Mdl Factored 1Hr** | 240 | 1213 | 6 | 1459 | 52 | 1010 | 1 | 1063 | 0 | 38 | 131 | 169 | 1 | 38 | 0 | 39 | *2730* |
| **Abs Diff** | 165 | 32 | 135 | 62 | 4 | 361 | 23 | 342 | 14 | 36 | 88 | 38 | 74 | 130 | 23 | 227 | 215 |
| **>1000** | - | **3%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **56%** | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

43 **9454**
Intersection Name: University & Donohoe
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 115 | 368 | 426 | 909 | 19 | 783 | 69 | 871 | 5 | 56 | 451 | 512 | 582 | 461 | 382 | 1425 | *3717* |
| **2019 Model 4Hr** | 402 | 1790 | 667 | 2859 | 2 | 4486 | 107 | 4595 | 0 | 384 | 805 | 1189 | 1039 | 1950 | 1774 | 4763 | *13406* |
| **Mdl Factored 1Hr** | 128 | 570 | 212 | 910 | 1 | 1428 | 34 | 1463 | 0 | 136 | 286 | 422 | 369 | 692 | 630 | 1691 | *4486* |
| **Abs Diff** | 13 | 202 | 214 | 1 | 18 | 645 | 35 | 592 | 5 | 80 | 165 | 90 | 213 | 231 | 248 | 266 | 769 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **82%** | - | | - | - | - | | **37%** | - | - | | |

43 **9454**
Intersection Name: University & Donohoe
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 293 | 588 | 714 | 1595 | 44 | 674 | 116 | 834 | 8 | 81 | 194 | 283 | 355 | 589 | 458 | 1402 | *4114* |
| **2019 Model 4Hr** | 939 | 2340 | 1279 | 4558 | 1 | 3523 | 20 | 3544 | 0 | 87 | 389 | 476 | 708 | 1675 | 2232 | 4615 | *13193* |
| **Mdl Factored 1Hr** | 299 | 745 | 407 | 1451 | 0 | 1121 | 6 | 1127 | 0 | 31 | 138 | 169 | 251 | 595 | 792 | 1638 | *4385* |
| **Abs Diff** | 6 | 157 | 307 | 144 | 44 | 447 | 110 | 293 | 8 | 50 | 56 | 114 | 104 | 6 | 334 | 236 | 271 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **27%** | **43%** | | - | **66%** | - | | - | - | - | | - | **1%** | - | | |

44 **55642**
Intersection Name: 101 NB Off & Donohoe
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 560 | 106 | 191 | 857 | 0 | 0 | 39 | 39 | 0 | 435 | 0 | 435 | 0 | 827 | 36 | 863 | *2194* |
| **2019 Model 4Hr** | 1896 | 0 | 770 | 2666 | 0 | 0 | 0 | 0 | 0 | 1044 | 0 | 1044 | 0 | 2863 | 0 | 2863 | *6573* |
| **Mdl Factored 1Hr** | 569 | 0 | 231 | 800 | 0 | 0 | 0 | 0 | 0 | 371 | 0 | 371 | 0 | 1017 | 0 | 1017 | *2188* |
| **Abs Diff** | 9 | 106 | 40 | 57 | 0 | 0 | 39 | 39 | 0 | 64 | 0 | 64 | 0 | 190 | 36 | 154 | 6 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | **2%** | - | - | | - | - | - | | - | - | - | | - | **23%** | - | | |

44 **55642**
Intersection Name: 101 NB Off & Donohoe
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 697 | 24 | 605 | 1326 | 11 | 0 | 89 | 100 | 0 | 875 | 0 | 875 | 0 | 710 | 18 | 728 | *3029* |
| **2019 Model 4Hr** | 2880 | 0 | 1765 | 4645 | 0 | 0 | 0 | 0 | 0 | 1359 | 0 | 1359 | 0 | 1732 | 0 | 1732 | *7736* |
| **Mdl Factored 1Hr** | 864 | 0 | 530 | 1394 | 0 | 0 | 0 | 0 | 0 | 483 | 0 | 483 | 0 | 615 | 0 | 615 | *2492* |
| **Abs Diff** | 167 | 24 | 75 | 68 | 11 | 0 | 89 | 100 | 0 | 392 | 0 | 392 | 0 | 95 | 18 | 113 | 537 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | **24%** | - | **12%** | | - | - | - | | - | **45%** | - | | - | **13%** | - | | |

45 **4734**
Intersection Name: Cooley & Donohoe
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 1 | 1 | 1 | 3 | 157 | 0 | 372 | 529 | 128 | 527 | 0 | 655 | 1 | 549 | 31 | 581 | *1768* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 267 | 0 | 749 | 1016 | 341 | 1470 | 0 | 1811 | 0 | 2115 | 164 | 2279 | *5106* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 95 | 0 | 266 | 361 | 121 | 522 | 0 | 643 | 0 | 751 | 58 | 809 | *1813* |
| **Abs Diff** | 1 | 1 | 1 | 3 | 62 | 0 | 106 | 168 | 7 | 5 | 0 | 12 | 1 | 202 | 27 | 228 | 45 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **1%** | - | | - | **37%** | - | | |

45 **4734**
Intersection Name: Cooley & Donohoe
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 80 | 15 | 39 | 134 | 65 | 0 | 90 | 155 | 472 | 941 | 0 | 1413 | 0 | 437 | 92 | 529 | *2231* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 233 | 0 | 0 | 233 | 1064 | 2057 | 0 | 3121 | 0 | 1733 | 225 | 1958 | *5312* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 83 | 0 | 0 | 83 | 378 | 730 | 0 | 1108 | 0 | 615 | 80 | 695 | *1886* |
| **Abs Diff** | 80 | 15 | 39 | 134 | 18 | 0 | 90 | 72 | 94 | 211 | 0 | 305 | 0 | 178 | 12 | 166 | 345 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **22%** | - | | - | - | - | | |

46 **10389**
Intersection Name: University & 101 SB
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 897 | 310 | 1207 | 833 | 1198 | 0 | 2031 | 0 | 0 | 0 | 0 | 309 | 0 | 313 | 622 | *3860* |
| **2019 Model 4Hr** | 0 | 4057 | 545 | 4602 | 2297 | 4037 | 0 | 6334 | 0 | 0 | 0 | 0 | 1833 | 0 | 347 | 2180 | *13116* |
| **Mdl Factored 1Hr** | 0 | 1291 | 173 | 1464 | 731 | 1285 | 0 | 2016 | 0 | 0 | 0 | 0 | 550 | 0 | 104 | 654 | *4134* |
| **Abs Diff** | 0 | 394 | 137 | 257 | 102 | 87 | 0 | 15 | 0 | 0 | 0 | 0 | 241 | 0 | 209 | 32 | 274 |
| **>1000** | - | - | - | | - | **7%** | - | | - | - | - | | - | - | - | | |
| **>500** | - | **44%** | - | | **12%** | - | - | | - | - | - | | - | - | - | | |

46 **10389**
Intersection Name: University & 101 SB
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 1206 | 243 | 1449 | 501 | 770 | 0 | 1271 | 0 | 0 | 0 | 0 | 299 | 0 | 793 | 1092 | *3812* |
| **2019 Model 4Hr** | 0 | 4964 | 577 | 5541 | 2224 | 2593 | 0 | 4817 | 0 | 0 | 0 | 0 | 2289 | 0 | 847 | 3136 | *13494* |
| **Mdl Factored 1Hr** | 0 | 1580 | 184 | 1764 | 708 | 825 | 0 | 1533 | 0 | 0 | 0 | 0 | 687 | 0 | 254 | 941 | *4238* |
| **Abs Diff** | 0 | 374 | 59 | 315 | 207 | 55 | 0 | 262 | 0 | 0 | 0 | 0 | 388 | 0 | 539 | 151 | 426 |
| **>1000** | - | **31%** | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | **41%** | **7%** | - | | - | - | - | | - | - | **68%** | | |

47 **11205**
Intersection Name: University & Woodland
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 49 | 609 | 12 | 670 | 179 | 913 | 477 | 1569 | 382 | 73 | 47 | 502 | 26 | 100 | 303 | 429 | *3170* |
| **2019 Model 4Hr** | 146 | 2278 | 26 | 2450 | 1657 | 3064 | 1157 | 5878 | 886 | 36 | 19 | 941 | 1 | 228 | 1435 | 1664 | *10933* |
| **Mdl Factored 1Hr** | 46 | 725 | 8 | 779 | 527 | 975 | 368 | 1870 | 315 | 13 | 7 | 335 | 0 | 81 | 509 | 590 | *3574* |
| **Abs Diff** | 3 | 116 | 4 | 109 | 348 | 62 | 109 | 301 | 67 | 60 | 40 | 167 | 26 | 19 | 206 | 161 | 404 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **19%** | - | | - | **7%** | - | | - | - | - | | - | - | - | | |

47 **11205**
Intersection Name: University & Woodland
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 33 | 660 | 7 | 700 | 211 | 537 | 337 | 1085 | 443 | 70 | 39 | 552 | 17 | 54 | 355 | 426 | *2763* |
| **2019 Model 4Hr** | 104 | 2903 | 2 | 3009 | 1672 | 2393 | 829 | 4894 | 1150 | 12 | 32 | 1194 | 38 | 188 | 1484 | 1710 | *10807* |
| **Mdl Factored 1Hr** | 33 | 924 | 1 | 958 | 532 | 762 | 264 | 1558 | 408 | 4 | 11 | 423 | 13 | 67 | 527 | 607 | *3546* |
| **Abs Diff** | 0 | 264 | 6 | 258 | 321 | 225 | 73 | 473 | 35 | 66 | 28 | 129 | 4 | 13 | 172 | 181 | 783 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | **40%** | - | | - | **42%** | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

48 **70197**
Intersection Name: University & Middlefield
**AM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 19 | 203 | 15 | 237 | 115 | 452 | 126 | 693 | 133 | 276 | 58 | 467 | 25 | 264 | 45 | 334 | *1731* |
| **2019 Model 4Hr** | 487 | 969 | 8 | 1464 | 241 | 1556 | 1 | 1798 | 128 | 2039 | 607 | 2774 | 9 | 1605 | 13 | 1627 | *7663* |
| **Mdl Factored 1Hr** | 155 | 308 | 3 | 466 | 77 | 495 | 0 | 572 | 41 | 649 | 193 | 883 | 3 | 511 | 4 | 518 | *2439* |
| **Abs Diff** | 136 | 105 | 12 | 229 | 38 | 43 | 126 | 121 | 92 | 373 | 135 | 416 | 22 | 247 | 41 | 184 | 708 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

48 **70197**
Intersection Name: University & Middlefield
**PM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 45 | 275 | 37 | 357 | 80 | 269 | 96 | 445 | 89 | 381 | 38 | 508 | 30 | 363 | 53 | 446 | *1756* |
| **2019 Model 4Hr** | 482 | 1624 | 10 | 2116 | 25 | 1016 | 0 | 1041 | 177 | 1738 | 528 | 2443 | 38 | 1682 | 188 | 1908 | *7508* |
| **Mdl Factored 1Hr** | 153 | 517 | 3 | 673 | 8 | 323 | 0 | 331 | 56 | 553 | 168 | 777 | 12 | 535 | 60 | 607 | *2388* |
| **Abs Diff** | 108 | 242 | 34 | 316 | 72 | 54 | 96 | 114 | 33 | 172 | 130 | 269 | 18 | 172 | 7 | 161 | 632 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

49 **69547**
Intersection Name: Lytton & Middlefield
**AM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 126 | 27 | 77 | 230 | 4 | 131 | 15 | 150 | 10 | 374 | 226 | 610 | 111 | 316 | 4 | 431 | *1421* |
| **2019 Model 4Hr** | 0 | 0 | 202 | 202 | 0 | 34 | 143 | 177 | 0 | 2572 | 0 | 2572 | 116 | 1973 | 0 | 2089 | *5040* |
| **Mdl Factored 1Hr** | 0 | 0 | 72 | 72 | 0 | 12 | 51 | 63 | 0 | 819 | 0 | 819 | 37 | 628 | 0 | 665 | *1619* |
| **Abs Diff** | 126 | 27 | 5 | 158 | 4 | 119 | 36 | 87 | 10 | 445 | 226 | 209 | 74 | 312 | 4 | 234 | 198 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

49 **69547**
Intersection Name: Lytton & Middlefield
**PM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 349 | 142 | 63 | 554 | 5 | 45 | 23 | 73 | 16 | 469 | 92 | 577 | 75 | 393 | 6 | 474 | *1678* |
| **2019 Model 4Hr** | 0 | 0 | 207 | 207 | 0 | 35 | 99 | 134 | 0 | 2235 | 0 | 2235 | 136 | 2026 | 0 | 2162 | *4738* |
| **Mdl Factored 1Hr** | 0 | 0 | 73 | 73 | 0 | 12 | 35 | 47 | 0 | 711 | 0 | 711 | 43 | 645 | 0 | 688 | *1519* |
| **Abs Diff** | 349 | 142 | 10 | 481 | 5 | 33 | 12 | 26 | 16 | 242 | 92 | 134 | 32 | 252 | 6 | 214 | 159 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

50 **11852**
Intersection Name: E Bayshore & Donohoe
**AM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 0 | 307 | 9 | 316 | 236 | 375 | 0 | 611 | 0 | 0 | 0 | 0 | 9 | 0 | 252 | 261 | *1188* |
| **2019 Model 4Hr** | 0 | 1306 | 0 | 1306 | 376 | 1357 | 0 | 1733 | 0 | 0 | 0 | 0 | 0 | 0 | 973 | 973 | *4012* |
| **Mdl Factored 1Hr** | 0 | 464 | 0 | 464 | 133 | 482 | 0 | 615 | 0 | 0 | 0 | 0 | 0 | 0 | 345 | 345 | *1424* |
| **Abs Diff** | 0 | 157 | 9 | 148 | 103 | 107 | 0 | 4 | 0 | 0 | 0 | 0 | 9 | 0 | 93 | 84 | 236 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

50 **11852**
Intersection Name: E Bayshore & Donohoe
**PM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 0 | 463 | 26 | 489 | 396 | 754 | 0 | 1150 | 0 | 0 | 0 | 0 | 7 | 0 | 149 | 156 | *1795* |
| **2019 Model 4Hr** | 0 | 1418 | 0 | 1418 | 571 | 1716 | 0 | 2287 | 0 | 0 | 0 | 0 | 0 | 0 | 539 | 539 | *4244* |
| **Mdl Factored 1Hr** | 0 | 503 | 0 | 503 | 203 | 609 | 0 | 812 | 0 | 0 | 0 | 0 | 0 | 0 | 191 | 191 | *1506* |
| **Abs Diff** | 0 | 40 | 26 | 14 | 193 | 145 | 0 | 338 | 0 | 0 | 0 | 0 | 7 | 0 | 42 | 35 | 289 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | **19%** | - | | - | - | - | | - | - | - | | |

51 **68616**
Intersection Name: E Bayshore & Holland
**AM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 0 | 59 | 0 | 59 | 5 | 77 | 0 | 82 | 0 | 0 | 0 | 0 | 3 | 0 | 11 | 14 | *155* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |
| **Abs Diff** | 0 | 59 | 0 | 59 | 5 | 77 | 0 | 82 | 0 | 0 | 0 | 0 | 3 | 0 | 11 | 14 | 155 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

51 **68616**
Intersection Name: E Bayshore & Holland
**PM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 0 | 238 | 6 | 244 | 10 | 88 | 0 | 98 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 7 | *349* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |
| **Abs Diff** | 0 | 238 | 6 | 244 | 10 | 88 | 0 | 98 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 7 | 349 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

52 **62110**
Intersection Name: Saratoga & Newbridge
**AM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 74 | 1 | 5 | 80 | 2 | 1 | 49 | 52 | 6 | 264 | 49 | 319 | 3 | 361 | 2 | 366 | *817* |
| **2019 Model 4Hr** | 113 | 0 | 0 | 113 | 0 | 0 | 0 | 0 | 2 | 1456 | 368 | 1826 | 0 | 1942 | 0 | 1942 | *3881* |
| **Mdl Factored 1Hr** | 40 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 1 | 517 | 131 | 649 | 0 | 690 | 0 | 690 | *1379* |
| **Abs Diff** | 34 | 1 | 5 | 40 | 2 | 1 | 49 | 52 | 5 | 253 | 82 | 330 | 3 | 329 | 2 | 324 | 562 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

52 **62110**
Intersection Name: Saratoga & Newbridge
**PM**

| Scenario: | NBL | NBT | NBR | Sum | SBL | SBT | SBR | Sum | EBL | EBT | EBR | Sum | WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | |
| **Existing 1Hr Cnt** | 98 | 2 | 7 | 107 | 1 | 0 | 13 | 14 | 19 | 459 | 98 | 576 | 0 | 335 | 3 | 338 | *1035* |
| **2019 Model 4Hr** | 1056 | 0 | 0 | 1056 | 0 | 0 | 0 | 0 | 0 | 2064 | 166 | 2230 | 0 | 1243 | 3 | 1246 | *4532* |
| **Mdl Factored 1Hr** | 375 | 0 | 0 | 375 | 0 | 0 | 0 | 0 | 0 | 733 | 59 | 792 | 0 | 441 | 1 | 442 | *1609* |
| **Abs Diff** | 277 | 2 | 7 | 268 | 1 | 0 | 13 | 14 | 19 | 274 | 39 | 216 | 0 | 106 | 2 | 104 | 574 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

Volume Adjustment Spreadsheet - AM Peak Hour (Difference Method)

53 **11820**
Intersection Name: Euclid & E Bayshore
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 360 | 0 | 5 | 365 | 7 | 600 | 0 | 607 | 0 | 113 | 41 | 154 | *1126* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 743 | 0 | 2 | 745 | 0 | 1126 | 0 | 1126 | 0 | 328 | 0 | 328 | *2199* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 264 | 0 | 1 | 265 | 0 | 400 | 0 | 400 | 0 | 116 | 0 | 116 | *781* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 96 | 0 | 4 | 100 | 7 | 200 | 0 | 207 | 0 | 3 | 41 | 38 | 345 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | **33%** | - | | - | - | - | | |

53 **11820**
Intersection Name: Euclid & E Bayshore
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 74 | 0 | 20 | 94 | 13 | 226 | 0 | 239 | 0 | 547 | 142 | 689 | *1022* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 331 | 0 | 0 | 331 | 1 | 477 | 0 | 478 | 0 | 1660 | 3 | 1663 | *2472* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 118 | 0 | 0 | 118 | 0 | 169 | 0 | 169 | 0 | 589 | 1 | 590 | *877* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 44 | 0 | 20 | 24 | 13 | 57 | 0 | 70 | 0 | 42 | 141 | 99 | 145 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | **8%** | - | | |

54 **4866**
Intersection Name: Clark & E Bayshore
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 312 | 0 | 32 | 344 | 57 | 204 | 0 | 261 | 0 | 111 | 64 | 175 | *780* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 233 | 0 | 0 | 233 | 0 | 250 | 0 | 250 | 0 | 1 | 0 | 1 | *484* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 83 | 0 | 0 | 83 | 0 | 80 | 0 | 80 | 0 | 0 | 0 | 0 | *163* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 229 | 0 | 32 | 261 | 57 | 124 | 0 | 181 | 0 | 111 | 64 | 175 | 617 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

54 **4866**
Intersection Name: Clark & E Bayshore
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 81 | 0 | 26 | 107 | 81 | 302 | 0 | 383 | 0 | 198 | 152 | 350 | *840* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | 189 | 95 | 284 | *308* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 8 | 0 | 60 | 30 | 90 | *98* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 81 | 0 | 26 | 107 | 81 | 294 | 0 | 375 | 0 | 138 | 122 | 260 | 742 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |

55 **10048**
Intersection Name: Pulgas & E Bayshore
**AM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 524 | 0 | 62 | 586 | 45 | 398 | 0 | 443 | 0 | 71 | 136 | 207 | *1236* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 2414 | 0 | 0 | 2414 | 0 | 484 | 0 | 484 | 0 | 1 | 1071 | 1072 | *3970* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 857 | 0 | 0 | 857 | 0 | 154 | 0 | 154 | 0 | 0 | 341 | 341 | *1352* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 333 | 0 | 62 | 271 | 45 | 244 | 0 | 289 | 0 | 71 | 205 | 134 | 116 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | **64%** | - | - | | - | - | - | | - | - | - | | |

55 **10048**
Intersection Name: Pulgas & E Bayshore
**PM**

| Scenario: | Northbound NBL | NBT | NBR | Sum | Southbound SBL | SBT | SBR | Sum | Eastbound EBL | EBT | EBR | Sum | Westbound WBL | WBT | WBR | Sum | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing 1Hr Cnt** | 0 | 0 | 0 | 0 | 202 | 0 | 80 | 282 | 127 | 265 | 0 | 392 | 0 | 268 | 559 | 827 | *1501* |
| **2019 Model 4Hr** | 0 | 0 | 0 | 0 | 1091 | 0 | 0 | 1091 | 0 | 24 | 0 | 24 | 0 | 287 | 2424 | 2711 | *3826* |
| **Mdl Factored 1Hr** | 0 | 0 | 0 | 0 | 387 | 0 | 0 | 387 | 0 | 8 | 0 | 8 | 0 | 91 | 771 | 862 | *1257* |
| **Abs Diff** | 0 | 0 | 0 | 0 | 185 | 0 | 80 | 105 | 127 | 257 | 0 | 384 | 0 | 177 | 212 | 35 | 244 |
| **>1000** | - | - | - | | - | - | - | | - | - | - | | - | - | - | | |
| **>500** | - | - | - | | - | - | - | | - | - | - | | - | - | **38%** | | |

Appendix 4
# Revised Arborist Biological Resources Reports

**4.1 Willow Village Master Plan Biological Resources Report**

**4.2 Heritage Tree Removal Application Willow Village**

**4.3 Heritage Tree Removal Application Hamilton Avenue Parcels**

**4.4 Heritage Tree Removal Application 1305 O'Brien Drive**

**4.5 Heritage Tree Removal Application 1330 O'Brien Drive**

**4.6 Heritage Tree Removal Application 1305 O'Brien Drive Right-of-Way**

Appendix 4.1

# Willow Village Master Plan Biological Resources Report

H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

**Willow Village Master Plan**
**Biological Resources Report**

**Project #3375-17**

Prepared for:

Brian Zubradt
**Peninsula Innovation Partners**
1 Hacker Way, Building 28
Menlo Park, CA 94025

Prepared by:

**H. T. Harvey & Associates**

August 6, 2022

# Table of Contents

## Figures



## Tables



## Appendices



## List of Preparers

Steve Rottenborn, Ph.D., Principal/Senior Wildlife Ecologist

Kelly Hardwicke, Ph.D., Senior Plant/Wetland Ecologist

Robin Carle, M.S., Project Manager/Associate Wildlife Ecologist

Ginger Bolen, Ph.D., Project Manager/Associate Wildlife Ecologist

Stephen L. Peterson, M.S., Wildlife Ecologist
Matthew Mosher, B.S., Plant Ecologist

# Section 1. Introduction

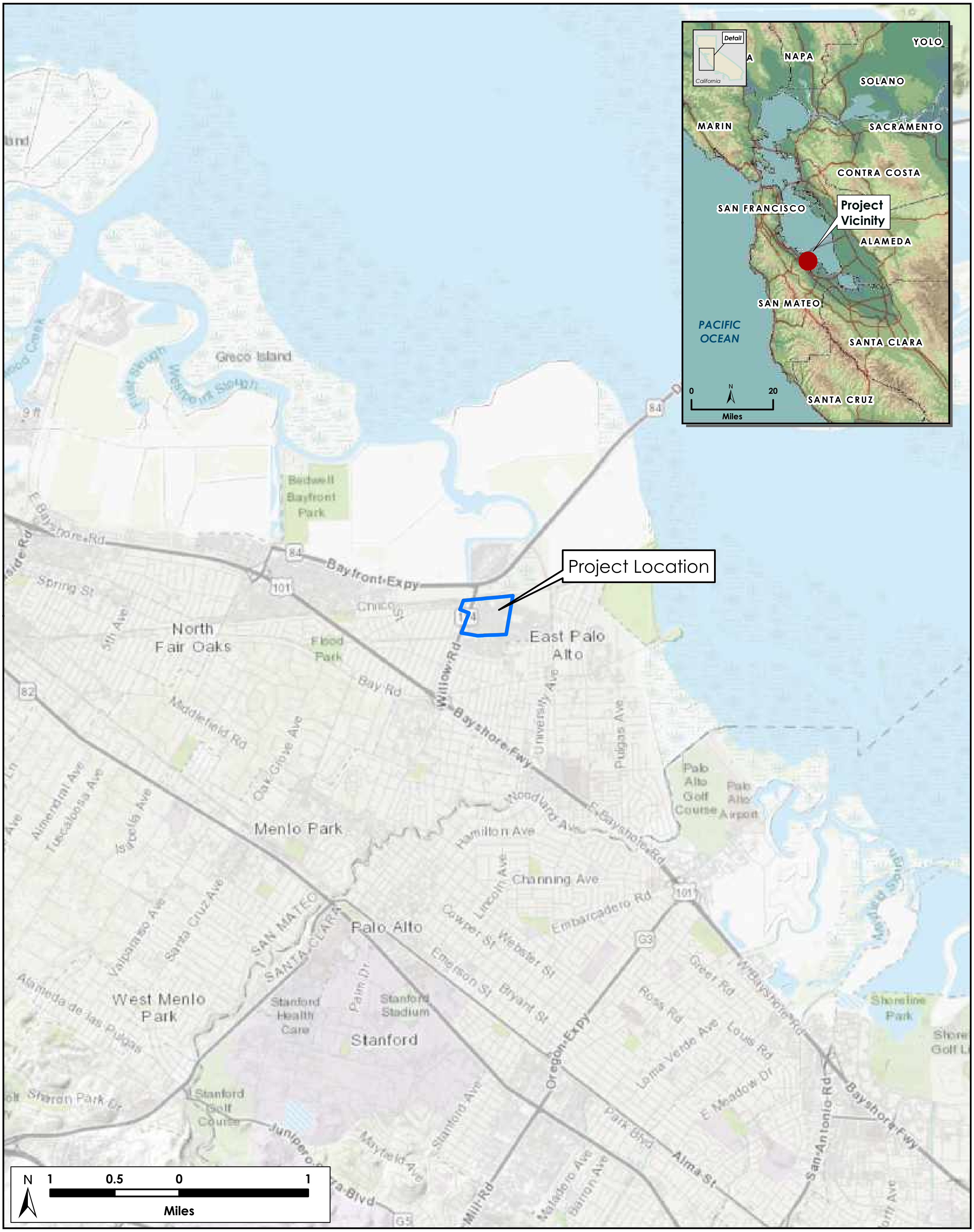
This report describes the biological resources present in and adjacent to the area of Meta Platforms, Inc.'s (Meta) proposed Willow Village Master Plan project (project), as well as the potential impacts of the proposed project and measures necessary to reduce impacts to less-than-significant levels under the California Environmental Quality Act (CEQA). This report was prepared to facilitate CEQA review of the Willow Village Master Plan by the City of Menlo Park. In addition, this report contains the information needed to satisfy Mitigation Measure BIO-1 from the ConnectMenlo General Plan Environmental Impact Report (EIR) (Placeworks 2016), which requires preparation of a biological resources assessment containing information specified in that mitigation measure.

## 1.1 Project Description

The proposed project entails the redevelopment of the former Menlo Science and Technology Park, as well as an adjacent area west of Willow Road, to create a contemporary mixed-use district including housing, community-serving retail, new public parks and landscaped areas, and a new campus district to provide additional workspace for Meta. The approximately 64.0-acre project site (inclusive of the "main project site" east of Willow Road and "Hamilton Avenue Parcels North and South" west of Willow Road) is located within Menlo Park's Bayfront Area and is bounded by Willow Road and commercial development to the west, the Dumbarton Rail Corridor to the north, the Hetch Hetchy right-of-way corridor and Mid-Peninsula High School to the south, and an existing life science complex to the east (Figure 1). To the west are existing commercial and multi-family uses and Menlo Park's Belle Haven neighborhood.

The main project site is currently occupied by 20 office, industrial, and warehouse buildings that compose approximately 1,000,000 square feet ($ft^2$) of improvements, as well as surface parking (Figure 2). The Hamilton Avenue Parcels North and South portion of the project site is occupied primarily by restaurants and a gas station. Following the approval of the 2014-2016 update of the Land Use and Circulation Elements of the City of Menlo Park General Plan, identified as ConnectMenlo (City of Menlo Park 2016), Meta undertook an extensive planning effort for the Willow Village Master Plan. The project has been carefully designed to conform to the updated zoning requirements, including the provision for "master planned projects" which allows for a single project or phased development project on sites that exceed 15 acres in size and contain different zoning designations to aggregate density and uses across the entire project site. In addition, the project would aim to comply with all other development standards in the office and residential mixed-use zoning districts, including parking, setbacks, open space, paseos, building design (including bird-friendly design), green and sustainable building, and heritage trees.

Willow Village proposes to replace more than 1,000,000 $ft^2$ of existing industrial, office, and warehouse space in the Menlo Science and Technology Park with a new, mixed-used village that includes up to 1,735 residential units, 200,000 $ft^2$ of retail uses, a hotel with up to 193 rooms and accessory uses, 1,250,000 $ft^2$ of office uses,





H. T. HARVEY & ASSOCIATES
Ecological Consultants

**Figure 1. Vicinity Map**
Willow Village Master Plan Biological Resources Report (3375-21)
August 2022


N:\Projects3300\3375-01\21\Reports\BRR\Fig 2 Study Area.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

**Figure 2. Study Area**
Willow Village Master Plan Biological Resources Report (3375-21)
August 2022

and 500,000 square feet of accessory uses. The plan will require demolition of all existing site improvements consisting of buildings, streets, and utilities. Proposed improvements include site grading to elevate the property above the FEMA base flood elevation and to create buildable pads, construction of new circulation improvements to accommodate vehicles, bicycles, and pedestrians, utilities, park and open space improvements, residential mixed-use buildings, a hotel, and an office campus. Additional improvements will be completed at key connection points at O'Brien Drive, Park Street, Adams Court, and Hamilton Avenue. Mixed-use buildings will range in height from 55–80 ft; office buildings and associated accessory buildings will have a maximum height of 110 ft and would comply with the average heights as established by *ConnectMenlo's* zoning standards.

In order to accommodate the realignment of Hamilton Avenue (to connect to New Hamilton) and to construct the western access (ramp and elevator) to an elevated park, some of the existing development on the block located at the northwest corner and a portion of the block located at the southwest corner of Willow Road and the existing Hamilton Avenue may need to be reconfigured. The block on the northwest corner is approximately 1.83 acres and currently is developed with approximately 16,000 square feet of retail buildings. The portion of the block located at the southwest corner is approximately 1.34 acres and currently is developed with a gas station with approximately 4,500 sf of retail. Both sites are zoned C-2-S Neighborhood Commercial District Special. To accommodate the Hamilton Avenue road realignment, the gas station would be relocated further north in the retail site. In addition, the existing retail may be removed and replaced with new retail buildings in a new site configuration. It is anticipated that the replacement development would be similar to the existing development in size and use potentially adding 5,000 sf in shops, which could include an additional drive through option. Any construction related activities would occur in Phase 2 of the schedule.

The site lighting for Willow Village will comply with Title 24 and Menlo Park's lighting guidelines for both the Residential Mixed-use and Office zoning districts. All fixtures will be energy-efficient, reduce glare and unnecessary light spillage, while providing safe routes of travel for vehicles and pedestrians.

It is anticipated that most of the existing trees on the project site would be removed. Heritage trees, as defined by the City of Menlo Park, would be replaced on site in an amount equivalent to the appraised value of the removed heritage trees in accordance with City policies for commercial applicants[1]. The conceptual landscape plan envisions a combination of native, drought-tolerant, and adapted species from around the world and calls for approximately 1,780 new trees to be planted. Consistent with Menlo Park municipal codes on landscape design, no invasive species or noxious weeds would be used in landscaping for the redeveloped areas.

A chain of publicly accessible open spaces will be located along Main Street, and a new 2.1-acre elevated pedestrian and bike-friendly publicly accessible park is designed to accommodate pedestrian walking trails, bicycle paths, gardens with native drought-tolerant and adapted species, lawn areas, interpretive horticultural exhibits, seating areas, children's play areas, recreation areas, shading canopies, water features, cafés, picnic areas, and public restrooms, as well as security and safety infrastructure. The elevated park would be constructed

[1] https://menlopark.org/DocumentCenter/View/833/Heritage-Tree-Replacement-Procedures

above grade, providing views south over Willow Village and Town Square, north to the Don Edwards San Francisco Bay National Wildlife Refuge, and east towards San Francisco Bay.

Offsite improvements will be made as well. Safe crossing design improvements will be incorporated in the northwest corner of the site to provide safe pedestrian, bicycle, and vehicular movements at Hamilton Avenue and between the two adjoining office campuses. Improvements along Willow Road will include widening of the right-of-way to accommodate additional left turn pockets, installation of new traffic signals, utility points of connections, sidewalk improvements, and landscape improvements. At the southeast corner of the site, in the Residential/Shopping District, a new intersection is proposed at O'Brien Drive, requiring new traffic signals and roadway layout alterations. Along the southern property line, an existing open channel located both on and off-site within the study area directs storm water flows to an existing storm drain main along the east property line. To accommodate site improvements, the drainage flows within this channel will be undergrounded and the channel filled.

It is currently anticipated that Willow Village will be constructed in two primary phases, with Phase 1 being divided into two sub-phases. Construction will commence on the southern portion of the site and move northward. Each construction phase will include the grading of that phase and construction of the circulation (including transit, auto, bicycle, and pedestrian) and utility infrastructure necessary to serve that phase. There may be some overlap in construction phases.

## 1.2 Bird-Safe Design

In 2014, the City of Menlo Park initiated the process of updating its General Plan Land Use and Circulation Elements as well as its zoning for the M-2 area (also known as the Bayfront Area) in the northern portion of Menlo Park. Collectively, this update to the General Plan and zoning is known as *ConnectMenlo*. On November 29, 2016, the City Council certified the *ConnectMenlo: General Plan Land Use & Circulation Elements and M-2 Area Zoning Update Environmental Impact Report* (ConnectMenlo EIR) and approved the General Plan Land Use and Circulation Elements. The Willow Village project is located within the ConnectMenlo area.

Mitigation Measure BIO-1 of the ConnectMenlo EIR requires measures to ensure that the project reduces bird collisions with new buildings. Pursuant to Mitigation Measure BIO-1, the project must comply with bird-safe design requirements subsequently incorporated into Municipal Code Sections 16.43.150(6) and 16.43.130(6), which include measures to reduce bird collisions. These requirements are as follows:

A. No more than 10% of façade surface area shall have non-bird-friendly glazing.

B. Bird-friendly glazing includes, but is not limited to, opaque glass, covering the outside surface of clear glass with patterns, paned glass with fenestrations, frit or etching patterns, and external screens over nonreflective glass. Highly reflective glass is not permitted.

C. Occupancy sensors or other switch control devices with an astronomic time clock shall be installed on nonemergency lights and shall be programmed to shut off during non-work hours and between 10:00 p.m. and sunrise.

D. Placement of buildings shall avoid the potential funneling of flight paths towards a building façade.

E. Glass skyways or walkways, free-standing (see-through) glass walls and handrails, and transparent building corners shall not be allowed.

F. Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with roof decks, patios and roofs with landscape vegetation.

G. Use of rodenticides shall not be allowed.

A project may receive a waiver from requirements A through F, subject to the submittal of a site-specific evaluation from a qualified biologist and review and approval by the Planning Commission. A waiver from requirement G is not authorized.

The Willow Village Master Plan incorporates robust bird-safe design measures to minimize bird collisions with project buildings, in accordance with Mitigation Measure BIO-1. H. T. Harvey & Associates (2021a) prepared a *Willow Village Master Plan Bird-Safe Design Assessment* that assessed the potential for bird collisions with various Master Plan components based on the locations of those components and the project's conceptual Conditional Development Permit (CDP) application. For that bird-safe design assessment, H. T. Harvey worked with Meta's design team to identify features of the architecture of project buildings and lighting principles that would reduce the frequency of avian collisions; the components of the City's bird-safe design requirements (from Mitigation Measure BIO-1 of the ConnectMenlo EIR) that Master Plan components could comply with; and proposed waivers from the requirements identified in Municipal Code Sections 16.43.150(6) and 16.43.130(6) and alternative measures that the project would incorporate to meet the intent and effectiveness of any City bird-safe design requirements that the project could not comply with to the letter. In addition, H. T. Harvey also proposed mitigation measures to further minimize impacts related to bird collisions. The *Willow Village Master Plan Bird-Safe Design Assessment* documents that with implementation of these design features, lighting principles, bird-safe design requirements or alternative measures, and mitigation measures, project impacts due to bird collisions with buildings would be reduced to less-than-significant levels under CEQA.

# Section 2. Methods

## 2.1 Background Review

Prior to conducting initial field work, H. T. Harvey & Associates ecologists reviewed the original project plans and description provided by Meta in November 2017; aerial images (Google Inc. 2021); a U.S. Geological Survey (USGS) topographic map; the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB 2021); and other relevant scientific literature and technical databases. Previous reports prepared for the project and vicinity were also reviewed, including the arborist report for the main project site (SBCA Tree Consulting 2017); the Final EIRs for the nearby Menlo Park Facebook Campus (Atkins 2012) and the Facebook Campus Expansion Project (ICF International 2016); the Final EIR for the ConnectMenlo: General Plan Land Use & Circulation Elements and M-2 Area Zoning Update for the City of Menlo Park (PlaceWorks 2016); and the Comprehensive Conservation Plan and Environmental Assessment for the Don Edwards San Francisco Bay National Wildlife Refuge (NWR) (USFWS 2012). In addition, for plants, we reviewed all species on current California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 1A, 1B, 2A, and 2B lists occurring in the *Palo Alto, California* USGS quadrangle and surrounding eight quadrangles (*Woodside, San Mateo, Redwood Point, Newark, Mountain View, Cupertino, Mindego Hill,* and *La Honda, California*). Quadrangle-level results are not maintained for CRPR 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in San Mateo County (CNPS 2021). In addition, we queried the CNDDB (2021) for natural communities of special concern that occur in the project region. For the purposes of this report, the "project vicinity" encompasses a 5-mile (mi) radius surrounding the project site.

After the Willow Village design and program were revised in May 2020, we reviewed the updated plans (Peninsula Innovation Partners 2020) and current CNDDB and CNPS information to ensure that our updated assessment of the project's potential impacts on biological resources was based on up-to-date information. We also reviewed the project's heritage tree removal applications (Peninsula Innovation Partners 2022a-e).

In addition, H. T. Harvey & Associates (2021b) performed a delineation of jurisdictional wetlands and other waters of the U.S./State within the study area in 2021. A field visit for that delineation was conducted in August 2021, and a follow-up visit to assess conditions in a drainage ditch was conducted on December 31, 2021.

## 2.2 Site Visits

The project site discussed in this report includes the area enclosed by the project boundary shown in Figure 2. For the purposes of ensuring evaluation of all potential direct, indirect, and cumulative effects on biological resources, the project's biological resources study area includes the project site (main site and Hamilton Avenue Parcels North and South) and areas within 100 ft beyond the project boundary (Figure 2). Reconnaissance-level field surveys of the main project site, as well as areas within the Dumbarton Rail Corridor both east and west of Willow Road, were initially conducted by H. T. Harvey & Associates senior wildlife ecologist Steve

Rottenborn, Ph.D., on October 26, 2017 and by H. T. Harvey & Associates wildlife ecologist, Stephen L. Peterson, M.S., and plant ecologist Matthew Mosher, B.S., on November 13, 2017, with an additional visit by M. Mosher on November 15, 2017. After the project was redesigned in 2019, S. Rottenborn visited the main project site again on April 22, 2019. After the project was redesigned in 2020, H. T. Harvey & Associates senior wildlife ecologist Robin Carle, M.S., visited the Hamilton Avenue Parcels North and South portion of the site on June 10, 2020 and H. T. Harvey & Associates senior plant ecologist Mark Bibbo, M.S., visited this area on June 12, 2020. The purpose of these surveys was to provide a project-specific impact assessment for the proposed project as described above. Specifically, surveys were conducted to (1) assess existing biotic habitats and general plant and wildlife communities in the study area, (2) assess the potential for the project to impact special-status species or their habitats, and (3) identify potential jurisdictional habitats, such as Waters of the U.S./State and riparian habitat.

In addition, focused surveys for Congdon's tarplant (*Centromadia parryi* var. *congdonii*) were conducted by H. T. Harvey & Associates plant ecologists on November 13, 2017 (main project site) and June 12, 2020 (Hamilton Avenue Parcels North and South). These surveys targeted areas of potential suitable habitat along the Dumbarton Rail Corridor in the northern portion of the study area.

# Section 3. Regulatory Setting

Biological resources on the project site are regulated by a number of federal, state, and local laws and ordinances, as described below.

## 3.1 Federal

### 3.1.1 Clean Water Act

The Clean Water Act (CWA) functions to maintain and restore the physical, chemical, and biological integrity of Waters of the U.S., which include, but are not limited to, tributaries to traditionally navigable waters currently or historically used for interstate or foreign commerce, and adjacent wetlands. Historically, in non-tidal waters, U.S. Army Corp of Engineers (USACE) jurisdiction extends to the ordinary high water (OHW) mark, which is defined in Title 33, Code of Federal Regulations (CFR), Part 328.3. If there are wetlands adjacent to channelized features, the limits of USACE jurisdiction extend beyond the OHW mark to the outer edges of the wetlands. Wetlands that are not adjacent or tributaries to Waters of the U.S. are termed "isolated wetlands" and, depending on the circumstances, typically are not subject to USACE jurisdiction. In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line. The high tide line is defined in 33 CFR Part 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide."

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit will be effective in the absence of Section 401 Water Quality Certification. The State Water Resources Control Board (SWRCB) is the state agency (together with the Regional Water Quality Control Boards [RWQCBs] charged with implementing water quality certification in California.

<u>Project Applicability</u>: The project site itself does not support wetland or aquatic habitats. A small, isolated segment of forested wetland that may be claimed as Waters of the U.S. is located in a drainage ditch along the northern edge of the study area, just outside the project boundary (H. T. Harvey & Associates 2021b). Similarly, a linear area of herbaceous-dominated seasonal wetland is present in the Dumbarton Rail Corridor immediately north of the Hamilton Avenue Parcels North and South portion of the project site. Another herbaceous seasonal wetland is present just outside the northeast corner of the project boundary (H. T. Harvey & Associates 2021b). These seasonal wetlands might also be claimed as Waters of the U.S. The San Francisco office of the USACE would ultimately determine whether or not these features are subject to USACE jurisdiction under Section 404 of the CWA (under either current regulations or any amended regulations). It is our understanding that the project will avoid to the extent feasible placing fill in those features, in which case no permit from the USACE would be needed for activities associated with these features even if determined to be jurisdictional. However, if these features are determined to be jurisdictional and are impacted by project grading, a Section

404 permit from the USACE would be required., and mitigation of impacts would be required as described in Mitigation Measures BIO-11 and 12 in Section 6.2.1.

A ditch located partially on-site and partially within the Hetch Hetchy easement corridor immediately south of the main project site (and within the study area) was dominated by upland (non-wetland) vegetation during our April 2019 site visit (as well as the August 2021 site visit for the delineation of waters of the U.S./State [H. T. Harvey & Associates 2021b]), is concrete-lined in at least some locations, and is excavated in uplands to collect stormwater runoff from the surrounding development. A visit to the site on December 31, 2021, after a prolonged, heavy rain event, revealed evidence of only a very small amount of runoff that had flowed through this ditch during the storm. As such, we do not expect this feature to be claimed as Waters of the U.S. by the USACE.

Brackish marsh habitat is present outside and well to the north and northeast of the study area. We expect that this brackish marsh would be considered Waters of the U.S. under both current and proposed definitions of Waters of the U.S. because it is adjacent to tidal channels that would either be considered navigable or tributaries to navigable waters. This brackish marsh habitat is located well off-site, however, and no impacts to this marsh would result from the proposed project.

### 3.1.2 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 prohibits the creation of any obstruction to the navigable capacity of Waters of the U.S., including discharge of fill and the building of any wharfs, piers, jetties, and other structures without Congressional approval or authorization by the Chief of Engineers and Secretary of the Army (33 U.S.C. 403).

Navigable Waters of the U.S., which are defined in 33 CFR, Part 329.4, include all waters subject to the ebb and flow of the tide, and those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as "the line on the shore reached by the plane of the mean (average) high water." It is important to understand that the USACE does not regulate wetlands under Section 10, only the aquatic or open waters component of bay habitat, and that there is overlap between Section 10 jurisdiction and Section 404 jurisdiction. According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce as a result of changed conditions or the presence of obstructions. Historical Section 10 Waters may occur behind levees in areas that are not currently exposed to tidal or muted-tidal influence, and meet the following criteria: (1) the area is presently at or below the mean high water line; (2) the area was historically at or below mean high water in its "unobstructed, natural state"; and (3) there is no evidence that the area was ever above mean high water.

As mentioned above, Section 404 of the CWA authorizes the USACE to issue permits to regulate the discharge of dredged or fill material into Waters of the U.S. If a project also proposes to discharge of dredged or fill material or introduce of other potential obstructions in navigable Waters of the U.S., a Letter of Permission authorizing these impacts must be obtained from the USACE under Section 10 of the Rivers and Harbors Act.

Project Applicability: Based on mapping of the historical margins of San Francisco Bay marshes (Nichols and Wright 1971), which depict the margins of baylands being located well north of the project site, no current or historical Section 10 waters are present within the project boundary or elsewhere within the study area (e.g., in the wetlands immediately north and northeast of the project boundary). Therefore, no Section 10 Letter of Permission from the USACE is required for the project.

### 3.1.3 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) protects federally listed wildlife species from harm or "take", which is broadly defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct." Take can also include habitat modification or degradation that directly results in death or injury of a listed wildlife species. An activity can be defined as "take" even if it is unintentional or accidental. Generally, listed plant species are provided less protection than listed wildlife species. Listed plant species are legally protected from take under the FESA only if they occur on federal lands.

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have jurisdiction over federally listed, threatened, and endangered species under FESA. The USFWS also maintains lists of proposed and candidate species. Species on these lists are not legally protected under FESA, but may become listed in the near future and are often included in their review of a project.

Project Applicability: No suitable habitat for any federally listed plant or animal species occurs in the study area. Thus, no federally listed species are reasonably expected to occur in the study area.

### 3.1.4 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit. The Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans (FMPs) to achieve the optimum yield from U.S. fisheries in their regions. These councils, with assistance from NMFS, establish Essential Fish Habitat (EFH) in FMPs for all managed species. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to recommendations by NMFS.

Project Applicability: No EFH is present in the study area.

### 3.1.5 Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA), 16 U.S.C. Section 703, prohibits killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The MBTA protects whole birds, parts of birds, and bird eggs and nests, and it prohibits the possession of all nests of protected bird species whether they are active or inactive. An active nest is defined as having eggs or young, as described by the USFWS in its June 14, 2018 memorandum "Destruction and Relocation of Migratory Bird Nest Contents". Nest starts (nests that are under construction and do not yet contain eggs) and inactive nests are not protected from destruction.

In its June 14, 2018 memorandum, the USFWS clarified that the destruction of an active nest "while conducting any activity where the intent of the action is not to kill migratory birds or destroy their nests or contents" is not prohibited by the MBTA. On February 3, 2020, the USFWS published a proposed rule to codify the scope of the MBTA as it applies to activities resulting in the injury or death of migratory birds (85 FR 5915-5926); the USFWS is currently considering comments on the proposed rule.

Project Applicability: All native bird species that occur in the study area are protected under the MBTA. Mitigation Measures BIO-13, 14, 15, and 16 shall be implemented to ensure that project activities comply with the MBTA as described in Section 6.4.1.

## 3.2 State

### 3.2.1 Porter-Cologne Water Quality Control Act

The SWRCB works in coordination with the nine RWQCBs to preserve, protect, enhance, and restore water quality. Each RWQCB makes decisions related to water quality for its region, and may approve, with or without conditions, or deny projects that could affect Waters of the State. Their authority comes from the CWA and the State's Porter-Cologne Water Quality Control Act (Porter-Cologne). Porter-Cologne broadly defines Waters of the State as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because Porter-Cologne applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of Waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" Waters of the State include headwaters, wetlands, and riparian areas. Moreover, the San Francisco Bay Region RWQCB's Assistant Executive Director has stated that, in practice, the RWQCBs may claim jurisdiction over riparian areas. Where riparian habitat is not present, such as may be the case at headwaters, jurisdiction is taken to the top of bank.

On April 2, 2019, the SWRCB adopted the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. In these new guidelines, riparian habitats are not specifically described as Waters of the State but instead as important buffer habitats to streams that do conform to the State Wetland Definition. The Procedures describe riparian habitat buffers as important resources that may both be included in required mitigation packages for permits for impacts to Waters of the State.

Pursuant to the CWA, projects that are regulated by the USACE must also obtain a Section 401 Water Quality Certification permit from the RWQCB. This certification ensures that the proposed project will uphold state water quality standards. Because California's jurisdiction to regulate its water resources is much broader than that of the federal government, proposed impacts on Waters of the State may require Waste Discharge Requirements even if the area occurs outside of USACE jurisdiction. Moreover, the RWQCB may impose mitigation requirements even if the USACE does not, for example for riparian habitats which are buffers to Waters of the State. Under the Porter-Cologne, the SWRCB and the nine regional boards also have the responsibility of granting CWA National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirements for certain point-source and non-point discharges to waters. These regulations limit impacts on aquatic and riparian habitats from a variety of urban sources.

Project Applicability: No aquatic, wetland, or riparian habitats are present within the project boundary. However, as noted above in Section 3.1.1, a small, isolated segment of forested wetland that would likely be claimed as Waters of the State is located in a drainage ditch along the northern edge of and within the study area, just outside the project boundary (H. T. Harvey & Associates 2021b). Similarly, a linear area of herbaceous-dominated seasonal wetland is present in the Dumbarton Rail Corridor immediately north of the Hamilton Avenue Parcels North and South portion of the project site. Another herbaceous seasonal wetland is present just outside the northeast corner of the project boundary (H. T. Harvey & Associates 2021b). These seasonal wetlands might also be claimed as Waters of the State. It is our understanding that the project will avoid to the extent feasible placing fill in those wetlands, in which case no permit from the RWQCB would be needed for activities associated with wetlands even if these features are determined to be jurisdictional. However, if these features are determined to be jurisdictional and are impacted by the project, Section 401 water quality certification or Waste Discharge Requirements from the RWQCB would be required, and mitigation of impacts would be required as described in Mitigation Measures BIO-11 and 12 in Section 6.2.1. A ditch located partially on-site and partially within the Hetch Hetchy easement corridor immediately south of the main project site (but within the study area) was dominated by upland (non-wetland) vegetation during our April 2019 site visit, is concrete lined in at least some locations, and is excavated in uplands to collect stormwater runoff from the surrounding development. As such, we do not expect this feature to be claimed as Waters of the State by the RWQCB (H. T. Harvey & Associates 2021b).

Brackish marsh habitat is present well to the north and northeast of the study area. We expect that this brackish marsh would be considered Waters of the State because it is adjacent to tidal channels that would either be considered navigable or tributaries to navigable waters. This brackish marsh habitat is located well off-site, however, and no impacts to this marsh would result from the proposed project.

### 3.2.2 California Endangered Species Act

The California Endangered Species Act (CESA; California Fish and Game Code, Chapter 1.5, Sections 2050-2116) prohibits the take of any plant or animal listed as an endangered, threatened, or candidate species. In accordance with the CESA, the CDFW has jurisdiction over state-listed species (Fish and Game Code 2070). The CDFW regulates activities that may result in "take" of individuals (i.e., "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code. The CDFW, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification."

Project Applicability: No suitable habitat for any state listed plant or animal species occurs in the study area, and thus no state listed species are expected to occur in the study area.

### 3.2.3 California Environmental Quality Act

CEQA is a state law that requires state and local agencies to document and consider the environmental implications of their actions and to refrain from approving projects with significant environmental effects if there are feasible alternatives or mitigation measures that can substantially lessen or avoid those effects. CEQA requires the full disclosure of the environmental effects of agency actions, such as approval of a general plan update or the projects covered by that plan, on resources such as air quality, water quality, cultural resources, and biological resources. The State Resources Agency promulgated guidelines for implementing CEQA are known as the State CEQA Guidelines.

Section 15380(b) of the State CEQA Guidelines provides that a species not listed on the federal or state lists of protected species may be considered rare if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definitions in the FESA and the CESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals. This section was included in the guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on a species that has not yet been listed by either the USFWS or CDFW or species that are locally or regionally rare.

The CDFW has produced three lists (amphibians and reptiles, birds, and mammals) of "species of special concern" that serve as "watch lists". Species on these lists are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review as potential rare species, but do not have specific statutory protection. All potentially rare or sensitive species, or habitats capable of supporting rare species, are considered for environmental review per the CEQA Section 15380(b).

The CNPS, a non-governmental conservation organization, has developed CRPRs for plant species of concern in California in the Inventory of Rare and Endangered Plants (CNPS 2021). The CRPRs include lichens, vascular, and non-vascular plants, and are defined as follows:

- CRPR 1A Plants considered extinct.
- CRPR 1B Plants rare, threatened, or endangered in California and elsewhere.
- CRPR 2A Plants considered extinct in California but more common elsewhere.
- CRPR 2B Plants rare, threatened, or endangered in California but more common elsewhere.
- CRPR 3 Plants about which more information is needed - review list.

- CRPR 4 Plants of limited distribution-watch list.

The CRPRs are further described by the following threat code extensions:

- .1—seriously endangered in California;
- .2—fairly endangered in California;
- .3—not very endangered in California.

Although the CNPS is not a regulatory agency and plants on these lists have no formal regulatory protection, plants appearing as CRPR 1B or 2 are, in general, considered to meet CEQA's Section 15380 criteria, and adverse effects on these species may be considered significant. Impacts on plants that are listed by the CNPS as CRPR 3 or 4 are also considered during CEQA review, although because these species are typically not as rare as those of CRPR 1B or 2, impacts on them are less frequently considered significant.

Compliance with CEQA Guidelines Section 15065(a) requires consideration of plant or animal natural communities. Vegetation types of "special concern" are tracked in Rarefind (CNDDB 2021). Further, the CDFW ranks sensitive vegetation alliances based on their global (G) and state (S) rankings analogous to those provided in the CNDDB. Global rankings (G1–G5) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas S rankings are a reflection of the condition of a habitat within California. If an alliance is marked as a G1–G3, all of the associations within it would also be of high priority. The CDFW provides the Vegetation Classification and Mapping Program's currently accepted list of vegetation alliances and associations (CDFW 2010).

Project Applicability: All potential impacts on biological resources will be considered during CEQA review of the project. This Biological Resources Report assesses these impacts to facilitate CEQA review of the project by the City of Menlo Park. Project impacts are discussed in Section 6 below.

### 3.2.4 California Fish and Game Code

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows generally fall under CDFW jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A *stream* is defined in Title 14, California Code of Regulations Section 1.72, as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish and other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." Using this definition, CDFW extends its jurisdiction to encompass riparian habitats that function as a part of a watercourse. California Fish and Game Code Section 2786 defines *riparian habitat* as "lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source." The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of CDFW can be measured in several ways, depending on the particular situation and the type of fish or wildlife at risk. At minimum, CDFW would claim jurisdiction over a stream's bed and bank. In areas that lack a vegetated riparian corridor, CDFW jurisdiction would be the same as USACE jurisdiction. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats.

Pursuant to California Fish and Game Code Section 1603, CDFW regulates any project proposed by any person that will "substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds." California Fish and Game Code Section 1602 requires an entity to notify CDFW of any proposed activity that may modify a river, stream, or lake. If CDFW determines that proposed activities may substantially adversely affect fish and wildlife resources, a Lake and Streambed Alteration Agreement (LSAA) must be prepared. The LSAA sets reasonable conditions necessary to protect fish and wildlife, and must comply with CEQA. The applicant may then proceed with the activity in accordance with the final LSAA.

Certain sections of the California Fish and Game Code describe regulations pertaining to protection of certain wildlife species. For example, Code Section 2000 prohibits take of any bird, mammal, fish, reptile, or amphibian except as provided by other sections of the code.

The California Fish and Game Code Sections 3503, 3513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFW. Raptors (i.e., eagles, hawks, and owls) and their nests are specifically protected in California under Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."

Bats and other non-game mammals are protected by California Fish and Game Code Section 4150, which states that all non-game mammals or parts thereof may not be taken or possessed except as provided otherwise in the code or in accordance with regulations adopted by the commission. Activities resulting in mortality of non-game mammals (e.g., destruction of an occupied nonbreeding bat roost, resulting in the death of bats), or disturbance that causes the loss of a maternity colony of bats (resulting in the death of young), may be considered "take" by the CDFW.

<u>Project Applicability</u>: The drainage ditches located along the northern and southern edges of the study area are not downstream continuations of terrestrial streams and only collect localized runoff from the surrounding development. Additionally, no flows continue downstream of these features out to the Bay or other stream or slough. As such, these features are not considered rivers or streams and are not regulated by the CDFW under California Fish and Game Code Section 1603 (H. T. Harvey & Associates 2021b).

Most native bird, mammal, and other wildlife species that occur on the project site and in the immediate vicinity are protected by the California Fish and Game Code. Mitigation Measures BIO-13, 14, 15, and 16 shall be implemented to ensure that project activities comply with the Fish and Game Code with respect to nesting birds, as described in Section 6.4.1.

## 3.3 Local

### 3.3.1 Menlo Park Municipal Code

The City of Menlo Park Municipal Code contains all ordinances for Menlo Park. Title 16, Zoning, includes regulations relevant to biological resources on the project site as discussed below.

**Bird-Friendly Design.** Sections 16.43.140 (6) (with respect to the O District) and 16.45.130(6) (with respect to the RMU District) require all new construction, regardless of size, to implement the following bird-friendly design measures:

- No more than 10% of facade surface area shall have non-bird-friendly glazing.
- Bird-friendly glazing includes, but is not limited to, opaque glass, covering of clear glass surface with patterns, paned glass with fenestration patterns, and external screens over non-reflective glass.
- Placement of buildings shall avoid the potential funneling of flight paths towards a building facade.
- Glass skyways or walkways, freestanding glass walls, and transparent building corners shall not be allowed.
- Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with green roofs.
- Use of rodenticides shall not be allowed.

A project may receive a waiver from one (1) or more of the items listed in subsections (6)(A) to (F) of this section, subject to the submittal of a site-specific evaluation from a qualified biologist and review and approval by the planning commission. (Ord. 1024 § 3 (part), 2016).

Project Applicability: Bird-friendly design will be incorporated into the project design as required by the City of Menlo Park Municipal Code. The project's incorporation of bird-safe design is discussed in Sections 1.2 and 6.5.2.

**Landscape Design Plan.** Chapter 12.44.090(a)(1)(G) provides that the use of invasive or noxious plant species is strongly discouraged. Invasive species are defined as those plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. A noxious weed refers to any weed designated by the weed control regulations in the Weed Control Act and identified on a regional district noxious weed control list.

Project Applicability: No invasive and/or noxious plant species will be used in the project's landscape design plan.

**Heritage Trees.** Chapter 13.24, Heritage Trees, establishes regulations for the preservation of heritage trees, defined as:

- Trees of historical significance, special character or community benefit, specifically designated by resolution of the City Council;
- An oak tree (*Quercus* sp.), which is native to California and has a trunk with a circumference of 31.4 inches (diameter of 10 inches) or more, measured at 54 inches above natural grade; and
- All trees other than oaks, which have a trunk with a circumference of 47.1 inches (diameter of 15 inches) or more, measured 54 inches above natural grade, with the exception of trees that are less than 12 ft in height, which will be exempt from this section.

To protect heritage trees, Section 13.24.025 requires that a tree protection plan prepared by a certified arborist be submitted for any work performed within a tree protection zone, which is an area ten times the diameter of the tree. Furthermore, all tree protection plans should be reviewed and approved by the Public Works Director or his or her designee prior to issuance of any permit for grading or construction.

The removal of heritage trees or pruning of more than one-fourth of the branches or roots within a 12-month period requires a permit from the City's Director of Public Works or his or her designee and payment of a fee. The Director of Public Works may issue a permit when the removal or major pruning of a heritage tree is reasonable based on a number of criteria, including condition of the tree, need for removal to accommodate proposed improvements, the ecological and long-term value of the tree, and feasible alternatives that would allow for tree preservation.

Project Applicability: The project site includes 327 trees that qualify as heritage trees under the City ordinance, distributed as follows: 284 on the main Willow Village project site, 13 at 1305 O'Brien Drive, 4 at 1330 O'Brien Drive, 8 in the O'Brien Drive right-of-way, and 18 on Hamilton Avenue Parcels North and South (SBCA Tree Consulting 2017, Peninsula Innovation Partners 2020, 2022a-e). It is anticipated that a total of 295 heritage trees, including 276 on the main Willow Village project site, 7 at 1305 O'Brien Drive, 3 at 1330 O'Brien Drive, 6 in the O'Brien Drive right-of-way, and 3 on the Hamilton Avenue Parcels North and South, would be removed as part of the proposed project. Therefore, a permit from the City would be required.

### 3.3.2 Menlo Park General Plan

The City of Menlo Park General Plan includes goals, policies, and programs relevant to the environmental factors potentially affected by the proposed project, including the following:

- *Goal LU-4:* Promote the development and retention of business uses that provide goods or services needed by the community that generate benefits to the City, and avoid or minimize potential environmental and traffic impacts.

- *Policy LU-4.5: Business Uses and Environmental Impacts.* Allow modifications to business operations and structures that promote revenue-generating uses for which potential environmental impacts can be mitigated.
- *Goal LU-6:* Preserve open-space lands for recreation; protect natural resources and air and water quality; and protect and enhance scenic qualities.
  - *Policy LU-6.5: Open Space Retention.* Maximize the retention of open space on larger tracts (e.g., portions of the St. Patrick's Seminary site) through means such as rezoning consistent with existing uses, clustered development, acquisition of a permanent open space easement, and/or transfer of development rights.
  - *Policy LU 6.6: Public Bay Access.* Protect and support public access to the Bay for the scenic enjoyment of open water, sloughs, and marshes, including restoration efforts, and completion of the Bay Trail.
  - *Policy LU-6.7: Habitat Preservation.* Collaborate with neighboring jurisdictions to preserve and enhance the Bay, shoreline, San Francisquito Creek, and other wildlife habitat and ecologically fragile areas to the maximum extent possible.
  - *Policy LU-6.8: Landscaping in Development.* Encourage extensive and appropriate landscaping in public and private development to maintain the City's tree canopy and to promote sustainability and healthy living, particularly through increased trees and water-efficient landscaping in large parking areas and in the public right-of-way.
  - *Policy LU-6.11. Baylands Preservation.* Allow development near the Bay only in already developed areas.
    - *Program LU-6.D: Design for Birds.* Require new buildings to employ façade, window, and lighting design features that make them visible to birds as physical barriers and eliminate conditions that create confusing reflections to birds.

- Goal OSC1: Maintain, Protect, and Enhance Open Space and Natural Resources.
  - *Policy OSC1.1: Natural Resources Integration with Other Uses.* Protect Menlo Park's natural environment and integrate creeks, utility corridors, and other significant natural and scenic features into development plans.
  - *Policy OSC1.2: Habitat for Open Space and Conservation Purposes.* Preserve, protect, maintain, and enhance water, water-related areas, plant and wildlife habitat for open space and conservation purposes.
  - *Policy OSC1.3: Sensitive Habitats.* Require new development on or near sensitive habitats to provide baseline assessments prepared by qualified biologists, and specify requirements relative to the baseline assessments.
  - *Policy OSC1.4: Habitat Enhancement.* Require new development to minimize the disturbance of natural habitats and vegetation, and require revegetation of disturbed natural habitat areas with native or non-invasive naturalized species.

- *Policy OSC1.5: Invasive, Non-Native Plant Species*. Avoid the use of invasive, non-native species, as identified on the lists of invasive plants maintained at the California Invasive Plant Inventory and United States Department of Agriculture invasive and noxious weeds database, or other authoritative sources, in landscaping on public property.
- *Policy OSC1.15: Heritage Trees*. Protect Heritage Trees, including during construction activities through enforcement of the Heritage Tree Ordinance (Chapter 13.24of the Municipal Code).

Project Applicability: The project is located within the Menlo Park General Plan area and would conform to all applicable requirements.

# Section 4. Environmental Setting

## 4.1 General Project Area Description

The 81.1-acre study area (including the approximately 64-acre project site) is located in the *Palo Alto*, *California* 7.5-minute USGS quadrangle. The approximately 64-acre project site (inclusive of the "main project site" east of Willow Road and "Hamilton Avenue Parcels North and South" west of Willow Road) is bounded by Willow Road to the west, the Hetch Hetchy easement corridor to the south, an existing life science complex to the east, and a drainage ditch, rail line, and Extra Space Storage self-storage units to the north. A review of historical aerial photographs indicates that the study area was largely agriculture in 1943. By 1991, the project site was developed with numerous buildings and parking lots known as the Menlo Science and Technology Park. Currently, the site is occupied by 21 office, industrial, and warehouse buildings (Figure 2).

The site is generally level, with elevations ranging from approximately 6 to 13 ft (North American Vertical Datum of 1988) above sea level. The site is underlain by one soil type, Urban land-Orthents, reclaimed complex, 0 to 2 percent slopes (NRCS 2021). This soil type has a variable profile to a depth of approximately 40 inches, with silty clay generally occurring from 40 to 60 inches, and is considered a well-drained soil.

## 4.2 Biotic Habitats

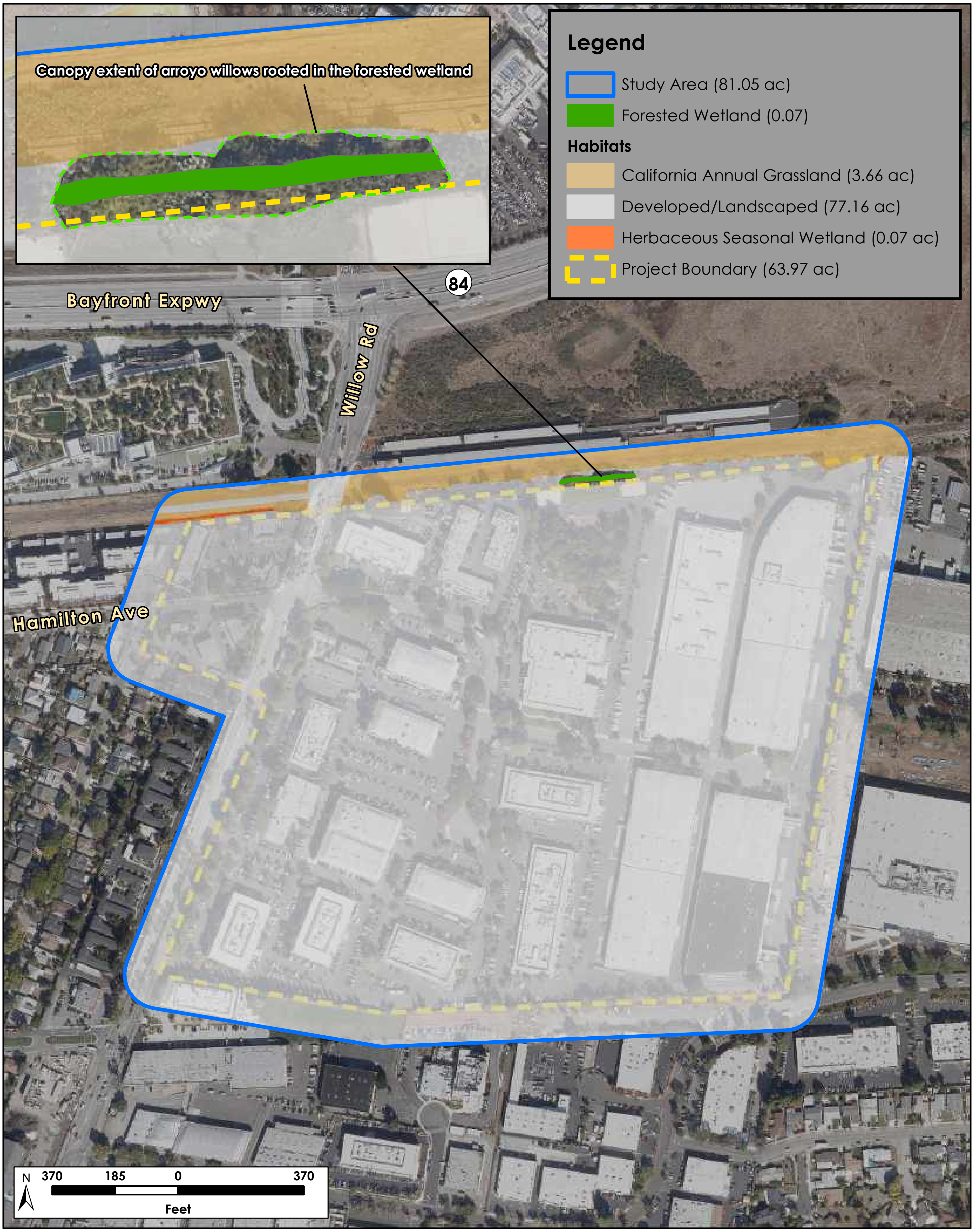
Reconnaissance-level surveys identified four habitat types/land uses in the study area: developed/landscaped (77.16 acres), California annual grassland (3.66 acres), forested wetland (0.07 acre[2]), and herbaceous seasonal wetlands (0.07 acre) (Figure 3). These habitats are described in detail below. Plant species observed during the reconnaissance survey are listed in Appendix A.

Photo 1. Developed/Landscaped habitat.

### 4.2.1 Developed/Landscaped

**Vegetation.** The entire project site, and the vast majority of the study area, are occupied by developed/landscaped land uses (Photo 1) that include office buildings, restaurants, a gas station, parking lots, walking paths, mulched and irrigated areas, and extensive plantings

[2] The depression comprising the footprint of the forested wetland is 0.07 acre in size; the canopy of the willows rooted within that wetland comprise an additional 0.13 acre.




N:\Projects3300\3375-01\21\Reports\BRR\Fig 3 Habitats Map.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

**Figure 3. Habitats Map**
Willow Village Master Plan Biological Resources Report (3375-21)
August 2022

of ornamental trees and other landscaping species. Species characteristic of this area include Canary Island pine (*Pinus canariensis*), Chinese pistache (*Pistacia chinensis*), London plane (*Platanus* x*hispanica*), eucalyptus (*Eucalyptus* sp.), and crepe myrtle (*Lagerstroemia* sp.). Common understory plants include buckbrush (*Ceanothus* sp.) and rosemary (*Rosmarinus officinalis*). Immediately outside the southern edge of the project boundary (but within an area where off-site improvements will be made), a ditch is located partially on-site and partially within the Hetch Hetchy easement area (Photo 2). This ditch was dominated by upland (non-wetland) vegetation during our April 2019 site visit, as well as during the August 2021 site visit conducted for the delineation of waters of the U.S./State, and is concrete lined in at least some locations (H. T. Harvey & Associates 2021b). The ditch collects some water from the surrounding uplands and flows into a stormdrain. However, a visit to the site on December 31, 2021, after a prolonged, heavy rain event, revealed evidence of only a very small amount of runoff in this ditch during the storm. It is evident that this ditch receives little runoff from surrounding areas.

**Photo 2. A drainage ditch in the southeastern part of the site.**

**Wildlife.** The wildlife most often associated with developed/landscaped areas are those that are tolerant of periodic human disturbances, including introduced species such as the European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*). Numerous common, native species are also able to utilize these habitats, especially the landscaped areas, including the western fence lizard (*Sceloporus occidentalis*), striped skunk (*Mephitis mephitis*), and a variety of birds, such as the American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), California towhee (*Melozone crissalis*), bushtit (*Psaltriparus minimus*), chestnut-backed chickadee (*Poecile rufescens*), and California scrub-jay (*Aphelocoma californica*), all of which were observed on the project site during the reconnaissance survey. In addition, the eaves of the buildings on the project site may be attractive to other nesting and/or roosting bird species in the area, such as the black phoebe (*Sayornis nigricans*). Further, a number of large eucalyptus trees found in the northern portion of the project site may provide suitable nesting habitat for a pair of raptors, such as the red-tailed hawk (*Buteo jamaicensis*), which was observed in the study area during the reconnaissance survey. However, a focused survey of the study area detected no evidence (i.e., old nests) of raptors having previously nested on the site. Similarly, an examination of trees and structures on the site failed to find any large cavities that might provide suitable bat roosting habitat. Therefore, large roosting or maternity colonies of bats are not expected to occur in the study area. The ditch immediately south of the project boundary provides no aquatic habitat, and therefore no aquatic or wetland-associated wildlife species are associated with this feature.

### 4.2.2 California Annual Grassland

Photo 3. California annual grassland habitat in the northeast corner of the study area.

**Vegetation.** California annual grassland habitat occurs in the northern portion of the study area along the Dumbarton Rail Corridor, primarily outside of the project boundary, but with a very small area encroaching into the project boundary in the northeast corner of the main project site (Photo 3). At the time of the reconnaissance survey, this habitat was dominated by non-native grasses and forbs such as wild oat (*Avena* sp.), fennel (*Foeniculum vulgare*), bull mallow (*Malva nicaeensis*), black mustard (*Brassica nigra*), and bristly ox-tongue (*Helminthotheca echioides*). Many of these non-native plant species are ranked as moderately or highly invasive by the California Invasive Plant Council (Cal-IPC 2021). For example, fennel is highly invasive and has severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Moderately invasive species, such as wild oats and black mustard, have substantial and apparent ecological impacts (Cal IPC 2021).

**Wildlife.** Wildlife use of California annual grasslands in the study area is limited by frequent human disturbance, the abundance of non-native and invasive species, and isolation of the grassland habitat remnants from more xtensive grasslands. As a result, wildlife species associated with more extensive grasslands, such as the grasshopper sparrow (*Ammodramus savannarum*) and western meadowlark (*Sturnella neglecta*), are absent from the small patches of grassland in the study area. Most of the bird species using this habitat during the breeding season nest in nearby landscaped habitats, using the California annual grassland only for foraging. Such species include the mourning dove (*Zenaida macroura*), lesser goldfinch (*Spinus psaltria*), dark-eyed junco (*Junco hyemalis*), American crow, and Brewer's blackbird (*Euphagus cyanocephalus*). Similarly, a few species nesting on nearby buildings, such as the cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), rock pigeon (*Columba livia*), black phoebe, and European starling, also forage on or over the California annual grassland habitat. Several other species of birds use the California annual grassland habitat during the nonbreeding season. These species, which include the golden-crowned sparrow (*Zonotrichia atricapilla*), savannah sparrow (*Passerculus sandwichensis*), and white-crowned sparrow (*Zonotrichia leucophrys*), forage on the ground or in herbaceous vegetation, primarily for seeds.

Few species of reptiles and amphibians occur in the California annual grassland in the study area due to its disturbed nature and low habitat heterogeneity. Nevertheless, reptiles such as the western fence lizard and gopher snake (*Pituophis melanoleucus*) occur in this type of habitat, and amphibians such as the Sierran chorus frog (*Pseudacris sierra*) and western toad (*Anaxyrus boreas*), which breed in freshwater marshes in the area, forage in this habitat. Small mammals expected to be present include the native western harvest mouse (*Reithrodontomys megalotis*) and nonnative house mouse, Norway rat, and black rat. Small burrowing mammals, such as the Botta's pocket gopher (*Thomomys bottae*) and California ground squirrel (*Spermophilus beecheyi*), are also present. Larger mammals, such as the striped skunk, Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), and black-tailed jackrabbit (*Lepus californicus*) are also likely to occur here.

### 4.2.3 Forested Wetland

**Vegetation.** A small, isolated segment of forested wetland occurs in a drainage ditch along the northern edge of the study area, just outside of the project boundary (Photo 4). This segment of the ditch is characterized by a dense overstory of willow (*Salix* sp.), with minimal groundcover predominantly consisting of tall flatsedge (*Cyperus eragrostis*) and poison oak (*Toxicodendron diversilobum*). The wetland hydrology here is supported by localized freshwater runoff from the surrounding area, which pools in or saturates the soils in the lowest portion of the drainage ditch during the wet season. No standing water was observed during the November 2017 site visit, but shallow water was pooled here during the April 2019 visit.

**Photo 4. Willow dominated isolated forested wetland located in the northern potions of the study area.**

**Wildlife.** Due to its small size, isolation, and lack of pooled water, wildlife diversity in the isolated forested wetland is fairly low. However, the dense foliage provided by this willow stand is likely to support several species of nesting birds and provide cover and foraging habitat for others. Bird species that may forage in this habitat include many of the same species as described in the habitats above, as well as species such as the Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), and the yellow-rumped warbler (*Setophaga coronata*). Amphibians such as the Sierran chorus frog and western toad may also be present in this habitat, and if water ponds long enough in this ditch, these species could potentially breed there.

### 4.2.4 Herbaceous Seasonal Wetlands

**Vegetation.** An herbaceous seasonal wetland is located off-site within the Dumbarton Rail Corridor between Willow Street and Chilco Street in the extreme northwest part of the study area, entirely outside the project boundary. Another herbaceous seasonal wetland is located just outside of the northeast corner of the project boundary. These wetlands are characterized by slight depressions. The northwestern herbaceous seasonal wetland is dominated by Italian rye grass (*Festuca perenne*), Bermuda grass (*Cynodon dactylon*) and bird's foot trefoil (*Lotus corniculatus*), with obligate species such as narrow-leaved cattail (*Typha angustifolia*) and chairmaker's bulrush (*Schoenoplectus americanus*) scattered throughout the feature (Photo 5). The northeastern herbaceous seasonal wetland is dominated by narrow-leaved cattail, with saltmarsh baccharis (*Baccharis glutinosa*) and dallis grass (*Paspalum dilatatum*) also present. Freshwater hydrology in these areas is likely a result of localized runoff and possibly groundwater upwelling that reaches the rooting zone but does not typically cause inundation. At the time of the wetland delineation survey, there was no ponding water observed, but soils were saturated approximately 6 inches below the ground's surface.

**Photo 5. Seasonal freshwater wetland located north of the railway between Willow Street and Chilco Street.**

**Wildlife.** The herbaceous seasonal wetlands in the study area provide only marginal habitat for most wildlife species due to their limited extent and limited depth and duration of ponding, if these wetlands even support ponding at all, and wildlife diversity is expected to be low. However, many of the same bird species described in the developed/landscaped and California annual grassland habitats above may forage in the herbaceous seasonal wetlands, such as the dark-eyed junco, white-crowned sparrow, and California towhee, all of which were observed during the reconnaissance survey. Amphibians such as the native Sierran chorus frog and western toad may also be present in this habitat during wet times of the year but are not expected to breed due to the limited depth and duration of ponding.

### 4.2.5 Nearby Land Uses and Biotic Habitats outside the Study Area

Outside the study area, developed/landscaped land uses dominate surrounding areas to the west and south for miles in each direction. East of the study area, developed lands associated with existing commercial land uses are present, and north of the study area, beyond the inactive Dumbarton Rail Corridor, a storage facility is present. A large brackish marsh is present north of the storage area and on both the north and south sides of the old rail line farther north and northeast. This brackish marsh, which extends north to State Route 84 and east to University Avenue, is dominated by salt marsh and brackish marsh plants and contains several channels. As a result, marsh-associated wildlife species such as the San Francisco common yellowthroat (*Geothlypis trichas sinuosa*), Alameda song sparrow (*Melospiza melodia pusillula*), northern harrier (*Circus hudsonius*), and possibly the salt marsh harvest mouse (*Reithrodontomys raviventris*) may occur in that brackish marsh. Farther to the north and northeast are former salt ponds, now managed as waterbird habitat, and the waters and marshes of San Francisco Bay.

# Section 5. Special-Status Species and Sensitive Habitats

CEQA requires assessment of the effects of a project on species that are protected as "threatened, rare, or endangered"; such species are typically described as "special-status species". For the purpose of the environmental review of the project, special-status species have been defined as described below. Impacts on these species are regulated by some of the federal, state, and local laws and ordinances described in Section 3.0 above.

For purposes of this analysis, "special-status" plants are considered plant species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, rare, or a candidate species.
- Listed by the CNPS as CRPR 1A, 1B, 2, 3, or 4.

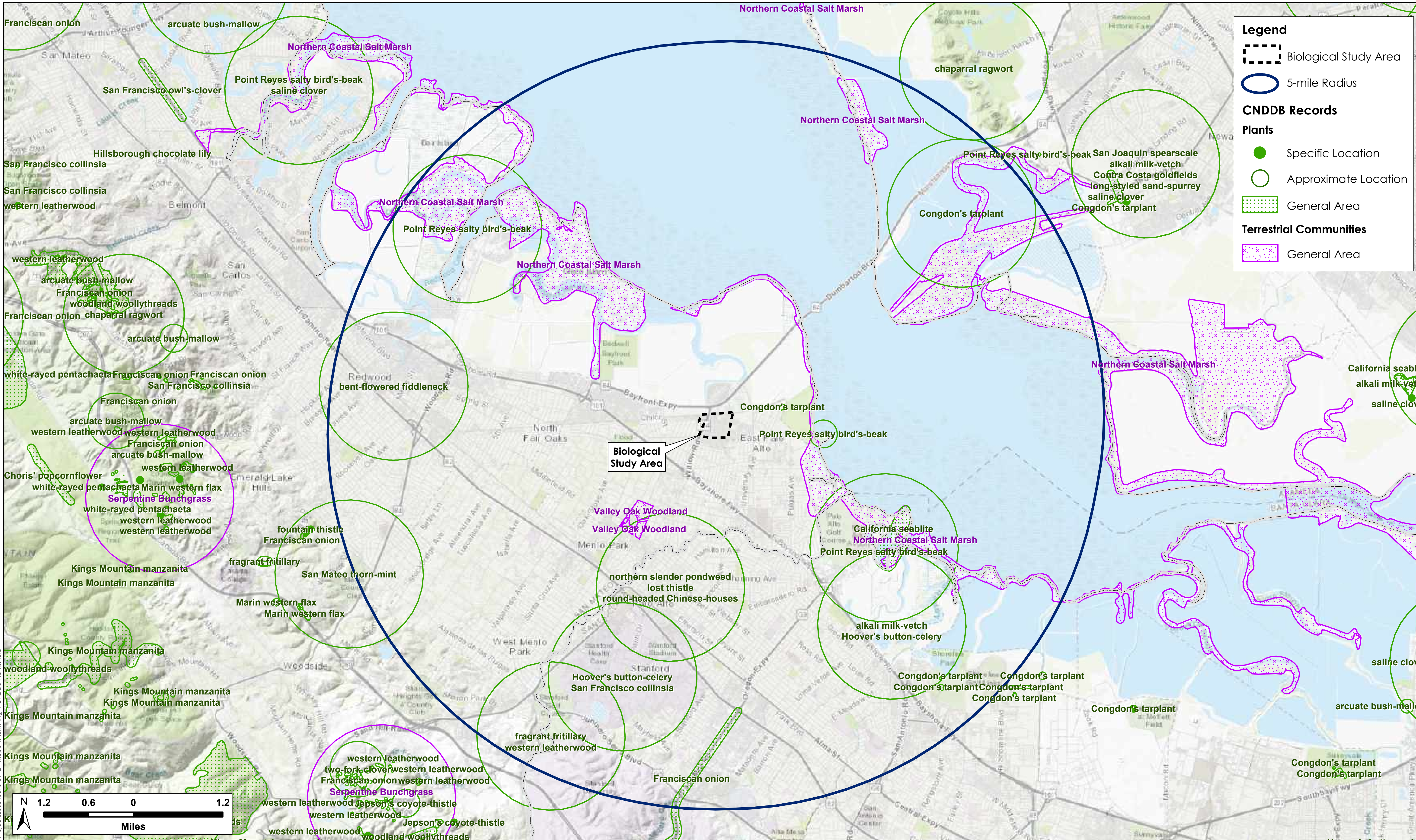
For purposes of this analysis, "special-status" animals are considered animal species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, or a candidate threatened or endangered species.
- Designated by the CDFW as a California species of special concern.
- Listed in the California Fish and Game Code as fully protected species (fully protected birds are provided in Section 3511, mammals in Section 4700, reptiles and amphibians in Section 5050, and fish in Section 5515).

Information concerning threatened, endangered, and other special-status species that potentially occur in the study area was collected from several sources and reviewed by H. T. Harvey & Associates biologists as described in Section 2.1 above. Figure 4 depicts CNDDB records of special-status plant species in the general vicinity of the project site and Figure 5 depicts CNDDB records of special-status animal species. These generalized maps show areas where special-status species are known to occur or have occurred historically.

## 5.1 Special-Status Plant Species

The CNPS (2021) and CNDDB (2021) identify 89 special-status plant species as potentially occurring in at least one of the nine USGS quadrangles containing or surrounding the study area for CRPR 1 or 2 species, or in San Mateo County for CRPR 3 and 4 species. Eighty-eight of those potentially occurring special-status plant species were determined to be absent from the study area for at least one of the following reasons: (1) lack of suitable habitat types; (2) absence of specific microhabitat or edaphic requirements, such as serpentine soils; (3) the elevation range of the species is outside of the range on the study area; or (4) the species is considered extirpated




H. T. HARVEY & ASSOCIATES
Ecological Consultants

**Figure 4. CNDDB-Mapped Records of Special-Status Plant Species**

Willow Village Master Plan Biological Resources Report (3375-21)

August 2022

Figure 5. CNDDB-Mapped Records of Special-Status Animal Species

Willow Village Master Plan Biological Resources Report (3375-21)

August 2022

N:\Projects3300\3375-01\21\Reports\BRR\Fig 5 CNDDB Animals.mxd

H. T. HARVEY & ASSOCIATES

Ecological Consultants

from the project vicinity. Appendix B lists these plants along with the basis for the determination of absence. Suitable habitat, edaphic requirements, and elevation range were determined to be present in the study area for one plant species, Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), which can persist in disturbed grasslands and has been documented by the CNDDB in the project vicinity (Figure 4). While no suitable habitat occurs on the project site itself, there is suitable habitat for Congdon's tarplant within the study area, in the California annual grassland along the old rail line immediately north of the project boundary. However, this species should still have been flowering and detectable during our November 2017 reconnaissance survey, and a focused survey for the species was conducted in the Dumbarton Rail Corridor on June 12[3], yet no individuals of this species were observed. Therefore, this species is determined to be absent from the study area.

## 5.2 Special-Status Animal Species

The protected classifications and likelihood of occurrence in the study area of special-status animal species known to occur, or potentially occurring, in the pregion are presented in Table 1. Most of the special-status species listed in Table 1 are not expected to occur in the study area because it lacks suitable habitat, is outside the known range of the species, or is isolated from the nearest known extant populations by development or otherwise unsuitable habitat. Special-status animal species not expected to occur on the project site for these reasons include the Crotch bumble bee (*Bombus crotchii*), western bumble bee (*Bombus occidentalis*), green sturgeon (*Acipenser medirostris*), Central California coast steelhead (*Oncorhynchus mykiss*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), western pond turtle (*Actinemys marmorata*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), California Ridgway's rail (*Rallus obsoletus obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), western snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), black skimmer (*Rynchops niger*), burrowing owl (*Athene cunicularia*), northern harrier, loggerhead shrike (*Lanius ludovicianus*), salt marsh harvest mouse, salt marsh wandering shrew (*Sorex vagrans halicoetes*) and American badger (*Taxidea taxus*). Although some of these species, such as the northern harrier, loggerhead shrike, white-tailed kite (*Elanus leucurus*), salt marsh harvest mouse, and salt marsh wandering shrew, may occur in wetland habitats not far outside the study area to the north and northeast, they are absent from the study area itself (including areas of proposed off-site improvements), and the proposed development footprint is well removed from suitable habitat for these species. Several other special-status species have some potential to occur in the study area only as visitors, migrants, or transients, but are not expected to reside or breed on the project site, to occur in large numbers, or otherwise to make substantial use of the project site. These include the San Francisco common yellowthroat, Alameda song sparrow, and pallid bat (*Antrozous pallidus*).

[3] Congdon's tarplant was documented flowering at the Sunnyvale Baylands Park, which is 9.4 miles southeast of the study area, on June 10, 2020. Therefore, given that this species was documented as flowering at a site that is relatively near the study area (but not located on the project site) on June 10, 2020, this species would have been detectable at the time of the June 12, 2020 site visit.

**Table 1. Special-Status Animal Species, Their Status, and Potential Occurrence in the Study Area**

| Name | *Status | Habitat | Potential for Occurrence in the Study Area |
|---|---|---|---|
| **Federal or State Endangered, Rare, or Threatened Species** | | | |
| Crotch bumble bee (*Bombus crotchii*) | SC | Occurs in open grassland and scrub habitats. Like most other species of bumble bees, nests primarily underground (Williams et al. 2014). Generalist foragers that visit a variety of floral resources. | **Absent.** There is one historical record of the species approximately 4 miles southwest of the project site (CNDDB 2021), but there are no recent records in the vicinity. Although the species was historically found throughout the southern two-thirds of California, it now appears to be absent from most of its former range (Xerces Society 2018). It is not recently or currently known from the project area and is not expected to occur currently due to these recent range contractions. |
| Western bumble bee (*Bombus occidentalis occidentalis*) | SC | Occurs in meadows and grasslands with abundant floral resources. Nests are primarily underground. | **Absent.** There are several records of this species from the project vicinity, but all records are historical (CNDDB 2021). Although this species was historically found throughout much of central and northern California, it is now confined to high elevation sites and a small number of records on the northern California coast (Xerces Society 2018). It is not expected to occur in the project area due to these recent range contractions. |
| Green sturgeon (*Acipenser medirostris*) | FT, CSSC | Spawns in large river systems such as the Sacramento River; forages in nearshore oceanic waters, bays, and estuaries. | **Absent.** No suitable aquatic habitat is present in the study area. Green sturgeon may forage infrequently, and in low numbers in the open Bay, which is 1.5 mi north and east of the project site; however, there is no aquatic connection between the Bay and the project site. Determined to be absent. |
| Central California Coast steelhead (*Oncorhynchus mykiss*) | FT | Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats. | **Absent.** No suitable aquatic habitat is present in the study area. Steelhead may forage in the open Bay, which is 1.5 mi north and east of the project site; however, there is no aquatic connection between the Bay and the project site. Determined to be absent. |
| California tiger salamander (*Ambystoma californiense*) | FT, ST | Vernal or temporary pools in annual grasslands or open woodlands. | **Absent.** No suitable habitat is present in the surrounding study area. Further, populations have largely been extirpated from San Mateo County due to habitat loss, and the species is now considered absent from the majority of the project vicinity, including the study area. The closest occurrence in the project vicinity is at Lake Lagunita on the Stanford campus, which is 4 mi south of the study area (CNDDB 2021). Determined to be absent. |

| Name | *Status | Habitat | Potential for Occurrence in the Study Area |
|---|---|---|---|
| San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) | FE, SE | Prefer densely vegetated freshwater habitats. May use upland burrows for aestivation. | **Absent.** No suitable habitat is present in the study area. Furthermore, the project vicinity is outside of the known range of the species. Determined to be absent. |
| California red-legged frog (*Rana draytonii*) | FT, CSSC | Streams, freshwater pools, and ponds with emergent or overhanging vegetation. | **Absent.** No suitable habitat is present in the study area. Further, this species has been extirpated from the majority of the project vicinity, due to development, the alteration of hydrology of its aquatic habitats, and the introduction of non-native predators such as non-native fishes and bullfrogs (*Lithobates catesbeianus*). The most recent record of the species in the project vicinity is from 2016 near Bear Gulch reservoir, over 4.8 mi to the southwest of the study area (CNDDB 2021). Determined to be absent. |
| California Ridgway's rail (*Rallus obsoletus obsoletus*) | FE, SE, SP | Salt marshes characterized by large expanses of saltmarsh cordgrass (*Spartina* spp.) or pickleweed (*Salicornia* spp.), with well-developed tidal channels. | **Absent.** Although the species is known to occur in the Palo Alto Baylands and the Ravenswood Open Space Preserve located 1 mi east of the study area, as well as on Greco Island 1 mi northwest of the study area, no salt marsh habitat is present in the study area. Further, the only marsh habitat located within 700 ft of the project site (which is equivalent to the size of the non-disturbance buffer typically required around active nests by the USFWS and CDFW) is a mosaic of both fresh water and salt marsh habitats located north of the study area. This marsh habitat lacks extensive patches of cordgrass or pickleweed and tidally influenced, braided channels, and therefore is not considered suitable habitat for the California Ridgway's rail. Determined to be absent. |
| California black rail (*Laterallus jamaicensis coturniculus*) | ST, SP | Breeds in fresh, brackish, and tidal salt marsh. | **Absent.** This species occurs in the project region primarily as a scarce winter visitor, with individuals recently recorded as close as a slough 0.5 mi north of the study area (CNDDB 2021). However, no suitable nesting or foraging habitat for the California black rail is present in the study area. Determined to be absent. |
| Western snowy plover (*Charadrius nivosus nivosus*) | FT, CSSC | Sandy beaches on marine and estuarine shores and salt pans in Bay saline managed ponds. | **Absent.** Although western snowy plovers are known to nest in salt panne habitat within 0.5 mi to the northwest, north, and east of the study area in the NWR's Ravenswood complex (CNDDB 2021), no suitable nesting or foraging habitat is present in the study area. Determined to be absent. |

| Name | *Status | Habitat | Potential for Occurrence in the Study Area |
|---|---|---|---|
| California least tern (*Sternula antillarum browni*) | FE, SE, SP | Nests along the coast on bare or sparsely vegetated, flat substrates. In the South Bay, nests in salt pannes and on an old airport runway. Forages for fish in open waters. | **Absent**. Suitable nesting habitat for the California least tern is not present in the study area. Least terns have been recorded in the project vicinity during the post-breeding season, and have been known to forage in the Redwood City salt ponds, 2.5 mi west of the study area (CNDDB 2021). Least terns have also been known to forage infrequently along the shores of the Palo Alto Baylands Preserve, located 3 mi southeast of the study area. However, least terns are not expected to forage in the study area due to the lack of any open water habitats supporting fish. Determined to be absent. |
| Salt marsh harvest mouse (*Reithrodontomys raviventris*) | FE, SE, SP | Salt marsh habitat dominated by common pickleweed or alkali bulrush. | **Absent.** The species has been recorded in salt marsh habitat in the project vicinity, including on the NWR to the north and east of the site (CNDDB 2021), and suitable pickleweed/alkali bulrush-dominated salt marsh habitat is present within several hundred feet northeast of the study area. However, no suitable habitat is present in the study area itself. Determined to be absent. |
| **California Species of Special Concern** | | | |
| Western pond turtle (*Actinemys marmorata*) | CSSC | Permanent or nearly permanent water in a variety of habitats. | **Absent.** No suitable aquatic habitat is present in the study area. Determined to be absent. |
| Northern harrier (*Circus cyaneus*) | CSSC (nesting) | Nests in marshes and moist fields, forages over open areas. | **Absent.** Northern harriers nest and forage in the wetlands immediately north and northeast of the study area, but they are not expected to nest or forage in the study area due to a lack of suitable habitat. |
| Black skimmer (*Rynchops niger*) | CSSC (nesting) | Nests on sparsely vegetated beaches, isolated islands, and levees. | **Absent.** No suitable nesting or foraging habitat is present in or near the study area. Determined to be absent. |
| Burrowing owl (*Athene cunicularia*) | CSSC | Nests and roosts in open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels (*Spermophilus beecheyi*). | **Absent.** No nesting burrowing owls are known to occur in the surrounding project vicinity (CNDDB 2021), and no suitable burrowing owl roosting or nesting habitat (i.e., open grasslands with ground squirrel burrows) is present in the study area. The narrow strip of California annual grassland at the northern edge of the study area is too limited and too hemmed in by trees and development to provide good burrowing owl habitat. Thus, the species is not expected to occur in the study area. |

| Name | *Status | Habitat | Potential for Occurrence in the Study Area |
|---|---|---|---|
| Loggerhead shrike (*Lanius ludovicianus*) | CSSC (nesting) | Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats. | **Absent.** No suitable breeding habitat is present in the study area, and the California annual grasslands in the study area are not sufficiently extensive to provide suitable foraging habitat. Determined to be absent. |
| San Francisco common yellowthroat (*Geothlypis trichas sinuosa*) | CSSC | Nests in herbaceous vegetation, usually in wetlands or moist floodplains. | **Absent as Breeder.** The San Francisco common yellowthroat breeds commonly in wetlands immediately north and northeast of the study area, but no suitable breeding habitat is present in the study area itself. Small numbers may occasionally forage along the northern edge of the study area. |
| Alameda song sparrow (*Melospiza melodia pusillula*) | CSSC | Nests in salt marsh, primarily in marsh gumplant and cordgrass along channels. | **Absent as Breeder.** Song sparrows breed commonly in wetlands immediately north and northeast of the study area, but no suitable breeding habitat is present in the study area itself. Small numbers may occasionally forage along the northern edge of the study area. |
| Salt marsh wandering shrew (*Sorex vagrans halicoetes*) | CSSC | Medium to high marsh 6 to 8 ft above sea level with abundant driftwood and common pickleweed. | **Absent.** Suitable pickleweed-dominated salt marsh habitat is present within several hundred feet northeast of the study area. However, no suitable habitat is present in the study area itself. Determined to be absent. |
| Pallid bat (*Antrozous pallidus*) | CSSC | Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees. | **Absent as Breeder.** Historically, pallid bats were likely present in a number of locations throughout the project region, but their populations have declined in recent decades. This species has been extirpated as a breeder from urban areas close to the Bay, as is the case in the study area. No suitable roosting habitat is present on the project site or in the study area and no known maternity colonies are present on or adjacent to the study area. There is a low probability that the species occurs in the project vicinity at all due to urbanization; however, individuals from more remote colonies could potentially forage over the study area on rare occasions. |
| American badger (*Taxidea taxus*) | CSSC | Burrows in grasslands and occasionally in infrequently disked agricultural areas. | **Absent.** Badgers are not known to occur in the project region due to the lack of extensive grasslands and agricultural areas with friable soils, needed for digging burrows. No suitable habitat is present on the project site or in the study area. Determined to be absent. |

| | | | |
|---|---|---|---|
| **California Fully Protected Species** | | | |
| White-tailed kite (*Elanus leucurus*) | SP | Nests in trees and forages in extensive grasslands or marshes. | **Absent.** No suitable breeding habitat is present in the study area, and the California annual grasslands in the study area are not sufficiently extensive to provide suitable foraging habitat. May nest north and northeast of the study area, but determined to be absent from the study area itself. |

**SPECIAL-STATUS SPECIES CODE DESIGNATIONS**

FE = Federally Listed Endangered
FT = Federally Listed Threatened
SE = State Listed Endangered
ST = State Listed Threatened
SC = Candidate for State Listing
CSSC = California Species of Special Concern
SP = State Fully Protected Species

## 5.3 Sensitive Natural Communities, Habitats, and Vegetation Alliances

Natural communities have been considered part of the Natural Heritage Conservation triad, along with plants and animals of conservation significance, since the state inception of the Natural Heritage Program in 1979. The CDFW determines the level of rarity and imperilment of vegetation types, and tracks sensitive communities in its Rarefind database (CNDDB 2021). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings are a reflection of the condition of a habitat within California. Natural communities are defined using NatureServe's standard heritage program methodology as follows (Faber-Langendoen et al. 2012):

G1/S1: Critically imperiled

G2/S2: Imperiled

G3/S3: Vulnerable.

G4/S4: Apparently secure

G5/S4: Secure

In addition to tracking sensitive natural communities, the CDFW also ranks vegetation alliances, defined by repeating patterns of plants across a landscape that reflect climate, soil, water, disturbance, and other environmental factors (Sawyer et al. 2009). If an alliance is marked G1-G3, all of the vegetation associations within it will also be of high priority (CDFW 2021). The CDFW provides the Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2021).

Impacts on CDFW sensitive natural communities, vegetation alliances/associations, or any such community identified in local or regional plans, policies, and regulations, must be considered and evaluated under CEQA (Title 14, Division 6, Chapter 3, Appendix G of the California Code of Regulations). Furthermore, aquatic, wetland and riparian habitats are also protected under applicable federal, state, or local regulations, and are generally subject to regulation, protection, or consideration by the USACE, RWQCB, CDFW, and/or the USFWS.

### 5.3.1 CDFW Sensitive Habitats

A query of sensitive habitats in Rarefind (CNDDB 2021) identified three sensitive habitats as occurring within the nine USGS quadrangles containing or surrounding the study area: serpentine bunchgrass grassland (Rank G2/S2.2), valley oak woodland (G3/S2.1), and northern coastal salt marsh (Rank G3/S3.2). Serpentine bunchgrass occurs only on serpentine soils, which do not occur in the study area. Valley oak woodland is characterized by valley oak (*Quercus lobata*) as the dominant or co-dominant species in the tree canopy. While some valley oak individuals do occur in the study area, they are ornamental plantings along buildings and roadways, and thus do not constitute this sensitive habitat type. The last sensitive habitat type, northern coastal salt marsh, is described by Holland (1986) as occurring along sheltered inland margins of bays, often co-dominated by pickleweed (*Salicornia* spp.), cordgrass (*Spartina* spp.), and sometimes saltgrass (*Distichlis spicata*). None of these species was noted in the study area, thus this habitat type is also absent.

### 5.3.2 CDFW Sensitive Vegetation Alliances

CDFW Sensitive alliances are not present on the project site (CDFW 2021).

### 5.3.3 Sensitive Habitats (Waters of the U.S./State)

As described above our surveys did not identify any wetlands or other waters that would fall under the jurisdiction of the USACE (Waters of the U.S.), or under the jurisdiction of the RWQCB or CDFW (Waters of the State), on the project site itself. Outside the project boundary, but within the study area, an isolated forested wetland depression is located immediately north of the main project site. One linear area of herbaceous seasonal wetland is located immediately north of the Hamilton Avenue Parcels North and South. Another herbaceous seasonal wetland is located just outside the northeast corner of the project boundary. As discussed in Section 3.1.1 above, the USACE may claim these features as jurisdictional Waters of the U.S., and the RWQCB could consider these wetlands (and possibly an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) to be Waters of the State. It is our understanding that the project will avoid to the extent feasible placing fill in those wetlands, in which case no permits from the USACE or RWQCB would be needed for activities associated with wetlands even if these features are determined to be jurisdictional. However, if these features are determined to be jurisdictional and are impacted by the project, permits from the USACE and RWQCB would be required, and mitigation of impacts would be required as described in Mitigation Measures BIO-11 and 12 in Section 6.2.1.

These wetlands would be considered sensitive habitats for CEQA assessment purposes. These wetlands are not associated with a stream and would therefore not constitute sensitive riparian habitat claimed by CDFW.

A ditch located partially on-site and partially in the Hetch Hetchy easement area immediately south of the main project site, but within the study area, is dominated by upland (non-wetland) vegetation, receives relatively little runoff from surrounding areas, and drains to the City stormwater system, and is therefore not considered sensitive or expected to be jurisdictional (H. T. Harvey & Associates 2021b). Brackish marsh habitat well north and northeast of the site provides higher-quality habitat than any wetland or aquatic features within the study area, but it is located well outside of the study area.

## 5.4 Non-Native and Invasive Species

Several non-native, invasive plant species occur in the study area in the California annual grassland habitat. Of these, fennel has the potential to cause the more severe ecological impacts. In addition, black mustard and wild oats were observed in the study area and can have substantial and apparent ecological impacts if they spread into native, sensitive habitats (Cal-IPC 2021). However, all of these species are also present in abundance in and around the wetland/grassland habitats to the north and northeast of the study area. The remainder of the project vicinity is developed/landscaped, and invasive species would not result in adverse effects on developed and landscaped areas.

# Section 6. Impacts and Mitigation Measures

The State CEQA Guidelines provide direction for evaluating the impacts of projects on biological resources and determining which impacts will be significant. CEQA defines a "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Under State CEQA Guidelines Section 15065, a project's impacts on biological resources are deemed significant if the project would:

A. "substantially reduce the habitat of a fish or wildlife species"
B. "cause a fish or wildlife population to drop below self-sustaining levels"
C. "threaten to eliminate a plant or animal community"
D. "reduce the number or restrict the range of a rare or endangered plant or animal"

In addition to the Section 15065 criteria that trigger mandatory findings of significance, Appendix G of State CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. The impacts listed in Appendix G may or may not be significant, depending on the level of the impact. For biological resources, these impacts include whether the project would:

A. "have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"

B. "have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"

C. "have a substantial adverse effect on state or federally protected wetlands" (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means)

D. "interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites"

E. "conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance"

F. "conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan"

The impact assessment below is structured based on the six significance criteria (A-F) listed above.

## 6.1 Impacts on Special-Status Species: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS (Less than Significant with Mitigation)

### 6.1.1 Impacts on Special-Status Species during Demolition and Construction (Less than Significant)

No special-status plants are present within the study area, and therefore, none will be impacted by demolition of existing structures, construction of the project, or any other project components. No special-status animals are expected to breed in the study area. However, as noted in Table 1, nonbreeding individuals of the San Francisco common yellowthroat, Alameda song sparrow, and pallid bat could possibly forage on the site on occasion. San Francisco common yellowthroats and Alameda song sparrows breeding in the off-site brackish marsh to the north and northeast of the site may disperse (particularly during the nonbreeding season) along the Dumbarton Rail Corridor to the dense vegetation along the northern edge of the site, where they may forage. Pallid bats are expected to occur on or near the site rarely, if at all, but dispersing individuals could occasionally forage on the site. Due to the absence of high-quality roosting sites for pallid bats, this species is not expected to roost on the project site.

During demolition and construction, the removal of vegetation, as well as noise and operation of heavy equipment, could disturb foraging yellowthroats and song sparrows, and disturbance of existing vegetation could result in loss or degradation of foraging habitat and declines in food resources for these bird species as well as the pallid bat. However, the project site does not provide high-quality habitat for any of these species, in its current state. These species would not be likely to occur on the site, or close enough to the project site to be disturbed by demolition or construction activities. Given the project site's relatively urban characteristics, the amount of habitat that may be degraded and the number of individuals of these species that would be disturbed by project activities are minimal.

Construction on offsite areas could include the placement of utilities lines under existing rights-of-way, construction of roundabout, and improvements to a Pacific Gas and Electric Company substation. All of these areas are developed and have no natural features that provide habitat for special-status species. Construction of offsite project components will not result in impacts to special-status species or other sensitive biological resources.

Therefore, project activities would not result in substantial impacts to these species' population and habitat, and such impacts would be less than significant.

### 6.1.2 Impacts on Wildlife from Artificial Lighting (Less than Significant with Mitigation)

The installation of lighting on buildings and around roads, paths, and parking lots may result in potential impacts on animal species. Many animals, both special-status and common species, are sensitive to light cues, which influence their physiology and shape their behaviors, particularly during the breeding season (Ringer 1972, de Molenaar et al. 2006). Artificial light has been used as a means of manipulating breeding behavior and productivity in captive birds for decades (de Molenaar et al. 2006), and has been shown to influence the territorial singing behavior of wild birds (Longcore and Rich 2004, Miller 2006, de Molenaar et al. 2006). While it is difficult to extrapolate results of experiments on captive birds to wild populations, it is known that photoperiod (the relative amount of light and dark in a 24-hour period) is an essential cue triggering physiological processes as diverse as growth, metabolism, development, breeding behavior, and molting (de Molenaar et al. 2006). This holds true for mammals and other taxa as well (Beier 2006), suggesting that increases in ambient light may interfere with these processes across a wide range of species, resulting in impacts on wildlife populations.

Artificial lighting may also indirectly affect animals by increasing the nocturnal activity of predators such as owls, hawks, and mammalian predators (Negro et al 2000, Longcore and Rich 2004, DeCandido and Allen 2006, Beier 2006). The presence of artificial light may influence habitat use by rodents (Beier 2006) and breeding birds (Rogers et al. 2006, de Molenaar et al. 2006) by causing avoidance of well-lit areas, resulting in a net loss of habitat availability and quality.

The *Willow Village Master Plan Bird-Safe Design Assessment*, provides a comprehensive analysis of lighting impacts for the Willow Village Master Plan based on the project's conceptual Conditional Development Permit (CDP) application. The report provides documentation of the lighting measures that will be incorporated into the project to ensure that (1) project impacts due to lighting are reduced to less-than-significant levels under CEQA, and (2) the project complies with City of Menlo Park lighting requirements. CEQA mitigation measures related to minimizing lighting impacts are identified below.

For all exterior lighting in the northern portion of the main project site (i.e., areas north of Main Street and Office Buildings 03 and 05 surrounding the hotel, Town Square retail pavilion, Office Building 04, event building, and North Garage):

- **Mitigation Measure BIO-1.** To the maximum extent feasible, up-lighting (i.e., lighting that projects upward above the fixture) shall be avoided in the project design. All lighting shall be fully shielded to block illumination from shining upward above the fixture.

  If up-lighting cannot be avoided in the project design, up-lights shall be shielded and/or directed such that no luminance projects above/beyond objects at which they are directed (e.g., trees and buildings) and such that the light would not shine directly into the eyes of a bird flying above the object. If the objects themselves can be used to shield the lights from the sky beyond, no substantial adverse effects on migrating birds are anticipated.

- **Mitigation Measure BIO-2.** All lighting shall be fully shielded to block illumination from shining outward towards San Francisco Bay habitats to the north. No light trespass shall be permitted more than 80 feet beyond the site's northern property line (i.e., beyond the JPB rail corridor).

- **Mitigation Measure BIO-3.** Exterior lighting shall be minimized (i.e., total outdoor lighting lumens shall be reduced by at least 30% or extinguished, consistent with recommendations from the International Dark-Sky Association [2011]) from 10:00 p.m. until sunrise, except as needed for safety and City code compliance.
- **Mitigation Measure BIO-4.** Temporary lighting that exceeds minimal site lighting requirements may be used for nighttime social events. This lighting shall be switched off no later than midnight. No exterior up-lighting (i.e., lighting that projects upward above the fixture, including spotlights) shall be used during events.

Due to the potential for lighting within the stair/elevator towers to result in bird collisions, the project will implement the following measure:

- **Mitigation Measure BIO-5.** Lights shall be shielded and directed so that lighting does not spill outwards from the elevator/stair towers into adjacent areas.

Due to the potential for interior lighting within the buildings within the atrium to spill outwards to the north and affect birds, the project shall implement the following mitigation measure for interior lights within the buildings within the atrium to minimize impacts due to lighting:

- **Mitigation Measure BIO-6.** Interior or exterior blinds shall be programmed to close on north-facing windows of interior buildings within the atrium from 10:00 p.m. to sunrise in order to block lighting from spilling outward from these windows.

If birds are able to distinguish illuminated interior vegetation, trees, and structures within the atrium at night, collisions with the building are expected to be appreciably higher as birds attempt to fly through glazing to reach these features (e.g., during descent from migration at dawn). The project shall implement Mitigation Measures BIO-1 and BIO-3 above as well as Mitigation Measure BIO-7 below to ensure that structures, trees, and vegetation in the atrium are not illuminated by up-lighting or accent lighting such that they are more conspicuous to birds from outside compared to ambient conditions (i.e., lighting levels from fixtures within the atrium that do not specifically illuminate these features). Structures, trees, and vegetation are considered 'more conspicuous' to birds when they would be more conspicuous when viewed by the human eye from outside the atrium at any elevation.

- **Mitigation Measure BIO-7.** Accent lighting within the atrium shall not be used to illuminate trees or vegetation. OR

  The applicant shall provide documentation to the satisfaction of a qualified biologist that the illumination of vegetation and/or structures within the atrium by accent lighting and/or up-lighting will not make these features more conspicuous to the human eye from any elevation outside the atrium compared to ambient conditions within the atrium. The biologist shall submit a report to the City following the completion of the lighting design documenting compliance with this requirement.

For Office Buildings 01, 02, 03, 05, and 06 and the residential/mixed-use buildings, the project shall implement Mitigation Measure BIO-1 above as well as the following mitigation measure to minimize impacts due to increased lighting:

- **Mitigation Measure BIO-8.** Exterior lighting shall be minimized (i.e., total outdoor lighting lumens shall be reduced by at least 30% or extinguished, consistent with recommendations from the International Dark-Sky Association [2011]) from midnight until sunrise, except as needed for safety and City code compliance.

### 6.1.3 Impacts on Wildlife from Feral Cat Predation (Less than Significant with Mitigation)

Mammalian predation of birds and small mammals is a natural process. However, when natural levels of predation are increased due to the presence of non-native species, the health of local animal populations, including populations of special-status species, can be adversely affected. Feral cats (*Felis catus*) have been implicated as a major predator on many native wildlife species, including birds and small mammals such as the salt marsh harvest mouse, which is known to occur in wetlands north and northeast of the study area (CNDDB 2021). Not only does predation by feral cats have a potential impact on animal populations, but feral cat feeding stations also attract other predators such as raccoons and skunks, increasing predation pressure on native species in these locations.

During the reconnaissance survey on November 13, 2017, multiple feral cats were observed on the main project site and in the surrounding study area. Implementation of the proposed project has the potential to result in an increase in the feral cat population, for example as a result of an influx of renters and their pets or the establishment of feral cat feeding stations by residents or workers. This impact would be potentially significant under CEQA due to the impact on native wildlife species (Criterion A). Implementation of Mitigation Measure BIO-9 will reduce potential impacts due to feral cats to a less-than-significant level.

**Mitigation Measure BIO-9. Feral Cat Management Program.** The developer shall implement a Feral Cat Management Program similar to the program developed in conjunction with the Peninsula Humane Society and the Society for the Prevention of Cruelty to Animals for Meta's East Campus in 2013. For one week, every three months (i.e., each quarter), three live trap cages designed to trap cats shall be placed around the perimeter of the main Project Site in locations where feral cats are likely to prey upon native wildlife species. Each trap cage shall be monitored and maintained on a daily basis during the week the traps have been set to determine whether a feral cat has been caught and whether the trap has inadvertently captured a non-target species. If a feral cat is caught, a representative from a pest control operator (or a similar service organization/company) shall be contacted and dispatched to transport the trapped cat to either the Humane Society of San Mateo County, a local cat shelter, a local cat rescue facility, or other local facility that accepts feral cats. If an animal other than a feral cat is caught in one of the traps, it shall be released immediately at the trap location.

## 6.2 Impacts on Sensitive Communities: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service

### 6.2.1 Impacts on Riparian Habitat or Other Sensitive Natural Communities (Less than Significant with Mitigation)

No riparian habitats or other sensitive natural communities are present on the project site itself. A small, isolated segment of forested wetland is located in a drainage ditch along the northern edge of the study area, just outside the project boundary. A linear area of herbaceous seasonal wetland is present immediately north of the Hamilton Avenue Parcels North and South portion of the project site. Another herbaceous seasonal wetland is present just outside the northeast corner of the project boundary. These wetlands are small and isolated, being in depressional areas, rather than having a surface connection to more extensive wetlands. Due to their small, isolated nature and lack of high-quality habitat for wildlife, these are not high-quality habitat features. Nevertheless, forested wetlands are relatively scarce along the edge of the bay, and seasonal wetlands along the edge of the bay have declined due to development and fill. Therefore, we consider these wetlands to be sensitive habitat areas.

Although these wetlands are outside of the project's property boundary, it is possible that these features may be impacted, either temporarily or permanently, during project grading. Elevation of the site and construction of a bicycle/pedestrian path along the northern edge of the main project site will require import of fill into that area, and although a retaining wall may be constructed to support the trail, some clearing of vegetation within, and fill of, these wetlands (or portions of these wetlands) may occur. As a result, it is possible that up to the entire 0.07-acre isolated forested wetland (as well as an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) and 0.07-acre herbaceous seasonal wetlands may be lost due to fill. Even if these wetlands are not permanently impacted, temporary impacts to wetlands may occur due to construction access, potentially resulting in degradation of wetland vegetation or hydrology. Owing to the scarcity of forested wetlands along the edge of the bay and the decline in seasonal wetlands in the region, this impact would be significant (Criterion B). Implementation of Mitigation Measures BIO-10, 11, and 12 will reduce this impact to a less-than-significant level. Indirect impacts on these wetlands will be avoided and minimized as described under *Impacts on Wetlands and Water Quality* below.

**Mitigation Measure BIO-10. Avoidance and Minimization.** To the extent feasible, construction activities should avoid or minimize the removal of wetland vegetation or the placement of fill in the wetlands immediately north and northeast of the project site. If all direct impacts to wetlands (i.e., vegetation removal and fill) are avoided, Mitigation Measures BIO-11 and BIO-12 do not need to be implemented, but if any wetland vegetation needs to be removed from the wetlands, or any fill needs to be placed in the wetlands, Measure BIO-11 (and Measure BIO-12, if permanent impacts will occur) will be implemented.

**Mitigation Measure BIO-11. In-Situ Restoration of Temporary Impacts.** If impacts to the wetlands immediately north and northeast of the project site are temporary, resulting in vegetation removal or temporary fill, but no permanent fill of the wetland is necessary, then the wetland area will be restored by the Project Sponsor following construction. The herbaceous seasonal wetlands are likely to become recolonized easily without the need for seeding and planting, as long as their existing hydrology and topography are restored following temporary impacts. Depending on the level of impact, there is potential for the arroyo willow clumps in the isolated forested wetland to regrow from cut stumps. In such a case, the in-situ restoration would involve simply protecting the area with exclusion fencing following construction to allow for re-growth of vegetation. For temporary impacts that may have removed willow root masses, but where in-situ restoration is still an option, a more detailed restoration plan will need to be developed. The mitigation should, at a minimum, achieve no net loss of wetland acreage (i.e., jurisdictional wetlands lost to fill will be replaced by creation or restoration of wetland habitat, of the same type that was impacted [either forested or herbaceous seasonal] at a minimum 1:1 ratio, on an acreage basis, or as otherwise required by any state or federal permitting agencies) or ecological functions and values through the restoration and enhancement of the impacted wetland that are equal to or greater than the baseline conditions for the existing wetlands. An in-situ restoration approach could involve salvage of wetland plant material prior to construction (e.g., willow cuttings or salvage of willow clumps, in the case of the isolated forested wetland) and then replanting those clumps if the seasonal timing of the construction were appropriate. USACE and/or RWQCB approvals may be required to authorize temporary impacts to these features.

**Mitigation Measure BIO-12. Compensatory Mitigation.** If any permanent fill of the isolated forested wetland or the herbaceous seasonal wetlands will occur, the project proponent will provide new wetland habitat of the same type that was impacted (either forested or herbaceous seasonal) to offset this impact, either through the creation enhancement, or restoration of wetlands in an appropriate location or via the purchase of mitigation credits in a USACE or RWQCB-approved wetland mitigation bank. The purchase of such credits shall serve as full mitigation for impacts to these wetland features. If project-specific creation, enhancement, or restoration of wetland habitat is implemented, habitat will be restored or created at a minimum ratio of 2:1 (compensation : impact) on an acreage basis, or as otherwise required by any state of federal permitting agencies. This ratio is not higher due to the relatively low quality of the wetlands in the study area relative to more extensive, less fragmented wetlands elsewhere in the region, but it is not lower due to the temporal loss of wetland functions and values that would result from the lag between impacts to the wetlands and maturation of the mitigation habitat. USACE and/or RWQCB approvals may be required to authorize permanent impacts to this feature.

To the extent compensatory mitigation is not provided by purchasing mitigation credits from a USACE- or RWQCB-approved wetland mitigation back, then, if feasible, compensation will be provided by creating, enhancing, or restoring wetland habitat so as to achieve the 2:1 ratio somewhere in San Mateo County, or as otherwise required by any state or federal permitting agencies. A qualified biologist shall develop a "Wetland Mitigation and Monitoring Plan" describing the mitigation, which will contain the following components (or as otherwise modified by regulatory agency permitting conditions):

- Summary of habitat impacts and proposed mitigation ratios
- Goal of the restoration to achieve no net loss of habitat functions and values
- Location of mitigation site(s) and description of existing site conditions
- Mitigation design:
    - Existing and proposed site hydrology
    - Grading plan if appropriate, including bank stabilization or other site stabilization features
    - Soil amendments and other site preparation elements as appropriate
    - Planting plan
    - Irrigation and maintenance plan
    - Remedial measures and adaptive management
- Monitoring plan (including final and performance criteria, monitoring methods, data analysis, reporting requirements, and monitoring schedule). Success criteria will include quantifiable measurements of wetland vegetation type (e.g., dominance by natives) and extent appropriate for the restoration location, and provision of ecological functions and values equal to or exceeding those in the wetland habitat affected. At a minimum, success criteria will include following:
    - At Year 5 post-mitigation, at least 75 percent of the mitigation site will be dominated by native hydrophytic vegetation.

The Wetland Mitigation and Monitoring Plan must be approved by the City of Menlo Park prior to the wetland impacts, and implementation of the Plan must begin within one year after the discharge of fill into these wetland features.

Alternately, off-site mitigation could be provided via the purchase of mitigation credits at an agency-approved mitigation bank, as noted above.

### 6.2.2 Impacts Caused by Non-Native and Invasive Species (Less than Significant)

Several non-native, invasive plant species occur in the California annual grassland habitat located along the northern edge of the study area. Invasive species can spread quickly and can be difficult to eradicate. Many non-native, invasive plant species produce seeds that germinate readily following disturbance. Further, disturbed areas are highly susceptible to colonization by non-native, invasive species that occur locally, or whose propagules are transported by personnel, vehicles, and other equipment.

Development undertaken because of the proposed project would result in a large portion of the site being subject to soil disturbance due to replacement of the existing outdated industrial complex with a new, mixed-used campus. Activities such as trampling, equipment staging, and vegetation removal are all factors that would also contribute to disturbance. Areas of disturbance could serve as the source for promoting the spread of non-native species, which could degrade the ecological values of wetlands that occur immediately adjacent to the project site, and adversely affect native plants and wildlife that occur there. Local propagule sources of one highly invasive weed, fennel, and other moderately invasive weeds such as wild oats and black mustard were observed on and surrounding the northern portion of the study area during the November 2017 and April 2019 surveys. Although no invasive weeds were observed on the project site itself, it is possible that some off-site grading in areas along the northern edge of the site will be necessary. Such grading may mobilize weeds within the immediate vicinity of the grading. However, given the minimal amount of disturbance in this off-site area, and the fact that surrounding areas are already developed, we do not expect this disturbance to result in an increased source population for the spread of non-native, invasive species into sensitive habitat areas.

Further, the project would comply with the City of Menlo Park Municipal Code, Chapter 12.44.090(a)(1)(G), which discourages the use of invasive or noxious plant species for landscaping. Thus, project activities would not result in the introduction of invasive species onto the project site or facilitate the spread of invasive plants into sensitive habitats (e.g., wetlands) surrounding the project site. In addition, the invasive species observed in the study area are already present in or around wetland habitats to the north and northeast, and the remainder of the surrounding area is developed/landscaped and thus not susceptible to habitat degradation by the spread of invasive plants. Therefore, the project would result in no impact due to the spread of non-native, invasive species.

## 6.3 Impacts on Wetlands: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means.

### 6.3.1 Impacts on Wetlands and Water Quality (Less than Significant with Mitigation)

No wetlands occur on the project site, but an isolated forested wetland and herbaceous seasonal wetlands are located to the north of the project site and to the northeast of the project site within the study area , and further, brackish wetlands occur to the north and northeast of the study area boundary. The isolated forested wetland, herbaceous seasonal wetlands, and brackish marsh may be subject to the regulatory jurisdiction of the USACE and RWQCB. Wetlands serve a variety of important functions, such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and terrestrial wildlife species habitat. Even though the acreage of these wetlands in the study area is small, wetlands are relatively scarce regionally, and even small wetland areas have disproportionate contributions to water quality, groundwater recharge, watershed function, and wildlife habitat in the region. In particular, forested wetlands are scarce along the edges of San Francisco Bay.

As discussed under *Impacts on Riparian Habitat or Other Sensitive Natural Communities* above, while the project proposes to avoid these features to the extent feasible, it is possible that the 0.07-acre isolated forested wetland (as well as an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) and 0.07-acre seasonal wetlands along the northern edge of the site may be impacted, either temporarily or permanently, during project grading. Owing to the scarcity of wetlands along the edge of the bay, this direct impact would be significant (Criterion C). Implementation of Mitigation Measures BIO-10, 11, and 12 will reduce impacts from the direct loss or modification of wetlands to a less-than-significant level. The brackish wetlands are located approximately 220 ft from the nearest proposed building and are separated from the main project site by an approximately 25 – 40 ft tall self-storage business. The project would not cause any direct impacts on these brackish wetlands.

Redevelopment has the potential to cause indirect impacts on nearby wetlands or water quality within those wetlands based on site runoff patterns. Currently during the 100-year storm, approximately 16% of the main project site's runoff flows overland to the brackish wetlands located northeast of the study area, with the rest flowing west to the Willow Road storm drain (Sherwood Design Engineers 2017). The project is expected to increase the area of overland flow that drains to the northeast corner of the main project site during the 100-year storm event somewhat, but would detain water on-site to not exceed existing peak flow rates. Such infrequent storm events are not expected to shape the species composition or habitat quality of wetlands to the north and northeast, as those habitats are governed by much more regular/frequent physical and ecological processes. As a result, an increase in runoff from the main project site during 100-year storm events would not have substantial impacts on wetlands to the north and northeast of the study area. The proposed project's storm drainage system would be designed to convey the 10-year storm event and lesser events from the entire main project site to the existing Willow Road storm drain main. During such 10-year and lesser events, no runoff would flow overland to the brackish wetlands located north and northeast of the study area. Therefore, due to the infrequency with which overland flows would enter off-site wetlands, the potential impact on wetland community composition or quality due to an influx of freshwater during large storm events is considered less than significant. Additionally, because the peak flow rate will not be increased to the marsh in large storm events over the existing condition, no significant erosion or sedimentation impacts would occur to the brackish marsh during site discharges to the area in large storm events.

In addition, the project would install stormwater infrastructure to collect site run-off and direct it into the City's storm drain system, rather than into the isolated forested wetland or herbaceous seasonal wetlands adjacent to the project boundary. This would prevent post-construction changes in run-off, including run-off carrying sediment or oil and grease, that could degrade water quality from entering the feature. Construction projects in California causing land disturbances that are equal to 1 acre or greater must comply with State requirements to control the discharge of stormwater pollutants under the NPDES *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Water Board Order No. 2009-0009-DWQ). Prior to the start of construction/demolition, a Notice of Intent must be filed with the State Water Board describing the project. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and maintained during the project and it must include the use of Best Management Practices (BMPs) to protect water quality until the site is stabilized. Standard permit conditions under the Construction General Permit require that the applicant utilize various measures including: on-site sediment control best management practices, damp street sweeping, temporary cover of disturbed land surfaces to control erosion during construction, and utilization of stabilized construction entrances or wash racks, among other elements.

Finally, in many Bay Area counties, including San Mateo County, projects must also comply with the *California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit* (MRP) (Water Board Order No. R2-2015-0049). This MRP requires that all projects implement BMPs and incorporate Low Impact Development practices into the design to prevent stormwater runoff pollution, promote infiltration, and hold/slow down the volume of water coming from a site after construction has been completed. In order to meet these permit and policy requirements, projects must incorporate the use of green roofs, impervious surfaces, tree planters, grassy swales, bioretention and/or detention basins, among other factors. These same features will be used to treat any stormwater that flows to the off-site brackish marsh during large storm events.

Reductions in ambient light levels in wetland habitat can lead to a decrease in the amount of aquatic vegetation present, which results in a reduction in primary production, as well as the amount of cover and herbaceous food available in the wetland habitat. The proposed project would result in an increase in the maximum height of buildings on the project site from approximately 34 ft currently to 110 ft. Thus, the project has the potential to affect vegetation near taller buildings due to changes in ambient lighting (i.e., shading). However, the increased height of the proposed buildings is not expected to result in a substantial change in the ambient light reaching nearby wetlands. The isolated forested wetlands immediately north of the project boundary are currently bordered to the south by an area of tall trees that already provide some shade, and under the proposed project, regardless of the height of buildings that are constructed nearby, these wetlands would still have exposure to the eastern sky, unimpeded by new buildings. Thus, shading of this wetland under the proposed project is not expected to increase substantially over current levels.

The herbaceous seasonal wetland immediately outside the northeast corner of the project site is in an open area, with no substantive shading from trees or buildings. The herbaceous seasonal wetland immediately north of the Hamilton Avenue Parcels North and South portion of the project site is currently bordered to the south by shrubs and small trees that provide minimal shade, as well as two approximately 20-foot tall buildings located approximately 15–25 feet from the wetland that also shade portions of the wetlands. Shading of both herbaceous seasonal wetlands by new buildings would reduce the amount of light received by wetland plants, potentially affecting the health and growth of these plants, and we would expect some degradation of the wetland habitat over time as a result. However, these wetlands would still have exposure to the eastern sky, unimpeded by new buildings, so they would not be completely shaded. Because these herbaceous seasonal wetlands in the study area would continue to receive adequate lighting, impacts to their functions and values would not rise to a level of significance under CEQA.

The brackish marsh to the north of the study area is located approximately 220 ft from the nearest proposed building and is separated from the main project site by an approximately 25 – 40 ft tall self-storage business. Thus, shading of the marsh by the existing storage units currently have an effect on aquatic vegetation, and the net increase in shading from the proposed project would be insignificant given the project site's distance from the marsh. Shade from the proposed buildings would only reach the marsh for short periods of the day when the sun is low in the sky and ambient light is dimmer and providing less photosynthetic input. Further, because of the open nature of the proposed development, with extensive open space, the project would not result in one large, continuous shadow but would allow light to penetrate through the campus. Therefore, shading impacts on wetlands from the proposed buildings would be less than significant.

Compliance with state requirements to control the discharge of stormwater pollutants during construction under the NPDES Construction General Permit and the RWQCB required SWPPP, and post-construction measures and design features required by the MRP would reduce the project's potential impact on water quality to a less-than-significant level.

## 6.4 Impacts on Wildlife Movement: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (Less than Significant)

### 6.4.1 Impacts on Wildlife Movement and Native Wildlife Nursery Sites (Less than Significant)

For many species, a typical urban landscape is a mosaic of suitable and unsuitable habitat types. Environmental corridors are segments of land that provide a link between these different habitats while also providing cover. Development that fragments natural habitats (i.e., breaks them into smaller, disjunct pieces) can have a twofold impact on wildlife: first, as habitat patches become smaller they are unable to support as many individuals (patch size), and second, the area between habitat patches may be unsuitable for wildlife species to traverse (connectivity).

All proposed project activities are located within an already developed footprint that is surrounded by existing development. Therefore, the project would not result in fragmentation of natural habitats. Further, the proposed project includes extensive open space. Thus, any common, urban adapted species that currently move through the project site would continue to be able to do so following project construction, and the project would not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors.

Construction disturbance during the avian breeding season (February 1 through August 31, for most species) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. Due to the absence of sensitive habitats from the project site, the habitats on the project site support only regionally common, urban-adapted breeding birds and support only a very small proportion of these species' regional populations. In addition, many birds are expected to continue to nest and forage on the project site after project construction is completed. These birds are habituated to disturbance related to the existing technology park, and the project incorporates trees, shrubs, and forbs into the landscape design, which will provide some food and structural resources for the common, urban-adapted birds of the area, as well as for migrants that may use the area during spring and fall migration. Therefore, project impacts on nesting and foraging birds that use the site, due to habitat impacts or disturbance of nesting birds, would not rise to the CEQA standard of having a substantial adverse effect, and these impacts would not constitute a significant impact on these species or their habitats under CEQA. However, all native bird species are protected from direct take by federal and state statutes (see Sections 3.1.5 and 3.2.4). Therefore, Mitigation Measures BIO-13, 14, 15, and 16 shall be implemented to ensure that project activities comply with the MBTA and California Fish and Game Code:

**Mitigation Measure BIO-13. Avoidance.** To the extent feasible, construction activities should be scheduled to avoid the nesting season. If construction activities are scheduled to take place outside the nesting season, all impacts on nesting birds protected under the MBTA and California Fish and Game Code will be avoided. The nesting season for most birds in San Mateo County extends from February 1 through August 31.

**Mitigation Measure BIO-14. Preconstruction/Pre-disturbance Surveys.** If it is not possible to schedule construction activities between September 1 and January 31 then preconstruction surveys for nesting birds should be conducted by a qualified ornithologist to ensure that no nests of migratory birds will be disturbed during project implementation. We recommend that these surveys be conducted no more than seven days prior to the initiation of construction activities for each construction phase. During this survey, the ornithologist will inspect all trees and other potential nesting habitats (e.g., trees, shrubs, California annual grasslands, buildings) in and immediately adjacent to the impact areas for migratory bird nests.

**Mitigation Measure BIO-15. Buffers.** If an active nest is found within trees or other potential nesting habitats that would be disturbed by these activities, the ornithologist will determine the extent of a construction-free buffer zone to be established around the nest (typically 300 ft for raptors and 100 ft for other species), to ensure that no nests of species protected by the MBTA and California Fish and Game Code will be disturbed during Project implementation.

**Mitigation Measure BIO-16. Inhibition of Nesting.** If construction activities will not be initiated until after the start of the nesting season, all potential nesting substrates (e.g., bushes, trees, grasses, and other vegetation) that are scheduled to be removed by the project may be removed prior to the start of the nesting season (e.g., prior to February 1). This will preclude the initiation of nests in this vegetation, and prevent the potential delay of the project due to the presence of active nests in these substrates.

## 6.5 Impacts due to Conflicts with Local Policies: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Less than Significant)

### 6.5.1 Impacts Related to Compliance with Municipal Code Chapter 13.24, Heritage Trees (Less than Significant)

Per City of Menlo Park Municipal Code Chapter 13.24, Heritage Trees, permits from the City's Director of Public Works or his or her designee and payment of a fee are required for the removal of any trees which meets the definition of heritage tree, as defined in Section 3.3.1 above. A total of 983 trees are currently present on the project site as a whole, including 805 on the main project site, 17 at 1305 O'Brien Drive, 6 at 1330 O'Brien Drive, 14 in the O'Brien Drive right-of-way, and 141 trees present on the Hamilton Avenue Parcels North and South; a total of 327 of these qualify as heritage trees. Of the 983 trees on the site, 865 (including 295 heritage trees) are expected to be removed during project construction activities (SBCA Tree Consulting 2017, Peninsula Innovation Partners 2020, 2022a-e). The removal or pruning of trees protected by the City of Menlo Park municipal code is considered potentially significant under CEQA (Criterion I). However, the project would comply with the City's heritage tree ordinance Sections 16.43.140(6) (with respect to the O District) and 16.45.130(6) (with respect to the RMU District), including obtaining a permit from the City to remove protected trees and paying any applicable fee. The project proposes to provide replacement trees for all heritage trees removed by the project, and a greater value of trees will be planted than removed (approximately 1,780 new trees will be planted). Therefore, impacts related to conflict with local policies or ordinances protecting heritage trees would be less than significant.

### 6.5.2 Impacts Related to Compliance with Municipal Code Chapters 16.43.140(6) and 16.45.130(6), Bird Safe Design (Less than Significant with Mitigation)

Development of the proposed project would result in the replacement of existing multi-story buildings with new multi-story buildings on the main project site, and the new buildings will incorporate glazing into their facades. Glass windows and building facades can result in injury or mortality of birds due to collisions with these surfaces. Because birds do not perceive glass as an obstruction the way humans do, they may collide with glass when the sky or vegetation is reflected in glass (e.g., they see the glass as sky or vegetated areas); when transparent windows allow birds to perceive an unobstructed flight route through the glass (such as at corners); and when the combination of transparent glass and interior vegetation (such as in planted atria) results in attempts by birds to fly through glass to reach that vegetation.

The majority of avian collisions with buildings occur within the first 60 ft of the ground (City of San Francisco 2011), where birds spend the majority of their time engaged in foraging, territorial defense, nesting, and roosting activities, and where vegetation is most likely to be reflected in glazed surfaces. However, very tall buildings (e.g., buildings 500 ft or more high) may pose a threat to birds that are migrating through the area, particularly to nocturnal migrants that may not see the buildings or that may be attracted to lights on the buildings.

Currently, terrestrial land uses and habitat conditions in and adjacent to the project site consist primarily of developed and landscaped uses such as buildings, parking lots, and roads. Vegetation in these areas is limited in extent, and consists primarily of non-native landscaped trees and shrubs. Although a number of bird species will use such vegetation, they typically do so in low numbers. Non-native vegetation supports fewer of the resources required by native birds than native vegetation, and the structural simplicity of the vegetation (without well-developed ground cover, understory, and canopy layers) further limits resources available to birds. In addition, although numerous waterbirds are known to congregate at the Don Edwards San Francisco Bay NWR to the north and east of the project site, because the area surrounding the project site to the west and south is heavily urbanized and contains no habitats of high value to estuarine birds using the NWR, we do not expect large numbers of waterbirds to be flying over the project site at altitudes low enough for bird-strike mortality to occur. The bird species with the greatest potential to collide with any buildings would consist primarily of the common, urban-adapted passerine species that currently use the project site, as these are the species that would spend the most time in the vicinity of the new buildings.

Zoning regulations set forth in Municipal Code Chapter 16.43.140 (6) require projects such as the Willow Village project to implement the following bird-safe design measures to reduce collision risk:

- No more than 10% of facade surface area shall have non-bird-friendly glazing.
- Bird-friendly glazing includes, but is not limited to opaque glass, covering of clear glass surface with patterns, paned glass with fenestration patterns, and external screens over non-reflective glass.
- Placement of buildings shall avoid the potential funneling of flight paths towards a building facade.
- Glass skyways or walkways, freestanding glass walls, and transparent building corners shall not be allowed.
- Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with green roofs.
- Use of rodenticides shall not be allowed.

However, these regulations allow that a project may receive a waiver from one or more of the items listed above, excluding the prohibition on use of rodenticides, subject to the submittal of a project-specific evaluation from a qualified biologist and review and approval by the planning commission (Ord. 1024 § 3 (part), 2016). To provide such a project-specific evaluation for the Willow Village project, H. T. Harvey & Associates (2021a) prepared the *Willow Village Master Plan Bird-Safe Design Assessment*, which comprehensively analyzes bird collision risk for the Willow Village Master Plan based on the project's conceptual Conditional Development Permit (CDP) application. The report provides documentation of the bird-safe design measures and mitigation measures that will be incorporated into the project to ensure that project impacts due to bird collisions with buildings are reduced to less-than-significant levels under CEQA.

Based on the *Willow Village Master Plan Bird-Safe Design Assessment*, the project shall comply with the following for purposes of addressing the potential for avian collision risk associated with the project:

1. The "beneficial project features" identified in Appendix A of the *Willow Village Master Plan Bird-Safe Design Assessment* (H. T. Harvey & Associates 2021a). These are features of the proposed buildings' architecture that would reduce the frequency of avian collisions by making the buildings' facades appear conspicuous to birds.
2. City Bird-Safe Design Requirements
    a. The City Bird-Safe Design Requirements identified in Mitigation Measure BIO-1 of the *ConnectMenlo: General Plan Land Use & Circulation Elements and M-2 Area Zoning Update Environmental Impact Report* (ConnectMenlo EIR), certified by the City of Menlo Park in 2016 and codified in Sections 16.43.140(6) and 16.45.130(6) of the City's Municipal Code

(collectively referred to as the "City Bird-Safe Design Requirements"), as described in Sections 5.2.2.1, 5.3.2.1, 5.4.2.1, 5.5.2.1, and 6.2.2 of the Bird-Safe Design Assessment.

b. Subject to City approval of waivers to certain City Bird-Safe Design Requirements, the Alternative Measures Proposed, as described in Sections 5.2.2.2, 5.3.2.2, 5.4.2.2, 5.5.2.2, and 6.2.2 of the Bird-Safe Design Assessment. These Alternative Measures are derived from the City of Menlo Park's requirements but are tailored specifically to the Willow Village Master Plan to achieve a reduction in collision risk commensurate with the City Bird-Safe Design Requirements.

3. The "lighting design principles," as described in Section 6.2.1 of the Bird-Safe Design Assessment.
4. Additional mitigation measures, including BIO-1 through BIO-8 described above for impacts on wildlife from artificial lighting, and BIO-17 through BIO-21 described below for the atrium.

As described in the *Willow Village Master Plan Bird-Safe Design Assessment*, an assessment of the conceptual design of most of the proposed structures in the Master Plan area (i.e., the hotel, residential/mixed-use buildings, office campus buildings, and event building and nearby buildings) determined that impacts from bird collisions with these buildings would be less than significant under CEQA with incorporation of beneficial project features, compliance with City Bird-Safe Design Requirements, implementation of Alternative Measures as described above, and implementation of Mitigation Measures BIO-1 through BIO-8 described above for impacts on wildlife from artificial lighting. As such, no additional mitigation measures (i.e., related to the buildings' facades) for impacts related to avian collisions are proposed for those buildings.

However, due to the unique design of the atrium, incorporation of beneficial project features, compliance with City Bird-Safe Design Requirements, and implementation of Alternative Measures may not reduce collision impacts with this structure sufficiently to avoid a significant impact under CEQA. Therefore, additional CEQA mitigation measures are necessary to reduce impacts. With the implementation of the following mitigation measures, which go above and beyond the City's bird-safe design requirements, impacts due to bird collisions with the atrium will be reduced to less-than-significant levels under CEQA, in our professional opinion.

- **Mitigation Measure BIO-17.** The project shall treat 100% of glazing on the 'dome-shaped' portions of the atrium's façades (i.e., all areas of the north façade, and all areas of the south façade above the elevated park) with a bird-safe glazing treatment to reduce the frequency of collisions. This glazing shall have a Threat Factor[4] of 15 or lower.

  Because a Threat Factor is a nonlinear index, its value is not equivalent to the percent reduction in collisions that a glazing product provides. However, products with lower threat factors result in fewer bird collisions.

[4] A material's Threat Factor is assigned by the American Bird Conservancy, and refers to the level of danger posed to birds based on birds' ability to perceive the material as an obstruction, as tested using a "tunnel" protocol (a standardized test that uses wild birds to determine the relative effectiveness of various products at deterring bird collisions). The higher the Threat Factor, the greater the risk that collisions will occur. An opaque material will have a Threat Factor of 0, and a completely transparent material will have a Threat Factor of 100. Threat Factors for many commercially available façade materials can be found at https://abcbirds.org/wp-content/uploads/2021/01/Master-spreadsheet-1-25-2021.xlsx.

Because the City's bird-safe design requirements (and requirements of other municipalities in the Bay Area) do not specify the effectiveness of required bird-safe glazing, Mitigation Measure BIO-17 goes above and beyond what would ordinarily be acceptable to the City, as well as what is considered the industry standard for the Bay Area.

- **Mitigation Measure BIO-18.** The project shall treat 100% of glazing on the atrium's east and west facades with a bird-safe glazing treatment to reduce the frequency of collisions. This glazing shall have a Threat Factor of 15 or lower.

- **Mitigation Measure BIO-19.** Interior trees and woody shrubs will be set back from the atrium's east, west, and non-sloped (i.e., vertical/perpendicular to the ground) portions of the south facades by at least 50 feet to reduce the potential for collisions with these facades due to the visibility of interior trees. This 50-foot distance is greater than the distance used in the project design for the north and sloped portions of the south facades (e.g., 20-25 feet for the north façade) due to the vertical nature of the east, west, and non-sloped portions of the south facades, as opposed to the articulated nature of the north and sloped portions of the south facades (which is expected to reduce the visibility of internal vegetation to some extent), as well as the direct line-of-sight views between interior and exterior vegetation through the east, west, and non-sloped portions of the south facades compared to the north façade (where internal vegetation is elevated above exterior vegetation). Interior trees and shrubs that are not visible through the east, west, and south facades may be planted closer than 50 feet to glass facades.

- **Mitigation Measure BIO-20.** Because the glass production process can result in substantial variations in the effectiveness of bird-safe glazing, a qualified biologist will review physical samples of all glazing to be used on the atrium to confirm that the bird-safe frit will be visible to birds in various lighting conditions, and is expected to be effective.

- **Mitigation Measure BIO-21.** The project shall monitor bird collisions around the atrium for a minimum of two years following completion of construction of the atrium to identify if there are any collision "hotspots" (i.e., areas where collisions occur repeatedly).

  A monitoring plan for the atrium shall be developed by a qualified biologist that includes focused surveys for bird collisions in late April–May (spring migration), September–October (fall migration), and mid-November–mid-January (winter) to maximize the possibility that the surveys will detect any bird collisions that might occur. Surveys of the atrium will be conducted daily for three weeks during each of these periods (i.e., 21 consecutive days during each season, for a total of 63 surveys per year). In addition, for the two-year monitoring period, surveys of the atrium will be conducted the day following all nighttime events held in the atrium during which temporary lighting exceeds typical levels (i.e., levels specified in the International Dark-Sky Association's defined lighting zone LZ-2 from dusk until 10:00 p.m., or 30% below these levels from 10:00 p.m. to midnight, as described in Section 6.5 below). The applicant can assign responsibility for tracking events and notifying the biologist when a survey is needed to a designated individual who is involved in the planning and scheduling of atrium events. The timing of the 63 seasonal surveys (e.g., morning or afternoon) will vary on different days to the extent feasible; surveys conducted specifically to follow nighttime events will be conducted in the early morning.

At a frequency of no less than every six months, a qualified biologist will review the bird collision data for the atrium in consultation with the City to determine whether any potential hotspots are present (i.e., if collisions have occurred repeatedly in the same locations). A "potential hotspot" is defined as a cluster of three or more collisions that occur within one of the three-week monitoring periods described above at a given "location" on the atrium. The "location" shall be identified by the qualified biologist as makes sense for the observed collision pattern and may consist of a single pane of glass, an area of glass adjacent to a landscape tree or light fixture, the 8,990 square-foot vertical façade beneath the elevated park, the façade adjacent to vegetation on the elevated park, the atrium's east façade, the atrium's west façade, or another defined area where the collision pattern is observed. "Location" shall be defined based on observations of (1) collision patterns and (2) architectural, lighting, and/or landscape features contributing to the collisions, and not arbitrarily (e.g., by assigning random grids).

If any potential hotspots are found, the qualified biologist will provide an opinion regarding whether the potential hotspot will impact bird populations over the long-term to the point that additional measures (e.g., adjustments to lighting or the placement of vegetation) are needed to reduce the frequency of bird strikes at the hotspot location in order to reduce impacts to a less-than-significant level under CEQA (i.e., whether it constitutes an actual "hotspot"). This will be determined based on the number and species of birds that collide with the atrium over the monitoring period. In addition, a "hotspot" is automatically defined if a cluster of five or more collisions are identified at a given "location" on the atrium within one of the three-week monitoring periods described above. If a hotpot is identified, additional measures will be implemented at the potential hotspot location at the atrium; these may include one or more of the following options in the area of the hotspot depending on the cause of the collisions:

- The addition of a visible bird-safe frit pattern, netting, exterior screens, art, printed sheets, interior shades, grilles, shutters, exterior shades, or other features to untreated glazing (i.e., on the façade below the elevated park) to help birds recognize the façade as a solid structure.
- Installing interior or exterior blinds in the buildings within the atrium to prevent light from spilling outward though glazed facades at night.
- Reducing lighting by dimming fixtures, redirecting fixtures, turning lights off, and/or adjusting programmed timing of dimming/shutoff.
- Replacing certain light fixtures with new fixtures to provide increased shielding or redirect lighting.
- Adjusting or reducing lighting during events.
- Adjusting the timing of events to reduce the frequency of events during certain times of year (e.g., spring and/or fall migration) when relatively high numbers of collisions occur.
- Adjusting landscape vegetation by removing, trimming, or relocating trees or other plants (e.g., moving them farther from glass), or blocking birds' views of vegetation through glazing (e.g., using a screen or other opaque feature).

If modifications to the atrium are implemented to reduce collisions at a hotspot, one year of subsequent focused monitoring of the hotspot location will be performed to confirm that the modifications effectively reduce bird collisions to a less-than-significant level under CEQA. This monitoring may or may not extend beyond the two-year monitoring period described above, depending on the timing of the hotspot detection.

It is our understanding that the project proposes to use a frit consisting of ¼-inch white dots spaced in a 2x2-inch grid (i.e., similar in specifications to the Solyx SX-BSFD Frost Dot Bird Safety Film product rated with a Threat Factor of 15 by the American Bird Conservancy) for all treated façade areas on the atrium. We further understand that the atrium's glazing will have a dark gray thermal frit treatment (e.g., dark dots incorporated into the glass) in addition to the lighter-toned frit pattern that composes the bird-safe treatment. The extent of thermal frit will vary from the lower portions of the atrium to the upper portions of the atrium, with the upper portions incorporating more extensive (i.e., greater percent cover) thermal frit. Based on our review of preliminary physical glass samples supporting potential combinations of thermal frit and bird-safe frit, provided by the project team, it is our opinion that the combination of the bird-safe frit treatment with the thermal frit would produce very low Threat Factors. We are unaware of any glazing products that incorporate thermal frit patterns and have been assigned a Threat Factor by the American Bird Conservancy; however, the U.S. Green Building Council allows Threat Factors to be determined via any of the following options: (1) using a glass product that has been tested and rated by the American Bird Conservancy; (2) using a glass product with the same characteristics as a product that has been tested and rated by the American Bird Conservancy; or (3) using a glass product that has not been tested and rated, and asking the American Bird Conservancy to provide their opinion regarding an appropriate Threat Factor. We reached out to Dr. Christine Sheppard at the American Bird Conservancy to request her concurrence that the presence of the solar frit would not reduce the effectiveness of the bird-safe frit (and may even increase the effectiveness of the bird-safe frit). Dr. Sheppard responded in an email dated April 9, 2021 agreeing that the solar frit should make the lighter bird-safe frit dots more visible, and the proposed bird-safe treatment would have a Threat Factor of 15 as long as the bird-safe frit dots are ¼-inch in diameter (Sheppard 2021). Thus, the proposed bird-safe glazing treatment is appropriate for the atrium facades and goes above and beyond the City's minimum requirements, as well as the local standard for the San Francisco Bay Area.

The project will also implement Mitigation Measures BIO-1 through BIO-8 to minimize the contribution of project lighting on bird collision risk.

Prior to City approval of each Architectural Control Plan ("ACP") for the project, a qualified biologist shall review the final ACP to confirm that the above features, requirements, alternative measures, and mitigation measures, or other alternative features, requirements, alternative measures, and mitigation measures proposed by the applicant and reasonably acceptable to the qualified biologist, are incorporated into the final design, such that project impacts due to bird collisions would be less than significant under CEQA as indicated in the Bird-Safe Design Assessment.

### 6.5.3 Impacts Related to Compliance with General Plan Policy OSC1.3, Sensitive Habitats (Less than Significant with Mitigation)

General Plan Policy OSC1.3, Sensitive Habitats, requires new development on or near sensitive habitats to (1) provide a baseline assessment prepared by qualified biologists and specify requirements relative to the baseline assessments, (2) consult with appropriate regulatory and resource agencies, (3) incorporate appropriate avoidance and minimization measures, and (4) obtain necessary permits/authorizations. Further, Mitigation Measure BIO-1 of the ConnectMenlo EIR (PlaceWorks 2016) specifies that the required biological resources assessment must address a number of specific requirements. The following summarizes the project's compliance with the requirements of General Plan Policy OSC1.3 and ConnectMenlo Mitigation Measure BIO-1.

- The baseline biological resources report is required to provide a determination on whether any sensitive biological resources, including jurisdictional wetlands and waters, essential habitat for special-status species, and sensitive natural communities, are present on the site or on any adjacent undeveloped lands that could be affected by the project and lands of the NWR. In compliance with this requirement, Section 4.2 of this report describes the biotic habitat types present in the study area. Sections 5.1 and 5.2 discuss the potential for these habitats to support special-status plants and animals and analyze the potential for special-status species to occur on the study area or close enough to be impacted by proposed project activities; Section 6.1 analyzes potential impacts to special-status species. No plant or animal species listed as threatened or endangered by the USFWS or CDFW are expected to occur within the study area. Further, no species designated as a species of special concern is expected to breed in the study area.

  Section 5.3 addresses the presence of sensitive habitats in the project vicinity, and Sections 6.2 and 6.3 analyze the potential for the project to result in impacts on such habitats. No habitats under the jurisdiction of the USFWS, CDFW, USACE, or RWQCB were determined to be present on the project site, but 0.07 acre of isolated forested wetland (and an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) and 0.07 acre of herbaceous seasonal wetlands are present immediately north and northeast of the site, and could potentially be impacted by construction. Implementation of Mitigation Measures BIO-10, 11, and 12 as described in Section 6.2.1 would reduce impacts on sensitive/jurisdictional habitats to less-than-significant levels.

- The baseline biological resources report is required to incorporate guidance from relevant regional conservation plans related to determining the potential presence or absence of sensitive biological resources. As described above, Sections 5.1 and 5.2 analyze the potential for special-status plant or animal species to occur on the project site. This analysis incorporates information from the NWR Comprehensive Conservation Plan and Environmental Assessment (U.S. Fish and Wildlife Service 2012), which includes a discussion of all the special-status species potentially occurring on the NWR.

- The baseline biological resources report is required to include an evaluation of the potential effects of the project on sensitive biological resources. The potential for the proposed project to result in significant impacts on sensitive biological resources is analyzed in Section 6 of this report. This analysis takes into consideration the habitat types present in the study area (Section 4.2), the potential for special-status species to be present in the study area (Sections 5.1 and 5.2), and the proximity of the project site to sensitive habitats (Section 5.3). Based on the analysis, it is determined that the project would not result in significant impacts on special-status plant or animal species. The project could potentially result in impacts on sensitive habitats under the jurisdiction of the USACE and RWQCB, in the form of the small areas of isolated forested wetland (0.07 acre plus an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) and herbaceous seasonal wetlands (0.07 acre) present immediately north and northeast of the site. Implementation of Mitigation Measures BIO-10, 11, and 12 as described in Section 6.2.1 would reduce impacts on sensitive/jurisdictional habitats to less-than-significant levels.

- The baseline biological resources report is required to include avoidance, minimization, and mitigation measures for adverse impacts. Based on the *Willow Village Master Plan Bird-Safe Design Assessment*, Mitigation Measures BIO-1 through BIO-8, described in Section 6.1.2, were identified to reduce impacts of project lighting on wildlife and help to mitigate bird collision risk with project buildings, and Mitigation Measures BIO-17 through BIO-21, described in Section 6.5.2, will reduce impacts from bird collisions with the proposed atrium. Mitigation Measure BIO-9, described in Section 6.1.3, will reduce potential impacts of feral cats on native animals. Mitigation Measures BIO-10, 11, and 12, as described in Section 6.2.1, will reduce impacts on sensitive/jurisdictional habitats. Mitigation Measures BIO-13, 14, 15, and 16, described in Section 6.4.1, will avoid project conflicts with the MBTA and California Fish and Game Code related to nesting birds. Collectively all these mitigation measures will reduce Master Plan impacts on biological resources to less-than-significant levels.

- Per Mitigation Measure BIO-1 of the ConnectMenlo EIR, if sensitive biological resources are determined to be present on the project site or may be present on any adjacent parcel containing natural habitat, coordination with the appropriate regulatory and resource agencies must occur. The project could potentially result in impacts on sensitive habitats under the jurisdiction of the USACE and RWQCB, if these habitats are jurisdictional, in the form of the small areas of isolated forested wetland (0.07 acre plus an additional 0.13-acre area where the canopy of willows extends outside the 0.07-acre forested wetland footprint within which the willows are rooted) and herbaceous seasonal wetlands (0.07 acre) present immediately north and northeast of the site. As discussed in Mitigation Measure 2 of this biological resources report, the project will avoid and minimize impacts to these features to the extent feasible. If all direct impacts can be avoided, so that no clearing of wetland vegetation or fill of these wetlands will occur, no regulatory permitting related to these features would be necessary even if these habitats are jurisdictional. However, if these habitats are jurisdictional and will be impacted by vegetation clearing or fill, the applicant will obtain the necessary 404/401 permits from the USACE and RWQCB.

The project would not result in impacts on plant or animal species listed as threatened or endangered by the USFWS or CDFW, and therefore, no coordination with regulatory agencies regarding impacts on special-status species is warranted. Resource agencies would be provided the opportunity to comment on the proposed project as part of the CEQA process for the project.

- Per Mitigation Measure BIO-1, where jurisdictional waters or federally or State listed special-status species would be affected by the project, appropriate authorizations shall be obtained by the project applicant. As described above, the applicant will obtain any necessary 404/401 permits from the USACE and RWQCB if the off-site isolated forested wetland and/or herbaceous seasonal wetlands are determined to be jurisdictional and will be impacted by vegetation clearing or fill. The project would not result in impacts on plant or animal species listed as threatened or endangered by the USFWS or CDFW. The project would comply with the City's heritage tree ordinance, including obtaining a permit from the City to remove protected trees and paying any applicable fee, as described in Section 6.5.1.

Thus, provided that this project incorporates the mitigation measures described in this biological resources report, the project will not conflict with General Plan Policy OSC1.3. This biological resources report represents compliance with ConnectMenlo EIR Mitigation Measure BIO-1 by providing all the information required by that mitigation measure for a biological resources assessment.

## 6.6 Impact due to Conflicts with an Adopted Habitat Conservation Plan: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan (No Impact)

### 6.6.1 Impacts due to Conflicts with an Adopted Habitat Conservation Plan (No Impact)

The project site is not located within an area covered by an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the project would not conflict with any such documents.

## 6.7 Cumulative Impacts

Cumulative impacts arise due to the linking of impacts from past, current, and reasonably foreseeable future projects in the region. Future development activities in the City of Menlo Park will result in impacts on the same habitat types and species that will be affected by the proposed project. The proposed project, in combination with other projects in the area and other activities that impact the species that are affected by this project, could contribute to cumulative effects on special-status species. Other projects in the area include office/retail/commercial development, mixed use, and residential projects that could adversely affect these species, as well as restoration projects (e.g., the South Bay Salt Pond Restoration Project Phase 2, SAFER Bay

Project) that will benefit these species. The South Bay Salt Pond Restoration Project has active restoration sites approximately 750 feet north of the Hamilton Avenue Parcel North component of the project.

The cumulative impact on biological resources resulting from the project in combination with other projects in the project area and larger region would be dependent on the relative magnitude of adverse effects of these projects on biological resources compared to the relative benefit of impact avoidance and minimization efforts prescribed by planning documents, CEQA mitigation measures, and permit requirements for each project; compensatory mitigation and proactive conservation measures associated with each project. In the absence of such avoidance, minimization, compensatory mitigation, and conservation measures, cumulatively significant impacts on biological resources would occur.

However, the project would comply with applicable law regarding protection of biological resources, including among others federal and state law related to jurisdictional waters, federal and state law related to migratory birds, and local regulations regarding bird safety. In addition, the Menlo Park General Plan contains conservation measures that would benefit biological resources, as well as measures to avoid, minimize, and mitigate impacts on these resources. Further, the project would implement mitigation measures (Measures BIO-1-21) to mitigate impacts on sensitive and regulated habitats, and to minimize impacts on nesting and migratory birds, as described above. Thus, the project will make a less than cumulatively considerable contribution to cumulative impacts on biological resources.

# Section 7. References

Atkins. 2012. Menlo Park Facebook Campus Project Final Environmental Impact Report. Prepared for City of Menlo Park. April 2012.

Beier, P. 2006. Effects of artificial night lighting on mammals in Rich, C. and T. Longcore, eds. Ecological Consequences of Artificial Night Lighting. Covelo, CA: Island Press. Pp 19-42.

[CDFW] California Department of Fish and Wildlife. 2021. Vegetation Classification and Mapping Program: Natural Communities List. Accessed December 2021 from http://www.dfg.ca.gov/biogeodata/vegcamp/natural_communities.asp

[Cal-IPC] California Invasive Plant Council. 2021. California Invasive Plant Inventory Database. Accessed December 2021 from http://www.cal-ipc.org/paf/.

[CNDDB] California Natural Diversity Database. 2021. Rarefind 5.0. California Department of Fish and Wildlife. Accessed December 2021 from http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.

[CNPS] California Native Plant Society. 2021. Inventory of Rare and Endangered Plants (7.0 and 9.0 online editions). Accessed December 2021 from http://www.cnps.org/inventory.

City of Menlo Park. 2016. General Plan Land Use and Circulation Elements and M-2 Area Zoning Update. Adopted November 29, 2016.

City of San Francisco. 2011. Standards for Bird-Safe Buildings. San Francisco Planning Department. Adopted 14 July 2011.

DeCandido R. and D. Allen. 2006. Nocturnal hunting by peregrine falcons at the Empire State Building, New York City. Wilson J. Ornithol. 118(1): 53-58.

de Molenaar, J.G., M.E. Sanders, and D.A. Jonkers. 2006. Road lighting and grassland birds: local influence of road lighting on a black-tailed godwit population in Rich, C., and T. Longcore, eds. Ecological Consequences of Artificial Night Lighting. Covelo, CA: Island Press. Pp 114-136.

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

Google Inc. 2021. Google Earth (Version 7.3.0.3832) [Software]. Available from earth.google.com.

H. T. Harvey & Associates. 2021a. Willow Village Master Plan Bird-Safe Design Assessment. Prepared for Peninsula Innovation Partners.

H. T. Harvey & Associates. 2021b. Willow Village Master Plan Regulated Habitats Report. Prepared for Peninsula Innovation Partners.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game.

ICF Jones & Stokes. 2016. Facebook Campus Expansion Project Final EIR. Prepared for City of Menlo Park. September 2016.

Longcore, T. and C. Rich. 2004. Ecological light pollution. Front. Ecol. Environ. 2(4): 191-198.

Miller, M. W. 2006. Apparent effects of light pollution on singing behavior of American robins. Condor 108(1): 130-139.

[NRCS] Natural Resources Conservation Service. 2021. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed December 2021.

Negro, J. J., J. Bustamante, C. Melguizo, J. L. Ruiz, and J. M. Grande. 2000. Nocturnal activity of lesser kestrels under artificial lighting conditions in Seville, Spain. J. Raptor Res. 34(4): 327-329.

Nichols, D. R. and N. A. Wright, N.A. 1971. Preliminary Map of Historic Margins of Marshlands, San Francisco Bay, California. Open-File Report 71-216, 12 p.

Peninsula Innovation Partners. 2020. Willow Village, Menlo Park, CA. Dated May 19, 2020.

Peninsula Innovation Partners. 2022a. Heritage tree removal application, 1305 O'Brien Drive. Dated August 1, 2022.

Peninsula Innovation Partners. 2022b. Heritage tree removal application, 1330 O'Brien Drive. Dated August 1, 2022.

Peninsula Innovation Partners. 2022c. Heritage tree removal application, Hamilton Avenue Parcels. Dated August 1, 2022.

Peninsula Innovation Partners. 2022d. Heritage tree removal application, O'Brien ROW. Dated August 1, 2022.

Peninsula Innovation Partners. 2022e. Heritage tree removal application, Willow Village. Dated August 1, 2022.

PlaceWorks. 2016. ConnectMenlo: General Plan Land Use & Circulation Elements and M-2 Area Zoning Update for the City of Menlo Park Final Environmental Impact Report. Prepared for the City of Menlo Park.

Ringer, R. K. 1972. Effect of light and behavior on nutrition. J. Anim. Sci. 35: 642-647.

Rogers, D. I., T. Piersma, and C. J. Hassell. 2006. Roost availability may constrain shorebird distribution: Exploring the energetic costs of roosting and disturbance around a tropical bay. Biol. Conserv. 33(4): 225-235.

Sawyer, J. O., T. Keeler-Wolf and J. M. Evens. 2009. A Manual of California Vegetation [online]. Second Edition. California Native Plant Society.

SBCA Tree Consulting. 2017. Willow Village Tree Survey. July 11, 2017.

Sheppard, C. 2021. Email correspondence to H. T. Harvey & Associates senior wildlife ecologist Robin Carle regarding the appropriate Threat Factor Rating for a custom glazing product with both bird-safe frit and solar frit.

Sherwood Design Engineers. 2017. Facebook Willow Village Civil Basis of Design. October 6, 2017.

U.S. Fish and Wildlife Service. 2012. Don Edwards San Francisco Bay National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment. October 2012.

Williams, P.H., R.W. Thorp, L.L. Richardson, and S.R. Colla. 2014. The Bumblebees of North America: An Identification Guide. Princeton University Press. Princeton.

Xerces Society, including: R. Hatfield, S. Jepsen, S.F. Jordan, M. Blackburn, and A. Code. 16 October 2018. Petition to the State of California Fish and Game Commission to List The Crotch bumble bee *(Bombus Crotchii*), Franklin's bumble bee *(Bombus franklini),* Suckley cuckoo bumble bee (*Bombus suckleyi*), and western bumble bee (*Bombus occidentalis*) as Endangered under the California Endangered Species Act. Xerces Society, Portland, OR.

# Appendix A.  Plants Observed

| Family | Scientific Name | Common Name |
|---|---|---|
| Aceraceae | *Acer palmatum* | Japanese maple |
| Aceraceae | *Acer rubrum* | red maple |
| Anacardiaceae | *Pistacia chinensis* | Chinese pistache |
| Anacardiaceae | *Schinus molle* | Peruvian pepper |
| Anacardiaceae | *Toxicodendron diversilobum* | poison oak |
| Apiaceae | *Foeniculum vulgare* | fennel |
| Araliaceae | *Hedera helix* | English ivy |
| Arecaceae | *Pheonix canariensis* | Canary Island palm |
| Asteraceae | *Baccharis pilularis* | coyote brush |
| Asteraceae | *Helminthotheca echioides* | bristly ox-tongue |
| Betulaceae | *Alnus cordata* | Italian alder |
| Bignoniaceae | *Jacaranda mimosifolia* | jacaranda |
| Brassicaeae | *Brassica nigra* | black mustard |
| Brassicaeae | *Raphanus sativus* | cultivated radish |
| Casuarinaceae | *Casuarina cunninghamiana* | casuarina |
| Cupresaceae | *Sequoia sempervirens* | coast redwood |
| Cupressaceae | *Cupressus sempervirens* | Italian cypress |
| Cyperaceae | *Cyperus eragrostis* | tall flatsedge |
| Fabaceae | *Acacia melanoxylon* | blackwood acacia |
| Fagaceae | *Quercus agrifolia* | coast live oak |
| Fagaceae | *Quercus lobata* | valley oak |
| Fagaceae | *Quercus rubra* | red oak |
| Ginkgoaceae | *Ginkgo biloba* | maidenhair |
| Lamiaceae | *Rosmarinus officinalis* | rosemary |
| Lythraceae | *Lagerstroemia spp.* | crepe myrtle |
| Magnoliaceae | *Magnolia soulangeana* | saucer magnolia |
| Malvaceae | *Malva nicaeensis* | bull mallow |
| Moraceae | *Ficus carica* | fig |
| Myrtaceae | *Eucalyptus camaldulensis* | red river gum |
| Myrtaceae | *Eucalyptus globulus* | Tasmanian blue gum |
| Myrtaceae | *Eucalyptus polyanthemos* | silver dollar gum |
| Myrtaceae | *Lophostemon confertus* | Brisbane box |
| Oleaceae | *Fraxinus oxycarpa 'Raywood'* | raywood ash |
| Oleaceae | *Fraxinus pennslyvanica* | Pennsylvania ash |
| Oleaceae | *Fraxinus uhdie* | shamel ash |
| Oleaceae | *Olea europaea* | olive |
| Papaveraceae | *Eschscholzia californica* | California poppy |
| Pinaceae | *Cedrus atlantica* | atlas cedar |
| Pinaceae | *Cedrus deodara* | deodar cedar |
| Pinaceae | *Pinus canariensis* | Canary Island pine |

| | | |
|---|---|---|
| Pinaceae | *Pinus halepensis* | aleppo pine |
| Pinaceae | *Pinus pinea* | Italian stone pine |
| Pinaceae | *Pinus radiata* | Monterey pine |
| Platanaceae | *Planatus xhispanica* | London plane |
| Poaceae | *Avena* sp. | Wild oats |
| Poaceae | *Bromus diandrus* | ripgut brome |
| Poaceae | *Phragmites australis* | common reed |
| Poaceae | *Stipa miliaceae* var. *miliacea* | smilo grass |
| Podocarpaceae | *Afrocarpus gracilior* | African fern pine |
| Polygonaceae | *Rumex crispus* | curly dock |
| Rhamnaceae | *Rhamnus alaternus* | Italian buckthorn |
| Rosaceae | *Prunus cerasifera 'Krauter Vesuvis'* | purple leaf plum |
| Rosaceae | *Prunus serrulata* | cherry |
| Rosaceae | *Pyrus calleryana* | flowering pear |
| Rosaceae | *Pyrus kawakamii* | evergreen pear |
| Salicaceae | *Salix babylonica* | weeping willow |
| Salicaceae | *Salix* sp. | willow |

# Appendix B. Special-Status Plants Considered for Potential Occurrence

| Common Name | Scientific Name | Suitable Habitat Absent | Edaphic Conditions Absent | Outside Elevation Range | Extirpated from Project Vicinity |
|---|---|---|---|---|---|
| alkali milk-vetch | Astragalus tener var. tener | x | x | | |
| Anderson's manzanita | Arctostaphylos andersonii | x | | x | |
| arcuate bush-mallow | Malacothamnus arcuatus | x | | x | |
| bay buckwheat | Eriogonum umbellatum var. bahiiforme | x | x | x | |
| Ben Lomond buckwheat | Eriogonum nudum var. decurrens | x | | x | |
| bent-flowered fiddleneck | Amsinckia lunaris | x | | | |
| Brewer's calandrinia | Calandrinia breweri | x | | x | |
| Brewer's clarkia | Clarkia breweri | x | x | x | |
| bristly leptosiphon | Leptosiphon acicularis | x | | x | |
| California androsace | Androsace elongata ssp. acuta | x | | x | |
| California seablite | Suaeda californica | x | | | |
| caper-fruited tropidocarpum | Tropidocarpum capparideum | x | x | | |
| chaparral ragwort | Senecio aphanactis | x | | x | |
| Choris' popcornflower | Plagiobothrys chorisianus var. chorisianus | x | | | |
| clay buckwheat | Eriogonum argillosum | x | x | x | |
| clustered lady's-slipper | Cypripedium fasciculatum | x | x | x | |
| coast iris | Iris longipetala | x | | | |
| coast lily | Lilium maritimum | x | | | |
| coastal marsh milk-vetch | Astragalus pycnostachyus var. pycnostachyus | x | | | |
| Congdon's tarplant | Centromadia parryi ssp. congdonii | | | | |
| Contra Costa goldfields | Lasthenia conjugens | x | x | | |
| cotula navarretia | Navarretia cotulifolia | x | x | | |
| Crystal Springs fountain thistle | Cirsium fontinale var. fontinale | x | x | x | |
| Crystal Springs lessingia | Lessingia arachnoidea | x | x | x | |
| Davidson's bush-mallow | Malacothamnus davidsonii | x | | x | |
| Delta woolly-marbles | Psilocarphus brevissimus var. multiflorus | x | | x | |
| Dudley's lousewort | Pedicularis dudleyi | x | | x | |
| dusky-fruited malacothrix | Malacothrix phaeocarpa | x | | x | |
| elongate copper moss | Mielichhoferia elongata | x | x | | |
| fragrant fritillary | Fritillaria liliacea | x | X | | |
| Franciscan onion | Allium peninsulare var. franciscanum | x | | x | |
| Gairdner's yampah | Perideridia gairdneri ssp. gairdneri | x | | | |
| hairless popcornflower | Plagiobothrys glaber | | | x | x |

| Common Name | Scientific Name | Suitable Habitat Absent | Edaphic Conditions Absent | Outside Elevation Range | Extirpated from Project Vicinity |
|---|---|---|---|---|---|
| Hickman's popcornflower | Plagiobothrys chorisianus var. hickmanii | x | | x | |
| Hillsborough chocolate lily | Fritillaria biflora var. ineziana | x | x | x | |
| Hoover's button-celery | Eryngium aristulatum var. hooveri | x | | | |
| Howell's onion | Allium howellii var. howellii | x | | x | |
| Jepson's coyote-thistle | Eryngium jepsonii | x | | | |
| Jepson's woolly sunflower | Eriophyllum jepsonii | x | | x | |
| Kings Mountain manzanita | Arctostaphylos regismontana | x | x | x | |
| large-flowered leptosiphon | Leptosiphon grandiflorus | x | | | |
| legenere | Legenere limosa | x | | | |
| Loma Prieta hoita | Hoita strobilina | x | x | x | |
| long-styled sand-spurrey | Spergularia macrotheca var. longistyla | x | | | |
| lost thistle | Cirsium praeteriens | | | | x |
| maple-leaved checkerbloom | Sidalcea malachroides | x | | | |
| Marin western flax | Hesperolinon congestum | x | x | | |
| Methuselah's beard lichen | Usnea longissima | x | | x | |
| Mexican mosquito fern | Azolla microphylla | x | | x | |
| Michael's rein orchid | Piperia michaelii | x | | | |
| minute pocket moss | Fissidens pauperculus | x | | x | |
| Montara manzanita | Arctostaphylos montaraensis | x | | x | |
| Mt. Diablo cottonweed | Micropus amphibolus | x | | x | |
| narrow-petaled rein orchid | Piperia leptopetala | x | | x | |
| Oakland star-tulip | Calochortus umbellatus | x | x | x | |
| Oregon polemonium | Polemonium carneum | x | | | |
| Patterson's navarretia | Navarretia paradoxiclara | x | x | x | |
| phlox-leaf serpentine bedstraw | Galium andrewsii ssp. gatense | x | x | x | |
| pincushion navarretia | Navarretia myersii ssp. myersii | x | | x | |
| Point Reyes salty bird's-beak | Chloropyron maritimum ssp. palustre | x | | | |
| round-headed Chinese-houses | Collinsia corymbosa | x | | | |
| round-leaved filaree | California macrophylla | x | | x | |
| saline clover | Trifolium hydrophilum | x | | | |
| San Antonio Hills monardella | Monardella antonina ssp. antonina | x | | x | |
| San Francisco Bay spineflower | Chorizanthe cuspidata var. cuspidata | x | | | |
| San Francisco campion | Silene verecunda ssp. verecunda | x | | x | |
| San Francisco collinsia | Collinsia multicolor | x | | x | |
| San Francisco owl's-clover | Triphysaria floribunda | x | | x | |
| San Francisco wallflower | Erysimum franciscanum | x | | | |
| San Joaquin spearscale | Extriplex joaquinana | x | | | |
| San Mateo thorn-mint | Acanthomintha duttonii | x | x | x | |

| Common Name | Scientific Name | Suitable Habitat Absent | Edaphic Conditions Absent | Outside Elevation Range | Extirpated from Project Vicinity |
|---|---|---|---|---|---|
| San Mateo woolly sunflower | *Eriophyllum latilobum* | x | | x | |
| Santa Clara red ribbons | *Clarkia concinna* ssp. *automixa* | x | | x | |
| Santa Clara thorn-mint | *Acanthomintha lanceolata* | x | | x | |
| Satan's goldenbush | *Isocoma menziesii* var. *diabolica* | x | | x | |
| serpentine leptosiphon | *Leptosiphon ambiguus* | x | | x | |
| short-leaved evax | *Hesperevax sparsiflora* var. *brevifolia* | x | | | |
| slender-leaved pondweed | *Stuckenia filiformis* ssp. *alpina* | x | | x | |
| South Coast Range morning-glory | *Calystegia collina* ssp. *venusta* | x | x | x | |
| spring lessingia | *Lessingia tenuis* | x | | x | |
| stinkbells | *Fritillaria agrestis* | x | | x | |
| sylvan microseris | *Microseris sylvatica* | x | x | x | |
| Tracy's eriastrum | *Eriastrum tracyi* | x | | x | |
| two-fork clover | *Trifolium amoenum* | x | | | |
| western leatherwood | *Dirca occidentalis* | x | | x | |
| white-flowered rein orchid | *Piperia candida* | x | | x | |
| white-rayed pentachaeta | *Pentachaeta bellidiflora* | x | x | x | |
| woodland woollythreads | *Monolopia gracilens* | x | x | | |
| woolly-headed lessingia | *Lessingia hololeuca* | x | | x | |

Appendix 4.2

# Heritage Tree Removal Application Willow Village

# HERITAGE TREE REMOVAL APPLICATION

## WILLOW VILLAGE

**Peninsula Innovation Partners**
**August 1, 2022**

## TABLE OF CONTENTS

# A.

## ARBORIST REPORT,
## TREE SURVEY AND VALUATION OF HERITAGE TREES

*SBCA TREE CONSULTING*
**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**

Date: Amendment 11, July 26, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: Tree Survey and Valuation of Heritage Trees

Location: Willow Campus

## Introduction

The original survey was conducted in July of 2017. At that time, all trees within the designated area of the Facebook Willow Campus were tagged and surveyed. SBCA Tree Consulting was asked to update survey to remeasure and provide valuation for all Heritage Trees, include trees suitable for preservation, and to include amount of Heritage and non-Heritage City Street trees. Amendment 10 includes the offsite trees.

Estimated value of all 284 Heritage Trees is **$3,448,500.**

Any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction.

The Arborist Report and tree removal and preservation recommendations are based on a review of the most recent plan set: 18-021_WP_Willow_Heritage Tree Removal, 20210430.

## City of Menlo Park Ordinance

Definitions of Heritage Tree:
https://www.codepublishing.com/CA/MenloPark/#!/MenloPark13/MenloPark1324.html#13.24.020

(5) "Heritage tree" shall mean:

(A) All trees other than oaks which have a trunk with a circumference of 47.1 inches (diameter of fifteen (15) inches) or more, measured fifty-four (54) inches above natural grade.

(B) An oak tree (Quercus) which is native to California and has a trunk with a circumference of 31.4 inches (diameter of ten (10) inches) or more, measured at fifty-four (54) inches above natural grade.

(C) A tree or group of trees of historical significance, special character or community benefit, specifically designated by resolution of the city council.

For purposes of subsections (5)(A) and (B) of this section, trees with more than one (1) trunk shall be measured at the diameter below the main union of all multi-trunk trees unless the union occurs below grade, in which case each stem shall be measured as a stand-alone tree. A multi-trunk tree under twelve (12) feet in height shall not be considered a heritage tree. (Ord. 1060 § 2 (part), 2019).

13.24.050 Permits and decision making criteria for removal:
https://www.menlopark.org/DocumentCenter/View/25577/Heritage-tree-ordinance-administrative-guidelines?bidId=

Development: The following documentation may be required to support criterion 5: • Schematic diagrams that demonstrate the feasibility/livability of alternative design(s) that preserve the tree, including utilizing zoning ordinance variances that would preserve the tree; • Documentation on the additional incremental construction cost attributable to an alternative that preserves the tree (i.e. construction cost of alternative design minus cost of original design) in relation to the appraised value of tree(s) and based on the most recent addition to the Guide for Plant Appraisal. The following guidance will be used to determine feasibility: • If the incremental cost of the tree preservation alternative is more than 140% of the appraised value of the tree, the cost will be presumed to be financially infeasible. • If the incremental cost of the tree preservation alternative is less than 110% of the appraised value of the tree, the cost will be presumed to be financially feasible. • If the incremental cost of the tree preservation alternative is between 110% and 140% of the appraised value of the tree, public works director or their designee will consider a range of factors, including the value of the improvements, the value of the tree, the location of the tree, the viability of replacement mitigation and other site conditions. • In calculating the incremental cost of the tree preservation alternative, only construction costs will be evaluated. No design fees or other soft costs will be considered

## Survey Procedure

Trees Tagged – Each tree was tagged with a metal number tag corresponding with the numbers used in the Excel data sheets in *Appendix 1*. Trees located offsite were provided an 'a' after the tag number to differentiate between trees on the Willow Campus with the same number tag.

Data Recorded – Arborists recorded data on tree species, diameter (DBH[1]), tree height, health and structural conditions, Heritage Tree Status, and suitability for retention. Site constraints were noted for valuation purposes. Trees recommended for potential transplant have been noted. Notes were recorded to provide commentary on general conditions.

## Summary

- **Total Trees**: 805 Trees
    - Heritage street tree: 87 Trees
    - Heritage tree: 197 Trees
    - Non-heritage street tree: 54 Trees

[1] **DBH** is tree diameter measured at 54 inches above soil grade.

- **Trees to be Removed**
    - Heritage street tree: 87 Trees
    - Heritage tree: 189 Trees
    - Non-heritage street tree: 54 Trees
    - Non-heritage tree: 451 Trees

- **Trees to Remain**
    - Heritage street tree: n/a
    - Heritage tree: 8 Trees
    - Non-heritage street tree: n/a
    - Non-heritage tree: 16 Trees

- **High Value Trees**
    - Valley Oak – One large 28" DBH *Quercus lobata* exists in the middle north area and appears to be in excellent health and structural condition. The tree is inundated with ivy which requires removal. It is recommended that efforts to retain this tree in the modified site be exercised.
    - Italian Stone Pine – The *Pinus pinea* that line Hamilton Ave are very nice, mature specimen trees.
    - London Plane – A few of the mature *Platanus x hispanica* located on site are very nice specimens. These include: #267-270, #438 and #587. Anthracnose infections were observed to be higher this year.
    - Brisbane Box – Two mature *Lophostemon confertus* are worth mentioning due to their pleasing structures, health, and size: #327 and #578.
    - Deodar Cedar – The mature *Cedrus deodara* lining Willow Ave seem to be thriving on site and provide valuable screening from the road.

- **Species diversity**
    - Most Numerous Species – The most numerous species was the Canary Island *Pine (Pinus canariensis)*, with 124 specimens identified. Eighty (80) trees qualify as "Heritage". Almost all these pines line the north and eastern perimeter of the property. Most all display good health and structural conditions and provide valuable screening to the property. Adjacent property owner on the eastern perimeter stubbed back branches on their side.

    - Second Most Numerous Species – The Crepe Myrtle *(Lagerstroemia spp.)* with 92 specimens identified, was the second most numerous species. Almost all trees located adjacent to buildings have been headed and are of little value. Nine trees display good structures and are suitable for relocation.

- **Problematic Trees** – Although some of the Raywood Ash *(Fraxinus oxycarpa* 'Raywood'*)* appear to be in fair condition, most are inflicted with Ash Blight (*Botryosphaeria stevensii*) and are displaying dieback and declining in health. Tree #286 is almost dead with bark falling off; the tree is at risk for failure and should be removed.

- **Suitable for Relocation –** Thirty-two (32) trees were found to be suitable for relocation. Factors that contributed to suitability include condition, species, size and proximity to adjacent infrastructure. These trees include:
  - 3 Atlas Cedar *(Cedrus atlantica)*
  - 12 Japanese Maple *(Acer palmatum)*
  - 9 Crepe Myrtle
  - 2 Chinese Pistache *(Pistacia chinensis)*
  - 3 Coast Redwood *(Sequoia sempervirens)*

Please refer to Arborist Memo, Willow Village Tree Relocation, 4-23-2021: *"It is our professional opinion that storing these non-Heritage trees for the duration of the project would be problematic. The estimated level of root damage to occur during excavation, the high level of care needed while in containers, and the likelihood of survival for a potential 2-3 year holding period is low."*

**Table 1** – The table below provides a breakdown of numbers of each tree species surveyed.

| | Species | Common Name | Total Amount | Heritage Tree Amount | Potential Transplant | Overall Retention Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Acacia melanoxylon* | Blackwood Acacia | 5 | 1 | | Poor | Located in the middle north area |
| **2** | *Acer palmatum* | Japanese Maple | 13 | 0 | 12 | Fair | Cultivars include 'Bloodgood' and 'Dissectum Atropurpureum'; 12 are suitable for transplant |
| **3** | *Acer rubrum* | Red Maple | 1 | 0 | | Good | Newly planted |
| **4** | *Afrocarpus gracilior* | African Fern Pine | 2 | 0 | | Poor | |
| **5** | *Alnus cordata* | Italian Alder | 2 | 2 | | Fair-Poor | Along Willow Ave; Bleeding lesions on trunk; Root damage from sidewalk installation |
| **6** | *Casuarina cunninghamiana* | Casuarina | 15 | 12 | | Good-Poor | Located in the middle north area; Some nice specimens |

| | Species | Common Name | Total Amount | Heritage Tree Amount | Potential Transplant | Overall Retention Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **7** | *Cedrus atlantica* | Atlas Cedar | 4 | | 3 | Good | Newly planted along Willow |
| **8** | *Cedrus deodara* | Deodar Cedar | 13 | 13 | | Good | Species performing well; Large specimen trees |
| **9** | *Cupressus sempervirens* | Italian Cypress | 8 | 0 | | Good | Nice specimens; Located against one side of a building |
| **10** | *Eucalyptus camaldulensis* | Red River Gum | 2 | 1 | | Fair-Poor | One large specimen likely with internal decay |
| **11** | *Eucalyptus globulus* | Tasmanian Blue Gum | 3 | 3 | | Good-Poor | One nice specimen; One specimen in northern perimeter fence |
| **12** | *Eucalyptus polyanthemos* | Silver Dollar Gum | 6 | 6 | | Fair-Poor | All SFPUC trees stump sprouts and growing in property fence |
| **13** | *Ficus carica* | Fig | 3 | 0 | | Fair | Located in the middle north area, all multis with stems emminating below grade |
| **14** | *Fraxinus oxycarpa 'Raywood'* | Raywood Ash | 43 | 32 | | Fair to Poor | Some doing well for the species; Most are experiencing fungal Ash Dieback |
| **15** | *Fraxinus uhdei* | Shamel Ash | 23 | 18 | | Fair to Poor | Poor pruning |
| **16** | *Ginkgo biloba* | Maidenhair | 1 | 0 | | Fair | Newly planted |
| **17** | *Hesperocyparis macrocarpa* | Monterey Cypress | 1 | 1 | | Good | Lower branching |
| **18** | *Jacaranda mimosifolia* | Jacaranda | 2 | 0 | | Fair | Newly planted, One has dysfunctional root system |
| **19** | *Juglas hindsii* | Black Walnut | 4 | 1 | | Poor | Volunteers in SFPUC land |

| | Species | Common Name | Total Amount | Heritage Tree Amount | Potential Transplant | Overall Retention Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **20** | *Lagerstroemia spp.* | Crepe Myrtle | 92 | 0 | 9 | Fair-Good | Some nice specimens, 9 have transplant potential, Most have been headed |
| **21** | *Lophostemon confertus* | Brisbane Box | 62 | 11 | | Fair to Good | Some nice specimens |
| **22** | *Magnolia soulangeana* | Saucer Magnolia | 2 | 0 | | Good, Poor | Nice specimens but form is not appropriate for transplant |
| **23** | *Olea europaea* | Olive | 14 | 9 | | Poor | All located in the middle north area |
| **24** | *Phoenix canariensis* | Canary Island Palm | 3 | 3 | | Fair | Located in the middle north area |
| **25** | *Pinus canariensis* | Canary Island Pine | 124 | 80 | | Good | Planted at the south and east perimeters, Some trees require end weight reduction to reduce potential of limb breakage; Many trees along east perimeter have branches stubbed back on adjacent property side |
| **26** | *Pinus halepensis* | Aleppo Pine | 2 | 2 | | Fair | Large trees, Poor pruning; One tree is dead |
| **27** | *Pinus pinea* | Italian Stone Pine | 22 | 22 | | Good | Located along Hamilton Ave, Mature valuable specimens, May have suffered large branch removals, #534 is at risk for branch failure. |
| **28** | *Pinus radiata* | Monterey Pine | 7 | 7 | | Fair to Poor | No recommended for retention due to common pathogen attacks |

| | Species | Common Name | Total Amount | Heritage Tree Amount | Potential Transplant | Overall Retention Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **29** | *Pistacia chinensis* | Chinese Pistache | 104 | 0 | 2 | Fair to Good | Two specimens worthy of transplant |
| **30** | *Platanus x hispanica* | London Plane | 67 | 29 | | Fair to Good | Some very nice specimens, Anthracnose not a significant issue this year |
| **31** | *Prunus cerasifera 'Krauter Vesuvius'* | Purple Leaf Plum | 49 | 5 | | Poor | Poor structures |
| **32** | *Prunus serrulata* | Cherry | 8 | 3 | | Good to Poor | Located along Willow Ave, 3 are in good condition |
| **33** | *Pyrus calleryana* | Flowering Pear | 27 | 2 | | Poor | Some nice specimens, but overall Poor retention suitability due to structure and species |
| **34** | *Pyrus kawakamii* | Evergreen Pear | 11 | 0 | | Fair-Poor | Dieback |
| **35** | *Quercus agrifolia* | Coast Live Oak | 10 | 4 | | Good, Poor | Located in the middle north area on campus; 8 volunteers in SFPUC land |
| **36** | *Quercus lobata* | Valley oak | 1 | 1 | | Good | Excellent specimen, Enveloped in ivy in the middle north area |
| **37** | *Quercus rubra* | Red Oak | 12 | 1 | 2 | Fair to Poor | Looking better than last year |
| **38** | *Rhamnus alaternus* | Italian Buckthorn | 1 | 1 | | Poor | Located in the middle north area, Many shrubby buckthorns located in the middle north area |
| **39** | *Salix babylonica* | Weeping Willow | 1 | 1 | | Poor | Recently retrenched |

| | Species | Common Name | Total Amount | Heritage Tree Amount | Potential Transplant | Overall Retention Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **41** | *Sequoia sempervirens* | Coast Redwood | 14 | 5 | 4 | Good | #480, 481 and 482 were relocated to the south side of 980 Hamilton |
| | | **Totals:** | **805** | **284** | **32** | | |

## Tree Valuation, Source and Methodology

This tree valuation report was prepared according to the standards for tree valuation presented in the 10th Edition of GUIDE FOR PLANT APPRAISAL, published by the International Society of Arboriculture, 2019.

Information regarding tree species is from the publication: SPECIES CLASSIFICATION AND GROUP ASSIGNMENTS, published by the International Society of Arboriculture.

Tree valuation is determined by using the FUNCTIONAL REPLACEMENT METHOD, *Trunk Formula* Technique as the tree is larger than the standard 24" box size utilized in tree valuation.

**Reproduction Method using Trunk Formula Technique for Determining Tree Value**

The current price for a 24-inch box tree is $200 (Council of Tree & Landscape Appraisers). Value is affected by tree species, tree condition and the location in which the tree is growing. The terms below are used is the valuation in the table below.

- **Species** – Species qualities are determined through the publication Species Classification And Group Assignment published by the WESTERN CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE. Tree species classification is used to determine the relative size of a replacement tree of a commonly attainable size.
    - **Species Group** – The group rating reflects the rate of growth for the tree species. The group rating determines the *basic price per square inch* of the trunk area for the different species.
- **DBH** - Diameter at Breast Height, measured at 4.5 feet above the average soil grade. Tree valuation is based upon DBH measurements. For multi-stemmed trees, this is based on calculations from the sum of the cross-sectional areas of all stems measured at 4.5 above grade. That figure is then matched with a DBH of a single stemmed tree with the same cross-sectional area.
- **Trunk Area** – The surface area of the cross-sectional area of the tree trunk measured at 4.5 feet above the soil grade (DBH).
- **Tree Condition** – Assessed base upon tree Health, Structure & Form.

| Rating | Rating | Amount | Rating | Rating | Amount |
|---|---|---|---|---|---|
| G | G | 0.9 | F | F/P | 0.6 |
| G | F/G | 0.85 | F | P | 0.5 |
| G | F | 0.8 | P | F/G | 0.55 |
| G | F/P | 0.7 | P | F/P | 0.4 |
| G | P | 0.6 | P | P | 0.2 |
| F | F/G | 0.75 | F/G | F/G | 0.8 |

| Rating | Rating | Amount | Rating | Rating | Amount |
|---|---|---|---|---|---|
| F | F | 0.7 | F/G | F/P | 0.65 |
| F | F/P | 0.6 | F/P | F/P | 0.45 |

- **Functional Limitations** – Factors within the controllable area that adversely impact the tree. Site Constraints - 1 is hardscape, structure, or wire limitations on one side; 2 is limitations on 2 sides; 3 is limitations on three or all sides.
- **External Limitations** – Adverse impacts beyond control of tree owner is the presence of the adjacent structure that limits the spread of the tree and will require pruning to accommodate. 1 is hardscape, structure, wire, or pruning limitations on one side; 2 is limitations on 2 sides; 3 is limitations on three or all sides.
- **Replacement Tree Diameter** – The diameter of the largest commonly available tree of the same species.
- **Cross-sectional area of Replacement tree** - Based upon diameter of replacement tree for 24” box size.
- **Replacement Tree Cost** – Standard cost for purchase is $200 for 24-inch size box tree. Cost does not include replanting.
- **Unit Tree Cost** – This is the cost of the tree divided by the cross-sectional area.
- **Basic Reproduction Cost** – The cross-sectional area of the tree being valued times the Unit Tree Cost.
- **Species Price per Square Inch**. – Determined from Species Group rating.
- **Depreciated reproduction cost** – Factor in Tree Condition, Functional Limitations & External Limitations.
- **Additional Costs** – Covers tree removal and cleanup prior to replanting.
- **Tree Value** – Total assessed value of the trees are rounded to the nearest $100.

Total value for all 284 Heritage Trees was determined to be $3,448,500

**End Report**

Appendices are as follows:

- *Appendix 1 – Tree Survey Data, Species Breakdowns, Heritage Trees, Street Trees, Non-Heritage Street Trees, Dead or Removed Trees*
- *Appendix 2 – Tree Valuation Data*
- *Appendix 3 – Facebook Tree Protection Specifications*

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# B.

## HERITAGE TREE REMOVALS

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: Amended 5-17-22

Project: Willow Village

Address: 1350-1390 Willow Rd., 923-1098 Hamilton Ave, 1010-1280 Hamilton Ct.

Project #: PLN2021-TBD

Owner: Facebook

Contact: Eric Harrison
Senior Vice President
Signature Development Group

Subject: Heritage Tree Removals

Description of site – 59-acre campus of single-story offices and industrial spaces located at corner of Willow Road and the Dumbarton rail line.

Description of development project – The Willow Village project proposes to replace more than one million square feet of existing industrial, office, and warehouse space in the Menlo Science and Technology Park with a new mixed-use village that would include up to 1,729 residential units, up to 200,000 sf of retail uses, up to a 193 room hotel and accessory uses (including restaurant and bar uses), and up to an 1,250,000 sf office campus with up to 350,000 sf of office amenity space uses for campus workers and visitors and approximately 150,000 square feet of open space within a sun-shaded, rain protected cover. In addition, other site improvements would include grading to elevate the property above the Federal Emergency Management Agency (FEMA) base flood elevation and compliance with the City's sea-level rise requirements, creating buildable pads, construction of new infrastructure and circulation improvements, construction of park and open space improvements including bicycle and pedestrian improvements.

The new housing and community-serving retail uses is proposed within the southwestern portion of the site, creating a Residential/Shopping District. This district would consist of up to 1,729 multi-family units, comprised of market rate and below market rate residential units, within multiple buildings along with approximately 100,000 sf of ground floor retail uses in the district. The retail uses may include a grocery store, fitness, cinema, live theatre, bowling alley, and other retail and dining uses along with public spaces of various scales. The Town Square District, in the northwestern portion of the Project Site, would form the center of the proposed neighborhood. A mix of uses would be organized around a Town Square surrounded by a hotel adjacent residential lobbies, public sidewalks, and bicycle lanes. In addition, the Town Square would feature three buildings with approximately 50,000 sf of food and retail uses. The

Office Campus District component of the Proposed Project would be in the northeastern and central portions of the Project Site, adjacent to the Dumbarton Rail Corridor and the life science buildings east of the Project Site. This district would accommodate office and office amenity space, accessory space, two parking structures, and publicly accessible retail space along Main Street.

Impacted to trees – All trees on site are proposed for removal due to a 5' grade elevation change.

Reasons for removal – "Criterion 5: Development. The heritage trees interfere with proposed development, repair, alteration or improvement of a site and there is no financially feasible and reasonable design alternative that would permit preservation of the heritage tree while achieving the applicant's reasonable development objectives or reasonable economic enjoyment of the property using the methodology established in the administrative guidelines."

Valuation – Appraised value of each protected tree related to development using the Trunk Formula Technique as described in the most current edition of the "Guide for Plant Appraisal," by the Council of Tree and Landscape Appraisers. Total value of 284 Heritage Trees is **$3,448,500.**

Report submitted by:

Molly Batchelder, Consulting Arborist
WC ISA Certified Arborist #9613A
Tree Risk Assessment Qualified (TRAQ)

Appendix items:

1. Willow Village Heritage Tree Survey Data
2. Willow Village Heritage Tree Valuation
3. Tree Location Maps

# C.

## NON-HERITAGE STREET TREE

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: May 17, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: Non-Heritage Street Trees

Location: Willow Campus

## Summary


Arborist identified 54 non-Heritage City Street trees located on the Willow Campus.


Table 1. Table below provides information on 54 non-Heritage City Street Trees.

| Tree Number | Tag # | Scientific name | DBH | Height | Health | Structure | Street Tree | Suitability for retention | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **163** | *Platanus x hispanica* | 6 | 30 | Poor | Poor | 1 | Poor | Half tree gone, anthracnose |
| 2 | **164** | *Platanus x hispanica* | 8 | 40 | Fair | Fair | 1 | Fair to poor | Anthracnose, codominant |
| 3 | **170** | *Platanus x hispanica* | 10.5 | 40 | Good | Good | 1 | Good | |
| 4 | **176** | *no tree* | | | | | 1 | | |
| 5 | **177** | *Pyrus calleryana* | 12.5 | 25 | Fair | Poor | 1 | Poor | Included bark x 4 |
| 6 | **184** | *Pyrus calleryana* | 12.5 | 45 | Fair | Poor | 1 | Fair to poor | Fire blight, included bark |
| 7 | **186** | *Platanus x hispanica* | 10 | 40 | Fair | Fair to good | 1 | Good | Lean, anthracnose |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | **188** | *Platanus x hispanica* | 11 | 45 | Good | Poor | 1 | Fair | Large pruning cuts, included bark |
| 9 | **194** | *Pyrus calleryana* | 14.5 | 40 | Fair to good | Poor | 1 | Fair | Some fire blight |
| 10 | **195** | *Platanus x hispanica* | 12 | 40 | Fair | Good | 1 | Fair | In canopy of euc |
| 11 | **197** | *Pyrus calleryana* | 12 | 40 | Fair to good | Poor | 1 | Fair to poor | Fire blight, included bark, large pruning cut |
| 12 | **198** | *Pyrus calleryana* | 11.5 | 40 | Fair to good | Poor | 1 | Fair to poor | Fire blight, included bark, large pruning cut |
| 13 | **200** | *Platanus x hispanica* | 12.5 | 50 | Good | Good | 1 | Good | |
| 14 | **201** | *Pistacia chinensis* | 4 | 20 | Good | Poor | 1 | Poor | 2 rip outs |
| 15 | **202** | *Platanus x hispanica* | 9 | 35 | Fair | Fair | 1 | Fair | Lean, under canopy of willow, codominant |
| 16 | **206** | *Prunus cerasifera 'Krauter Vesuvius'* | 7.5 | 25 | Fair | Fair to poor | 1 | Fair to poor | Pruning cuts, some dieback |
| 17 | **210** | *Pyrus calleryana* | 12 | 40 | Fair to good | Fair | 1 | Fair | Under canopy of cedar, fire blight |
| 18 | **211** | *Pyrus calleryana* | 9 | 35 | Fair | Poor | 1 | Fair to poor | Under canopy of cedar, fire blight |
| 19 | **216** | *Prunus serrulata* | 14 | 30 | Fair | Fair | 1 | Fair | Sparse foliage, dieback |
| 20 | **220** | *Platanus x hispanica* | 11.5 | 35 | Good | Fair | 1 | Fair | Significantly lean |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21 | **221** | *Platanus x hispanica* | 12 | 55 | Poor | Good | 1 | Fair | Anthracnose |
| 22 | **222** | *Platanus x hispanica* | 12.5 | 60 | Poor | Good | 1 | Fair | Anthracnose, large pruning cuts |
| 23 | **226** | *Prunus serrulata* | 9 | 25 | Fair to poor | Fair | 1 | Fair to poor | Dieback |
| 24 | **227** | *Pistacia chinensis* | 4 | 20 | Good | Good | 1 | Good | |
| 25 | **477** | *Lagerstroemia spp.* | 8 | 25 | Good | Good | 1 | Fair to good | Poor pruning |
| 26 | **485** | *Magnolia soulangeana* | 11 | 15 | Good | Good | 1 | Good | One sided, but nice tree. Transplant potential |
| 27 | **490** | *Prunus cerasifera 'Krauter Vesuvius'* | 10 @ 2' | 25 | Fair | Poor | 1 | Poor | Included bark, lean |
| 28 | **501** | *Prunus cerasifera 'Krauter Vesuvius'* | 8.5 @ 2' | 15 | Fair | Fair | 1 | Poor | Included bark, dieback |
| 29 | **502** | *Prunus cerasifera 'Krauter Vesuvius'* | 9.5 | 15 | Poor-dead | Poor | 1 | Poor | Almost dead |
| 30 | **503** | *Prunus cerasifera 'Krauter Vesuvius'* | 1.5 | 10 | Good | Poor | 1 | Poor | Dysfunctional root system |
| 31 | **505** | *Pistacia chinensis* | 6 | 25 | Fair to good | Fair to good | 1 | Fair | In lawn |
| 32 | **506** | *Quercus rubra* | 12 | 25 | Fair | Good | 1 | Fair | Surface roots, in lawn, dieback |
| 33 | **509** | *Magnolia soulangeana* | 7 @ base | 10 | Good | Fair | 1 | Fair to poor | In lawn, large wound at base |
| 34 | **513** | *Lagerstroemia spp.* | 1.5 | 10 | Poor | Poor | 1 | Poor | Headed, base girdled |
| 35 | **521** | *Fraxinus uhdei* | 13.5 | 50 | Good | Fair | 1 | Fair | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | **530** | *Prunus cerasifera 'Krauter Vesuvius'* | 12 @ 2.5' | 25 | Fair | Fair | 1 | Fair to poor | Some dieback |
| 37 | **531** | *Lagerstroemia spp.* | 12 @ base | 10 | Fair | Fair | 1 | Fair | Multi, headed |
| 38 | **533** | *Lagerstroemia spp.* | 7 | 15 | Fair | Fair | 1 | Fair | Headed |
| 39 | **542** | *Sequoia sempervirens* | 2.5 | 10 | Poor | Good | 1 | Poor | Poorly planted |
| 40 | **543** | *Sequoia sempervirens* | 2 | 10 | Fair | Good | 1 | Poor | Poorly planted |
| 41 | **548** | *Prunus cerasifera 'Krauter Vesuvius'* | 8 | 20 | Fair | Poor | 1 | Poor | Dieback, included bark |
| 42 | **549** | *Prunus cerasifera 'Krauter Vesuvius'* | 8.5 | 25 | Good | Fair | 1 | Fair | Lots of suckers |
| 43 | **550** | *Prunus cerasifera 'Krauter Vesuvius'* | 7 | 25 | Good | Fair to good | 1 | Fair | |
| 44 | **552** | *Fraxinus uhdei* | 10 | 25 | Good | Fair to poor | 1 | Poor | Large branch removal |
| 45 | **553** | *Fraxinus uhdei* | 13.5 | 40 | Fair | Fair | 1 | Fair | |
| 46 | **586** | *Lagerstroemia spp.* | 8 | 30 | Good | Good | 1 | Good | Transplant worthy? |
| 47 | **588** | *Quercus rubra* | 2 | 10 | Fair | Good | 1 | Good | |
| 48 | **589** | *Quercus rubra* | 2 | 10 | Fair to good | Good | 1 | Fair | |
| 49 | **590** | *Cedrus atlantica* | 4 | 15 | Good | Poor | 1 | Good | Extensive vehicle damage to base |
| 50 | **604** | *Prunus cerasifera 'Krauter Vesuvius'* | 8 @ 3' | 25 | Good | Poor | 1 | Poor | Lean, included bark x2 |
| 51 | **630** | *Pyrus kawakamii* | 11 | 15 | Fair to good | Fair to good | 1 | Fair | |

SBCA Tree Consulting
1534 Rose St. Crockett, CA 94525
steve@sbcatree.com
Phone (510) 787-3075
Fax (510) 787-3065
www.sbcatree.com

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 52 | **637** | *Cedrus atlantica* | 5 @ 1' | 10 | Good | Good | 1 | Good | |
| 53 | **638** | *Cedrus atlantica* | 5 @ 1' | 10 | Good | Good | 1 | Good | |
| 54 | **639** | *Cedrus atlantica* | 5 @ 1' | 10 | Good | Good | 1 | Good | |

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# D.
## TREE RELOCATION MEMO

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

| | |
|---|---|
| Date: | May 17, 2022 |
| To: | Eric Harrison<br>Senior Vice President<br>Signature Development Group |
| Subject: | This memo is to address the feasibility of relocating 32 trees listed as Suitable for Relocation in SBCA Tree Arborist Report, *Willow Campus Tree Survey and Valuation of Heritage Trees,* Amendment 10, 5-17-22. |

## Summary

We identified 32 trees suitable for relocation in our Willow Campus Tree Survey Amendment #10 report dated 5-17-22. None of the trees qualified as Heritage Trees based on the City of Menlo Park Tree Ordinance. These trees were installed with the original parking lot construction of the existing buildings.

Willow Campus improvement activities include demolition, grading, installation of utilities, street improvements, and construction of multiple buildings. It is our professional opinion that storing these non-Heritage trees for the duration of the project would be problematic. The estimated level of root damage to occur during excavation, the high level of care needed while in containers, and the likelihood of survival for a potential 2-3 year holding period is low.

Therefore, we recommend that the future is best served by putting resources into the procurement of vigorous nursery grown, disease-free replacement specimens with healthy and non-compromised root systems. In addition, the new tree species selection would be tailored to an appropriate plant palette of the completed overall Masterplan. We are recommending all the previously identified relocation trees (32 count) be removed with site construction.

## End

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# E.

## ARBORIST RESPONSE TO CITY COMMENTS

*SBCA TREE CONSULTING*
**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**

---

Date: May 17, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: Heritage Tree Removal Permits, Arborist Report, and Project Plans Evaluation- Willow Village Master Plant Project- City Arborist Review

Location: Willow Campus

Assignment: Arborist was asked to review City comments and provide response.

**City Arborist Evaluation of the Revised Arborist Report and Project Plans**

City Comment: "Specify the tree numbers for the 32 non-heritage trees evaluated as suitable for relocation and identify them in the tree inventory. Regarding the suitability of relocating these 32 trees listed as Suitable for Relocation in SBCA Tree Arborist Report, please confirm whether it is possible to immediately transplant these trees to a location on-site away from proposed work."

- Trees have been added to tree inventory, *Appendix 1, Willow Campus Survey Data, Amended 7-30-21*
- Please refer to Arborist Memo, Willow Village Tree Relocation, 4-23-2021: *"It is our professional opinion that storing these non-Heritage trees for the duration of the project would be problematic. The estimated level of root damage to occur during excavation, the high level of care needed while in containers, and the likelihood of survival for a potential 2-3 year holding period is low."*

City Comment: "Submit HTR permit applications for removal of all Street Trees currently located within City ROW (permit fee waived)"

- Submitted 7-16-21

City Comment: "Some of the appraisal costs appear to be off. For instance, tree #153 (a 14" purple leaf plum) was appraised at $19,700. Please provide the methodology used to determine such factors as the

Replacement Tree Area and Unit Costs of the largest commercially available nursery tree based on Group number".

- Our valuation utilized *Guide for Plant Appraisal, 10th Edition, Revised By Council of Tree and Landscape Appraisers.* Methodology is contained in *Arborist Report, Willow Village Tree Survey, Amendment 7, July 30, 2021.* We amended Replacement Tree Cost from $512 to $200 by taking out the planting cost.

City Comment: "Please clarify how multi-stemmed trees (such as #153, 154, and 156) were measured for this tree inventory. When the trunk splits at 4.5' above the ground or less, the trunk diameters are to be measured below the main union. This diameter is used to determine whether a tree is a Heritage Tree."

- For the purpose of determining City Heritage Tree status for multi-stemmed trees, diameter measurements are taken below the main union unless the union occurs below grade. For the purpose of tree valuation, DBH measurements were taken. Both measurements are contained in *Appendix 1, Willow Campus Survey Data, Amended 7-30-21*

City Comment: "Some non-native trees with diameters less than 15" in trunk diameter are listed as Heritage Trees. These include #156, 536, 157, 529, 153, 284, 285, and 768. Please address."

- Multi stemmed trees were determined as Heritage as per City Ordinance
- Trees 14.5" were rounded to 15"
- *Phoenix canariensis* were included as Heritage due to 25" diameter size.

| Tree # | DBH | Diameter measured below the main union | Sum of cross-sectional area |
|---|---|---|---|
| 156 | 4.5, 5.5, 5.5, 5, 2 | 16 @ base | 10.5 |
| 536 | 7, 6.5, 5.5 | 15 @ base | 11 |
| 157 | 7.5, 7, 6 | 19 @ base | 12 |
| 529 | 5, 6.5, 9.5 | 15 @ 3' | 12 |
| 153 | 7, 8.5, 6, 7 | 15 @ 2' | 14 |
| 284 | 14.5 | Rounded to 15 | |
| 285 | 9, 11 | 16.5 @ base | 14.5 |
| 768 | 25 | *Phoenix canariensis* were included as Heritage due to 25" trunk size | |

City Comment: "Please list any development-related plans reviewed and date of plans. The Arborist Report and tree removal and preservation recommendations should be based on a review of the most recent plan set."

- Stated in *Arborist Report, Willow Village Tree Survey, Amendment 7, July 30, 2021:* The Arborist Report and tree removal and preservation recommendations are based on a review of the most recent plan set: 18-021_WP_Willow_Heritage Tree Removal, 20210430

City Comment: "Please include a statement that any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction."

- Included in *Arborist Report, Willow Village Tree Survey, Amendment 7, July 30, 2021.*

City Comment: "Please include Facebook's Tree Preservation Specifications in the Arborist Report so these guidelines may be reviewed. Please ensure these specifications include the recommendation that the Project Arborist review tree protection measures and monitor impactful work near Heritage Trees to be preserved. Any time development-related work is recommended to be supervised by a Project Arborist, the Project Arborist shall provide a follow-up letter documenting the mitigation has been completed to specification."

- Facebook Tree Protection Specifications included as *Appendix 3 to Arborist Report, Willow Village Tree Survey, Amendment 7, July 30, 2021.*

City Comment: "The appendix tree valuation and tree survey data only include information for Heritage Trees to be removed. Please confirm whether any Heritage Trees will be preserved as a part of this project and include their information in the tables as well."

- Eight Heritage Trees will be preserved. These include: #s 5, 10, 15-19, and 23.

City Comment: "If any Heritage Trees are to be preserved, please define the tree protection zone (TPZ) for these trees with dimensions for tree protection fencing or a map indicating where fencing is to be placed."

- RPZs for trees designated for preservation contained in *Appendix 1, Willow Campus Survey Data, Amended 7-30-21*

**City Arborist Review of Project Plans**

City Comment: "Please include on-site, street tree, and off-site tree designations in the Tree Inventory Table. Please include reason(s) for tree removal in the Tree Inventory table, i.e., located where grading is planned."

- Submitted 7-16-21

City Arborist Comment: "Please include the tree preservation guidelines, including trunk protection specifications and tree protection fencing specifications as a sheet in the plan set."

- Facebook Tree Protection Specifications included as *Appendix 3 to Arborist Report, Willow Village Tree Survey, Amendment 7, July 30, 2021.*

City Arborist Comment: "For any Heritage Trees to be preserved, please include accurate trunk locations and canopy spread, numbered tree symbols, and tree protection fencing shown on demolition and site plans as a bold, dashed line and denote 6' tall chain link fencing."

- RPZ for Heritage Trees to be preserved has been included in *Appendix 1, Willow Campus Survey Data, Amended 7-30-21.* RPZ is determined by tree DBH, not canopy spread.

**End**

# F.

## MPK FACEBOOK TREE PRESERVATION SPECIFICATION

# MPK Facebook Tree Preservation Specifications

## Purpose

These guidelines provide for the care and maintenance of the tree(s) before, during and after construction activities. Tree condition is assessed during the design phase to determine suitability for retention. Healthy trees (measured in high starch reserves) are more likely to survive adverse impacts. It is recommended that costs of preservation do not exceed tree value.

The goal of tree protection and preservation is to provide for a successful transition to a modified site. To be most effective, health mitigation measures must begin before the time of disturbance.

Project construction documents shall provide clear and concise tree protection requirements. Documents shall also provide procedures to be used for all activities occurring within the designated tree protection area.

Project Arborist will review tree protection measures and monitor impactful work near Heritage Trees to be preserved. Any time development-related work is recommended to be supervised by a Project Arborist, the Project Arborist shall provide a follow-up letter documenting the mitigation has been completed to specification.

## Definitions

City Heritage Trees – Menlo Park's Tree Ordinance designates tree removal permits for trees having attained Heritage size:

1. Any tree having a trunk with a circumference of 47.1 inches (diameter of 15 inches) or more measured at 54 inches above natural grade.
2. Any oak tree native to California, with a circumference of 31.4 inches (diameter of 10 inches) or more measured at 54 inches above natural grade.
3. Any tree with more than one trunk measured at the point where the trunks divide, with a circumference of 47.1 inches (diameter of 15 inches) or more, with the exception of trees that are under twelve (12) feet in height, which are exempt from the ordinance.1

Protected tree – Any tree that has been designated to be retained and is located within the scope of a construction project.

Project arborist – A certified arborist appointed to oversee tree protection. Project arborist shall have the authority to halt all construction activities if tree protection guidelines are not being adhered to.

DBH –Diameter at Breast Height: Tree diameter measured at 54 inches above average soil grade.

Root Protection Zone (RPZ) – A radial distance from the base of the tree designated by project arborist. Sometimes equal the crown spread but is generally a distance of one-foot from the base of the tree for every one-inch in tree (DBH). No heavy machinery is allowed within the RPZ.

Soil compaction – Soil compaction is excessive when planting soil is compacted (generally) over 80% ASTM from a standard Proctor compaction test. Soil compaction must be avoided and mitigated when identified within the designated RPZ.

Mechanical damage – Damage to tree trunk, branches, or roots that causes loss of bark and cambial damage.

Crown pruning – Shortening or removal of branches in accordance with guidelines presented in ANSI A300 PRUNING STANDARDS. All pruning must be approved of and conducted by qualified personnel.

Root pruning – Pruning of tree roots must be approved of and conducted by project arborist.

Water Jet/Air Spade – Soil aeration tools used to mitigate soil compaction using water and air, respectively.

Rootable Soil – Rootable soil is a soil medium that is compacted less than 80% ASTM, has oxygen levels between 6-16% and has sufficient available moisture and nutrients with no toxic substances.

## Design

Whenever early design contemplates the retention of an existing tree in the modified environment, deference to the needs of the tree must be provided. This entails an understanding of the current conditions and the level of encroachment that will occur. Arborist involvement during the initial design period is important to understanding if the tree is worthy of saving and if the tree can be saved. Trees designated to be retained require both minimization of root loss and an overall improvement in the quality of the soil conditions.

The first logical step in tree preservation is to conduct a process called Site Analysis, which involves investigation of both physical soil properties and laboratory analysis. The purpose is to identify conditions that may limit the ability of the plant material to thrive. Once the site limitations have been identified, mitigation treatments can be prescribed.

## Site analysis and early tree health mitigation

Prior tree survey and site analysis will designate trees to be retained and all procedures and treatments to be used to assure the trees survive the site modifications.

Soil profile examination – The soil profile examination determines soil texture and moisture levels. Soil compaction is also assessed. This information is vital to understanding the level of soil protection and mitigation that will be necessary.

Laboratory analysis – Analysis of soil and plant tissue samples can help guide the use of soil amendments and fertilization.

Root investigation – Preliminary excavation to determine the size, depth, and amount of roots present in the impacted area. This information may initiate design modifications.

Mitigation of limitations identified – Limitations identified during site analysis are best mitigated as soon as possible to improve overall tree health. Possible limitations to be mitigated include soil compaction, nutritional deficiencies, and soil moisture. Most basic mitigation entails: irrigation, mulching, water jet and air spade procedures. Soil amendments other than good quality mulch must be based upon laboratory soil analysis.

## Pre-construction activities

These activities should be undertaken prior to initiation of construction activity.

Mulching – Use of good quality organic mulch (fresh wood chips are best) on soil surface helps to reduce soil compaction and retain soil moisture. Recommended material is wood chips generated from tree trimming. Fresh redwood, incense cedar and walnut chips are not acceptable, nor is palm generated mulch. Mulch shall be from tree parts taken from a minimum of 2 meters above ground. Mulch shall not contain soil particles.

Crown pruning –Pruning must comply with ANSI A300 Pruning Standards. Pruning prior to construction should include: Necessary Clearance Pruning, Deadwood Removal and Safety Pruning.

Construction documents to show protected trees and tree protection requirements – Project plans to show tree protection fencing layout, areas of encroachment, and list procedures for working around protected trees.

Designation of tree Root Protection Zone (RPZ)–The tree Root Protection Zone designates an area surrounding a tree or grouping of trees that is to be fenced off from all access. The RPZ is commonly defined as a distance of one (1) foot radial distance from the base of the tree for every one (1) inch in tree diameter (DBH). A tree with a 10-inch diameter would have a RPZ equal to 10 feet out from the tree. Project arborist can modify the RPZ distance based upon physical evidence of root presence or absence.

Tree Root Protection Zone fencing – Fencing is to be chain-link type metal fencing with metal posts driven two-feet into the soil. Signs shall be attached to tree protection fencing every 20' which read "TREE PROTECTION ZONE: DO NOT ENTER".

Procedures and treatments for work activities that must occur inside of the designated RPZ – All such activities and relocation of fencing must be overseen by project arborist. Special trunk, scaffold and soil protection measures are required. When encroachment is anticipated prior to the beginning of construction activities, the protections must be in place prior to beginning work activities.

Arborist review and approval of tree protection measures – Project arborist to review tree protection guidelines and modify as deemed necessary.

Tree protections installation and inspected – Project arborist must certify that all tree protection measures have been properly installed.

Pre-construction meeting – Project arborist shall meet with supervisor and work crew to review requirements of the tree protection. All personnel working on site must be provided an orientation to the tree preservation requirements. There will be no excuses for transgressions.

**No construction activities may begin until this meeting has been conducted.**

Project arborist can direct that all work activities stop if tree protection guidelines are not being followed. All work activities cease until such time as the problem has been corrected.

## Work activities that encroach into the designated RPZ

Arborist supervision – All activities occurring within the designated RPZ must be under direct supervision of project arborist. Encroachment is not permitted until all additional protections are in place and have been approved.

Required method of excavation within critical root zone – When trenching is required, carefully **hand** excavation or the use of the Air Spade or hydraulic water excavation are acceptable methods. Project arborist must approve and supervise all such activity. No heavy equipment is allowed.

Wherever possible, route utilities outside of the designated RPZ. Tunneling is the preferred method for utilities passing through the RPZ.

Soil protection –The effects of foot traffic can be mitigated using six (6) inches of wood chip mulch and ¾ inch plywood placed on top.

Soil protections for equipment operating within the designated RPZ requires 12 inches of mulch with either metal trenching plates or 1 1/8-inch plywood placed on top.

Trunk and scaffold protection – Whenever construction activity must occur inside the tree protection zone, the base of the tree and the **first eight-feet and exposed scaffold limbs** must be armored. Protection is generally provided by wrapping the trunk with straw waddles covered with orange plastic construction fencing. Exposed scaffold limbs are best protected by strapping 2x4 boards to the part exposed to potential injury and wrapping with orange plastic fencing material.

Root protection – All exposed roots must be covered with 2 layers of damp burlap secured with jute staples. Burlap shall always remain damp and can remain in place when backfilled.

Necessary root pruning – Late fall season is the best time for root pruning and spring can be the most harmful. All necessary root pruning and shaving is conducted by project arborist after the roots have been exposed without damage.

## Post construction mitigation

Arborist Designation of Health Mitigation Activities – Project arborist will designate tree health mitigation activities based upon the level of root loss and adverse impacts that have occurred.

Monitoring Tree Health – Trees that have been adversely impacted by construction activities are noted for regular visual inspection. Project arborist will direct further mitigation. Insects and fungal pathogens are a sign of poor tree health (low energy reserves) and indicate the need for health mitigation.

Monitoring of Soil Moisture –Moisture should be monitored using a soil probe. Project arborist will designate supplemental irrigation. When root loss occurs, supplemental irrigation may be required for several years.

Mitigation of Soil Compaction – The level and depth of soil compaction must be assessed and mitigated, as necessary. Tools that are most suitable for mitigation of compacted soil are the water jet or air spade.

Landscaping – All landscaping planning must take precautions when planting within the designated RPZ. All plant materials should be selected for compatibility with the favored moisture regime (hydrazone) of the tree species and soil texture.

Continued Mulching – Mulch is extremely beneficial in creating a healthy root environment. A regular program of mulch application is recommended to help retain soil moisture, provide a source of nutrients, help with control weed control and reduce soil compaction.

Fertilization –Trees should be fertilized only when the nutritional limitations have been identified through laboratory analysis of soil or plant tissue. Excessive nitrogen fertilization is known to draw sucking insects (aphid, scale, etc.) to the plants and provide nutrition to fungal pathogens in the soil.

Pest Management Program – Healthy trees do not generally have serious pest problems. Stressed trees are attractive hosts to pathogens, which can contribute to further decline. Pest management is prescribed when monitoring indicates a need.

## Below pavement treatments adjacent to existing trees or newly planted trees

Damage to pavement near trees can be reduced and long-term health and vigor in the tree can be improved through treatments that promote good soil gas exchange and allow for deeper root development.

1. Excavation Techniques – In the situation where tree roots are already present, excavation occurs by hand, air spade or hydraulic evacuation methods. Crushed rock can be placed around exposed roots. *See graphic: Under Pavement Treatments in Areas with Existing Tree Roots*

2. Tunneling under Roots – Utilities that must pass through the designated tree protection area are best installed by tunneling below the tree roots.

3. Use of Clean Crushed Rock Below Pavement – This treatment is easiest to implement during original landscape installation. The treatment excavates the area below pavement to 6” to 12” deeper and place a clean crushed rock. Compaction can occur only from the surface of the rock after it is a minimum 6” deep. The rock is then covered with tensile and or filter fabric.

Aggregate base can be placed on the fabric and compaction can occur again prior to installing the pavement.

4. Use of 'Gap Graded' or 'Structural' Soil – Structural soil scan be purchased ready for installation or made from site soil and imported clean crushed rock.

5. Radial Trenching – In situations where trees are in areas with limited soil volumes and there are available rootable soil volumes adjacent, roots can be directed to rootable soil with radial trenching. Trenches are backfilled with structural soil. A layer of clean crushed rock is always placed on top of structural soil to reduce future hardscape displacement.

## Treatment of contractor transgressions

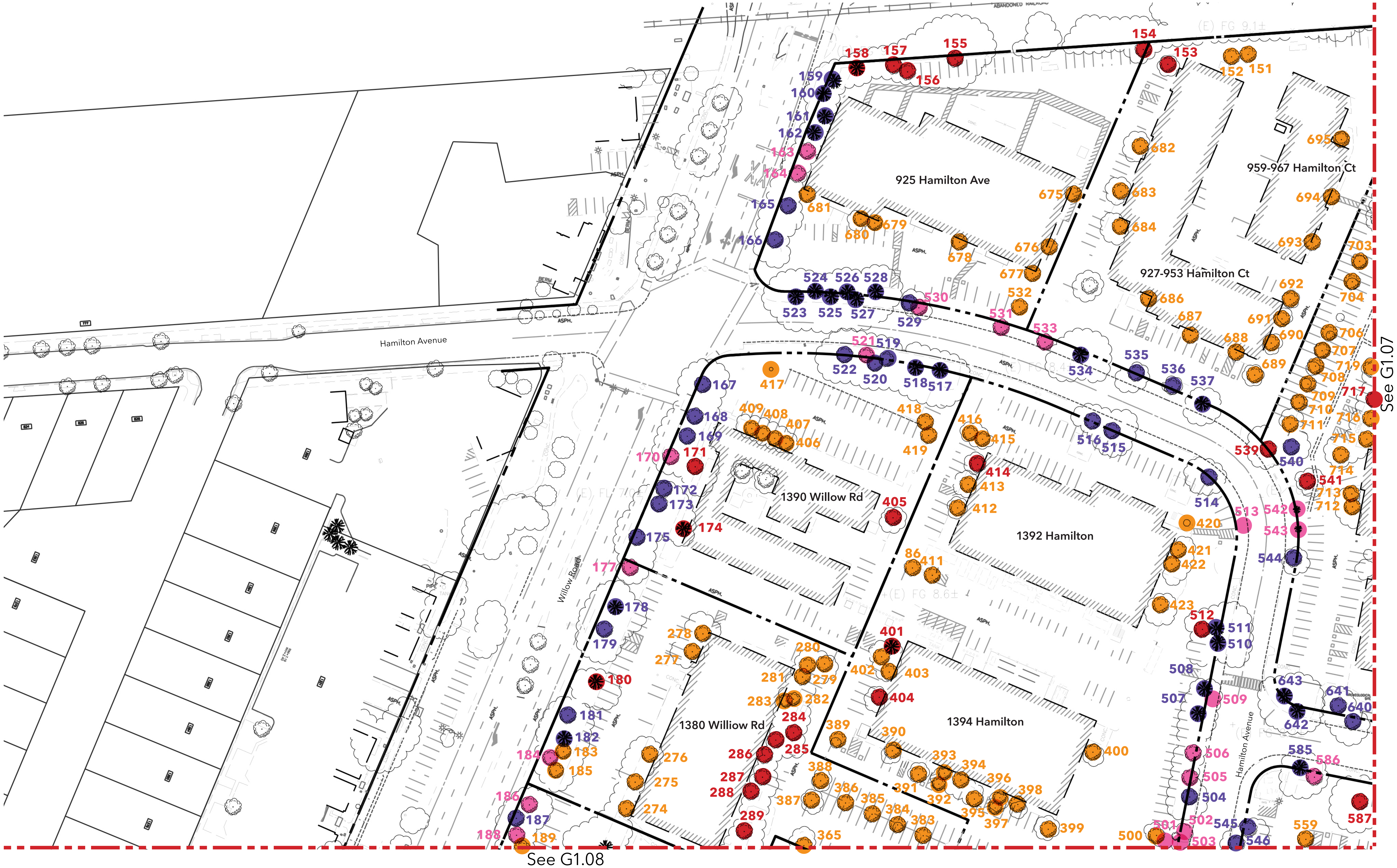
Enforcement of Tree Protection – Without a method to assure that the tree protection guidelines are properly followed, it is often the case that the protections are not adhered to. Transgressions occur both large and small as contractors make mistakes or attempt to cut corners to speed up their work. To be effective, the cost for contractor non-compliance must be greater than the savings to the contractor.

Penalties for Non-Compliance of Tree Protection Guidelines – It is recommended that contractors be required to place a bond to the value of the protected vegetation and potential soil mitigation. The bond is released when contractor compliance has been verified by project arborist. Should transgressions occur, the bond remains in place until such time at the situation has been fully mitigated.

## End

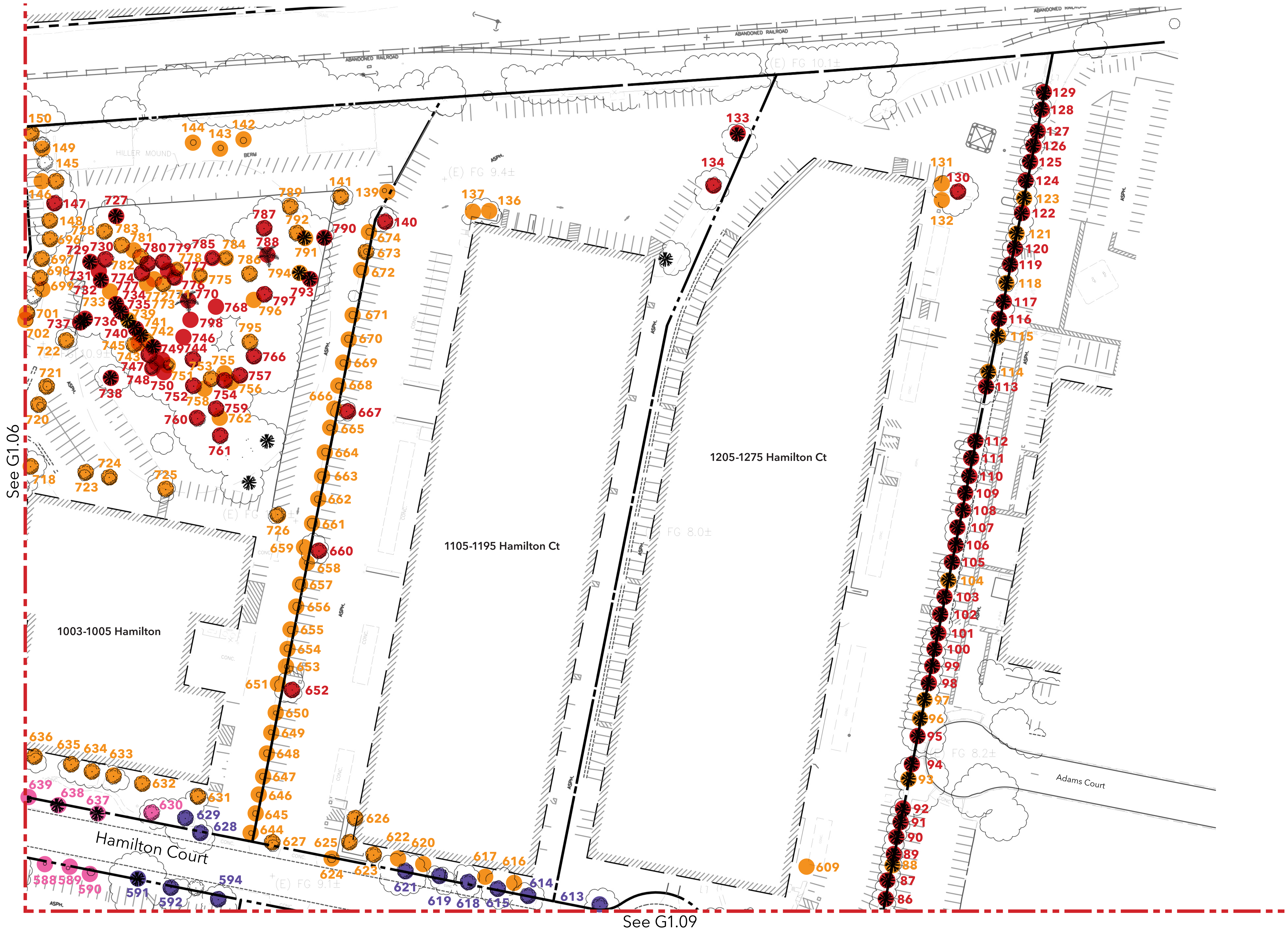
# G.

# HERITAGE TREE REMOVAL PLAN




| TREE INVENTORY SUMMARY | | |
|---|---|---|
| Total Trees | | 805 |
| Trees To-Be Removed | | 781 |
| | Heritage Street Tree | 87 |
| | Heritage Tree | 189 |
| | Non-heritage Street Tree | 54 |
| | Non-heritage Tree | 451 |
| Trees To Remain | | 24 |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 8 |
| | Non-heritage Street Tree | N/A |
| | Non-heritage Tree | 16 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.




| TREE INVENTORY SUMMARY | |
|---|---|
| **Total Trees** | **805** |
| **Trees To-Be Removed** | **781** |
| Heritage Street Tree | 87 |
| Heritage Tree | 189 |
| Non-heritage Street Tree | 54 |
| Non-heritage Tree | 451 |
| **Trees To Remain** | **24** |
| Heritage Street Tree | N/A |
| Heritage Tree | 8 |
| Non-heritage Street Tree | N/A |
| Non-heritage Tree | 16 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

1 min. Walk

0 50 100 150 250 400'

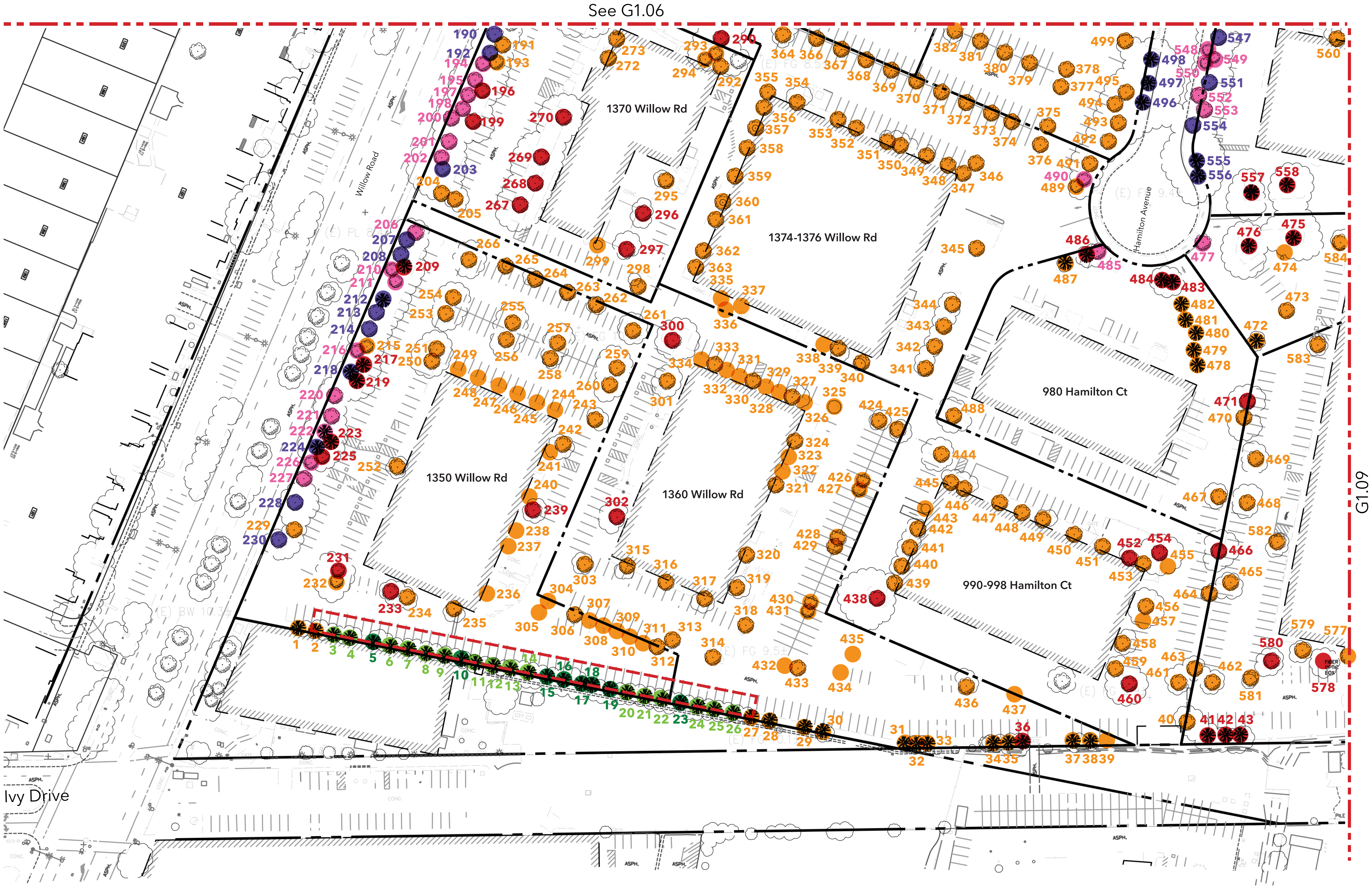
1" = 50' at 22" x 34"

**MASTER PLAN**
**Peninsula Innovation Partners**

# WILLOW VILLAGE

*Menlo Park, CA*

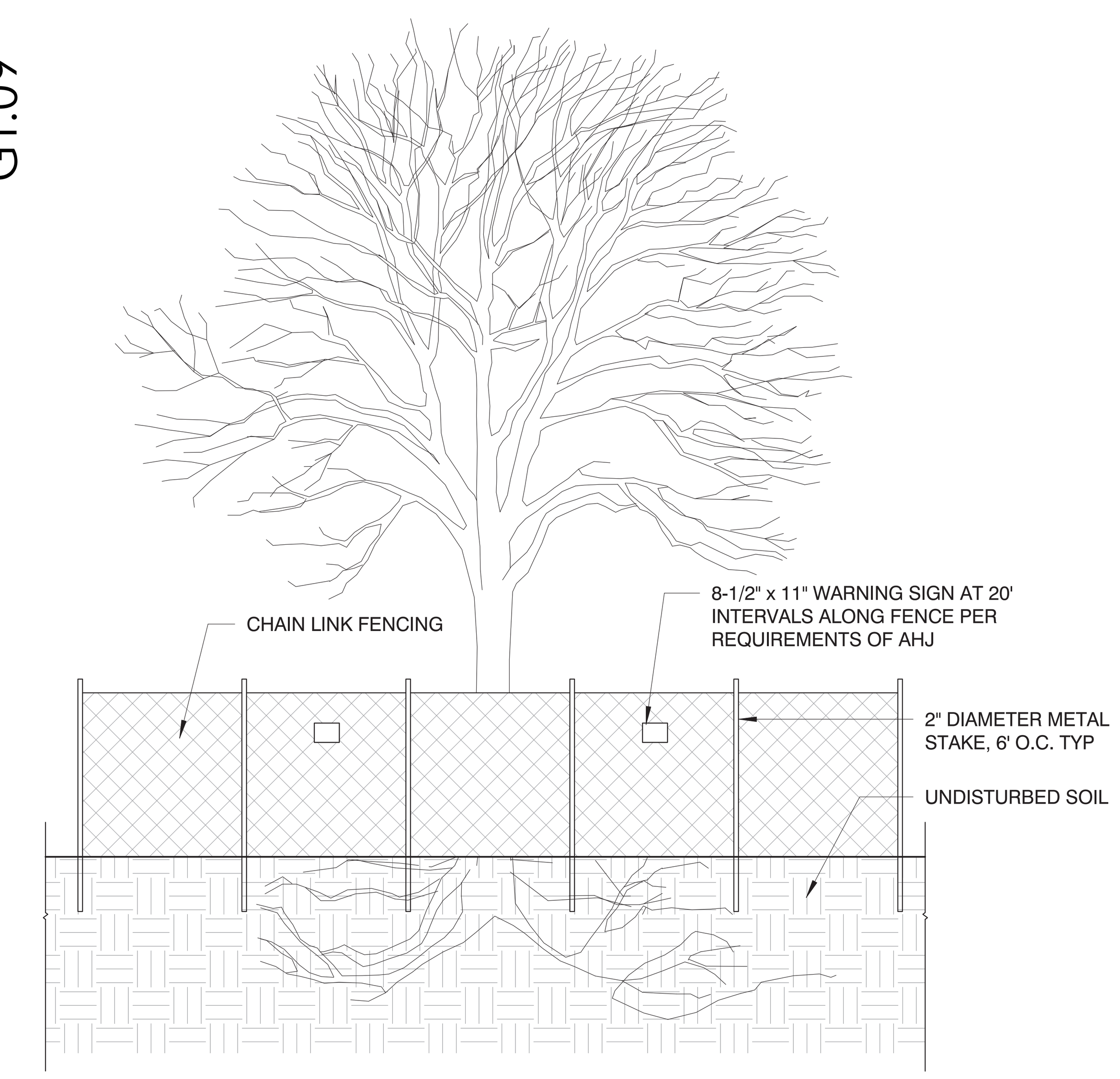
**G1.07**
**Heritage Tree Removal Plan**
August 1, 2022




## TREE INVENTORY SUMMARY

| | |
|---|---|
| **Total Trees** | **805** |
| **Trees To-Be Removed** | **781** |
| Heritage Street Tree | 87 |
| Heritage Tree | 189 |
| Non-heritage Street Tree | 54 |
| Non-heritage Tree | 451 |
| **Trees To Remain** | **24** |
| Heritage Street Tree | N/A |
| Heritage Tree | 8 |
| Non-heritage Street Tree | N/A |
| Non-heritage Tree | 16 |

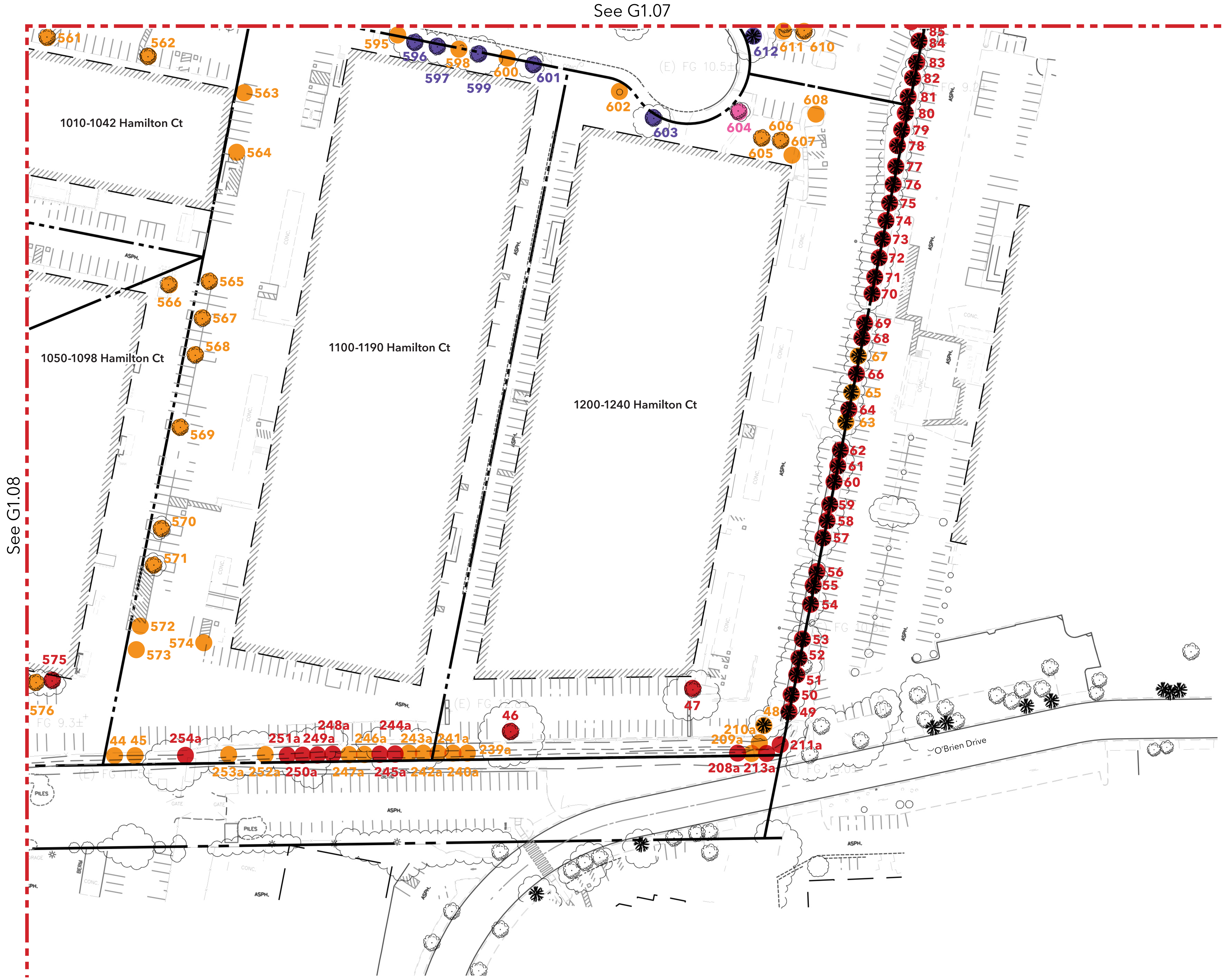
Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.




**TEMP. TREE PROTECTION DETAIL**
SCALE: 3/16" = 1' - 0"

**NOTES**

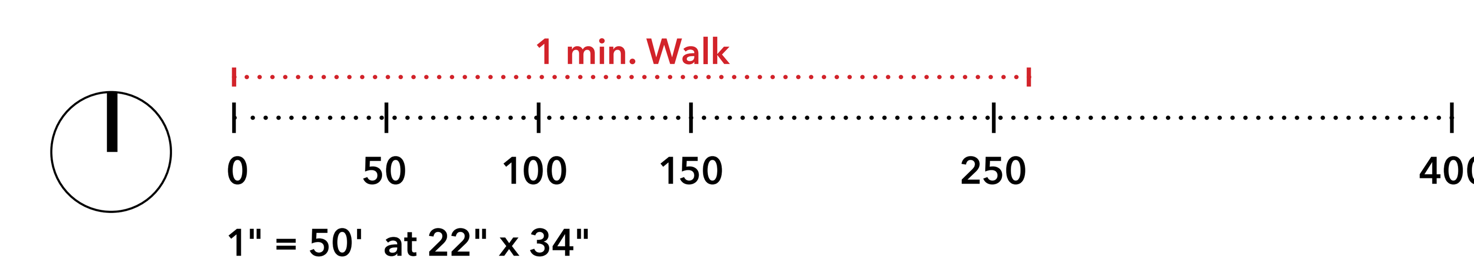
1. TREE IDENTIFICATION NUMBERS REFERENCE ARBORIST REPORT BY ERIC FOLMER DATED 2/1/2020, AND ARBORIST REPORT BY SBCA DATED 06/15/2021.
2. PROTECTIVE FENCING INSTALLED PRIOR TO ARRIVAL OF MATERIALS, VEHICLES, OR EQUIPMENT.
3. MOVING TREE PROTECTION FENCE PROHIBITED WITHOUT AUTHORIZATION FROM PROJECT ARBORIST AND CITY STAFF.
4. TREE PROTECTION ZONE COVERS PRIMARY ROOT PLATES (PRP) AT A MIN.
5. FOR DEMOLITION WITHIN AREAS OF TREE PROTECTION SEE PROJECT ARBORIST SPECIFICATIONS.



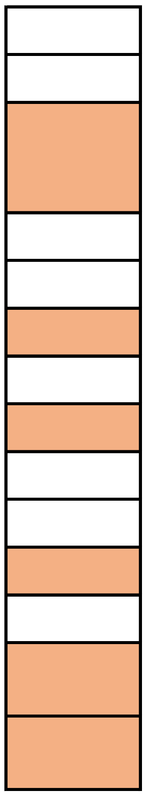

## TREE INVENTORY SUMMARY

| | |
|---|---|
| **Total Trees** | **805** |
| **Trees To-Be Removed** | **781** |
| Heritage Street Tree | 87 |
| Heritage Tree | 189 |
| Non-heritage Street Tree | 54 |
| Non-heritage Tree | 451 |
| **Trees To Remain** | **24** |
| Heritage Street Tree | N/A |
| Heritage Tree | 8 |
| Non-heritage Street Tree | N/A |
| Non-heritage Tree | 16 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **131** | *No tree* | | | | | | | | | |
| **132** | *No tree* | | | | | | | | | |
| **135** | *Pinus halepensis* | Aleppo Pine | | | DEAD | | | | DEAD | |
| **176** | *no tree* | | | | | | | | | |
| **271** | *No tree* | | | | | | | | | |
| **291** | *No tree* | | | | | | | | | |
| **593** | *No tree* | | | | | | | | | |
| **685** | *No tree* | | | | | | | | | |
| **700** | *No tree* | | | | | | | | | |
| **705** | *No tree* | | | | | | | | | |
| **763** | *No tree* | | | | | | | | | |
| **764** | *No tree* | | | | | | | | | |
| **765** | *Schinus molle* | Peruvian Pepper | | | DEAD | | | | DEAD | |
| **769** | *Schinus molle* | Peruvian Pepper | | | DEAD | | | | DEAD | |



| Tree No. | Tag # | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **5** | *Pinus canariensis* | 17.5 | 241 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **2** | **10** | *Pinus canariensis* | 15 | 177 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **3** | **15** | *Pinus canariensis* | 16.5 | 214 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **4** | **16** | *Pinus canariensis* | 16.5 | 214 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **5** | **17** | *Pinus canariensis* | 17 | 227 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **6** | **18** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **7** | **19** | *Pinus canariensis* | 16.5 | 214 | 0.85 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **8** | **23** | *Pinus canariensis* | 15 | 177 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **9** | **36** | *Pinus canariensis* | 20 | 314 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **10** | **41** | *Pinus canariensis* | 16 | 201 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **11** | **42** | *Pinus canariensis* | 16.5 | 214 | 0.6 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **12** | **43** | *Pinus canariensis* | 19.5 | 299 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **13** | **46** | *Fraxinus uhdei* | 52 | 2124 | 0.6 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 111775 |
| **14** | **47** | *Fraxinus uhdei* | 38.5 | 1164 | 0.6 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 61272 |
| **15** | **49** | *Pinus canariensis* | 16.5 | 214 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **16** | **50** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **17** | **51** | *Pinus canariensis* | 19.5 | 299 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **18** | **52** | *Pinus canariensis* | 20 | 314 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **19** | **53** | *Pinus canariensis* | 19 | 284 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **20** | **54** | *Pinus canariensis* | 17.5 | 241 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **21** | **55** | *Pinus canariensis* | 16 | 201 | 0.7 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **22** | **56** | *Pinus canariensis* | 17.5 | 241 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **23** | **57** | *Pinus canariensis* | 15.5 | 189 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **24** | **58** | *Pinus canariensis* | 21.5 | 363 | 0.6 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 19108 |
| **25** | **59** | *Pinus canariensis* | 16 | 201 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **26** | **60** | *Pinus radiata* | 16 | 201 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **27** | **61** | *Pinus canariensis* | 21.5 | 363 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 19108 |
| **28** | **62** | *Pinus canariensis* | 21 | 346 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **29** | **64** | *Pinus canariensis* | 18 | 254 | 0.7 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **30** | **66** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **31** | **68** | *Pinus canariensis* | 15 | 177 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **32** | **69** | *Pinus canariensis* | 16 | 201 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **33** | **70** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 13393 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **34** | **71** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **35** | **72** | *Pinus canariensis* | 17 | 227 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **36** | **73** | *Pinus canariensis* | 20.5 | 330 | 0.7 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 17372 |
| **37** | **74** | *Pinus canariensis* | 15 | 177 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **38** | **75** | *Pinus canariensis* | 19.5 | 299 | 0.85 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **39** | **76** | *Pinus canariensis* | 19 | 284 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **40** | **77** | *Pinus canariensis* | 19 | 284 | 0.8 | 0.8 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **41** | **78** | *Pinus canariensis* | 23 | 415 | 0.6 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 21867 |
| **42** | **79** | *Pinus canariensis* | 22 | 380 | 0.6 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 20007 |
| **43** | **80** | *Pinus canariensis* | 20.5 | 330 | 0.9 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 17372 |
| **44** | **81** | *Pinus canariensis* | 25.5 | 511 | 0.9 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 26879 |
| **45** | **82** | *Pinus canariensis* | 24 | 452 | 0.7 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 23810 |
| **46** | **83** | *Pinus canariensis* | 20 | 314 | 0.6 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **47** | **84** | *Pinus canariensis* | 15.5 | 189 | 0.85 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **48** | **85** | *Pinus canariensis* | 19 | 284 | 0.8 | 1 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **49** | **86** | *Pinus canariensis* | 21 | 346 | 0.6 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **50** | **87** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **51** | **89** | *Pinus canariensis* | 19.5 | 299 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 15718 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **52** | **90** | *Pinus canariensis* | 15.5 | 189 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **53** | **91** | *Pinus canariensis* | 18.5 | 269 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 14148 |
| **54** | **92** | *Pinus canariensis* | 16.5 | 214 | 0.8 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **55** | **94** | *Pinus canariensis* | 15 | 177 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **56** | **95** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.6 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **57** | **98** | *Pinus canariensis* | 18 | 254 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **58** | **99** | *Pinus canariensis* | 16 | 201 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **59** | **100** | *Pinus canariensis* | 17.5 | 241 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **60** | **101** | *Pinus canariensis* | 17 | 227 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **61** | **102** | *Pinus canariensis* | 17 | 227 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **62** | **103** | *Pinus canariensis* | 16 | 201 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **63** | **105** | *Pinus canariensis* | 15.5 | 189 | 0.5 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **64** | **106** | *Pinus canariensis* | 16 | 201 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **65** | **107** | *Pinus canariensis* | 16.5 | 214 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **66** | **108** | *Pinus canariensis* | 17.5 | 241 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **67** | **109** | *Pinus canariensis* | 17 | 227 | 0.85 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **68** | **110** | *Pinus canariensis* | 20 | 314 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **69** | **111** | *Pinus canariensis* | 20.5 | 330 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 17372 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **70** | **112** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **71** | **113** | *Pinus canariensis* | 20 | 314 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **72** | **116** | *Pinus canariensis* | 16.5 | 214 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **73** | **117** | *Pinus canariensis* | 21 | 346 | 0.8 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **74** | **119** | *Pinus canariensis* | 19 | 284 | 0.6 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **75** | **120** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **76** | **122** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **77** | **124** | *Pinus canariensis* | 16 | 201 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **78** | **125** | *Pinus canariensis* | 15.5 | 189 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **79** | **126** | *Pinus canariensis* | 19.5 | 299 | 0.85 | 0.4 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **80** | **127** | *Pinus canariensis* | 17 | 227 | 0.85 | 0.4 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **81** | **128** | *Pinus canariensis* | 21 | 346 | 0.9 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **82** | **129** | *Pinus canariensis* | 21.5 | 363 | 0.85 | 0.6 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 19108 |
| **83** | **130** | *Fraxinus oxycarpa 'Raywood'* | 25 | 491 | 0.6 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 43828 |
| **84** | **133** | *Pinus halepensis* | 28.5 | 638 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 33576 |
| **85** | **134** | *Schinus molle* | 29 | 661 | 0.85 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 34764 |
| **86** | **140** | *Fraxinus oxycarpa 'Raywood'* | 15 | 177 | 0.7 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 15778 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **87** | **147** | *Eucalyptus camaldulensis* | 44 | 1521 | 0.75 | 0.4 | 1 | 2.2 | 3.8 | 200 | 52.6 | 80028 |
| **88** | **153** | *Prunus cerasifera 'Krauter Vesuvius'* | 14 | 154 | 0.7 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 13745 |
| **89** | **154** | *Lophostemon confertus* | 17 | 227 | 0.75 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 20266 |
| **90** | **155** | *Eucalyptus globulus* | 51 | 2043 | 0.8 | 0.6 | 1 | 2.46 | 4.75 | 200 | 42.1 | 86014 |
| **91** | **156** | *Lophostemon confertus* | 10.5 | 87 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 7731 |
| **92** | **157** | *Lophostemon confertus* | 12 | 113 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 10098 |
| **93** | **158** | *Pinus radiata* | 20.5 | 330 | 0.75 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 13897 |
| **94** | **159** | *Pinus radiata* | 19 | 284 | 0.75 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 11938 |
| **95** | **160** | *Pinus radiata* | 21.5 | 363 | 0.7 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 15286 |
| **96** | **161** | *Pinus radiata* | 17.5 | 241 | 0.75 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 10128 |
| **97** | **162** | *Pinus radiata* | 20.5 | 330 | 0.75 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 13897 |
| **98** | **165** | *Platanus x hispanica* | 15 | 177 | 0.65 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **99** | **166** | *Platanus x hispanica* | 17 | 227 | 0.7 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **100** | **167** | *Platanus x hispanica* | 19.5 | 299 | 0.9 | 0.4 | 1 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **101** | **168** | *Platanus x hispanica* | 19.5 | 299 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **102** | **169** | *Platanus x hispanica* | 16.5 | 214 | 0.55 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11254 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **103** | **171** | *Platanus x hispanica* | 17.5 | 241 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 12659 |
| **104** | **172** | *Prunus serrulata* | 18 | 254 | 0.75 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **105** | **173** | *Platanus x hispanica* | 23 | 415 | 0.85 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 21867 |
| **106** | **174** | *Pinus radiata* | 19 | 284 | 0.9 | 0.6 | 1 | 2.46 | 4.75 | 200 | 42.1 | 11938 |
| **107** | **175** | *Platanus x hispanica* | 17 | 227 | 0.85 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **108** | **178** | *Cedrus deodara* | 28 | 616 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 32408 |
| **109** | **179** | *Platanus x hispanica* | 22.5 | 398 | 0.75 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 20927 |
| **110** | **180** | *Cedrus deodara* | 25.5 | 511 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 26879 |
| **111** | **181** | *Platanus x hispanica* | 17 | 227 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **112** | **182** | *Cedrus deodara* | 25.5 | 511 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 26879 |
| **113** | **187** | *Platanus x hispanica* | 15 | 177 | 0.9 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **114** | **190** | *Platanus x hispanica* | 17 | 227 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **115** | **192** | *Prunus serrulata* | 19.5 | 299 | 0.9 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 26665 |
| **116** | **196** | *Eucalyptus polyanthemos* | 36.5 | 1046 | 0.7 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 93424 |
| **117** | **199** | *Fraxinus uhdei* | 20 | 314 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 13228 |
| **118** | **203** | *Salix babylonica* | 30 | 707 | 0.5 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 29763 |
| **119** | **207** | *Platanus x hispanica* | 15.5 | 189 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **120** | **208** | *Platanus x hispanica* | 17 | 227 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **121** | **209** | *Cedrus deodara* | 28 | 616 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 32408 |
| **122** | **212** | *Cedrus deodara* | 25 | 491 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 25836 |
| **123** | **213** | *Platanus x hispanica* | 16.5 | 214 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **124** | **214** | *Platanus x hispanica* | 17 | 227 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **125** | **217** | *Cedrus deodara* | 24.5 | 471 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 24812 |
| **126** | **218** | *Cedrus deodara* | 18 | 254 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **127** | **219** | *Cedrus deodara* | 22.5 | 398 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 20927 |
| **128** | **223** | *Cedrus deodara* | 25 | 491 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 25836 |
| **129** | **224** | *Cedrus deodara* | 21.5 | 363 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 19108 |
| **130** | **225** | *Prunus serrulata* | 16 | 201 | 0.7 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **131** | **228** | *Platanus x hispanica* | 16.5 | 214 | 0.2 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11254 |
| **132** | **230** | *Platanus x hispanica* | 15 | 177 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **133** | **231** | *Platanus x hispanica* | 15 | 177 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **134** | **233** | *Lophostemon confertus* | 17 | 227 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 20266 |
| **135** | **239** | *Lophostemon confertus* | 16 | 201 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **136** | **267** | *Platanus x hispanica* | 19 | 284 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **137** | **268** | *Platanus x hispanica* | 18 | 254 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 13393 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **138** | **269** | *Platanus x hispanica* | 19 | 284 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **139** | **270** | *Platanus x hispanica* | 18.5 | 269 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 14148 |
| **140** | **284** | *Platanus x hispanica* | 14.5 | 165 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 8691 |
| **141** | **285** | *Fraxinus uhdei* | 14.5 | 165 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 6953 |
| **142** | **286** | *Fraxinus oxycarpa 'Raywood'* | 16.5 | 214 | 0.2 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 19092 |
| **143** | **287** | *Fraxinus oxycarpa 'Raywood'* | 16 | 201 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **144** | **288** | *Fraxinus oxycarpa 'Raywood'* | 18 | 254 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 22721 |
| **145** | **289** | *Fraxinus oxycarpa 'Raywood'* | 24 | 452 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 40392 |
| **146** | **290** | *Fraxinus oxycarpa 'Raywood'* | 26.5 | 552 | 0.7 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 49245 |
| **147** | **296** | *Fraxinus oxycarpa 'Raywood'* | 16.5 | 214 | 0.6 | 0.4 | 1 | 1.69 | 2.24 | 200 | 89.3 | 19092 |
| **148** | **297** | *Fraxinus oxycarpa 'Raywood'* | 20 | 314 | 0.6 | 0.4 | 1 | 1.69 | 2.24 | 200 | 89.3 | 28050 |
| **149** | **300** | *Platanus x hispanica* | 15.5 | 189 | 0.9 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **150** | **302** | *Lophostemon confertus* | 17.5 | 241 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 21476 |
| **151** | **401** | *Pinus canariensis* | 25 | 491 | 0.9 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 43828 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **152** | **404** | *Lophostemon confertus* | 16 | 201 | 0.9 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **153** | **405** | *Lophostemon confertus* | 16 | 201 | 0.9 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **154** | **414** | *Prunus cerasifera 'Krauter Vesuvius'* | 15 | 177 | 0.5 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 15778 |
| **155** | **438** | *Platanus x hispanica* | 26.5 | 552 | 0.9 | 0.4 | 1 | 2.2 | 3.8 | 200 | 52.6 | 29029 |
| **156** | **452** | *Prunus cerasifera 'Krauter Vesuvius'* | 15 | 177 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 15778 |
| **157** | **454** | *Platanus x hispanica* | 15 | 177 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **158** | **460** | *Platanus x hispanica* | 16 | 201 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 10582 |
| **159** | **466** | *Pyrus calleryana* | 20 | 314 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 28050 |
| **160** | **471** | *Pyrus calleryana* | 19 | 284 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |
| **161** | **475** | *Pinus pinea* | 40 | 1257 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 52911 |
| **162** | **476** | *Pinus pinea* | 41 | 1320 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 55590 |
| **163** | **483** | *Sequoia sempervirens* | 20 | 314 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 13228 |
| **164** | **484** | *Sequoia sempervirens* | 22 | 380 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 16006 |
| **165** | **486** | *Sequoia sempervirens* | 19.5 | 299 | 0.9 | 0.6 | 1 | 2.46 | 4.75 | 200 | 42.1 | 12575 |
| **166** | **496** | *Pinus pinea* | 49 | 1886 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 79400 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **167** | **497** | *Pinus pinea* | 34 | 908 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 38228 |
| **168** | **498** | *Pinus pinea* | 33 | 855 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 36013 |
| **169** | **504** | *Quercus rubra* | 17.5 | 241 | 0.7 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 21476 |
| **170** | **507** | *Sequoia sempervirens* | 31 | 755 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 31780 |
| **171** | **508** | *Sequoia sempervirens* | 26.5 | 552 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 23223 |
| **172** | **510** | *Pinus pinea* | 32 | 804 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 33863 |
| **173** | **511** | *Pinus pinea* | 29 | 661 | 0.8 | 0.6 | 1 | 2.46 | 4.75 | 200 | 42.1 | 27811 |
| **174** | **512** | *Fraxinus oxycarpa 'Raywood'* | 22.5 | 398 | 0.2 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 35501 |
| **175** | **514** | *Fraxinus oxycarpa 'Raywood'* | 17 | 227 | 0.75 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 20266 |
| **176** | **515** | *Fraxinus uhdei* | 20 | 314 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 13228 |
| **177** | **516** | *Fraxinus oxycarpa 'Raywood'* | 16 | 201 | 0.2 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **178** | **517** | *Pinus pinea* | 45 | 1590 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 66966 |
| **179** | **518** | *Pinus pinea* | 40 | 1257 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 52911 |
| **180** | **519** | *Fraxinus uhdei* | 17 | 227 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 9557 |
| **181** | **520** | *Fraxinus uhdei* | 18 | 254 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 10715 |
| **182** | **522** | *Fraxinus uhdei* | 25.5 | 511 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 21503 |
| **183** | **523** | *Pinus pinea* | 35.5 | 990 | 0.85 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 41676 |
| **184** | **524** | *Pinus pinea* | 41 | 1320 | 0.85 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 55590 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **185** | **525** | *Pinus pinea* | 34 | 908 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 38228 |
| **186** | **526** | *Pinus pinea* | 23.5 | 434 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 18263 |
| **187** | **527** | *Pinus pinea* | 33.5 | 881 | 0.9 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 37112 |
| **188** | **528** | *Pinus pinea* | 37.5 | 1104 | 0.85 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 46504 |
| **189** | **529** | *Prunus cerasifera 'Krauter Vesuvius'* | 12 | 113 | 0.8 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 10098 |
| **190** | **534** | Pinus pinea | 47 | 1735 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 73050 |
| **191** | **535** | *Alnus cordata* | 20.5 | 330 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 17372 |
| **192** | **536** | *Prunus cerasifera 'Krauter Vesuvius'* | 11 | 95 | 0.7 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 8485 |
| **193** | **537** | *Pinus pinea* | 30.5 | 731 | 0.85 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 30763 |
| **194** | **539** | *Fraxinus oxycarpa 'Raywood'* | 19.5 | 299 | 0.4 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 26665 |
| **195** | **540** | *Fraxinus oxycarpa 'Raywood'* | 18.5 | 269 | 0.6 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 24000 |
| **196** | **541** | *Fraxinus oxycarpa 'Raywood'* | 16 | 201 | 0.6 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 17952 |
| **197** | **544** | *Alnus cordata* | 21 | 346 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **198** | **545** | *Fraxinus uhdei* | 26 | 531 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 22355 |
| **199** | **546** | *Fraxinus uhdei* | 21 | 346 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 14584 |
| **200** | **547** | *Fraxinus uhdei* | 19 | 284 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 11938 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **201** | **551** | *Fraxinus uhdei* | 18 | 254 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 10715 |
| **202** | **554** | *Fraxinus uhdei* | 22 | 380 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 16006 |
| **203** | **555** | *Pinus pinea* | 46 | 1662 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 69975 |
| **204** | **556** | *Pinus pinea* | 39 | 1195 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 50299 |
| **205** | **557** | *Pinus pinea* | 38 | 1134 | 0.7 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 47752 |
| **206** | **558** | *Pinus pinea* | 35 | 962 | 0.7 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 40510 |
| **207** | **575** | *Lophostemon confertus* | 15.5 | 189 | 0.9 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 16848 |
| **208** | **578** | *Lophostemon confertus* | 15.5 | 189 | 0.9 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 16848 |
| **209** | **580** | *Lophostemon confertus* | 15.5 | 189 | 0.9 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 16848 |
| **210** | **585** | *Cedrus deodara* | 30.5 | 731 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 38454 |
| **211** | **587** | *Platanus x hispanica* | 21.5 | 363 | 0.9 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 19108 |
| **212** | **591** | *Pinus pinea* | 53 | 2206 | 0.6 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 92892 |
| **213** | **592** | *Fraxinus uhdei* | 23 | 415 | 0.75 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 17494 |
| **214** | **594** | *Fraxinus uhdei* | 30 | 707 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 29763 |
| **215** | **596** | *Fraxinus oxycarpa 'Raywood'* | 22.5 | 398 | 0.65 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 35501 |
| **216** | **597** | *Fraxinus oxycarpa 'Raywood'* | 19 | 284 | 0.75 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |
| **217** | **599** | *Fraxinus oxycarpa 'Raywood'* | 22 | 380 | 0.75 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 33941 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **218** | **601** | *Fraxinus oxycarpa 'Raywood'* | 19 | 284 | 0.9 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |
| **219** | **603** | *Fraxinus oxycarpa 'Raywood'* | 19 | 284 | 0.6 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |
| **220** | **612** | *Pinus halepensis* | 30.5 | 731 | 0.7 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 65234 |
| **221** | **613** | *Fraxinus oxycarpa 'Raywood'* | 18 | 254 | 0.5 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 22721 |
| **222** | **614** | *Fraxinus oxycarpa 'Raywood'* | 19 | 284 | 0.5 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |
| **223** | **615** | *Fraxinus oxycarpa 'Raywood'* | 17.5 | 241 | 0.6 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 21476 |
| **224** | **618** | *Fraxinus oxycarpa 'Raywood'* | 17.5 | 241 | 0.75 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 21476 |
| **225** | **619** | *Fraxinus oxycarpa 'Raywood'* | 23.5 | 434 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 38727 |
| **226** | **621** | *Fraxinus uhdei* | 25.5 | 511 | 0.85 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 21503 |
| **227** | **628** | *Fraxinus oxycarpa 'Raywood'* | 17 | 227 | 0.5 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 20266 |
| **228** | **629** | *Fraxinus oxycarpa 'Raywood'* | 22 | 380 | 0.5 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 33941 |
| **229** | **640** | *Fraxinus uhdei* | 21 | 346 | 0.8 | 0.8 | 1 | 2.46 | 4.75 | 200 | 42.1 | 14584 |
| **230** | **641** | *Fraxinus oxycarpa 'Raywood'* | 19 | 284 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 25315 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **231** | **642** | *Cedrus deodara* | 23 | 415 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 21867 |
| **232** | **643** | *Cedrus deodara* | 35.5 | 990 | 0.9 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.6 | 52095 |
| **233** | **652** | *Fraxinus oxycarpa 'Raywood'* | 23 | 415 | 0.6 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 37096 |
| **234** | **660** | *Fraxinus oxycarpa 'Raywood'* | 15 | 177 | 0.9 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 15778 |
| **235** | **667** | *Fraxinus oxycarpa 'Raywood'* | 15.5 | 189 | 0.8 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 16848 |
| **236** | **717** | *Fraxinus oxycarpa 'Raywood'* | 15 | 177 | 0.2 | 0.6 | 1 | 1.69 | 2.24 | 200 | 89.3 | 15778 |
| **237** | **727** | *Casuarina cunninghamiana* | 22 | 380 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 20007 |
| **238** | **729** | *Casuarina cunninghamiana* | 19 | 284 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 14923 |
| **239** | **730** | *Eucalyptus globulus* | 38 | 1134 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 47752 |
| **240** | **731** | *Eucalyptus globulus* | 26.5 | 552 | 0.7 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 23223 |
| **241** | **732** | *Casuarina cunninghamiana* | 26 | 531 | 0.75 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 27944 |
| **242** | **734** | *Casuarina cunninghamiana* | 33 | 855 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 45016 |
| **243** | **735** | *Casuarina cunninghamiana* | 15.5 | 189 | 0.75 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **244** | **736** | *Casuarina cunninghamiana* | 15 | 177 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **245** | **737** | *Casuarina cunninghamiana* | 15 | 177 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **246** | **738** | *Casuarina cunninghamiana* | 18.5 | 269 | 0.85 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 14148 |
| **247** | **740** | *Casuarina cunninghamiana* | 17 | 227 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **248** | **744** | *Casuarina cunninghamiana* | 15.5 | 189 | 0.2 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **249** | **746** | *Casuarina cunninghamiana* | 18 | 254 | 0.45 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **250** | **747** | *Rhamnus alaternus* | 15 | 177 | 0.75 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **251** | **749** | *Quercus lobata* | 28 | 616 | 0.9 | 1 | 1 | 1.69 | 2.24 | 200 | 89.3 | 54978 |
| **252** | **750** | *Olea europaea* | 24 | 452 | 0.2 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 23810 |
| **253** | **752** | *Olea europaea* | 33.5 | 881 | 0.5 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 46390 |
| **254** | **754** | *Olea europaea* | 29 | 661 | 0.4 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 34764 |
| **255** | **757** | *Olea europaea* | 23.5 | 434 | 0.4 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 22828 |
| **256** | **759** | *Schinus molle* | 17 | 227 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **257** | **760** | *Schinus molle* | 32 | 804 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 42329 |
| **258** | **761** | *Schinus molle* | 43 | 1452 | 0.8 | 0.9 | 0.9 | 2.2 | 3.8 | 200 | 52.6 | 76432 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **259** | **766** | *Olea europaea* | 25 | 491 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 25836 |
| **260** | **767** | *Olea europaea* | 15.5 | 189 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **261** | **768** | *Phoenix canariensis* | 1 | | 0.9 | 1 | 1 | 375 | | 200 | | 338 |
| **262** | **770** | *Phoenix canariensis* | 25 | | 0.75 | 1 | 1 | 375 | | 200 | | 7031 |
| **263** | **774** | *Olea europaea* | 19.5 | 299 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **264** | **776** | *Schinus molle* | 20 | 314 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **265** | **777** | *Schinus molle* | 17 | 227 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 11946 |
| **266** | **779** | *Schinus molle* | 18 | 254 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 13393 |
| **267** | **780** | *Schinus molle* | 15.5 | 189 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 9931 |
| **268** | **785** | *Olea europaea* | 21 | 346 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 18230 |
| **269** | **787** | *Quercus agrifolia* | 20.5 | 330 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 17372 |
| **270** | **788** | *Phoenix canariensis* | 25 | | 0.9 | 1 | 1 | 375 | 1 | | | 8438 |
| **271** | **790** | *Casuarina cunninghamiana* | 19.5 | 299 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 15718 |
| **272** | **793** | *Hesperocyparis macrocarpa* | 36 | 1018 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.3 | 90882 |
| **273** | **797** | *Olea europaea* | 20 | 314 | 0.2 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 16535 |
| **274** | **798** | *Quercus agrifolia* | 12.5 | 123 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 6459 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **275** | **244 a** | *Eucalyptus polyanthemos* | 22 | 380 | 0.5 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 33941 |
| **276** | **245 a** | *Eucalyptus polyanthemos* | 36 | 1018 | 0.5 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 90882 |
| **277** | **248 a** | *Eucalyptus polyanthemos* | 24.5 | 471 | 0.4 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 42093 |
| **278** | **249 a** | *Eucalyptus polyanthemos* | 22 | 380 | 0.2 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 33941 |
| **279** | **250 a** | *Quercus agrifolia* | 27.5 | 594 | 0.6 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 53032 |
| **280** | **251 a** | *Eucalyptus polyanthemos* | 33 | 855 | 0.5 | 1 | 0.5 | 1.69 | 2.24 | 200 | 89.3 | 76366 |
| **281** | **254 a** | *Quercus agrifolia* | 7.5 | 44 | 0.6 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 2325 |
| **282** | **208 a** | *Fraxinus uhdei* | 8 | 50 | 0.6 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 2646 |
| **283** | **211 a** | *Acacia melanoxylon* | 15 | 177 | 0.6 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 9301 |
| **284** | **213 a** | *Juglans hindsii* | 7 | 38 | 0.6 | 1 | 0.8 | 2.2 | 3.8 | 200 | 52.6 | 2026 |

| Depreciated Reproduction Cost (K*E*F*G) |
|---|
| $ 4,102 |
| $ 4,018 |
| $ 4,862 |
| $ 4,862 |
| $ 5,161 |
| $ 4,290 |
| $ 4,592 |
| $ 4,018 |
| $ 7,143 |
| $ 4,572 |
| $ 3,241 |
| $ 6,036 |
| $ 32,191 |
| $ 22,058 |
| $ 4,862 |

| | |
|---|---|
| $ | 5,786 |
| $ | 6,790 |
| $ | 7,143 |
| $ | 5,730 |
| $ | 5,469 |
| $ | 3,556 |
| $ | 4,102 |
| $ | 2,860 |
| $ | 4,127 |
| $ | 3,429 |
| $ | 3,048 |
| $ | 5,503 |
| $ | 5,906 |
| $ | 3,375 |
| $ | 3,218 |
| $ | 3,013 |
| $ | 3,048 |
| $ | 4,339 |

| | |
|---|---|
| $ | 4,339 |
| $ | 3,871 |
| $ | 4,378 |
| $ | 2,679 |
| $ | 4,810 |
| $ | 4,835 |
| $ | 5,730 |
| $ | 7,872 |
| $ | 7,203 |
| $ | 9,381 |
| $ | 14,515 |
| $ | 10,000 |
| $ | 5,953 |
| $ | 5,065 |
| $ | 7,163 |
| $ | 3,938 |
| $ | 4,339 |
| $ | 4,527 |

| | |
|---|---|
| $ | 2,860 |
| $ | 4,584 |
| $ | 3,241 |
| $ | 3,013 |
| $ | 4,339 |
| $ | 5,786 |
| $ | 4,572 |
| $ | 4,861 |
| $ | 5,161 |
| $ | 4,587 |
| $ | 4,572 |
| $ | 2,383 |
| $ | 4,064 |
| $ | 4,862 |
| $ | 4,861 |
| $ | 4,874 |
| $ | 7,143 |
| $ | 7,505 |

| | |
|---|---|
| $ | 4,290 |
| $ | 7,143 |
| $ | 4,862 |
| $ | 7,000 |
| $ | 4,298 |
| $ | 4,290 |
| $ | 4,290 |
| $ | 4,572 |
| $ | 4,290 |
| $ | 4,275 |
| $ | 3,249 |
| $ | 7,875 |
| $ | 7,796 |
| $ | 15,778 |
| $ | 21,489 |
| $ | 17,730 |
| $ | 6,627 |

| | |
|---|---|
| $ | 24,008 |
| $ | 7,697 |
| $ | 12,160 |
| $ | 41,287 |
| $ | 4,948 |
| $ | 6,463 |
| $ | 8,338 |
| $ | 7,163 |
| $ | 10,700 |
| $ | 7,596 |
| $ | 10,423 |
| $ | 4,836 |
| $ | 5,017 |
| $ | 5,659 |
| $ | 11,003 |
| $ | 6,190 |

| | |
|---|---|
| $ | 8,102 |
| $ | 10,045 |
| $ | 18,587 |
| $ | 6,447 |
| $ | 8,124 |
| $ | 25,926 |
| $ | 15,695 |
| $ | 24,191 |
| $ | 9,557 |
| $ | 24,191 |
| $ | 6,697 |
| $ | 8,362 |
| $ | 23,999 |
| $ | 52,317 |
| $ | 6,349 |
| $ | 14,881 |
| $ | 4,966 |

| | |
|---|---|
| $ | 5,973 |
| $ | 29,167 |
| $ | 23,252 |
| $ | 5,627 |
| $ | 5,973 |
| $ | 22,331 |
| $ | 12,054 |
| $ | 18,834 |
| $ | 23,252 |
| $ | 17,197 |
| $ | 12,566 |
| $ | 2,251 |
| $ | 4,650 |
| $ | 6,697 |
| $ | 12,970 |
| $ | 8,617 |
| $ | 13,430 |
| $ | 12,054 |

| | |
|---|---|
| $ | 13,430 |
| $ | 12,733 |
| $ | 5,562 |
| $ | 5,006 |
| $ | 3,055 |
| $ | 8,617 |
| $ | 10,906 |
| $ | 19,388 |
| $ | 27,577 |
| $ | 4,582 |
| $ | 6,732 |
| $ | 5,363 |
| $ | 13,745 |
| $ | 31,556 |

| | |
|---|---|
| $ | 9,694 |
| $ | 9,694 |
| $ | 6,311 |
| $ | 10,450 |
| $ | 7,574 |
| $ | 6,697 |
| $ | 6,773 |
| $ | 13,464 |
| $ | 12,151 |
| $ | 33,863 |
| $ | 31,130 |
| $ | 9,524 |
| $ | 11,524 |
| $ | 6,790 |
| $ | 44,464 |

| | |
|---|---|
| $ | 24,466 |
| $ | 23,048 |
| $ | 12,026 |
| $ | 22,881 |
| $ | 16,721 |
| $ | 21,672 |
| $ | 13,349 |
| $ | 5,680 |
| $ | 12,160 |
| $ | 7,408 |
| $ | 3,590 |
| $ | 32,144 |
| $ | 25,397 |
| $ | 5,352 |
| $ | 6,000 |
| $ | 12,042 |
| $ | 28,340 |
| $ | 37,801 |

| | |
|---|---|
| $ | 27,524 |
| $ | 11,688 |
| $ | 26,721 |
| $ | 31,623 |
| $ | 8,078 |
| $ | 40,908 |
| $ | 12,160 |
| $ | 5,940 |
| $ | 20,919 |
| $ | 6,400 |
| $ | 8,640 |
| $ | 6,463 |
| $ | 12,761 |
| $ | 10,730 |
| $ | 9,334 |
| $ | 7,640 |

| | |
|---|---|
| $ | 6,857 |
| $ | 10,244 |
| $ | 33,588 |
| $ | 32,191 |
| $ | 26,741 |
| $ | 28,357 |
| $ | 12,130 |
| $ | 12,130 |
| $ | 12,130 |
| $ | 27,687 |
| $ | 10,318 |
| $ | 44,588 |
| $ | 10,496 |
| $ | 19,048 |
| $ | 23,076 |
| $ | 18,986 |
| $ | 20,364 |

| | |
|---|---|
| $ | 22,784 |
| $ | 15,189 |
| $ | 45,664 |
| $ | 11,360 |
| $ | 7,595 |
| $ | 12,885 |
| $ | 16,107 |
| $ | 18,589 |
| $ | 18,278 |
| $ | 8,106 |
| $ | 13,576 |
| $ | 9,334 |
| $ | 16,202 |

| | |
|---|---|
| $ | 15,744 |
| $ | 28,131 |
| $ | 13,355 |
| $ | 8,520 |
| $ | 8,087 |
| $ | 1,893 |
| $ | 12,004 |
| $ | 11,938 |
| $ | 42,977 |
| $ | 16,256 |
| $ | 20,958 |
| $ | 40,514 |
| $ | 7,448 |

| |
|---|
| $ 8,371 |
| $ 5,580 |
| $ 12,025 |
| $ 9,557 |
| $ 1,986 |
| $ 6,027 |
| $ 6,976 |
| $ 49,480 |
| $ 4,762 |
| $ 23,195 |
| $ 13,906 |
| $ 9,131 |
| $ 10,752 |
| $ 33,863 |
| $ 49,528 |

| | |
|---|---|
| $ | 15,501 |
| $ | 5,959 |
| $ | 304 |
| $ | 5,273 |
| $ | 9,431 |
| $ | 11,574 |
| $ | 9,557 |
| $ | 8,036 |
| $ | 6,952 |
| $ | 10,938 |
| $ | 10,423 |
| $ | 7,594 |
| $ | 11,317 |
| $ | 58,164 |
| $ | 3,307 |
| $ | 5,813 |

| |
|---|
| $ 8,485 |
| $ 22,721 |
| $ 8,419 |
| $ 3,394 |
| $ 15,910 |
| $ 19,092 |
| $ 1,116 |
| $ 1,270 |
| $ 4,464 |
| $ 972 |

$ 3,448,501

Appendix 4.3

# Heritage Tree Removal Application Hamilton Avenue Parcels

# HERITAGE TREE
# REMOVAL APPLICATION

## HAMILTON AVENUE PARCELS

**Peninsula Innovation Partners**
**August 1, 2022**

### TABLE OF CONTENTS

# A.

## ARBORIST REPORT, TREE SURVEY AND VALUATION OF HERITAGE TREES

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: Amendment 6 July 31, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: Hamilton Parcels Tree Survey and Valuation

Scope: Trees are located on three parcels west of Willow Road, identified by Signature Development Group. Three trees behind the Starbucks were not accessible.

## Introduction

Estimated value of the 18 Heritage Trees proposed for removal is $126,500.

Any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction.

## City of Menlo Park Ordinance

Definitions of Heritage Tree: https://www.menlopark.org/DocumentCenter/View/25577/Heritage-tree-ordinance-administrative-guidelines---draft

Section 13.24.080(4)(B) identifies special provisions for an oak tree which is native to California. The city arborist has determined the following species of oak trees are native to California:

• Coast live oak *(Quercus agrifolia)* • Scrub oak *(Quercus berberidifolia)* • Canyon live oak *(Quercus chrysolepis)* • Blue oak *(Quercus douglasii)* • Leather oak *(Quercus dumosa)* • Englemann oak *(Quercus englmannii)* • Oregon white oak *(Quercus garryanna)* • Black oak *(Quercus kellogii)* • Valley oak *(Quercus lobata)* • Shreve oak *(Quercus parvula var. shrevei)* • Oracle oak *(Quercus x morehus)* • Island oak *(Quercus tomentella)* • Interior live oak *(Quercus wislizenii)*

Multi-trunk trees, also known as multi-stemmed trees, with a union above the existing grade is measured by the following steps: 1. Measure the diameter of each trunk at 4.5 feet in height above the ground 2. Add the diameter measure measurement of each trunk and use the sum to determine trunk diameter.

In reference to Section 13.24.090, the monetary value of a replacement tree correlates with the size of the heritage tree trunk diameter (measured from 54 inches above grade). For every heritage tree proposed for removal, it must be replaced by the following replacement tree requirement:

- An oak heritage tree with a trunk diameter of 10 to 15 inches has a minimum replacement tree requirement of one (1) #5 container. The monetary value is $100.

- Any heritage tree with a trunk diameter of greater than 15 inches to 20 inches has a minimum replacement tree requirement of one (1) #15 container. The monetary value is $200.
- Any heritage tree with a trunk diameter of greater than 20 inches to 30 inches has a minimum replacement tree requirement of one (1) 24-inch tree box. The monetary value is $400. 6 PW rev 20200626
- Any heritage tree with a trunk diameter of greater than 30 inches to 40 inches has a minimum replacement tree requirement of one (1) 36-inch tree box. The monetary value is $1,200.
- Any heritage tree with a trunk diameter of greater than 40 inches to 50 inches has a minimum replacement tree requirement of one (1) 48-inch tree box. The monetary value is $5,000.
- Any heritage tree with a trunk diameter of greater than 50 inches has a minimum replacement tree requirement of one (1) 60-inch tree box. The monetary value is $7,000. Applicants shall submit written statements or landscape plans to describe how they will fulfil the replacement tree requirements. The submissions shall include: (a) the replacement tree species, (b) the container size, (c) the planting location, and (d) an in-lieu fee payment, if applicable

## Survey Procedure

Trees Tagged – Each tree was tagged with a metal number tag corresponding with the numbers used in the Excel data sheets in *Appendix 1*.

Data Recorded – Arborists recorded data on tree species, diameter (DBH[1]), tree height, health and structural conditions, Heritage Tree Status, and suitability for retention, and suitability for relocation. Notes were recorded to provide commentary on general conditions.

Scope – Tag #132 does not exist.

## Summary

**North Parcel**

- **Total Trees**: 82 Trees
  - Heritage street tree: n/a
  - Heritage tree: n/a
  - Non-heritage street tree: 25 Trees

- **Trees to be Removed**
  - Heritage street tree: n/a
  - Heritage tree: n/a
  - Non-heritage street tree: 19 Trees
  - Non-heritage tree: 9 Trees

[1] **DBH** is tree diameter measured at 54 inches above soil grade.

- **Trees to Remain**
  - Heritage street tree: n/a
  - Heritage tree: 7 Trees
  - Non-heritage street tree: 6 Trees
  - Non-heritage tree: 41 Trees

**South Parcel**

- **Total Trees**: 59 Trees
  - Heritage street tree: n/a
  - Heritage tree: 11 Trees
  - Non-heritage street tree: 10 Trees

- **Trees to be Removed**
  - Heritage street tree: n/a
  - Heritage tree: 3 Trees
  - Non-heritage street tree: 5 Trees
  - Non-heritage tree: 25 Trees

- **Trees to Remain**
  - Heritage street tree: n/a
  - Heritage tree: 8 Trees
  - Non-heritage street tree: 5 Trees
  - Non-heritage tree: 13 Trees

- **High Value Trees**
  - Coast Redwood – The two stands of redwoods located near the Jack in the Box and west of the Chevron Station are in very good condition. The stand south of the Chevron requires mitigation to address drought stress concerns.
  - Coast Live Oak – Two large (> 20" DBH) *Quercus agrifolia* are in Parcel 2. Tree #48 was noted with significant structural concerns (included bark) and requires pruning to mitigate failure potential. Tree #29 is a nice specimen.

- **Species Diversity** – Ten different tree species were identified.
  - Most Numerous Species – The most numerous species is the Chinese Pistache *(Pistacia chinensis)*, with 39 specimens identified. Sixteen (16) are City Street Trees.
  - Second Most Numerous Species – The Red Maple *(Acer rubrum)* is the second most numerous species, with 19 specimens identified. Most are doing well and exhibit good health and structure. Three additional trees were noted behind the Starbucks but were inaccessible due to fencing.

**Table 1** – The table below provides a breakdown of numbers of each tree species surveyed.

| | Species | Common Name | Total Amount | Heritage Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Acer rubrum* | Red Maple | 19 | 0 | G | F | Overall trees are in Good condition in health and structure. #61 and #116 are in poor condition; |
| **2** | *Betula nigra* | River Birch | 4 | 0 | G | F | No issues |
| **3** | *Betula pendula* | European Birch | 13 | 0 | F-G | F | All located at the Chevron parcel |
| **4** | *Fraxinus oxycarpa 'Raywood'* | Raywood Ash | 9 | 0 | P | P | Ash dieback and poor structures |
| **5** | *Pistacia chinensis* | Chinese Pistache | 39 | 0 | G | F | 23 are street trees; Ones noted as failure to thrive were likley root bound at time of planting |
| **6** | *Platanus x hispanica* | London Plane | 16 | 0 | G | F-P | Most along Willow Rd in front of the Chevron and Starbucks; eight (#63, 64 126-131) are street trees |
| **7** | *Prunus cerasifera* | Purple Plum | 13 | 0 | P | P | Received poor pruning; Poor structures; #62 is a street tree |
| **8** | *Pyrus calleryana* | Flowering Pear | 5 | 0 | F | P | Poor structures; Fireblight |
| **9** | *Quercus agrifolia* | Coast Live Oak | 7 | 5 | G | P | #29 and 48 are large trees; #48 requires pruning mitigation to address poor branching attachments and failure potential |
| **10** | *Sequoia sempervirens* | Coast Redwood | 16 | 13 | G | P | Stands #19-22 and #95-102 are in good condition; #108-111 may require mulch and supplemental irrigation to mitigate signs of drought stress |
| | | | **141** | **18** | | | |

# Tree Valuation, Source and Methodology

This tree valuation report was prepared according to the standards for tree valuation presented in the 10th Edition of GUIDE FOR PLANT APPRAISAL, published by the International Society of Arboriculture, 2019.

Information regarding tree species is from the publication: SPECIES CLASSIFICATION AND GROUP ASSIGNMENTS, published by the International Society of Arboriculture.

Tree valuation is determined by using the FUNCTIONAL REPLACEMENT METHOD, *Trunk Formula* Technique as the tree is larger than the standard 24” box size utilized in tree valuation.

**Reproduction Method using Trunk Formula Technique for Determining Tree Value**

The current price for a 24-inch box tree, installed in the landscape, is $516 (Council of Tree & Landscape Appraisers). Value is affected by tree species, tree condition and the location in which the tree is growing. The terms below are used is the valuation in the table below.

- **Species** – Species qualities are determined through the publication Species Classification And Group Assignment published by the WESTERN CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE. Tree species classification is used to determine the relative size of a replacement tree of a commonly attainable size.
    - **Species Group** – The group rating reflects the rate of growth for the tree species. The group rating determines the *basic price per square inch* of the trunk area for the different species.

- **DBH** - Diameter at Breast Height, measured at 4.5 feet above the average soil grade. Tree valuation is based upon DBH measurements. For multi-stemmed trees, this is based on calculations from the sum of the cross-sectional areas of all stems measured at 4.5 above grade. That figure is then matched with a DBH of a single stemmed tree with the same cross-sectional area.
- **Trunk Area** – The surface area of the cross-sectional area of the tree trunk measured at 4.5 feet above the soil grade (DBH).
- **Tree Condition** – Assessed base upon tree Health, Structure & Form.

| Rating | Rating | Amount |
|---|---|---|
| G | G | 0.9 |
| G | F/G | 0.85 |
| G | F | 0.8 |
| G | F/P | 0.7 |
| G | P | 0.6 |
| F | F/G | 0.75 |
| F | F | 0.7 |
| F | F/P | 0.6 |
| F | P | 0.5 |
| P | F/G | 0.55 |
| P | F/P | 0.4 |
| P | P | 0.2 |
| F/G | F/G | 0.8 |
| F/G | F/P | 0.65 |
| F/P | F/P | 0.45 |

- **Functional Limitations** – Factors within the controllable area that adversely impact the tree. All trees were given variable scores based on proximity to hardscape.
- **External Limitations** – Adverse impacts beyond control of tree owner is the presence of the adjacent structure that limits the spread of the tree and will require pruning to accommodate.
- **Replacement Tree Diameter** – The diameter of the largest commonly available tree of the same species.
- **Cross-sectional area of Replacement tree** - Based upon diameter of replacement tree for 24" box size.
- **Replacement Tree Cost** – Standard cost for purchase of replacement tree. Normal is $200 for 24-inch size box tree.
- **Unit Tree Cost** – This is the cost of the tree divided by the cross-sectional area.
- **Basic Reproduction Cost** – The cross-sectional area of the tree being valued times the Unit Tree Cost.
- **Species Price per Square Inch**. – Determined from Species Group rating.
- **Depreciated reproduction cost** – Factor in Tree Condition, Functional Limitations & External Limitations.
- **Additional Costs** – Covers tree removal and cleanup prior to replanting.
- **Tree Value** – Total assessed value of the trees is to the nearest $100.

__Table 2.__ Table below provides methodology for tree appraisal.

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) | Depreciated Reproduction Cost (K*E*F*G) | Tree Value to nearest $100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | *Quercus agrifolia* | 13 | 132.7326 | 0.9 | 0.5 | 1 | 2.2 | 3.8 | 200 | 52.63157895 | 6,986 | $ 3,144 | $3,100 |
| 19 | *Sequoia sempervirens* | 21.5 | 363.05115 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 15,286 | $ 9,630 | $9,600 |
| 20 | *Sequoia sempervirens* | 24 | 452.3904 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 19,048 | $ 12,000 | $12,000 |
| 21 | *Sequoia sempervirens* | 21 | 346.3614 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 14,584 | $ 9,188 | $9,200 |
| 22 | *Sequoia sempervirens* | 17.5 | 240.52875 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 10,128 | $ 6,380 | $6,400 |
| 29 | *Quercus agrifolia* | 23 | 415.4766 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.63157895 | 21,867 | $ 15,744 | $15,700 |
| 48 | *Quercus agrifolia* | 22 | 380.1336 | 0.6 | 0.7 | 1 | 2.2 | 3.8 | 200 | 52.63157895 | 20,007 | $ 8,403 | $8,400 |
| 95 | *Sequoia sempervirens* | 22 | 380.1336 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 16,006 | $ 10,084 | $10,100 |
| 96 | *Sequoia sempervirens* | 16.5 | 213.82515 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 9,003 | $ 5,672 | $5,700 |
| 97 | *Sequoia sempervirens* | 17 | 226.9806 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 9,557 | $ 6,021 | $6,000 |
| 99 | *Sequoia sempervirens* | 15 | 176.715 | 0.9 | 0.7 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 7,441 | $ 4,688 | $4,700 |
| 101 | *Sequoia sempervirens* | 22 | 380.1336 | 0.9 | 0.6 | 1 | 2.46 | 4.75 | 200 | 42.10526316 | 16,006 | $ 8,643 | $8,600 |

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional | External | Replaceme nt Tree | Replaceme nt Tree | Replaceme nt Tree | Unit Cost (I/H) | Basic Reproducti on Cost | Depreciate d Reproducti on Cost | Tree Value to nearest $100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 102 | *Sequoia sempervire ns* | 17 | 226.9806 | 0.9 | 0.6 | 1 | 2.4 6 | 4.7 5 | 200 | 42.1052631 6 | 9,557 | $ 5,161 | $5,200 |
| 104 | *Quercus agrifolia* | 14.5 | 165.1303 5 | 0.9 | 0.7 | 0.7 | 2.2 | 3.8 | 200 | 52.6315789 5 | 8,691 | $ 3,833 | $3,800 |
| 108 | *Sequoia sempervire ns* | 15 | 176.715 | 0.8 | 0.7 | 0.7 | 2.4 6 | 4.7 5 | 200 | 42.1052631 6 | 7,441 | $ 2,917 | $2,900 |
| 109 | *Sequoia sempervire ns* | 18.5 | 268.8031 5 | 0.8 | 0.7 | 0.7 | 2.4 6 | 4.7 5 | 200 | 42.1052631 6 | 11,318 | $ 4,437 | $4,400 |
| 111 | *Sequoia sempervire ns* | 22 | 380.1336 | 0.9 | 0.7 | 0.7 | 2.4 6 | 4.7 5 | 200 | 42.1052631 6 | 16,006 | $ 7,058 | $7,100 |
| 122 | *Quercus agrifolia* | 14 | 153.9384 | 0.9 | 0.5 | 1 | 2.2 | 3.8 | 200 | 52.6315789 5 | 8,102 | $ 3,646 | $3,600 |
| | | | | | | | | | | | | | $126,500 |

## End Report

Appendices are as follows:

- *Appendix 1 – Tree Survey Data*
- *Appendix 2 – Tree Location Map*
- *Appendix 3 – Facebook Tree Protection Specifications*

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# B.

## TREE LOCATION MAP


SBCA Tree Consulting
1534 Rose St. Crockett, CA 94525
steve@sbcatree.com

Phone (510) 787-3075
Fax (510) 787-3065
www.sbcatree.com

# C.

## HERITAGE TREE REMOVAL PLAN


| TREE INVENTORY SUMMARY | | |
|---|---|---|
| Total Trees | | 82 |
| Trees To-Be Removed | | 28 |
| | Heritage Street Tree | N/A |
| | Heritage Tree | N/A |
| | Non-heritage Street Tree | 19 |
| | Non-heritage Tree | 9 |
| Trees To Remain | | 54 |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 7 |
| | Non-heritage Street Tree | 6 |
| | Non-heritage Tree | 41 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

Proposed Parcel Line

Peninsula Innovation Partners

# HAMILTON AVENUE PARCEL NORTH

*Menlo Park, CA*

**Heritage Tree Removal Plan**

August 1, 2022


| TREE INVENTORY SUMMARY | | |
|---|---|---|
| Total Trees | | 59 |
| Trees To-Be Removed | | 33 |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 3 |
| | Non-heritage Street Tree | 5 |
| | Non-heritage Tree | 25 |
| Trees To Remain | | 26 |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 8 |
| | Non-heritage Street Tree | 5 |
| | Non-heritage Tree | 13 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

Proposed Parcel Line

Peninsula Innovation Partners

# HAMILTON AVENUE PARCEL SOUTH

*Menlo Park, CA*

**Heritage Tree Removal Plan**

August 1, 2022

| | Species | Common Name | Total Amount | Heritage Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Acer rubrum* | Red Maple | 19 | 0 | G | F | Overall trees are in Good condition in health and structure. #61 and #116 are in poor condition; |
| **2** | *Betula nigra* | River Birch | 4 | 0 | G | F | No issues |
| **3** | *Betula pendula* | European Birch | 13 | 0 | F-G | F | All located at the Chevron parcel |
| **4** | *Fraxinus oxycarpa 'Raywood'* | Raywood Ash | 9 | 0 | P | P | Ash dieback and poor structures |
| **5** | *Pistacia chinensis* | Chinese Pistache | 39 | 0 | G | F | 23 are street trees; Ones noted as failure to thrive were likley root bound at time of planting |
| **6** | *Platanus x hispanica* | London Plane | 16 | 0 | G | F-P | Most along Willow Rd in front of the Chevron and Starbucks; eight (#63, 64 126-131) are street trees |
| **7** | *Prunus cerasifera* | Purple Plum | 13 | 0 | P | P | Received poor pruning; Poor structures; #62 is a street tree |
| **8** | *Pyrus calleryana* | Flowering Pear | 5 | 0 | F | P | Poor structures; Fireblight |
| **9** | *Quercus agrifolia* | Coast Live Oak | 7 | 5 | G | P | #29 and 48 are large trees; #48 requires pruning mitigation to address poor branching attachments and failure potential |
| **10** | *Sequoia sempervirens* | Coast Redwood | 16 | 13 | G | P | Stands #19-22 and #95-102 are in good condition; #108-111 may require mulch and supplemental irrigation to mitigate signs of drought stress |
| | | | **141** | **18** | | | |

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) | Depreciated Reproduction Cost (K*E*F*G) | Additional Costs | Tree Value to be rounded to nearest $100 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | *Sequoia sempervirens* | 21.5 | 363 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 15,286 | $ 13,758 | 0 | $13,758 | |
| 20 | *Sequoia sempervirens* | 24 | 452 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 19,048 | $ 17,143 | 0 | $17,143 | |
| 21 | *Sequoia sempervirens* | 21 | 346 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 14,584 | $ 13,125 | 0 | $13,125 | |
| 22 | *Sequoia sempervirens* | 17.5 | 241 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 10128 | 9114.774 | 0 | $9,115 | |
| 29 | *Quercus agrifolia* | 23 | 415 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 21867 | 19680.47 | 0 | $19,680 | |
| 48 | *Quercus agrifolia* | 22 | 380 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.6 | 20007 | 12004.22 | 0 | $12,004 | |
| 101 | *Sequoia sempervirens* | 22 | 380 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 16006 | 14405.06 | 0 | $14,405 | $14,405 |
| 102 | *Sequoia sempervirens* | 17 | 227 | 0.9 | 1 | 1 | 2.46 | 4.75 | 200 | 42.1 | 9557.1 | 8601.37 | 0 | $8,601 | $8,601 |
| 122 | *Quercus agrifolia* | 14 | 154 | 0.9 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6 | 8102 | 5833.455 | 0 | $5,833 | $5,833 |
| | | | | | | | | | | | | | | $113,666 | $28,840 |

Appendix 4.4

# Heritage Tree Removal Application 1305 O'Brien Drive

# HERITAGE TREE REMOVAL APPLICATION

## 1305 O'BRIEN DRIVE

**Peninsula Innovation Partners**
**August 1, 2022**

### TABLE OF CONTENTS

# A.

## ARBORIST REPORT,
## TREE SURVEY AND VALUATION OF HERITAGE TREES

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: Amended July 26, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: **1305 O'Brien Drive Tree Survey**

Scope: Arborist surveyed trees within the scope provided by Signature Development Group

## Introduction

Estimated value of the 13 Heritage Trees is $197,400.

Any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction.

## City of Menlo Park Ordinance

"Heritage tree" shall mean:

(A) All trees other than oaks which have a trunk with a circumference of 47.1 inches (diameter of fifteen (15) inches) or more, measured fifty-four (54) inches above natural grade.

(B) An oak tree (Quercus) which is native to California and has a trunk with a circumference of 31.4 inches (diameter of ten (10) inches) or more, measured at fifty-four (54) inches above natural grade.

(C) A tree or group of trees of historical significance, special character or community benefit, specifically designated by resolution of the city council.

For purposes of subsections (5)(A) and (B) of this section, trees with more than one (1) trunk shall be measured at the diameter below the main union of all multi-trunk trees unless the union occurs below grade, in which case each stem shall be measured as a stand-alone tree. A multi-trunk tree under twelve (12) feet in height shall not be considered a heritage tree. (Ord. 1060 § 2 (part), 2019).

## Survey Procedure

Trees Tagged – All 17 trees were tagged with a metal number tag corresponding with the numbers used in the Excel data sheets in *Appendix 1*. Numbering begins with #212 and then skips to #214-229.

Data Recorded – Arborists recorded data on tree species, diameter (DBH[1]), tree height, health and structural conditions, Heritage Tree Status, and suitability for retention, and suitability for relocation. Notes were recorded to provide commentary on general conditions.

## Summary

- **Total Trees**: 17 Trees
  - Heritage street tree: n/a
  - Heritage tree: 13 Trees
  - Non-heritage street tree: n/a

- **Trees to be Removed**
  - Heritage street tree: n/a
  - Heritage tree: 7 Trees
  - Non-heritage street tree: n/a
  - Non-heritage tree: 2 Trees

- **Trees to Remain**
  - Heritage street tree: n/a
  - Heritage tree: 6 Trees
  - Non-heritage street tree: n/a
  - Non-heritage tree: 2 Trees

**Table 1** – The table below provides a breakdown of numbers of each tree species surveyed.

| | Species | Total Amount | Heritage Tree Amount | Street Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Acacia melanoxylon* | 1 | 0 | 0 | 0 | P | Volunteer suckers, growing in fence |
| **2** | *Pinus canariensis* | 5 | 5 | 0 | G | P | Large, beautiful specimens |
| **3** | *Pinus halepensis* | 1 | 1 | 0 | G | G | Large, beautiful specimens, Both display leans |
| **4** | *Platanus hispanica* | 4 | 1 | 0 | F | P | Minimal soil volume |
| **5** | *Pyrus calleryana* | 6 | 6 | 0 | P | P | Poor structures; Fire blight; Trees in parking lot were headed |
| | | **17** | **13** | **0** | | | |

[1] **DBH** is tree diameter measured at 54 inches above soil grade.

# Tree Valuation, Source and Methodology

This tree valuation report was prepared according to the standards for tree valuation presented in the 10th Edition of GUIDE FOR PLANT APPRAISAL, published by the International Society of Arboriculture, 2019.

Information regarding tree species is from the publication: SPECIES CLASSIFICATION AND GROUP ASSIGNMENTS, published by the International Society of Arboriculture.

Tree valuation is determined by using the FUNCTIONAL REPLACEMENT METHOD, *Trunk Formula* Technique as the tree is larger than the standard 24" box size utilized in tree valuation.

### Reproduction Method using Trunk Formula Technique for Determining Tree Value

The current price for a 24-inch box tree is $200. Value is affected by tree species, tree condition and the location in which the tree is growing. The terms below are used is the valuation in the table below.

- **Species** – Species qualities are determined through the publication Species Classification And Group Assignment published by the WESTERN CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE. Tree species classification is used to determine the relative size based upon rate for growth of a replacement tree of a commonly attainable size.
  - **Species Group** – The group rating reflects the rate of growth for the tree species. The group rating determines the *basic price per square inch* of the trunk area for the different species.

- **DBH** - Diameter at Breast Height, measured at 4.5 feet above the average soil grade. Tree valuation is based upon DBH measurements. For multi-stemmed trees, this is based on calculations from the sum of the cross-sectional areas of all stems measured at 4.5 above grade. That figure is then matched with a DBH of a single stemmed tree with the same cross-sectional area.
- **Trunk Area** – The surface area of the cross-sectional area of the tree trunk measured at 4.5 feet above the soil grade (DBH).
- **Tree Condition** – Assessed base upon tree Health, Structure & Form.

| Rating | Rating | Amount | Rating | Rating | Amount |
|---|---|---|---|---|---|
| G | G | 0.9 | F | F/P | 0.6 |
| G | F/G | 0.85 | F | P | 0.5 |
| G | F | 0.8 | P | F/G | 0.55 |
| G | F/P | 0.7 | P | F/P | 0.4 |
| G | P | 0.6 | P | P | 0.2 |
| F | F/G | 0.75 | F/G | F/G | 0.8 |
| F | F | 0.7 | F/G | F/P | 0.65 |
| F | F/P | 0.6 | F/P | F/P | 0.45 |

- **Functional Limitations** – Factors within the controllable area that adversely impact the tree. All trees were given variable scores based on proximity to hardscape.
- **External Limitations** – Adverse impacts beyond control of tree owner is the presence of the adjacent structure that limits the spread of the tree and will require pruning to accommodate.
- **Replacement Tree Diameter** – The diameter of the largest commonly available tree of the same species.
- **Cross-sectional area of Replacement tree** - Based upon diameter of replacement tree for 24" box size.
- **Replacement Tree Cost** – Standard cost for purchase of replacement tree. Normal is $200 for 24-inch size box tree.
- **Unit Tree Cost** – This is the cost of the tree divided by the cross-sectional area.

- **Basic Reproduction Cost** – The cross-sectional area of the tree being valued times the Unit Tree Cost.
- **Species Price per Square Inch**. – Determined from Species Group rating.
- **Depreciated reproduction cost** – Factor in Tree Condition, Functional Limitations & External Limitations.
- **Additional Costs** – Covers tree removal and cleanup prior to replanting.
- **Tree Value** – Total assessed values of the trees are to the nearest $100.

Table 2. Table below provides methodology for tree appraisal.

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) | Depreciated Reproduction Cost (K*E*F*G) | Additional Costs | Tree Value to nearest $100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 214 | *Pyrus calleryana* | 25 | 490.9 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.29 | 43,828 | $21,038 | 0 | 21,000 |
| 215 | *Pyrus calleryana* | 18 | 254.5 | 0.6 | 1 | 1 | 1.69 | 2.24 | 200 | 89.29 | 22,721 | $13,632 | 0 | 12,600 |
| 216 | *Pyrus calleryana* | 22.5 | 397.6 | 0.6 | 1 | 1 | 1.69 | 2.24 | 200 | 89.29 | 35,501 | $21,300 | 0 | 21,300 |
| 219 | *Pyrus calleryana* | 16.5 | 213.8 | 0.6 | 0.7 | 1 | 1.69 | 2.24 | 200 | 89.29 | 19,092 | $ 8,018 | 0 | 8,800 |
| 220 | *Pinus halepensis* | 26 | 530.9 | 0.85 | 0.6 | 1 | 2.2 | 3.8 | 200 | 52.63 | 27,944 | $14,251 | 0 | 19,00 |
| 221 | *Platanus x hispanica* | 15 | 176.7 | 0.7 | 1 | 1 | 2.2 | 3.8 | 200 | 52.63 | 9,301 | $ 6,511 | 0 | 6,500 |
| 222 | *Pinus canariensis* | 24 | 452.4 | 0.6 | 1 | 1 | 2.2 | 3.8 | 200 | 52.63 | 23,810 | $14,286 | 0 | 14,300 |
| 223 | *Pinus canariensis* | 28 | 615.8 | 0.85 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.63 | 32,408 | $22,037 | 0 | 22,000 |
| 225 | *Pyrus calleryana* | 22.5 | 397.6 | 0.6 | 1 | 1 | 1.69 | 2.24 | 200 | 89.29 | 35,501 | $21,300 | 0 | 21,300 |
| 226 | *Pyrus calleryana* | 21 | 346.4 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.29 | 30,925 | $14,844 | 0 | 14,800 |
| 227 | *Pinus canariensis* | 22.5 | 397.6 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.63 | 20,927 | $16,741 | 0 | 16,700 |
| 228 | *Pinus canariensis* | 22.5 | 397.6 | 0.8 | 1 | 1 | 2.2 | 3.8 | 200 | 52.63 | 20,927 | $16,741 | 0 | 16,700 |
| 229 | *Pinus canariensis* | 24 | 452.4 | 0.9 | 1 | 1 | 2.2 | 3.8 | 200 | 52.63 | 23,810 | $21,429 | 0 | 21,400 |
| | | | | | | | | | | | | | | **197,400** |

## End Report

Appendices are as follows:

- *Appendix 1 – Tree Survey Data*
- *Appendix 2 – Tree Location Map*

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# B.

## HERITAGE TREE REMOVAL PLAN


| TREE INVENTORY SUMMARY | | |
|---|---|---|
| **Total Trees** | | **17** |
| **Trees To-Be Removed** | | **9** |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 7 |
| | Non-heritage Street Tree | N/A |
| | Non-heritage Tree | 2 |
| **Trees To Remain** | | **8** |
| | Heritage Street Tree | N/A |
| | Heritage Tree | 6 |
| | Non-heritage Street Tree | N/A |
| | Non-heritage Tree | 2 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

**Peninsula Innovation Partners**

# 1305 O'BRIEN DRIVE

*Menlo Park, CA*

**Heritage Tree Removal Plan**

August 1, 2022

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 214 | *Pyrus calleryana* | Flowering Pear | 25 | | 40 | G | P | 1 | P | P | 25 | | 34" | Cdeb, ripout pruning wounds, fireblight |
| 216 | *Pyrus calleryana* | Flowering Pear | 22.5 | | 40 | G | P | 1 | P | P | 23 | | 52" | Cdeb, |
| 219 | *Pyrus calleryana* | Flowering Pear | 16.5 | | 35 | G | P | 1 | F | P | 17 | | | Old tag#366, Cdeb |
| 220 | *Pinus halepensis* | Aleppo Pine | 26 | | 50 | G | F-G | 1 | G | P | 26 | | 40" | Lean |
| 221 | *Platanus x hispanica* | London Plane | 15 | | 35 | F | F | 1 | F | P | 15 | | | Old tag# 361, cd |
| 222 | *Pinus canariensis* | Canary Island Pine | 24 | | 65 | G | P | 1 | G | P | 24 | | 65" | Cdeb, lean |
| 223 | *Pinus canariensis* | Canary Island Pine | 28 | | 65 | G | F-G | 1 | G | P | 28 | | 60" | Old tag # 356, lean |

Appendix 4.5

# Heritage Tree Removal Application 1330 O'Brien Drive

# HERITAGE TREE REMOVAL APPLICATION

## 1330 O'BRIEN DRIVE

**Peninsula Innovation Partners**
**August 1, 2022**

## TABLE OF CONTENTS

# A.

## ARBORIST REPORT,
## TREE SURVEY AND VALUATION OF HERITAGE TREES

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: Amended July 26, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: **1330 O'Brien Drive Tree Survey**

Scope: Arborist surveyed trees within the scope provided by Signature Development Group

## Introduction

Estimated value of the four Heritage is $53,600.

Any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction.

## City of Menlo Park Ordinance

"Heritage tree" shall mean:

(A) All trees other than oaks which have a trunk with a circumference of 47.1 inches (diameter of fifteen (15) inches) or more, measured fifty-four (54) inches above natural grade.

(B) An oak tree (Quercus) which is native to California and has a trunk with a circumference of 31.4 inches (diameter of ten (10) inches) or more, measured at fifty-four (54) inches above natural grade.

(C) A tree or group of trees of historical significance, special character or community benefit, specifically designated by resolution of the city council.

For purposes of subsections (5)(A) and (B) of this section, trees with more than one (1) trunk shall be measured at the diameter below the main union of all multi-trunk trees unless the union occurs below grade, in which case each stem shall be measured as a stand-alone tree. A multi-trunk tree under twelve (12) feet in height shall not be considered a heritage tree. (Ord. 1060 § 2 (part), 2019).

## Survey Procedure

Trees Tagged – Six (6) trees were tagged and identified within this designated area. Each tree was tagged with a metal number tag corresponding with the numbers used in the Excel data sheets in *Appendix 1*. Numbering begins with #233 and ends with #238.

Data Recorded – Arborists recorded data on tree species, diameter (DBH[1]), tree height, health and structural conditions, Heritage Tree Status, and suitability for retention, and suitability for relocation. Notes were recorded to provide commentary on general conditions.

## Summary

- **Total Trees**: 6 Trees
  - Heritage street tree: n/a
  - Heritage tree: 4 Trees
  - Non-heritage street tree: n/a

- **Trees to be Removed**
  - Heritage street tree: n/a
  - Heritage tree: 3 Trees
  - Non-heritage street tree: n/a
  - Non-heritage tree: 2 Trees

- **Trees to Remain**
  - Heritage street tree: n/a
  - Heritage tree: 1 Tree
  - Non-heritage street tree: n/a
  - Non-heritage tree: n/a

**Table 1** – The table below provides a breakdown of numbers of each tree species surveyed.

| | Species | Common Name | Total Amount | Heritage Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Geijera parviflora* | Australian willow | 4 | 2 | P | P | Poor structures |
| **2** | *Pinus canariensis* | Canary Island Pine | 2 | 2 | G | P | Large, beautiful specimens |
| | | | **6** | **4** | | | |

## Tree Valuation, Source and Methodology

This tree valuation report was prepared according to the standards for tree valuation presented in the 10th Edition of GUIDE FOR PLANT APPRAISAL, published by the International Society of Arboriculture, 2019.

Information regarding tree species is from the publication: SPECIES CLASSIFICATION AND GROUP ASSIGNMENTS, published by the International Society of Arboriculture.

Tree valuation is determined by using the FUNCTIONAL REPLACEMENT METHOD, *Trunk Formula* Technique as the tree is larger than the standard 24" box size utilized in tree valuation.

[1] **DBH** is tree diameter measured at 54 inches above soil grade.

## Reproduction Method using Trunk Formula Technique for Determining Tree Value

The current price for a 24-inch box tree is $200. Value is affected by tree species, tree condition and the location in which the tree is growing. The terms below are used is the valuation in the table below.

- **Species** – Species qualities are determined through the publication Species Classification And Group Assignment published by the WESTERN CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE. Tree species classification is used to determine the relative size based upon rate for growth of a replacement tree of a commonly attainable size.
  - **Species Group** – The group rating reflects the rate of growth for the tree species. The group rating determines the *basic price per square inch* of the trunk area for the different species.

- **DBH** - Diameter at Breast Height, measured at 4.5 feet above the average soil grade. Tree valuation is based upon DBH measurements. For multi-stemmed trees, this is based on calculations from the sum of the cross-sectional areas of all stems measured at 4.5 above grade. That figure is then matched with a DBH of a single stemmed tree with the same cross-sectional area.
- **Trunk Area** – The surface area of the cross-sectional area of the tree trunk measured at 4.5 feet above the soil grade (DBH).
- **Tree Condition** – Assessed base upon tree Health, Structure & Form.

| Rating | Rating | Amount | Rating | Rating | Amount |
|---|---|---|---|---|---|
| G | G | 0.9 | F | F/P | 0.6 |
| G | F/G | 0.85 | F | P | 0.5 |
| G | F | 0.8 | P | F/G | 0.55 |
| G | F/P | 0.7 | P | F/P | 0.4 |
| G | P | 0.6 | P | P | 0.2 |
| F | F/G | 0.75 | F/G | F/G | 0.8 |
| F | F | 0.7 | F/G | F/P | 0.65 |
| F | F/P | 0.6 | F/P | F/P | 0.45 |

- **Functional Limitations** – Factors within the controllable area that adversely impact the tree. All trees were given variable scores based on proximity to hardscape. Tree #236 is impacted by large pine growing overhead.
- **External Limitations** – Adverse impacts beyond control of tree owner is the presence of the adjacent structure that limits the spread of the tree and will require pruning to accommodate.
- **Replacement Tree Diameter** – The diameter of the largest commonly available tree of the same species.
- **Cross-sectional area of Replacement tree** - Based upon diameter of replacement tree for 24" box size.
- **Replacement Tree Cost** – Standard cost for purchase of replacement tree. Normal is $200 for 24-inch size box tree.
- **Unit Tree Cost** – This is the cost of the tree divided by the cross-sectional area.
- **Basic Reproduction Cost** – The cross-sectional area of the tree being valued times the Unit Tree Cost.
- **Species Price per Square Inch**. – Determined from Species Group rating.
- **Depreciated reproduction cost** – Factor in Tree Condition, Functional Limitations & External Limitations.
- **Additional Costs** – Covers tree removal and cleanup prior to replanting.
- **Tree Value** – Total assessed values of the trees are to the nearest $100.

Table 2. Table below provides methodology for tree appraisal.

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) | Depreciated Reproduction Cost (K*E*F*G) | Additional Costs | Tree Value to nearest $100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 233 | *Geijera parviflora* | 18 | 254.4696 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.2857143 | 22,721 | $ 10,906 | 0 | 10,900 |
| 235 | *Pinus halepensis* | 33.5 | 881.41515 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 46,390 | $ 29,690 | 0 | 29,700 |
| 236 | *Pinus canariensis* | 15 | 176.715 | 0.9 | 0.7 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 9,301 | $ 5,859 | 0 | 5,900 |
| 238 | *Geijera parviflora* | 15.5 | 188.69235 | 0.6 | 0.7 | 1 | 1.69 | 2.24 | 200 | 89.2857143 | 16,848 | $ 7,076 | 0 | 7,100 |
| | | | | | | | | | | | | | | $ 53,600 |

## End Report

Appendices are as follows:

- *Appendix 1 – Tree Survey Data*
- *Appendix 2 – Tree Location Map*

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# B.

## HERITAGE TREE REMOVAL PLAN


| TREE INVENTORY SUMMARY | |
|---|---|
| **Total Trees** | **6** |
| **Trees To-Be Removed** | **5** |
| Heritage Street Tree | N/A |
| Heritage Tree | 3 |
| Non-heritage Street Tree | N/A |
| Non-heritage Tree | 2 |
| **Trees To Remain** | **1** |
| Heritage Street Tree | N/A |
| Heritage Tree | 1 |
| Non-heritage Street Tree | N/A |
| Non-heritage Tree | N/A |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

**Peninsula Innovation Partners**

# 1330 O'BRIEN DRIVE

*Menlo Park, CA*

**Heritage Tree Removal Plan**

August 1, 2022

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 233 | *Geijera parviflora* | Australian willow | 18 | | 30 | G | P | 1 | P | P | 18 | | | Large breakout, cdeb |
| 235 | *Pinus halepensis* | Aleppo Pine | 33.5 | | 75 | G | F | 1 | G | P | 34 | | | CD, slight lean |
| 236 | *Pinus canariensis* | Canary Island Pine | 15 | | 50 | G | G | 1 | G | P | 15 | | | |

Appendix 4.6

# Heritage Tree Removal Application 1305 O'Brien Drive Right-of-Way

# HERITAGE TREE REMOVAL APPLICATION

## O'BRIEN ROW

**Peninsula Innovation Partners**
**August 1, 2022**

### TABLE OF CONTENTS

# A.

## ARBORIST REPORT,
## TREE SURVEY AND VALUATION OF HERITAGE TREES

# *SBCA TREE CONSULTING*

**1534 Rose Street, Crockett, CA 94525**
**Phone: (510) 787-3075**
**Fax: (510) 787-3065**
**Website: www.sbcatree.com**

*Steve Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #228**
**CUFC Certified Urban Forester #134**
**CA Contractor License #(C-27) 53367**
**E-mail: steve@sbcatree.com**

*Molly Batchelder, Consulting Arborist*
**WC ISA Certified Arborist #9613A**
**ISA Tree Risk Assessment Qualified**
**E-mail: molly@sbcatree.com**


---

Date: Amendment 2 July 31, 2022

To: Eric Harrison
Senior Vice President
Signature Development Group

Subject: **CITY ROW, O'Brien Drive Tree Survey**

Scope: Arborist surveyed trees within the scope provided by Signature Development Group

## Introduction

Estimated value of the eight Heritage Trees was determined to be $122,000.

Any tree protected by the City's Municipal Code to be retained will require replacement according to its appraised value if it is damaged beyond repair as a result of construction.

## City of Menlo Park Ordinance

"Heritage tree" shall mean:

(A) All trees other than oaks which have a trunk with a circumference of 47.1 inches (diameter of fifteen (15) inches) or more, measured fifty-four (54) inches above natural grade.

(B) An oak tree (Quercus) which is native to California and has a trunk with a circumference of 31.4 inches (diameter of ten (10) inches) or more, measured at fifty-four (54) inches above natural grade.

(C) A tree or group of trees of historical significance, special character or community benefit, specifically designated by resolution of the city council.

For purposes of subsections (5)(A) and (B) of this section, trees with more than one (1) trunk shall be measured at the diameter below the main union of all multi-trunk trees unless the union occurs below grade, in which case each stem shall be measured as a stand-alone tree. A multi-trunk tree under twelve (12) feet in height shall not be considered a heritage tree. (Ord. 1060 § 2 (part), 2019).

## Survey Procedure

Trees Tagged – All 14 trees were tagged with a metal number tag corresponding with the numbers used in the Excel data sheets in *Appendix 1*. Numbering begins with #146-155 and #200-203.

Data Recorded – Arborists recorded data on tree species, diameter (DBH[1]), tree height, health and structural conditions, Heritage Tree Status, Street Tree status, and suitability for retention, and suitability for relocation. Notes were recorded to provide commentary on general conditions.

# Summary

- **Total Trees**: 14 Trees
    - Heritage street tree: 8 Trees
    - Heritage tree: n/a
    - Non-heritage street tree: 5 Trees

- **Trees to be Removed**
    - Heritage street tree: 6 Trees
    - Heritage tree: n/a
    - Non-heritage street tree: 3 Trees
    - Non-heritage tree: n/a

- **Trees to Remain**
    - Heritage street tree: 2 Tree
    - Heritage tree: n/a
    - Non-heritage street tree: 2 Trees
    - Non-heritage tree: 1

**Table 1** – The table below provides a breakdown of numbers of each tree species surveyed.

| | Species | Total Amount | Heritage Tree Amount | Street Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **1** | *Araucaria heterophylla* | 1 | 0 | 0 | F | P | High voltage power lines above; Codominant with included bark |
| **2** | *Eucalyptus camaldulensis* | 3 | 1 | 3 | G, F, P | P | Many are growing under the high voltage wires and pruned for clearance; Good health |
| **3** | *Fraxinus uhdei* | 6 | 4 | 6 | P | P | Seven headed for line clearance; Good health |
| **4** | *Prunus cerasifera* | 1 | 0 | 1 | F-P | P | Dieback, pruning wounds, lean |
| **5** | *Salix spp* | 1 | 1 | 1 | P | P | Volunteer with bunch of suckers |

[1] **DBH** is tree diameter measured at 54 inches above soil grade.

| | Species | Total Amount | Heritage Tree Amount | Street Tree Amount | Overall Retention Suitability | Overall Relocation Suitability | Comments |
|---|---|---|---|---|---|---|---|
| **6** | *Sequoia sempervirens* | 2 | 2 | 2 | G | P | Nice trees; Appear a little off color and drought stressed |
| | | **14** | **8** | **13** | | | |

## Tree Valuation, Source and Methodology

This tree valuation report was prepared according to the standards for tree valuation presented in the 10th Edition of GUIDE FOR PLANT APPRAISAL, published by the International Society of Arboriculture, 2019.

Information regarding tree species is from the publication: SPECIES CLASSIFICATION AND GROUP ASSIGNMENTS, published by the International Society of Arboriculture.

Tree valuation is determined by using the FUNCTIONAL REPLACEMENT METHOD, *Trunk Formula* Technique as the tree is larger than the standard 24" box size utilized in tree valuation.

### Reproduction Method using Trunk Formula Technique for Determining Tree Value

The current price for a 24-inch box tree is $200. Value is affected by tree species, tree condition and the location in which the tree is growing. The terms below are used is the valuation in the table below.

- **Species** – Species qualities are determined through the publication Species Classification And Group Assignment published by the WESTERN CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE. Tree species classification is used to determine the relative size based upon rate for growth of a replacement tree of a commonly attainable size.
    - **Species Group** – The group rating reflects the rate of growth for the tree species. The group rating determines the *basic price per square inch* of the trunk area for the different species.

- **DBH** - Diameter at Breast Height, measured at 4.5 feet above the average soil grade. Tree valuation is based upon DBH measurements. For multi-stemmed trees, this is based on calculations from the sum of the cross-sectional areas of all stems measured at 4.5 above grade. That figure is then matched with a DBH of a single stemmed tree with the same cross-sectional area.
- **Trunk Area** – The surface area of the cross-sectional area of the tree trunk measured at 4.5 feet above the soil grade (DBH).
- **Tree Condition** – Assessed base upon tree Health, Structure & Form.

| Rating | Rating | Amount | Rating | Rating | Amount |
|---|---|---|---|---|---|
| G | G | 0.9 | F | F/P | 0.6 |
| G | F/G | 0.85 | F | P | 0.5 |
| G | F | 0.8 | P | F/G | 0.55 |
| G | F/P | 0.7 | P | F/P | 0.4 |
| G | P | 0.6 | P | P | 0.2 |
| F | F/G | 0.75 | F/G | F/G | 0.8 |
| F | F | 0.7 | F/G | F/P | 0.65 |
| F | F/P | 0.6 | F/P | F/P | 0.45 |

- **Functional Limitations** – Factors within the controllable area that adversely impact the tree. All trees were given variable scores based on proximity to hardscape.
- **External Limitations** – Adverse impacts beyond control of tree owner is the presence of the adjacent structure that limits the spread of the tree and will require pruning to accommodate. Trees #143 and 144 were reduced in value based on high voltage power lines.
- **Replacement Tree Diameter** – The diameter of the largest commonly available tree of the same species.
- **Cross-sectional area of Replacement tree** - Based upon diameter of replacement tree for 24" box size.
- **Replacement Tree Cost** – Standard cost for purchase of replacement tree. Normal is $200 for 24-inch size box tree.
- **Unit Tree Cost** – This is the cost of the tree divided by the cross-sectional area.
- **Basic Reproduction Cost** – The cross-sectional area of the tree being valued times the Unit Tree Cost.
- **Species Price per Square Inch**. – Determined from Species Group rating.
- **Depreciated reproduction cost** – Factor in Tree Condition, Functional Limitations & External Limitations.
- **Additional Costs** – Covers tree removal and cleanup prior to replanting.
- **Tree Value** – Total assessed values of the trees are to the nearest $100.

Table 2. Table below provides methodology for tree appraisal.

| Tree No. | Species | DBH | Trunk Area (TA) | Condition | Functional Limitations | External Limitations | Replacement Tree Diameter | Replacement Tree Area | Replacement Tree Cost | Unit Cost (I/H) | Basic Reproduction Cost (D/J) | Depreciated Reproduction Cost (K*E*F*G) | Tree Value to nearest $100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 146 | *Eucalyptus camaldulensis* | 23.5 | 433.73715 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.2857143 | 38,727 | $ 24,785 | 24,800 |
| 147 | *Fraxinus uhdei* | 18.5 | 268.80315 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 14,148 | $ 9,054 | 10,000 |
| 148 | *Sequoia sempervirens* | 31.5 | 779.31315 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 41,016 | $ 26,251 | 26,300 |
| 150 | *Fraxinus uhdei* | 19 | 283.5294 | 0.7 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 14,923 | $ 8,357 | 8,400 |
| 152 | *Sequoia sempervirens* | 31.5 | 779.31315 | 0.8 | 0.8 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 41,016 | $ 26,251 | 26,300 |
| 154 | *Fraxinus uhdei* | 19 | 283.5294 | 0.6 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.2857143 | 25,315 | $ 12,151 | 12,200 |
| 155 | *Fraxinus uhdei* | 17.5 | 240.52875 | 0.8 | 0.8 | 1 | 1.69 | 2.24 | 200 | 89.2857143 | 21,476 | $ 13,745 | 13,700 |
| 201 | *Salix spp* | 5.5 | 23.75835 | 0.5 | 0.5 | 1 | 2.2 | 3.8 | 200 | 52.6315789 | 1,250 | $ 313 | 300 |

## End Report

Appendices are as follows:

- *Appendix 1 – Tree Survey Data*
- *Appendix 2 – Tree Location Map*

Report submitted by:

*Molly Batchelder, Consulting Arborist*
*WC ISA Certified Arborist #9613A*
*Tree Risk Assessment Qualified (TRAQ)*

# B.

## HERITAGE TREE REMOVAL PLAN


| TREE INVENTORY SUMMARY | |
|---|---|
| Total Trees | 14 |
| Trees To-Be Removed | 9 |
| Heritage Street Tree | 6 |
| Heritage Tree | N/A |
| Non-heritage Street Tree | 3 |
| Non-heritage Tree | N/A |
| Trees To Remain | 5 |
| Heritage Street Tree | 2 |
| Heritage Tree | N/A |
| Non-heritage Street Tree | 2 |
| Non-heritage Tree | 1 |

Note: All tree replacements will meet minimum tree replacement value determined by the arborist, SBCA Tree Consulting, per arborist report dated August 1, 2022.

Peninsula Innovation Partners

# O'BRIEN DRIVE ROW

*Menlo Park, CA*

**Heritage Tree Removal Plan**

August 1, 2022

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 147 | *Fraxinus uhdei* | Shamel Ash | 18.5 | | 35 | G | F | 1 | F | P | 19 | 1 | 28" | Heading cuts, internal decay |
| 148 | *Sequoia sempervirens* | Coast Redwood | 31.5 | | 55 | F | G | 1 | G | P | 32 | 1 | 36" | Recent pruning for clearance, off color, drought stressed |
| 150 | *Fraxinus uhdei* | Shamel Ash | 19 | | 30 | F | F | 1 | P | P | 19 | 1 | 37" | Pruning wounds internal decay, dieback |
| 152 | *Sequoia sempervirens* | Coast Redwood | 31.5 | | 55 | F | G | 1 | G | P | 32 | 1 | 30" | Off color, drought stressed |
| 154 | *Fraxinus uhdei* | Shamel Ash | 19 | | 45 | G | P | 1 | F | P | 19 | 1 | 40" | CDEB, lean, previous tag# 938 |
| 155 | *Fraxinus uhdei* | Shamel Ash | 17.5 | | 45 | G | F | 1 | F | P | 18 | 1 | 5" | Lean, CD, previous tag #937 |

# Appendix 5
# **Air Quality**

**5.1 CEQA Air Quality, Greenhouse Gas and Health Risk Assessment Technical Report**

**5.2 Additional Information Regarding Potential Health Effects or Criteria Air Pollutant Emission Impacts**

**5.3 Air Quality, Greenhouse Gas, and Energy Analysis of the Willow Village Project Variants**

Appendix 5.1

# CEQA Air Quality, Greenhouse Gas and Health Risk Assessment Technical Report

Prepared for
**Peninsula Innovation Partners, LLC**

Prepared by
**Ramboll US Corporation**
**San Francisco, California**

Project Number
**1690010687**

Date
**June 2022**

# CEQA AIR QUALITY, GREENHOUSE GAS AND HEALTH RISK ASSESSMENT TECHNICAL REPORT

## WILLOW VILLAGE

## MENLO PARK, CALIFORNIA

# CONTENTS

## TABLES

## FIGURES



## APPENDICES

# Acronyms and Abbreviations

| | |
|---|---|
| AB32 | Assembly Bill 32 |
| ACC | Advanced Clean Cars |
| AERMET | American Meteorological Society/Environmental Protection Agency Regulatory Model Meteorological Processor |
| AERMOD | USEPA's atmospheric dispersion modeling system |
| APCO | Air Pollution Control Officer |
| ARB | (California) Air Resources Board |
| ASF | Age Sensitivity Factor |
| BAAQMD | Bay Area Air Quality Management District |
| BMP | Best Management Practice |
| Cal/EPA | California Environmental Protection Agency |
| CalEEMod | California Emissions Estimator Model |
| CAP | Criteria Air Pollutant |
| CEQA | California Environmental Quality Act |
| $CH_4$ | methane |
| City | City of Menlo Park, California |
| CO | carbon monoxide |
| $CO_2e$ | carbon dioxide equivalents |
| cREL | chronic reference exposure level |
| CPF | Cancer Potency Factor |
| DPF | Diesel Particulate Filter |
| DPM | Diesel Particulate Matter |
| EIR | Environmental Impact Report |
| EV | electric vehicle |
| EMFAC | EMission FACtor model |
| eVMTs | Electric Vehicle Miles Traveled |
| GHG | Greenhouse Gas |
| g/trip | grams per trip |
| g/s | gram per second |
| HRA | Health Risk Assessment |
| HQ | hazard quotient |
| KPAO | Palo Alto Airport |
| KSQL | San Carlos Airport |
| kWh | kilowatt-hour |
| Lbs | pounds |
| m | meter |
| MAF | modeling adjustment factor |
| MSS | Mobile Source Strategy |
| MEISR | Maximally Exposed Individual Sensitive Receptor |
| NED | National Elevation Dataset |
| NMHC | non-methane hydrocarbon |
| $N_2O$ | nitrous oxide |
| NOx | oxides of nitrogen |
| OEHHA | Office of Environmental Health Hazard Assessment |
| OFFROAD2011 | (ARB) In-Use Off-Road Equipment model |

| | |
|---|---|
| OPR | Office of Planning and Research |
| PCE | Peninsula Clean Energy |
| PG&E | Pacific Gas & Electric |
| PHEV | plug-in hybrid vehicles |
| PM | Fine Particulate Matter |
| $PM_{2.5}$ | Fine Particulate Matter Less than 2.5 Micrometers in Aerodynamic Diameter |
| $PM_{10}$ | Particulate Matter Less than 10 Micrometers in Aerodynamic Diameter |
| Ramboll | Ramboll US Corporation |
| ROG | reactive organic gases |
| RPS | Renewables Portfolio Standard |
| SB | Senate Bill |
| SCAQMD | South Coast Air Quality Management District |
| TAC | Toxic Air Contaminant |
| TDM | Transportation Demand Management |
| TOG | total organic gases |
| tpy | tons per year |
| $\mu g/m^3$ | microgram per cubic meter |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| VMT | vehicle miles traveled |
| VOC | volatile organic compound |
| ZEV | zero-emissions vehicles |

# 1. INTRODUCTION

Ramboll US Consulting Inc. conducted an air quality and greenhouse gas (GHG) assessment for the construction and operation of the proposed mixed-use development at Willow Village in Menlo Park, California (referred to hereafter as the "Proposed Project" or "Project") for Peninsula Innovation Partners, LLC. The scope and methods used in this assessment are consistent with recommended analyses for projects requiring review under California Environmental Quality Act (CEQA). The CEQA analysis in this report addresses criteria air pollutants (CAP) and CAP precursors, GHGs, toxic air contaminants (TACs) and local air quality and health impacts associated with the Project construction and operation at off-site sensitive receptors. For informational purposes, this report also includes analysis of the health impacts associated with Project construction and operation at on-site sensitive receptors. The analysis in this report will be independently reviewed by the City of Menlo Park, California (referred to as the "City") and peer reviewed by ICF, the City's environmental consultant for possible incorporation into the Environmental Impact Report (EIR) for the Project.

This emissions and Health Risk Assessment (HRA) methodology document describes the scope and methodology for evaluation of air quality, GHG, and health impacts from Project construction and operational emissions, and cumulative impacts at on-site and adjacent off-site sensitive receptors. This document also describes the thresholds of significance that were used, which were consistent with the 2017 Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines where appropriate.

## 1.1 Project Description

### 1.1.1 Existing Conditions

The main Project site is a 59-acre plot adjacent to Willow Road between the Dumbarton Corridor and O'Brien Avenue. The Project site also includes three parcels west of Willow Road on both sides of Hamilton Avenue, referred to as the Hamilton Avenue Parcels North and South. The main Project site includes 20 existing office, commercial, industrial and warehouse buildings totalling approximately 1,000,000 square feet, along with associated parking. One emergency diesel generator is currently on-site. The area in the general vicinity of the Project consists primarily of residential, mixed-use, commercial, industrial, and educational/institutional uses. The educational/institutional buildings of Mid-Peninsula High School's campus are adjacent to the Project site to the southwest. To the west is a residential neighborhood. South of the main Project site are mixed-use commercial, industrial, and residential buildings. Though there are commercial operations in the general vicinity of the Project site, there is a lack of amenities in the site vicinity such as grocery stores, pharmacies, and public gathering spaces. **Figure 1** shows the location and boundary of the Proposed Project in Menlo Park and **Figure 2** shows sensitive receptor locations.

### 1.1.2 Proposed Project

The Proposed Project on the main Project Site would be a mixed-use development that would include up to 1,730 residential units, up to 200,000 square feet of retail uses, a 193-room hotel, up to 1,600,000 square feet of space for office and accessory uses consisting of up to 1.25 million square feet of office uses and the balance (350,000 square feet of office use is maximized) of accessory uses, a publicly accessible park, a dog park, a town square, and associated parking spaces.[1] The proposed land use summary is shown in **Table 1**. The main Project Site would consist of three planning districts: The Town Square District, the Residential/Shopping District, and the Campus District. The Town Square District would allow space for a range of activities and events from recreation to seasonal markets. The Residential/Shopping District would provide multifamily rental residences and parking, retail, grocery, and park space. The Campus District is planned to consist of office space organized around a pedestrian promenade as well as accessory space and public-serving retail amenities. The Project also would include the re-alignment of Hamilton Avenue, relocation of the existing services station and addition of retail area on the Hamilton Avenue Parcels North and South. The Project Applicant has committed to powering all buildings entirely by electricity. Natural gas may be used for commercial culinary uses only, as allowed under Menlo Park building code.

Project construction would include demolition of all existing structures (including existing buildings, parking spaces, and other features on the main Project Site) and removal of the generator on-site. It is assumed that the earliest-constructed residential buildings would be occupied during the construction activities associated with the subsequent construction activities and, even though not required by CEQA, future residents are considered as on-site receptors for purposes of this air quality analysis.

The Project would also include off-site improvements. To serve the Project's requested electrical demand, four 12 kilovolt feeders need to be installed from Ravenswood Substation. This includes work at the substation itself, which is northeast of the Project site along Bayfront Expressway, and installing the underground feeders from the substation to the Project. The Project would also include intersection improvements in the form of signal changes, lane stripping, and sidewalk improvements.

Land uses for the existing conditions to be demolished and the Proposed Project are shown in **Table 1**.

## 1.2 Objective and Methodology

The purpose of the air quality and GHG analysis is to assess potential criteria air pollutant and GHG emissions, as well as health risks and hazards that would result from the construction and operation of the Proposed Project consistent with guidelines and methodologies from air quality regulatory agencies, specifically, the BAAQMD, the California Air Resources Board (ARB), the California Office of Environmental Health Hazard Assessment (OEHHA), and the US Environmental Protection Agency (USEPA). The analysis in this report followed the BAAQMD 2017 CEQA Guidelines where appropriate. In addition to the evaluation of an individual project, the CEQA Guidelines recommend an analysis of cumulative impacts when the project's incremental effect is cumulatively considerable. (14 Cal. Code Regs., § 15130, subd. (a).) For an air quality HRA, the cumulative analysis is performed when a project is in an area that includes other air emissions sources within a "zone of influence" of 1,000 feet surrounding the project. This report evaluates the risks and hazards associated with Project construction and operational activities on on-site receptors,

[1] Only actively programmed open space, such as parks, were evaluated in this analysis. The remainder of the open space would not generate new emissions outside emissions covered in other land uses.

off-site receptors and the cumulative impact to both on-site and off-site sensitive receptors from Project construction and surrounding sources.

### 1.2.1 Resources

Ramboll directly or indirectly relied on emissions estimation guidance from government sponsored organizations, government-commissioned studies of energy use patterns, Project-specific studies, and emissions estimation software as described below. In cases noted below, third-party studies were also relied upon to support analyses and assumptions made outside of the approach described above. Where Project-specific data estimates were available, they were used preferentially instead of model defaults. The methodology used to calculate this emissions inventory is described in detail in the following sections, including citations to information used in this inventory.

#### 1.2.1.1 CalEEMod

Ramboll primarily utilized the methodology from the California Emissions Estimator Model (CalEEMod) version 2020.4.0 to assist in quantifying the criteria pollutant emissions in the inventories presented in this report for the Project. CalEEMod is a statewide program designed to calculate both criteria and GHG emissions from development projects in California. This model was developed under the auspices of the South Coast Air Quality Management District (SCAQMD) and received input from other California air districts. It is currently supported by numerous lead agencies for use in quantifying the emissions associated with development projects undergoing environmental review. CalEEMod utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available.

CalEEMod provides a platform to calculate annual operational criteria pollutant emissions from a land use development project. Specifically, the model aids the user in estimating operational emissions associated with a fully built out land use development. This includes emissions from on-road mobile vehicle traffic associated with the land uses, emissions from landscaping equipment and other off-road mobile sources, emissions from natural gas usage in the buildings, emissions associated with electricity usage in the buildings and electricity usage associated with water usage. This also includes emissions associated with solid waste disposal.

CalEEMod uses sources such as the USEPA AP-42 emission factors,[2] ARB's approved on-road and off-road equipment emission models such as the EMission FACtor model (EMFAC) and In-Use Off-Road Equipment model (OFFROAD), and studies commissioned by California agencies such as the California Energy Commission and CalRecycle. OFFROAD is an emission factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment) (CARB 2011a). The off-road diesel equipment emission factors used by CalEEMod are based on the ARB OFFROAD2011 program. ARB has released an updated OFFROAD version, OFFROAD2017, that includes updates to population information and emission factors. OFFROAD2017 was used in this analysis. EMFAC is an emission factor model used to calculate emissions rates from on-road

[2] The USEPA maintains a compilation of Air Pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering estimates. Available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors. Accessed: October 2021.

vehicles (e.g. passenger vehicles) (CARB 2011b). The emission factors used by CalEEMod for on-road vehicles are based on the ARB EMFAC2017 program. ARB recently released EMFAC2021, an update to EMFAC2017, that includes various changes, notably the incorporation of USEPA and ARB regulations and standards (e.g., Advanced Clean Trucks and the Heavy Duty Omnibus). EMFAC2021 was incorporated into this analysis.

In addition, CalEEMod contains default values and existing regulatory methodologies to use in each specific local air district or county. Appropriate state-wide default values can be utilized if regional default values are not defined. Ramboll used default factors for San Mateo County for the emissions inventory, unless otherwise noted in the methodology descriptions below.

## 1.3 Thresholds for Evaluation

### 1.3.1 Criteria Pollutants and Precursors

Project construction and operation emissions of CAPs and precursors were evaluated and compared with the BAAQMD's 2017 CEQA Guidelines thresholds of significance. Project operational emissions at full buildout were compared to the annual and daily operational thresholds of 54 pounds (lbs) per day and 10 tons per year (tpy)of Reactive Organic Gases (ROG), oxides of nitrogen ($NO_X$), and $PM_{2.5}$ and 82 lbs per day and 15 tpy of fine particulate matter less than 10 micrometers in aerodynamic diameter ($PM_{10}$). Project construction emissions were compared to the average daily construction thresholds of 54 lbs per day of ROG, $NO_X$, and $PM_{2.5}$ and 82 lbs per day of $PM_{10}$. BAAQMD thresholds of significance for construction-related $PM_{10}$ and $PM_{2.5}$ mass emissions apply to exhaust emissions only and do not include fugitive dust emissions, which are addressed through BAAQMD's Best Management Practices (BMPs). Because construction would overlap with operations of other components of the Project, emissions during construction were combined with the operational emissions that are expected to occur during that calendar year and then compared to operational thresholds.

As noted above, the BAAQMD threshold for fugitive dust emissions during construction is compliance with its BMPs.

CEQA also requires evaluation of whether the Project would conflict with or obstruct implementation of the applicable air quality plan. Analysis of the Project's consistency with the applicable air quality plan is shown in Appendix A.

### 1.3.2 Greenhouse Gases

BAAQMD's 2017 CEQA Guidelines do not recommend a threshold for GHG emissions from construction. BAAQMD recommends quantifying and disclosing construction GHG emissions. Emissions from Project construction are estimated and disclosed.

BAAQMD's 2017 CEQA Guidelines include a recommendation for a GHG emissions threshold for operations for the year 2020. Since the project will be built out after 2020, this operational threshold is not appropriate for use. Due to lack of a recommended threshold from BAAQMD, the Project is evaluated against a two-tiered threshold that is based on guidance from expert agencies, including CARB and the Office of Planning and Research (OPR).

Building emissions, such as energy use, water use, area sources, and solid waste, are evaluated against a net zero threshold because a project that does not alter the existing environment has no impact on the environment.

GHG impacts from vehicles are evaluated using the City's VMT threshold. This threshold provides information on whether the project is consistent with applicable plans and goals to reduce GHG emissions by reducing VMT, including Plan Bay Area. In addition, using the same VMT threshold for both transportation and mobile-source GHG impacts ensures consistency throughout the EIR.

CEQA also requires evaluation of a project's consistency with an applicable plan, policy or regulation adopted for the purpose of reducing environmental impacts, including plans adopted to reduce the emissions of GHGs. The analysis of the Project's consistency with applicable plans to reduce GHG emissions is shown in Appendix B.

### 1.3.3 Health Risks and Hazards

The HRA evaluates the estimated cancer risk, non-cancer chronic and acute hazard index (HI), and fine particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) concentration associated with construction and operation of the Project. The cumulative analysis estimates the total excess lifetime cancer risks, non-cancer HI, and $PM_{2.5}$ concentrations that are attributable to off-site rail, mobile, and stationary sources within the 1,000-foot "zone of influence" in addition to effects from the construction and operation of the Project.

The HRA evaluates potential sensitive receptor locations including "people—children, adults, and seniors—occupying or residing in:

- Residential dwellings, including apartments, houses, condominiums;
- Schools;
- Daycare centers;
- Parks;
- Hospitals; and
- Senior-care facilities." (BAAQMD 2012a)

To meet these objectives, this HRA was conducted consistent with the following guidance:

- Air Toxics Hot Spots Program Risk Assessment Guidelines (Office of Environmental Health Hazard Assessment [OEHHA] 2015a);
- May 2017 BAAQMD CEQA Guidelines (BAAQMD 2017);
- BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012a); and
- BAAQMD Health Risk Assessment Modeling Protocol (BAAQMD 2020c).

The results of the construction and operational health risk analyses are compared with the BAAQMD 2017 CEQA significance thresholds for single sources separately. Then the impacts from construction and operations combined, during the time that construction and operations would overlap, are compared to the single source thresholds. Finally, the maximum scenario for the combined construction and operational impacts are combined with the impacts of off-site sources of toxic air contaminants TACs and compared against the BAAQMD 2017 CEQA cumulative thresholds. The thresholds are:

Single Source Impacts:

- An excess lifetime cancer risk level of more than 10 in one million;
- Non-cancer chronic and acute HIs greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter (μg/m$^3$).

Cumulative Impacts:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic non-cancer HI greater than 10.0; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 μg/m$^3$.

As discussed in detail in **Section 3**, health impacts from the Project are based on emissions of TACs from diesel and gasoline combustion. Diesel particulate matter (DPM) does not have an acute non-cancer toxicity value, so an acute HI from diesel exhaust is not estimated. BAAQMD does not estimate acute HI from roadways in its Roadway Screening Analysis Calculator (BAAQMD 2015) since impacts from all roadways were well below thresholds.[3] Therefore, acute HI from Project traffic also was not estimated.

We understand the City received guidance from BAAQMD that $PM_{2.5}$ from fugitive dust from earth movement activity during construction should be included in the comparison to the $PM_{2.5}$ concentration threshold, which contradicts previous guidance Ramboll received from BAAQMD. To be conservative, fugitive dust is included in this analysis. Additionally, resuspended road dust from Project traffic is included in this analysis.

### 1.3.4 Odor

To evaluate odor impacts, the ConnectMenlo EIR identifies a three-pronged approach "[r]eview of projects using BAAQMD's odor screening distances during future CEQA review, implementation of the [General Plan Policies], and compliance with BAAQMD Regulation 7 would ensure that odor impacts are minimized and are *less than significant*." (City of Menlo Park 2016)

The Project was evaluated against this three-prong approach in **Section 3**.

## 1.4 Document Organization

This scope of work is divided into seven sections as follows:

**Section 1.0 – Introduction:** describes the purpose and scope of the air quality analysis, the objectives and methodology used, and outlines the document organization.

**Section 2.0 – Criteria Air Pollutant and Greenhouse Gas Emission Estimates:** describes the methods used to estimate CAP, TAC, and GHG emissions from the Project, and includes the Project CAP and GHG emissions results and comparison to the applicable thresholds of significance.

[3] A previous version of BAAQMD's tools for estimating health impacts from roadways stated that the maximum acute and chronic HI from all traffic on roadways was well below 0.1, so screening values were not provided by BAAQMD. In the current version of its tools, acute and chronic HI are not provided.

**Section 3.0 – Estimated Air Concentrations:** discusses the air dispersion modeling, the selection of the dispersion models, the data used in the dispersion models (*e.g.*, terrain, meteorology, source characterization), and identifies receptor locations evaluated in the HRA.

**Section 4.0 – Carbon Monoxide Analysis:** discusses evaluation of potential carbon monoxide impacts.

**Section 5.0 – Odor Analysis:** discusses potential odor sources and the evaluation of the Project against the three-pronged approach proposed in the ConnectMenlo EIR.

**Section 6.0 – Health Risk Assessment :** provides an overview of the methodology for conducting the HRA, and includes the Project HRA results and comparison to the BAAQMD threshold of significance.

**Section 7.0 – Cumulative Analysis:** summarizes the approach used in the HRA cumulative analysis. The analysis of criteria air pollutants and GHG emissions is inherently cumulative.

**Section 8.0 – References:** includes a listing of all references cited in this report.

# 2. CRITERIA AIR POLLUTANT, TOXIC AIR CONTAMINANT, AND GREENHOUSE GAS EMISSION ESTIMATES

Project and net incremental (Project minus Existing) CAP, TAC, and GHG emissions from Proposed Project construction and operational sources were estimated. Methodologies used to calculate CAP, TAC, and GHG emissions are summarized below.

## 2.1 Existing Conditions Calculation Methodology

All CAP, TAC and GHG emissions for existing operations on the Project site were calculated for year 2019 as data from 2020 and 2021 would not be representative of normal operations due to reduced activity resulting from the COVID-19 pandemic. Emissions estimates include activity in existing buildings slated for demolition, use of emergency generators, and traffic associated with these buildings. Existing land uses at the Project site include offices, warehouses, and parking lots, as well as retail at the Hamilton Avenue Parcels North and South. Emissions from existing offices, warehouses, and parking lots slated for demolition were estimated using CalEEMod with default data assumptions and data provided by the Project Applicant. The carbon intensity factor was adjusted for 2019 as described in **Section 2.3.4.1**. Existing retail, located at the Hamilton Parcels North and South, were not included in the existing emissions calculation, which is conservative because any retail that is replaced would likely be more efficient and less emissions intensive than the existing uses due to stricter building codes. Existing emergency generator information was provided by the Project Applicant. Existing operational traffic information was provided by the Transportation Engineer.[4]

## 2.2 Calculation Methodologies for Construction Emissions

A detailed construction equipment list was provided by the Project Applicant, which includes the type, quantity, construction schedule and hours of operation anticipated for each piece of equipment for each year of construction.[5] This data was used to estimate construction emissions using calculation methodologies consistent with CalEEMod2020.4.0. It was assumed that all construction off-road equipment is diesel powered except for those specified as electric powered by the Project Applicant. All diesel-fueled off-road equipment emissions of $PM_{10}$ were assumed to be DPM, which is a TAC.

The Proposed Project construction is assumed to start after project entitlements and last roughly five years.[6] A mix of construction equipment would operate over the course of any given day. **Table 2** shows a summary of the expected construction schedule provided by the Project Applicant. Construction of the Project includes construction on-site and at the off-

---

[4] The Transportation Engineer, Hexagon, provided daily Project VMT and trip rates on October 5, 2021.

[5] This schedule and equipment list is subject to change as Project details evolve. A conservative construction start date and schedule was analyzed to identify maximum impacts of Project construction.

[6] Construction is conservatively assumed to start December 15, 2021. The analysis uses a start date that is earlier than possible to be sure that the impact analysis is conservative. Emissions and impacts would decrease the later the actual construction start date is due to the incorporation of cleaner equipment into the construction fleet with time.

site improvements.[7] Construction emissions were calculated for off-road equipment, on-road vehicles, and off-gassing activities.

As discussed in **Section 1.3.1**, BAAQMD thresholds for fugitive dust are compliance with its Best Management Practices. However, as discussed in **Section 1.3.3**, emissions from fugitive dust are included in the estimation of $PM_{2.5}$ concentration.

### 2.2.1 Construction Phasing

The analysis described here does not rely on the default construction phasing schedule from CalEEMod, as a detailed schedule was provided by the Project Applicant. **Table 2**, provided by the Project Applicant, summarizes the expected construction schedule.

This analysis assumes that construction of buildings will overlap, that the complete build out would occur in roughly five years and that the buildings constructed would be occupied and fully operational as soon as construction of each building is completed. This is conservative because occupancy and operation of each building would likely ramp up over time, rather than immediately upon completion of construction. The analysis also assumes that operational emissions from completed buildings would overlap with construction emissions from buildings that are still being constructed.

The construction program would commence after existing uses have vacated from the Willow Village site.[8,9] The preliminary construction schedule assumes that construction would begin after project entitlements and would last for roughly five years, as indicated in **Table 2**. Construction diesel equipment would be expected to operate between the hours of 7 AM to 6 PM, consistent with the Menlo Park noise ordinance,[10] with construction with heavy duty equipment exceeding 60 decibels (dBA) occurring Monday through Friday from 8 AM to 6 PM. However, equipment would not be expected to run its engine during this entire period. The equipment list for the construction of the Campus and Town Square Districts is shown in **Table 3**. The equipment list for the construction of the Residential/Shopping District is shown in **Table 4**.

Initial construction activities affecting the full site area include demolition of the existing buildings and parking lots, followed by grading and utilities.

### 2.2.2 Emissions from Diesel Construction Off-road Equipment

Emissions calculations associated with off-road construction equipment were based on the construction schedule and the type, size, fuel type, tier level, hours of operation and

---

[7] Off-site improvements considered are construction at the Ravenswood Substation, underground installation of the feeder lines, and intersection improvements that include diesel equipment operation.

[8] The existing dialysis center may remain open for several months after demolition commences. If this were to occur, changes to the analysis would be negligible. The dialysis center would not be considered a sensitive receptor based on BAAQMD guidance, so the impacts of construction on the dialysis center do not need to be analyzed. The existing operational emissions associated with the dialysis center remaining and the shifting of emissions from the demolition of the dialysis center would not change conclusions as these would be minor changes.

[9] The analysis only considers net new retail in the Hamilton Avenue Parcels North and South, so does not consider the existing retail in this area to be vacated.

[10] Construction activity is assumed to start at 7 AM to conservatively consider more morning hours in the dispersion analysis, but no equipment will be operated that would violate the Menlo Park noise ordinance, which has low noise level thresholds for construction equipment prior to 8 AM.

utilization factor for each piece of equipment submitted by the Project Applicant. A Project-specific construction equipment list is presented in **Table 3** and **Table 4**.[11] For diesel-powered off-road construction equipment, methodologies consistent with CalEEMod are used to estimate emissions. Where Project-specific equipment information was not available, CalEEMod default horsepower were used. Load factors for each piece of equipment were based on the default load factor from CalEEMod.

The CalEEMod methodology for off-road construction equipment emissions relied on the ARB In-Use Off-Road Equipment model (OFFROAD2011) as well as specific emission factors by engine tier. However, ARB released a new version of its off-road emissions estimator model, OFFROAD2017, which was used to estimate emissions from the Project. Emission factors from OFFROAD2017 that are used in this analysis are shown in **Table 5**.

Emissions are calculated outside of CalEEMod using the same methodologies and emissions factors as CalEEMod. Emissions were calculated using the following formula, which is consistent with CalEEMod.

$$E_C = \sum (EF_C * HP * LF * Hr * Red * C)$$

Where:

$E_C$: off-road equipment exhaust emissions in pounds (lbs.)

$EF_C$: emission factor (g/bhp-hr) (CalEEMod defaults)

HP: equipment horsepower (CalEEMod defaults or Project-specific)

LF: equipment load factor (CalEEMod defaults)

Hr: equipment operating hours

Red: reduction from Diesel Particulate Filter (DPF), as applicable

C: unit conversion factor

Unmitigated emissions were based on fleetwide average emission factors from OFFROAD2017, as shown in **Table 5**. For mitigated emissions, emission factors from CalEEMod associated with Tier 4 final engines are used for 95 percent of the equipment operation before residents move on-site in Year 5 and 98 percent of the equipment after residents move on-site in Year 5. The other 5 percent and 2 percent of equipment (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Mitigated emission factors are based on the weighted average of 95 percent and 98 percent (before and after on-site residents, respectively) Tier 4 final emission factors and 5 percent and 2 percent (before and after on-site residents, respectively) Tier 2 emission factors, since all equipment may not be available as Tier 4 final. This equates to equipment with Tier 2 engines or better operating for up to 618,028 horsepower-hours before residents occupy the on-site buildings and up to 34,716 horsepower-hours after residents occupy the on-site buildings.

---

[11] Emissions are not estimated for intersection improvements without diesel equipment use. Emissions are assumed to be minor since the activity duration is short and trucks would not be idling at the intersection for long periods of time. Travel to the site is assumed to be included in the worker trip counts.

### 2.2.3 Emissions from Electric Construction Equipment

GHG emissions from the use of electrical off-road equipment were estimated based on type and usage of each equipment. The Project Applicant provided the equipment that will be electrically powered. Yearly electricity consumption by construction equipment was estimated to calculate emissions by multiplying the carbon dioxide equivalents ($CO_2e$) intensity factor with the electricity consumption for each year. Emissions from electric construction equipment are shown in **Table 6**.

### 2.2.4 On-road Construction Trips

Construction trip rates were provided by the Project Applicant for each general area. Construction trips by area are shown in **Table 7a**. Trip lengths are shown in **Table 7b**. For demolition and grading hauling trip generation rates, total haul truck trip counts were provided by Project Applicant.

Emission factors from EMFAC2021,[12] the ARB Emission Factors model for on-road emissions, were used for emissions of CAPs and GHGs. The emission factors used for on-road construction trips of the Proposed Project cover the anticipated years of construction. EMFAC2021 incorporates the Pavley Clean Car Standards and the Advanced Clean Cars (ACC) program.

Running exhaust, running loss, tire wear, and brake wear emission factors were estimated with a gram/mile factor. These emissions were calculated as shown below:

$$E_M = \sum (EF_M * VMT)$$

Where:

VMT or Vehicle Miles Traveled: Trip Length*Trip Number

$EF_M$: emission factor (g/mile) from EMFAC2021

Emissions from vehicle idling exhaust, starting exhaust, and evaporative emissions were estimated with a gram/trip emission factor. Idling emission factors were only estimated for heavy duty trucks as idling emissions occur during extended idling events while the truck is operating but not traveling any significant distance (e.g., during loading and unloading). In EMFAC2021, an extended idling event is defined as "a continuous segment of vehicle activity that meets three criteria: all instantaneous vehicle speeds being lower than 5 mph, the total distance of less than 1 mile, and the total duration of more than 5 minutes" (CARB, 2021). EMFAC takes account of idling emissions from light duty vehicles and other vehicle types in running emissions estimates. These emissions were estimated as shown below:

$$E_T = \sum (EF_T * Trip\ Number)$$

Where:

$EF_T$ = emissions factor (g/trip) from EMFAC2021.

[12] ARB has published off-model adjustment factors to account for the "Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program" (SAFE 1) adopted by the USEPA and the National Highway Traffic Safety Administration (NHTSA). These adjustment factors will not be incorporated into this analysis as this regulation is currently under litigation and the USEPA and NHTSA have proposed rulemakings to repeal SAFE 1.

Trip Number = trips provided by Project Applicant

Idling time is modeled to be consistent with California Airborne Toxics Control Measure (ATCM) to limit diesel-fueled commercial motor vehicle idling (California ARB 2016).

Road dust emissions are calculated using ARB methodology. The on-road entrained dust emission factor derivation is shown in **Table 8**.

### 2.2.5 Fugitive Dust

Fugitive dust contributes to $PM_{10}$ and $PM_{2.5}$ emissions and is generated by the various activities occurring at the Project site. The following subsections describe the methodology used to calculate fugitive dust emissions from Project activities.

Fugitive dust emissions are not included in the comparison to thresholds for mass emissions as these thresholds for construction are for exhaust only. However, to be conservative, fugitive dust emissions are included in the estimation of $PM_{2.5}$ concentration based on recent guidance provide to the City by the BAAQMD.

#### 2.2.5.1 Demolition

Fugitive dust emissions from mechanical dismemberment and debris loading during demolition were estimated using CalEEMod methodology and assumptions. The emission factor is calculated on a per-ton of building waste weight. Building waste weight was estimated based on the volume of building waste from demolition provided by the Project Applicant. Mitigated emissions assume a 55% reduction due to watering two times a day. Dust emissions from demolition are presented in **Table 9a.**

#### 2.2.5.2 Grading

Fugitive dust emissions from grading equipment (i.e., graders and scrapers) occur during the grading and utility phases. Grading emissions were estimated using CalEEMod methodology and assumptions. The emission factor for grading is calculated on a per-VMT basis. Equipment VMT was calculated using the maximum area disturbed per day, based on Project-specific data and CalEEMod default assumptions. Mitigated emissions assume a 55% reduction due to watering two times a day. Grading emissions are presented in **Table 9b.**

#### 2.2.5.3 Material Loading

Fugitive dust from material loading activities includes the unloading of materials construction and loading of soil onto the haul trucks during the grading and utilities excavation phases. Material loading fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for material loading is calculated on a per-ton basis. Material loaded in cubic yards is based on Project-specific data. Mitigated emissions assume a 55% reduction due to watering two times a day. Emissions from material loading are presented in **Table 9c.**

### 2.2.6 Watering for Dust Control

GHG emissions associated with the electricity consumed during watering for construction dust control were calculated based on the total water consumption, electricity used for watering, and the electricity carbon intensity for water supply, distribution and treatment over the construction period using CalEEMod equivalent methodologies. Total water consumption is from the Project Applicant. The electricity intensity used is Pacific Gas and

Electric's (PG&E) GHG emission factor.[13] Emissions from construction water use are presented in **Table 10**.

CAP and GHG emissions from water trucks operation were calculated using EMFAC2021 emission factors with other on-road construction trips as described in **Section 2.2.4**.

### 2.2.7 Architectural Coatings and Paving Off-Gas Emissions

Emissions from architectural coating and paving off-gas emissions were estimated using methodologies consistent with CalEEMod.

Paving emissions were based on the square footage of roadway and parking lots that need to be paved. This square footage was provided by the Project Applicant. The parking lot and the estimated square footage of roadways were summed together to determine the overall paved surface area assumed for the Project. This was used to calculate asphalt off-gassing emissions from the Project using default CalEEMod methodologies and factors, as shown in **Table 11**.

Architectural coating emissions were based on the square footage of different land uses as well as CalEEMod defaults regarding the amount of coated areas for the various land uses, as shown in **Table 12**. Unmitigated emissions from architectural coating during Project construction assumed compliance with BAAQMD paint volatile organic compound (VOC) regulations, while mitigated emissions assume that Project indoor painting during construction will utilize super-compliant coatings, which are paints that have been reformulated to exceed the SCAQMD's Rule 1113 (Architectural Coatings) requirements.

### 2.2.8 Construction CAP and GHG Emissions Summary

A summary of maximum annual average daily construction CAP emissions is shown in **Summary Table A**, below. More detail on unmitigated construction CAP emissions from the Project are summarized in **Table 13** and mitigated construction CAP emissions from the Project are summarized in **Table 14**. CAP emissions are reported in units of annual average daily emissions for each year of construction. For construction that will occur throughout the full year, annual emissions were averaged over 365 days of construction each year to give average daily emissions in lbs per day to get an average emission rate to compare against thresholds. [14] Construction will not occur throughout the full year during the first and last years of construction. In these scenarios, the annual construction emissions for the first and last years were averaged over the number of days construction will occur in the respective year. Mitigated emissions assume 95 percent of construction equipment before residents move on-site and 98 percent of construction equipment after residents move on-site has Tier 4 Final engines. The remaining equipment could have Tier 2 engines or better. Mitigated emissions also assume indoor painting during construction will utilize super-compliant coatings, which are paints that have been reformulated to exceed the SCAQMD's Rule 1113 (Architectural Coatings) requirements.

---

[13] The Project would receive its power from Peninsula Clean Energy. However, the electricity to pump water from its source to the Project is not under control of the Project, so the carbon intensity of electricity from PG&E powered electricity will be used.

[14] Activity is expected on most Saturdays. Even if 6 days per week (312 days per year) were used to average emissions, conclusions would not change.

Total GHG emissions for construction are summarized in **Table 15**. GHG emissions are reported in total metric tons of carbon dioxide equivalents.

**Summary Table A. Summary of Maximum Annual Average Daily Construction CAP Emissions and Annual Construction GHG Emissions**

| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
|---|---|---|---|---|---|
| | lb/day | | | | MT/year |
| BAAQMD Threshold of Significance | 54 | 54 | 82 | 54 | N/A |
| Unmitigated Emissions | 63 | 124 | 5.8 | 5.4 | 23,050 |
| *Exceed Threshold?* | *Yes* | *Yes* | *No* | *No* | *N/A* |
| Mitigated Emissions | 28 | 47 | 0.78 | 0.77 | 23,050 |
| *Exceed Threshold?* | *No* | *No* | *No* | *No* | *N/A* |
| Source: Table 13, Table 14, and Table 15 | | | | | |

## 2.3 Calculation Methodologies for Operational Emissions

The net (Project minus Baseline) CAP, GHG and TAC operational emissions were evaluated. Sources of operational emissions from the existing site improvements (Baseline) and Project include operation of the buildings (area, energy, water, waste), emergency diesel generators, and on-road vehicles. The Baseline condition has one emergency diesel generator, and the Project would have thirteen emergency diesel generators.

Operational emissions that are concurrent with construction activities are presented by year in order to determine the combined construction and operational emissions for each year of construction, as discussed further in **Section 2.4**. Partial buildout emissions for both operational and mobile sources were scaled using the portion of each building area that becomes operational for each year of construction, as shown in **Table 16**.

Project and Baseline operational emissions were estimated using CalEEMod equivalent methodologies, as discussed below.

### 2.3.1 On-road Mobile Sources

Vehicles on the roadway emit CAPs, GHGs[15] and TACs in their exhaust and through evaporation, tire and brake wear, and fugitive dust from roadways. Mobile emissions were calculated using Project-specific trip generation and VMT by vehicle type and emission factors from EMFAC2021 for San Mateo County. To estimate annual emissions, trips and

---

[15] GHG emissions from mobile sources are estimated for informational purposes. GHG impacts are evaluated based on VMT, as discussed in Section 1.3.2.

VMT were multiplied by the relevant emission factor of pollutants. More details on this calculation are provided below. The fleet mix and trip generation for the Project, and the Campus District in particular, are unique to the Project due to the Project's unique Transportation Demand Management (TDM) program, trip cap, and vehicle fleets. Therefore, using generalized approaches in CalEEMod would not appropriately estimate emissions for the Project. Project specific information was used to develop emissions calculations using EMFAC2021 directly.

#### 2.3.1.1 Vehicle Trips and VMT

Project traffic included residential and worker trips as well as service vehicle and vendor trips, and retail and commercial trips. The Transportation Engineer provided project-specific daily vehicle trips and vehicle miles travelled (VMT) for the Campus District and Baseline conditions at the Project site broken down by fleet category and the total daily vehicle trips and VMT in the Town Square and Residential/Shopping District broken down by land use. The trip rates and VMT of the Hamilton Avenue Parcels North and South were provided separately and combined with retail land use totals in the mobile emission calculations. These trip rates account for the Project-specific TDM program proposed for the Campus District, the Town Square District, and the Residential/Shopping District and the trip cap proposed for the Campus District.

We understand the Project's TDM program will reduce the amount of vehicle traffic generated by creating measures, strategies and incentives to encourage workers and residents to use alternate modes of transportation. The TDM measures include, but are not limited to the following measures:

- Improve Biking/Walking Network
- Provide Bicycle Amenities
- Improved public transit service (coordinated with San Mateo County Transit District)
- Car Share Program
- Tram Service
- Commuter Shuttles
- Parking Management
- Emergency Ride-Home Program
- Carpool and Vanpool Programs
- A Commute Assistance Center
- On-Site Housing

The Transportation Engineer provided weekday trip rates provided in Appendix C; therefore average daily trip rates for each land use and fleet category were estimated by scaling the Project specific trip rates with a ratio derived from CalEEMod weekday and weekend trip rates by land use. Average daily trip rates were calculated as a weighted average of the weekday and weekend trip rates. For partial buildout years, the trips and VMT were scaled by the proportion that each land use was operational during each year of construction, as shown in **Table 16.**

The weekday trip rates and daily VMT as provided by the Transportation Engineer are shown in **Table 17**. The trip rates and VMT are summarized in **Table 18** for baseline, full buildout and partial buildout.

Campus District. Trips and VMT for the Campus District were calculated using Project-specific fleet mixes and Project specific trip and VMT information from the Transportation Engineer.

The Project TDM program will employ several methods of reducing vehicle emissions including: commuter shuttles that take workers to and from work, a fleet of trams that move employees between campuses reducing the number of worker cars on the road, and on-demand vehicles that workers can summon for short trips around the campuses. These measures would reduce Campus District VMT. Specific trip rates and VMT were developed for each of these unique fleets and matched with fleet appropriate emission factors. Trams are proposed to operate at the same level of activity as the Baseline conditions; therefore, tram trips and VMTs are not considered in the emissions analysis because no net increase is proposed.

Campus District emissions were broken down into the following categories:

- Cars
- Trucks
- Shuttles
- On-Demand Vehicles

Cars, Trucks, Shuttles, and On-Demand Vehicle fleets are Project-specific fleets associated with the Campus District land use. It is anticipated that the shuttles, and on-demand vehicles will service all of Meta Platforms, Inc, ("Meta") campuses and often make multiple stops on one trip. Trip rates and VMT associated with the Campus District were provided by the Transportation Engineer.

Town Square District and Residential/Shopping District. Trips and VMT for the Town Square District and Residential/Shopping District were also provided by the Transportation Engineer and account for TDM reductions required by the City. These Mixed-Use trips and VMTs are assigned to the San Mateo County Mix fleet type, which includes all vehicle categories. The trips associated with the Hamilton Avenue Parcels North and South are added to the trips associated with the Town Square and Residential/Shopping Districts.

Existing site. Trips and VMT at the existing site were estimated by the Transportation Engineer for the same vehicle categories as the Campus District.

#### 2.3.1.2 Fleet Mixes

As mentioned above, the existing site has, and Campus District is anticipated to have, a unique fleet mix due to Meta's proposed trip cap and extensive TDM program. The vehicle fleets for the Town Square District, Residential/Shopping District, and Hamilton Avenue Parcels North and South are based on the default fleet mix for San Mateo County in EMFAC2021, consistent with the methodology used in CalEEMod. A summary of the fleet mix categories is shown in **Table 19**. Where a mix of EMFAC vehicle categories is used, the mix is based on the ratio of EMFAC2021 VMT for each vehicle type. The Shuttle fleet mix was assumed to be all diesel to conservatively estimate health risks.

#### 2.3.1.3 Emission Factors

Mobile emission factors from running, idling, and starting vehicle exhaust, as well as evaporative running loss, tire wear, and brake wear emissions were calculated using EMFAC2021 in San Mateo County for each of the fleet mix categories. Running exhaust, running loss evaporative, tire wear, and brake wear emissions were determined using factors with units of g/mile while idling and starting exhaust and other evaporative emissions were determined using factors with units of g/trip.

Total emissions from EMFAC2021 were converted to emission factors using the total VMT or trips for the relevant vehicle classes. The average emission factor for each fleet mix category was then calculated using the ratio of VMT or trips between vehicle classes.

Emission factors were calculated for each fleet mix category for the baseline year of 2019, full buildout, and each intermediate year where the Project would be operating concurrent with construction. For the purposes of this analysis, this is assumed to be 2024-2026, consistent with buildout of specific buildings in the construction analysis. The fleet-average mobile emission factors decrease over time due to fleet turnover and regulations such as ACC. For fleet mix categories associated with the Campus District, vehicles are assumed to be either gasoline or diesel, or natural gas in the case of certain vehicles in the fleet for trucks. Electric vehicles (EVs) were not included in the Campus District fleets because Project-specific reductions for vehicle charging were applied later, as discussed in **Section 2.3.2.1.** Emission factors for fleet mix categories associated with the Town Square District, Residential/Shopping District, and Hamilton Avenue Parcels North and South include gasoline, diesel, natural gas, and EVs based on default EV penetration for San Mateo County from EMFAC2021. EVs do not emit CAPs beyond PM from brake wear and tire wear. **Table 20a** and **Table 20b** show the CAP and GHG emission factors from EMFAC that were used in the analysis for Project and Baseline.

Vehicles driving on roadways would also emit $PM_{2.5}$ and $PM_{10}$ in the form of re-suspended road dust as described in **Section 2.2.5**. Road dust $PM_{2.5}$ and $PM_{10}$ emissions were added to exhaust $PM_{2.5}$ and $PM_{10}$ emissions for comparison against BAAQMD’s total operational $PM_{2.5}$ and $PM_{10}$ mass emissions significance thresholds. The re-suspended road dust emission factors are summarized in **Table 8.**

#### 2.3.1.4 Emissions

Emission factors for each vehicle class were multiplied by the annual trips and VMT calculated as described above. For partial buildout years, the emissions were scaled by the proportion that each land use was operational during each year of construction, as shown in **Table 16**.

Mobile CAP and GHG emissions before reductions associated with the EV charging are summarized in **Table 21a** and **Table 21b**.

### 2.3.2 EV Charging Emissions Reductions

The Project will have a comprehensive EV charging network. Emissions reductions associated with the increase in EV miles traveled (eVMTs) due to the addition of EV charging at the Project are taken into account. EVs emit fine particulate matter (PM) brake wear and tire wear at the same rate as other vehicles (per EMFAC2021); therefore, these emissions are excluded from the emissions reductions taken for EVs.

The reductions associated with increased eVMT due to Project charging infrastructure are addressed differently for the Town Square and the Residential/Shopping District and the Campus District. The EV chargers in Town Square and the Residential/Shopping District would be utilized by the general public where there is less control over the use. The Campus District has a comprehensive program to for EV charging for its workers, as discussed below.

The reductions associated with EV charging are based on ARB's VISION program (California ARB 2020), which evaluates various scenarios regarding California's growth and adoption of technologies in the transportation sector. The program has developed and enhanced predictive traffic models since 2012. The VISION traffic models have been used by CARB to support transportation policy decisions and inform air quality and climate planners.

#### 2.3.2.1 EV Charging Emissions Reductions for Campus District

As discussed above, Meta offers an advanced EV charging program to its workers. Charging on campus is free and valets move cars into chargers to maximize charging time. Therefore, the Campus District would be expected to produce more EV penetration in its fleet than would be seen in the general public in the Town Square and the Residential/Shopping District. This is a further benefit to the community because workers can charge their EVs on campus using carbon free electricity instead of in their homes where electricity may not be carbon free.

The Project Applicant provided the annual electricity use for charging at Meta's existing campuses in 2019 in Menlo Park, including the existing charging at the Project site. The existing main Project site electricity use was used to estimate reductions associated with the baseline conditions, as shown in **Table 22**.

The anticipated amount of charging in the Campus District was calculated based on the historical charging in 2019, as shown in **Table 22**. The provided studies were used to calculate an average ratio of kilowatt-hours to square footage from the existing campuses. This ratio was applied to the projected square footage of the Campus District at full buildout to determine anticipated energy usage. To account for expected increases in fleet EV penetration by full buildout, the anticipated energy usage was scaled by the increase in eVMT 2026 in the Mobile Source Strategy (MSS) scenario of CARB's VISION program compared to the percentage of eVMT associated with the existing main Project site. The more aggressive MSS scenario was used to scale the Campus District eVMT because the EV incentives offered by Meta are expected to contribute to greater EV adoption by Meta workers when compared to the fleet average.

The electricity use for charging in baseline and full buildout was used to estimate the number of miles driven by EVs charged at the Campus District based on a fuel economy of 0.30 kilowatt-hours (kWhs) per mile.[16] The eVMT for the Campus District is shown in **Table 22.**

The electricity for EV charging at the Project would be supplied with 100% carbon-free energy, as discussed in more detail in **Section 2.3.2.2.** Mobile emissions for the Campus District were calculated assuming all VMT and trips were gasoline or diesel and then removing the equivalent gasoline or diesel emissions that are replaced by eVMT and EV trips, for both baseline and the Project. Therefore, the associated reductions in CAP and GHG

[16] The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.

emissions are calculated from the replacement of gasoline and diesel-powered vehicles with EVs for the same travel.

### 2.3.2.2 EV Charging Reductions for Town Square and the Residential/Shopping District

The EV chargers installed with the Project in the Town Square and the Residential/Shopping District contribute to emissions reductions due to increased eVMT charged by the Project chargers, similar to reductions associated with the Campus District. However, the Town Square and the Residential/Shopping District is not controlled by one employer, and vehicular travel associated with this area is largely from the general public. Therefore, reductions associated with eVMT were estimated using data derived from statewide trends in ARB's VISION program.

ARB is currently preparing the 2020 MSS model as part of the VISION program to anticipate fleet changes in accordance with the ambitious targets set by recent legislative actions. The new model incorporates the 2020 MSS scenario, which estimates eVMTs reflecting the target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are zero emissions vehicles (ZEV) or plug-in hybrid vehicles (PHEV), and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The emissions reductions associated with this Project were determined to be the difference between the eVMT under the reference or "as-is" scenario and the MSS scenario, since the additional charging infrastructure associated with the Project will be an essential link towards reaching the targets set in the MSS.

As discussed in **Section 2.3.1.1**, the Town Square and the Residential/Shopping District fleet mix is based on EMFAC2021 and includes the default percentage of EV travel. To calculate the respective reductions from the Project chargers in the Town Square and the Residential/Shopping District, the percent of eVMT under the 2020 MSS model was determined for both the reference and MSS scenarios based on the model. The percentage of EV travel in the reference scenario is assumed to be similar to the EV travel in EMFAC2021. Because the 2020 MSS model only accounts for passenger vehicles, the percent of eVMT from the model was multiplied by the percentage of passenger vehicle VMT of the total fleet VMT from EMFAC2021. The resulting percentage, representing the vehicles within the fleet that could use the Project's chargers was then multiplied by the trip rates and VMT associated with the Town Square and the Residential/Shopping District by year. The eVMT offered by the Project chargers was then calculated based on usage assumptions for the charger of 10 hours per day and 365 days per year, where 1 hour of charging offers on average 25 miles of eVMT, as shown in **Table 23**. Charger usage was assumed based on typical operating time for retail charging. However, as shown in Table 23, emissions reductions are limited by projected demand of eVMT and EV trips, not charger availability.

The emissions reductions associated with the installation of the EV chargers in the Town Square and the Residential/Shopping District was calculated using the difference in charger eVMT between the reference and MSS scenarios. The reductions in CAP and GHG emissions were calculated using the emission factors and methodologies described in **Section 2.3.1.3** for the Town Square and the Residential/Shopping District.

The combined EV CAP and GHG emissions reductions from the Campus District and the Town Square and the Residential/Shopping District are shown in **Table 24a** and **Table 24b**. A summary of the total mobile CAP and GHG emissions with and without reductions associated with EV vehicles are in **Table 25a** and **Table25b**.

### 2.3.3 On-site Generators

The Project would include thirteen new emergency generators and the removal of the single existing emergency generator. Project and Baseline emissions for the emergency generators are based on the BAAQMD rule limiting the hours of non-emergency operation for emergency standby diesel engines to a maximum of 50 hours per year of testing and maintenance, which is consistent with the maximum allowed testing time from the ATCM for Stationary Compression Ignition Engines (CARB 2011). $PM_{2.5}$ and $PM_{10}$ emissions were calculated using emission factors based on ARB engine tier standards for diesel generator engines. NOx and ROG emissions were calculated by converting non-methane hydrocarbon (NMHC) emission factor values provided in ARB's Tier standards to the intended emission factors using EPA conversion factors (USEPA 2010) if explicit values are not provided for the specific tier level. When an emission factor was specified as a combined NMHC+NOx factor, the NMHC/NOx ratio of 5%/95% were taken from BAAQMD guidance (BAAQMD 2004). GHG emissions were calculated using CalEEMod default emission factors. All emission factors can be found in **Table 26**. Generator information, such as size of engine, quantity, and engine tier, was provided by the Project Applicant, as shown in **Table 27**. A summary of on-site generator emissions can be found in **Table 27**.

### 2.3.4 Energy

Energy emissions include indirect emissions from electricity used by buildings and direct natural gas combustion emissions. Indirect emissions are typically due to electricity generation from off-site power plant locations. Emissions from natural gas combustion can be generated from commercial usage (e.g., cooking and heating) and industrial usage (e.g., boilers).

CAP and GHG emissions from energy sources at the existing main Project site were evaluated based on energy use at the site in 2019, as shown in Appendix A. Existing land uses at the site include offices, a health center, industrial, commercial, and warehouse buildings, and parking lots. Emissions were estimated using CalEEMod equivalent methodologies with energy usage data provided by the Project Applicant. The carbon intensity factor for 2019 was used as described in **Section 2.3.4.1**.

Electricity usage rates for the Project were provided by the Project Applicant based on Project-specific estimates, as shown in Appendix A, which assume space heating and cooling, domestic hot water heating, and residential cooking equipment would be powered by electricity rather than natural gas. Natural gas would be used in supermarket and restaurant land uses for commercial cooking equipment only. Energy use associated with the net new retail at the Hamilton Avenue Parcels North and South are based on CalEEMod defaults. A portion of the retail in these parcels would be demolished and rebuilt. Evaluating only the net new area is conservative because newer, more energy efficient buildings will replace older buildings built under an older version of building energy code.

In an effort to reduce GHG emissions, the Project would be entirely electrically powered, with the exception of commercial culinary uses. The residential buildings would be entirely electrically powered. Therefore, energy use totals for the Project are based on Project-specific electricity and natural gas usage studies provided by the Project Applicant. A summary of energy use provided is shown in **Table 28**.

The Project also would include the installation of solar PV arrays that would generate about 3,900,000 kWh per year of electricity.

The buildings on the main Project Site also must comply with applicable Menlo Park Municipal Code requirements, stating:

*For all new construction, a project will meet 100 percent of energy demand (electricity and natural gas) through any combination of the following measures:*

(i) *Onsite energy generation,*

(ii) *Purchase of 100 percent renewable electricity through Peninsula Clean Energy or Pacific Gas and Electric Company (PG&E) in an amount equal to the annual energy demand of the project,*

(iii) *Purchase of local renewable energy generation in Menlo Park in an amount equal to the annual energy demand of the project, and*

(iv) *Purchase of certified renewable energy credits and/or certified renewable energy offsets annually in an amount equal to the annual energy demand of the project.*

The Campus District would meet this code requirement by eliminating the use of natural gas, except for culinary purposes (limited to the restaurant uses), and committing to purchasing 100 percent carbon free electricity from Peninsula Clean Energy (PCE).

Portions of the Town Square, Campus, and/or the Residential/Shopping District would include natural gas for cooking in the retail area. To meet this code requirement, the on-site solar would offset any emissions from the natural gas combustion for cooking and any electricity that may not be carbon free.

The compliance method is discussed further in the memorandum from Signature Development Group to the City of Menlo Park dated December 2, 2021 regarding Willow Village 100% Renewable Energy Memo.

The analysis accounts for state laws that require municipal utility providers, such as PG&E, to incrementally increase the percent of electricity it supplies from carbon free sources between now and 2045, when the electricity mix must be 100 percent carbon-free.

#### 2.3.4.1 Electricity

To estimate emissions, the estimated electricity usage of the Project was multiplied by the carbon intensity of the electrical grid. Carbon intensities of electricity are GHG emission rates from a given source in terms of the amount of GHG released in pounds per megawatt hour (MWh) of energy produced and are different depending on the source of electricity.

Electrical power is supplied to the study area by PCE, although the option to purchase electricity from PG&E is available. The carbon intensity from the PCE Standard plan, using the PCE power sources that supply energy under that plan, were used to estimate emissions from existing conditions and is shown in **Table 29**. The PCE Standard plan currently utilizes - and is committed to utilizing 86% renewable sources of energy through 2030.[17]

[17] Peninsula Clean Energy comes from 51% renewable sources, 35% hydroelectric sources and 14% unspecified sources. Unspecified sources were assumed to have the same carbon intensity as the non-renewable PG&E mix of power. Available at: https://www.peninsulacleanenergy.com/energy-sources/

As discussed above, as part of its sustainability strategy, the Project Applicant has committed to purchasing 100 percent carbon free energy from PCE for Campus District uses to reduce its GHG emissions, which is also consistent with the City zoning code. Any electricity in the Town Square, Campus and/or the Residential/Shopping District that is not carbon free would be offset with on-site solar. Therefore, a carbon intensity factor of zero was used for Project emissions.

As discussed above, the on-site solar would produce more electricity than would be needed to offset the non-carbon-free portion of electricity use and the natural gas use. Therefore, the additional electricity generated from the on-site solar PV would offset electricity that would have been generated by the utility, likely through non-renewable sources or peaker plants. The renewable energy generated onsite that is not consumed by the Project would thus be available for other projects, further reducing GHG emissions from electricity for the Project. However, to be conservative, this additional reduction in non-renewable energy was not taken into account in this analysis.

Indirect electricity emissions for the Project were estimated by combining the carbon intensity and projected usage for each year using methodologies consistent with CalEEMod as shown in **Table 30**.

#### 2.3.4.2 Natural Gas

Natural gas combustion emits GHGs and CAPs. Natural gas usage rates are based on Project-specific estimates provided by the Project Applicant and reflect the fact that all buildings would be primarily electric and would use natural gas only for culinary purposes in the supermarket and restaurant land uses. Residential units would be electric, including space heating and cooling, domestic hot water heating, and residential cooking equipment.

As discussed above, compliance with the City Municipal Code requires any natural gas usage to be offset by on-site renewable energy generation, off-site new renewable energy generation or offsets. However, to be conservative, GHG emissions from natural gas combustion are estimated for the Project since the carbon intensity of the reduction in grid electricity production due to the on-site solar is not known at this time.

For years before full buildout, the natural gas used at full buildout was multiplied by the percent of retail land uses that would be completed during each year.

CalEEMod default emission factors for natural gas combustion were used, as shown in **Table 29**. Direct emissions from the combustion of natural gas for both existing conditions and Project conditions can be found in **Table 30**.

### 2.3.5 Water and Wastewater

Water and wastewater use emits GHGs from the electricity used to convey, treat, and distribute water and wastewater and the release of methane ($CH_4$) and nitrous oxide ($N_2O$) directly from the wastewater.

The amount of electricity required to convey, treat, and distribute water depends on the volume of water as well as the sources of the water. Indirect emissions from electricity to supply, treat, and distribute water decrease over time as the average carbon intensity of electricity use decreases due to the California Renewables Portfolio Standard (RPS), a law designed to meet statewide GHG reduction targets. The electricity used to pump the water to the site is not under the control of the Project and therefore cannot be guaranteed to be generated with 100% renewable or carbon free energy from PCE. Therefore, GHG emissions from water transport are based on the carbon intensity of PG&E. The RPS required 33% of electricity supplied by utilities to come from renewable sources by 2020. The RPS was recently expanded with Senate Bill SB 100 to require 60% of electricity to be from renewable sources by 2030 and 100% of electricity to be from carbon neutral sources by 2045 (SB-100 2018). PG&E's estimated carbon intensity factor was adjusted for existing conditions, for each year of concurrent construction and operation and for full buildout based on the criteria established in the California RPS, as shown in **Table 29**.

GHG emissions from water and wastewater sources at the existing site were evaluated based on 2019 data. Existing land uses at the site include retail, offices, a health center, industrial manufacturing, research and development, and warehouse buildings, and parking lots. As discussed above, only net new square footage at the Hamilton Avenue Parcels North and South were included in the Project analysis because that represents the change from existing, baseline conditions.

Water use rates for the Project were provided by the Project Applicant, as shown in **Appendix C**. Water use at the Hamilton Avenue Parcels North and South were estimated using CalEEMod default rates. Summarized usage rates can be found in **Table 31**.

Emissions from water and wastewater use at existing offices, warehouses, and parking lots were estimated using CalEEMod equivalent methodologies with default data assumptions for San Mateo County, based on existing land use areas as listed in **Table 1**.

Water and wastewater emissions are summarized in **Table 32**.

### 2.3.6 Solid Waste Disposal

Indirect GHG emissions associated with waste disposal include $CH_4$ generation from the decomposition of waste and the $CO_2$ emissions associated with the combustion of $CH_4$, if applicable. GHG emissions associated with non-landfill diverted waste streams were not considered because it is generally assumed that these diversions do not result in any appreciable amounts of GHG emissions. Waste diversion alternatives may result in differences in life-cycle emissions of GHGs, but it is not appropriate to combine life-cycle emissions for only one category of emissions.

Biogenic $CO_2$ emissions were not included when the ARB analyzed the GHG emissions inventory under Assembly Bill 32 (AB32). Therefore, they were not included in the emissions inventory.

Emissions from the disposal of solid waste were calculated using default solid waste generation rates from CalEEMod for San Mateo County. In order to reduce waste disposal, Meta diverts 82% of solid waste from landfill disposal.[18] The diverted waste would be composted or recycled. As a result, an 82% reduction was applied to the default solid waste generation rates for the Campus District, as shown in **Table 33**. In 2016, the City implemented zero waste management plan with the goal of diverting 90% of waste from Life Sciences, Office, and Mixed Use Residential zoning districts by 2035 (City of Menlo Park); however, these diversion rates were conservatively excluded from the analysis.

[18] The 82% diversion rate was determined using waste disposal and diversion data for 2019 provided by the Project Applicant via email communication on August 2, 2021, as shown in **Appendix A**.

GHG emissions from solid waste disposal sources at the existing site were evaluated. Existing land uses at the site include offices, a health center, industrial, commercial, and warehouse buildings, and parking lots. Emissions from existing land uses that would be affected by the Project and Project emissions were estimated using CalEEMod equivalent methodologies with default data assumptions based on existing land use areas as listed in **Table 1.**. A diversion rate of 82% was also applied to the existing office building land use since the waste diversion program is currently in place.

Solid waste disposal emissions from both the existing site and the Project can be found in **Table 34**.

### 2.3.7 Area Sources

GHG and CAP emissions from area sources, such as landscaping equipment, consumer products, and architectural coating, were estimated using CalEEMod default values and equivalent methodologies based on the type and size of land uses associated with the Proposed Project. The residential units would not include any hearths, so emissions from hearths were not estimated.

GHG emissions from area sources at the existing site were evaluated for 2019.[19] Emissions were estimated using CalEEMod equivalent methodologies with default data assumptions based on existing land use areas as listed in **Table 1**.

#### 2.3.7.1 Architectural Coating

Operational architectural coatings include the reapplication of paint and coatings on interior and exterior surfaces, which result in emissions of ROGs. CalEEMod default assumptions were used to calculate the building surface area that would be coated, as well as the application rate and indoor and outdoor ROG emission factors based on BAAQMD Regulation 8 Rule 3 paint VOC regulations (BAAQMD 2009). The unmitigated architectural coating emissions are summarized in **Table 35**. Mitigated emissions assume that Project indoor painting will utilize super-compliant coatings, which are paints that have been reformulated to exceed the SCAQMD's Rule 1113 (Architectural Coatings) requirements,[20] as shown in **Table 36**Table 36.

#### 2.3.7.2 Consumer Products

Consumer product emissions come from various non-industrial solvents, including cleaning supplies, kitchen aerosols, cosmetics, and toiletries, which emit ROGs during their use.

CalEEMod provides a statewide consumer products emission factor based on the ARB 2008 emissions inventory. (CAPCOA 2020b) For this analysis, a San Mateo County specific emission factor was developed based on the emissions from consumer products from the ARB 2020 emissions inventory for San Mateo County and the building square footage in the county using the same methodologies utilized in CalEEMod, as shown in **Table 37.**Table 37

---

[19] As discussed above, only net new square footage at the Hamilton Avenue Parcels North and South were included in the Project analysis because "net new" represents the change from baseline.

[20] Assumes "super compliant" architectural coatings for indoor building surfaces based on more stringent VOC limits from South Coast Air Quality Management District (SCAQMD) Rule 1113. South Coast Air Quality Management District. Super Compliant Architectural Coatings per Rule 1113. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings&parent=other-low-voc-products.

The emission factor for the parking area and parks are the default values for the land uses from the CalEEMod User's Guide.

Consumer product emissions are summarized in **Table 38**.

#### 2.3.7.3 Landscaping Equipment

Emissions from landscaping equipment were calculated using CalEEMod and based on information regarding building square footage and acreage, as well as CalEEMod defaults. The recent law (Assembly Bill 1346) banning the sale of gasoline-powered landscaping equipment by 2024 was conservatively not accounted for, since it is unknown how the law will affect emissions due to non-electric equipment already in operation. These emissions are shown in **Table 39** and CalEEMod output files are shown in **Appendix D.**[21]

### 2.3.8 Net Operational CAP and GHG Emissions Summary

As discussed above, the Project would replace existing office, recreational, commercial, industrial and warehouse buildings, and surface parking facilities. Therefore, total operational emissions associated with the Proposed Project are the difference between emissions from the new land uses and emissions from existing land uses that would no longer be present. Existing emissions were subtracted from Proposed Project emissions for total net emissions from the Project. During Project operation, annual operational emissions were averaged over 365 days to give average daily operational emissions.

Net unmitigated and mitigated CAP emissions are summarized in **Table 40** and **Table 41**, respectively. Operational GHG emissions are summarized in **Table 42**. Mobile GHG emissions are 16,766 MT/yr. These emissions are not included in the estimate of net GHG emissions since GHG impacts from mobile sources are evaluated based on VMT, as discussed in Section 1.3.2.

Summary **Table B**, below, summarizes these emissions.

**Summary Table B. Summary of Maximum Annual Average Daily Net Operational CAP Emissions and Annual Net Operational GHG Emissions**

| | **ROG** | **$NO_X$** | **$PM_{10}$** | **$PM_{2.5}$** | **$CO_2e$** |
|---|---|---|---|---|---|
| | lb/day | | | | MT/year |
| BAAQMD Threshold of Significance | 54 | 54 | 82 | 54 | N/A |
| Unmitigated Emissions | 88 | 21 | 37 | 7.0 | -1,056 |
| *Exceed Threshold?* | *Yes* | *No* | *No* | *No* | *N/A* |
| Mitigated Emissions | 80 | 21 | 37 | 7.0 | -1,056 |

[21] CalEEMod was only used to estimate landscape emissions only. Appendix D contains the non-default inputs to CalEEMod used to calculate these landscape emissions.

| | | | | | |
|---|---|---|---|---|---|
| *Exceed Threshold?* | *Yes* | *No* | *No* | *No* | *N/A* |
| Source: Table 40, Table 41, and Table 42. | | | | | |

## 2.4 Combined Construction and Operational Emissions Summary

This analysis conservatively assumed that the buildings constructed in each year of the construction program would be occupied and fully operational upon completion. This is conservative because occupancy and operation of each phase would likely ramp up over time.

Construction is expected to occur during Project operation because the Project will be constructed over a period of several years. In years when construction is scheduled to coincide with Project operation, construction emissions were combined with operational emissions. The combined construction and operational emissions were compared with average daily emissions thresholds, using the 365 days per year to average annual emissions for both construction and operations, as shown in **Table 43** and **Table 44**.[22]

**Summary Table C. Summary of Annual Average Daily Net Construction and Operational CAP Emissions for Maximum Year**

| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| | lb/day | | | |
| BAAQMD Threshold of Significance | 54 | 54 | 82 | 54 |
| Unmitigated Emissions | 97 | 72 | 37 | 7.0 |
| *Exceed Threshold?* | *Yes* | *Yes* | *No* | *No* |
| Mitigated Emissions | 80 | 21 | 37 | 7.0 |
| *Exceed Threshold?* | *Yes* | *No* | *No* | *No* |
| Source: Table 43 and Table 44 | | | | |

## 2.5 Proposed Mitigation Measures

As discussed, several mitigation measures were incorporated into the analysis. The measures are summarized below

[22] As discussed above, activity is expected on most Saturdays. Even if 6 days per week (312 days per year) were used to average emissions for construction, conclusions would not change.

**Architectural Coatings.** The applicant shall use super-compliant architectural coatings during construction and operation for all buildings, which shall have VOC content that meet SCAQMD Rule 1113 Architectural Coatings as revised on February 5, 2016.

**Tier 4 Construction Equipment.** To reduce construction emissions to below the 2017 BAAQMD CEQA Air Quality Guidelines, the Project Applicant shall either:

- Ensure all off-road construction equipment with greater than 25 hp and operating for more than 20 hours total over the entire duration of construction activities have engines that meet or exceed either USEPA or ARB Tier 4 Final offroad emission standards. The exception to this requirement is for a cumulative total 618,028 horsepower-hours over the duration of construction activities before residents move on-site in Year 5 and 34,716 horsepower-hours over the duration of construction activities after residents move on-site in Year 5 can be operated with off-road construction equipment that meets Tier 2 standards or better.

or

- Prior to commencing construction, provide supplemental analysis prepared by a qualified air quality specialist to the City for approval that shows that emissions of ROG and $NO_X$, excess lifetime cancer risk, and $PM_{2.5}$ concentration would not exceed the thresholds from the 2017 BAAQMD CEQA Air Quality Guidelines using the mix of equipment proposed by the applicant.

**Construction Fugitive Dust Emissions.** The following BAAQMD Best Management Practices (BMPs) for fugitive dust control shall be required for all construction activities within the project area. These measures would reduce fugitive dust emissions primarily during soil movement and grading, but also during vehicle and equipment movement on unpaved project sites.

Basic BMPs that Apply to All Construction Sites

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All streets, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of CCR). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action, if necessary, within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

# 3. ESTIMATED AIR CONCENTRATIONS

To evaluate the health risks and concentration of air toxics upon the surrounding community, BAAQMD recommends estimating concentrations using air pollution dispersion modeling. The methodologies used to evaluate emissions for the Proposed Project and cumulative HRA impacts are based on the most recent BAAQMD CEQA Guidelines (BAAQMD 2017) and the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2015a).

## 3.1 Chemical Selection and Sources of Emissions

The Project would emit TACs from the combustion of gasoline and diesel fuels. The cancer risk and chronic non-cancer analyses in the HRA for the Project were based on DPM concentrations from diesel combustion and total organic gases (TOG) concentrations from gasoline combustion.

Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen (California Environmental Protection Agency [Cal/EPA], OEHHA 1998). Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks and non-cancer chronic HI associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks and HI associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (OEHHA 2015b). BAAQMD states "diesel exhaust particulate matter should be used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines" (BAAQMD Rule 2-5).

The Cal/EPA-approved toxicity values for DPM were used to evaluate health impacts from construction and operational diesel fueled sources (Cal/EPA 2020).

Health effects from exhaust and evaporation from gasoline combustion were based on specific TAC emissions. Emissions of TOG from gasoline-fueled vehicles were speciated using organic chemical profiles from BAAQMD as shown in **Table 45** (BAAQMD 2012a).[23] The Cal/EPA-approved toxicity values for each TAC were used to evaluate health impacts from operational gasoline fueled sources (Cal/EPA 2020) as shown in **Table 46**.

There is currently no acute non-cancer toxicity value available for DPM and acute HI from roadways is expected to be minimal, as discussed in **Section 1.3**. Thus, an acute HI from the Project was not estimated.

[23] Speciation profile is from BAAQMD's Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2021a), Table 14, Toxic Speciation of TOG due to Tailpipe Emissions, and Table 15, Toxic Speciation of TOG due to Evaporative Losses.

### 3.1.1 Construction Phase

The cancer risk and chronic hazards in the HRA for the Project construction were based on TAC emissions from off-road diesel construction equipment, on-road vendor vehicles, and on-road diesel hauling trucks. Accordingly, the chemicals evaluated in the HRA for the construction phase were DPM emissions in diesel exhaust and $PM_{2.5}$ emissions from exhaust, tire wear and brake wear, and fugitive dust. DPM emissions are assumed to be equal to exhaust $PM_{10}$ from on- and off-road construction equipment.

Demolition of existing buildings has the potential to release additional TACs from the release of TACs in the buildings themselves. TACs that should be considered in building demolition include lead and asbestos. Before demolition, we understand the potential for lead paint or asbestos will be identified and all lead paint and asbestos will be removed in accordance with ARB and BAAQMD rules and regulations before demolition of the building occurs. Because the lead and asbestos remediation would occur before demolition and construction and would follow all regulations to reduce impacts to below a level of concern, these sources were not included in the HRA.

### 3.1.2 Operational Phase

The cancer risk and chronic non-cancer analysis for the Project operation are based on TAC emissions from on-road traffic and diesel-powered emergency generators. The chemicals evaluated in the HRA include $PM_{2.5}$ emissions (assumed to be engine exhaust from vehicles and generators, and brake wear, tire wear, and entrained dust from vehicles), DPM emissions (assumed to be exhaust $PM_{10}$ from combustion from diesel vehicles and on-site generators) and speciated evaporative and exhaust TOGs from on-road emissions from gasoline vehicles.

BAAQMD recommends evaluating impacts from all roadways with traffic of over 10,000 vehicles per day. Major roadways around the Project site include Bayfront Expressway, University Ave, and Willow Road. In addition, vehicles associated with the Project are also expected to use Adams Drive, Adams Court, and O'Brien Drive. Regardless of whether Project traffic exceeds 10,000 vehicles per day on these roadways, health impacts from Project traffic on these roadways were evaluated at on- and off-site receptors in the vicinity of these roadways.

Project traffic consists of on-site, off-site, and shuttle traffic. Onsite traffic is represented by the Cars fleet type and shuttle traffic is represented by the Shuttles fleet type. Offsite traffic for the Campus District is represented by a unique fleet mix, as described in **Section 2.3.1.1**, which combines Cars, Trucks, On-Demand, and Shuttles fleet types; however, shuttles are represented in its own fleet mix, as described above. Offsite traffic for the Town Square and Residential/Shopping District is represented by the default San Mateo County Mix. A summary of traffic volumes by roadway segment and fleet is summarized in **Table 47.**[24]

All fleet types except the Shuttle fleet mix are expected to contain vehicles that run on both diesel, whose health impacts are evaluated using DPM, and gasoline, whose health impacts are evaluated using evaporative and exhaust TOG. The Shuttle fleet mix is conservatively

[24] An on-site assessment of Hamilton Avenue Parcels North and South was not analyzed because volumes are minor and driving distance on-site are short.

assumed to be comprised of all diesel, as a result, all emissions from the Shuttle fleet mix contain only DPM emissions while emissions from all other fleet types contain both DPM emissions and evaporative and exhaust TOG. The DPM emission factor for Cars, On-Demand, Trucks, and the San Mateo Default Fleet vehicle types was determined from the $PM_{10}$ running and idling exhaust emission factors discussed above. These $PM_{10}$ emission factors account for emissions from both gasoline and diesel; however, DPM emissions are only attributable to diesel-run vehicles. Therefore, the portion of the total $PM_{10}$ that is actually DPM was calculated as the sum of $PM_{10}$ running and idling exhaust emissions from diesel vehicles divided by the sum of all $PM_{10}$ running and idling exhaust emissions for vehicles. A summary of traffic emission factors can be found in **Table 48**.

## 3.2 AERMOD Modeling

The most recent version of the American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD Version 21112) was used to evaluate ambient air concentrations of DPM, $PM_{2.5}$ and TOGs at on- and off-site receptors (USEPA 2021). For each receptor location, the model generates air concentrations that result from emissions from multiple sources. In this case, air dispersion factors as unit emissions were modeled and air concentrations were calculated in a subsequent post-processing step.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological data, topographical data, and receptor parameters. When site-specific information is unknown, default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations were used (USEPA 2021).

### 3.2.1 Meteorological Data

Air dispersion modeling applications require the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. For this analysis, meteorological data collected from Palo Alto Airport (KPAO) and San Carlos Airport (KSQL) were used.

The Palo Alto Airport is located approximately 2.2 miles southeast of the Project site, making it a good candidate for representative meteorological data for dispersion modeling. The meteorological conditions shown in the data from Palo Alto Airport most closely matched on-site measurements observed adjacent to the Project site, which makes it the preferred station for representative data. Unfortunately, like many smaller Automated Surface Observing System (ASOS) stations, meteorological data are only collected during daylight hours. However, the San Carlos Airport collects data 24-hours per day. San Carlos Airport is 6 miles north west of the Project site and is the next closest meteorological station to the Project Site.

In an effort to develop a complete data set, in AERMET the Palo Alto Airport was selected as the "on-site" meteorological station and the San Carlos Airport, was selected as the "surface" station in AERMET. With these assumptions, data from the Palo Alto Airport will be used when available and data from the San Carlos Airport will be used when data is not available from Palo Alto Airport (i.e., non-daylight hours).

Meteorological data from 2012-2016 was used as these years were the most recent years with the most complete data set of meteorological data. A precipitation analysis was performed for both the on-site and surface stations using surface parameters obtained using the latest version of AERSURFACE, v20060. The data were processed using the Adjust U* option (ADJ_U*), a method that reduces overprediction of modeled concentrations that occur in stable conditions with low wind speeds due to underprediction of the surface friction velocity (u*).

### 3.2.2 Terrain and Land Use Considerations

Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey ([USGS] 2013) in NED 1/3 arc sec.

An important consideration in an air dispersion modeling analysis is whether or not to model an area as urban. Due to the proximity of the project to the San Francisco Bay and marshland, the default rural option was used in the modeling. The rural option tends to produce more conservative concentrations than the urban option due to the enhanced turbulence associated with urban environments due to the additional mixing associated with the heat island effect.

### 3.2.3 Building Downwash

Turbulent eddies can form on the downwind side of buildings and may cause a plume from a stack or point source located near the building to be drawn towards the ground to a greater degree than if the building were not present. This is referred to as the "building downwash" effect. The effect can increase the resulting ground-level pollutant concentrations downwind of a building. AERMOD takes this effect into account for sources modeled as point sources. The dimensions and locations of all on-site buildings were used, to allow AERMOD to incorporate algorithms to evaluate the downwash effect on dispersion of point sources. Building heights were obtained from the proposed Willow Village Master Plan Conditional Development Permit (Peninsula Innovation Partners 2021). The direction-specific building downwash dimensions were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME). As discussed in **Section 3.2.5**, point sources were used only to model the Project generators, so building downwash was only evaluated in the Project operational generator modeling.

### 3.2.4 Emission Rates

Emissions were modeled using the $\chi/Q$ ("chi over q") method, such that each source has a unit emission rate (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of micrograms per cubic meter (([µg/m$^3$])/[g/s]). Actual emission rates were multiplied by the dispersion factors to obtain concentrations.

#### 3.2.4.1 Construction Emission Rates

For the construction phase, emitting activities were modeled to reflect the actual hours of the day that construction activity would occur. Emissions were modeled as occurring between 7 AM and 6 PM, consistent with the expected construction hours for the Project.[25] The AERMOD EMISFACT option was used to limit emissions to this time period.

For annual average ambient air concentrations over the construction phase, the estimated annual average dispersion factors were multiplied by the annual average emission rates. The emission rates would vary day to day, with some days having no emissions. To estimate an annual average, the model assumes a constant emission rate during the entire year. Thus,

[25] Construction activity is assumed to start at 7 AM to conservatively consider more morning hours in the dispersion analysis, but no equipment will be operated that will violate the Menlo Park noise ordinance, which has a lower construction noise threshold from 7 AM to 8 AM than from 8 AM to 6 PM.

the average emissions rates were calculated by taking the total mass of emissions and dividing by the hours considered in the model (11 hours per day, 365 days per year). The equipment would be expected to operate at most 8 hours per day, but this 8-hour period can occur anytime in the 11-hour window from 7 AM to 6 PM. Because the exact timing of when the equipment would operate is not known, the eight hours of emissions were averaged over these 11 hours of meteorology. While construction using heavy equipment is expected to generally occur Monday through Friday, the emissions were averaged over 365 days per year as meteorology conditions are not dependent upon day of the week. Weekends were not excluded from the meteorology data in order to generate more representative averages.

#### 3.2.4.2 Operational Emission Rates

Emergency generators were assumed to be tested at any hour of day; as a result, no variable emission rate factor was applied.

Traffic emission rates were calculated based on the actual fleet breakdown, as provided by the Project Applicant. The diurnal pattern of traffic volumes for operations (high volumes during rush hour and during the day, with low volumes overnight) was incorporated using the AERMOD EMISFACT option and percentage of traffic by hour. The traffic by hour was developed using ratios of hourly trip rates from EMFAC2021 in San Mateo County for all vehicle types, as shown in **Table 49**. Traffic by hour for the shuttles were developed using the shuttle schedule, as shown in **Table 49**.

### 3.2.5 Source Parameters

#### 3.2.5.1 Construction Sources

Source location and parameters are necessary to model the dispersion of air emissions. For construction, area sources were used to represent the on-site activity in AERMOD. The on-site construction exhaust sources were modeled with a release height of 5 meters (m) (SCAQMD 2008) and an initial vertical dimension of 1.16 m (USEPA 2019). Fugitive dust sources from grading, demolition, and truck hauling during construction were modeled with a release height of 0 meters and an initial vertical dimension of 1 m (SCAQMD 2008). Construction activity associated with off-site feeder lines were represented as adjacent volume sources. Construction area source group locations are presented in **Figures 3, 4a and 4b**.[26]

Exhaust and fugitive dust emissions from heavy-duty haul and vendor trucks on roadways were modeled using line sources. The line source width was the width of the road plus six meters, the modeled release height was 2.55 m, and the initial vertical dimension was 2.37 m, consistent with the USEPA haul road guidance (USEPA 2012). On-road construction worker trips would have negligible impact and therefore were not included in the HRA analysis for excess lifetime cancer risk and chronic HI. $PM_{2.5}$ emissions associated with on-road construction worker trips were included in the construction HRA analysis for $PM_{2.5}$ concentration modeling. Construction on-road source group locations are presented in **Figure 5**. **Table 50** summarizes the construction modeling parameters that were used in AERMOD.

[26] Since it is not known whether the feeder lines associated with the PG&E work for off-site improvements would be installed in University Avenue or Willow Road, emissions were conservatively applied to both routes, essentially doubling the emissions for the health risk assessment for this activity.

#### 3.2.5.2 Operational Sources

The Project generators were modeled as point sources. Project-specific stack heights, taken as the height of the building, were used in combination with default modeling parameters for generator sources, including stack diameter, temperature, and velocity, as reported by BAAQMD (STI 2011). The impact of the existing generator that will be removed was modeled using specifications provided by the Project Applicant and subtracted from the impact of the proposed new generators. The pump station associated with the Project may be located in one of two possible locations: 1) in the dog park (referred to as Location 1) or 2) in the parking lot of the park in the southwest portion of the site (referred to as Location 2). The pump station has an associated 755 horespower generator. Because the location of this generator has not been finalized, both locations were analyzed and the maximum health impact from either location is reported. Source parameters for the generators are summarized in **Table 51**. The location of the modeled generators is provided in **Figure 6a**.

On-road traffic sources were modeled as line sources following USEPA guidelines for this type of activity (USEPA 2012). Onsite passenger vehicles were modeled with a release height of 1.70 m, consistent with the San Francisco Community Risk Reduction Plan – HRA (SFDPH). Modeled on-site vehicle routes can be found in **Figure 6b**. Since passenger vehicles occupy the majority of off-site Project traffic, off-site traffic was modeled with a release height of 1.70 m, consistent with the San Francisco Community Risk Reduction Plan (SFDPH). Modeled off-site traffic routes can be found in **Figure 7**; as discussed, modeled roadways include Bayfront Expressway, Willow Road, University Avenue, and O'Brien Drive.

Intercampus shuttles were modeled separately, using a release height of 3.39 m, based on the actual vehicle type provided by the Project Applicant, as discussed in more detail in **Table 51.** Modeled shuttle routes can be found in **Figure 8**. The initial vertical dimensions for all pollutants were calculated consistent with USEPA Haul Road Guidance (i.e., plume height/2.15).

**Table 51** summarizes the operational phase modeling parameters that were used in AERMOD.

### 3.2.6 Receptors

TAC concentrations were estimated at both on-site and off-site sensitive receptor populations. As discussed in **Section 1.3.3**, sensitive receptors include areas with residents, schools, daycare centers, parks, hospitals and senior care facilities. Recreational areas near the Project site were also evaluated.

Residential and recreational receptors were identified using zoning maps for Menlo Park (City of Menlo Park 2019) and East Palo Alto (City of East Palo Alto 2017). Residential and recreational areas were modeled as a grid with 20 m (65.6 feet) spacing within 500 m of the Project site and 40 m spacing within 1,000 m of the project site.

Other sensitive receptor locations were identified using a report from Environmental Data Resources (EDR). The EDR report identified schools, daycare centers, nursing homes and hospitals near the Project site. These locations were modeled as discrete locations.

Off-site receptors were modeled at the breathing height of 1.8 m, consistent with the BAAQMD CEQA Air Quality Guidelines (BAAQMD 2017).

On-site receptors were modeled at the breathing height for each floor of the proposed buildings.

Maximum average annual dispersion factors were estimated for each receptor location.

**Figure 2** includes a map of both off-site and on-site sensitive receptor locations that were used in the HRA.

### 3.2.7 Modeling Adjustment Factor

OEHHA (2015a) recommends applying an adjustment factor to the annual average concentration modeled assuming continuous emissions (i.e., 24 hours per day, seven days per week), when the actual emissions are less than 24 hours per day and exposures are concurrent with activities occurring as part of the Project.

For construction activities, emissions only impact receptors during certain hours of the day when activities are occurring. However, the emissions modeled during those hours were annualized assuming 24 hour per day in the modeling outputs. Thus, a modeling adjustment factor (MAF) was applied to the annual average concentration used in the evaluation to account for an emissions schedule that is not occurring 24 hours per day, seven days per week, where the exposure takes place preferentially during construction hours.

Operational activities are expected to occur all day; therefore, the annual average concentration was not adjusted for concentrations from operational activities.

Resident children were assumed to be exposed to annual construction and operational emissions (averaged from actual operating hours) 24 hours per day, seven days per week. This assumption is consistent with the modeled annual average air concentration for construction (24 hours per day, seven days per week). Thus, the annual average concentration for construction was not adjusted for the residential population.

The MAF for the daycare center and school receptors assumes receptors are present only during the hours of the day emissions are occurring. Therefore, a MAF of 2.55 was applied to the annual average concentration for construction ([24 hours/11 hours] * [7 days/6 days]) for the daycare and school populations, since construction would occur seven days per week.[27]

The MAF for the recreational receptor assumes receptors may be present throughout the hours of the day emissions are occurring. A MAF of 2.55 was applied to the annual average concentration for construction ([24 hours/11 hours] * [7 days/6 days]) for the recreational population, since construction would occur seven days per week. The MAFs are presented in **Table 52**. [28]

---

[27] Even if the MAF was based on a construction schedule of 5 days per week, conclusions would not change. The maximally exposed individual receptor is a resident, which is not affected by the MAF.

[28] Even if the MAF was based on a construction schedule of 5 days per week, conclusions would not change. The maximally exposed individual receptor is a resident, which is not affected by the MAF.

# 4. CARBON MONOXIDE ANALYSIS

Carbon Monoxide (CO) emissions from traffic are expected to be below significance levels if the following criteria is met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway). (BAAQMD 2017)

The San Mateo County Congestion Management Program (CMP) requires new development projected to add 100 or more peak hour trips to the CMP roadway network to implement Transportation Demand Management (TDM) measures that would reduce project impacts. As discussed above, the Project has a comprehensive TDM program that reduces VMT consistent with City requirements and with the TDM program, the Project would not conflict with the CMP. As shown in **Table 47,** traffic at all roadways around the Project are expected to be lower than 44,000 vehicles per hour. The Willow Road Tunnel may be considered an intersection where vertical and/or horizontal mixing is limited. Traffic through the Willow Road Tunnel would be much below 24,000 vehicles per hour since this tunnel is only used by Project shuttles and trams, bicycles, and pedestrians. The Project is not projected to produce more than 24,000 trips per hour. Therefore, additional analysis is not needed. As such, operational traffic is expected to be a minor contributor to operational CO emissions.

Emergency generators would also emit CO. Emergency generators are subject to permitting with the BAAQMD and are subject to federal and state emissions standards that are designed to avoid impacts on the community and environment. Therefore, emergency generators are not expected to cause CO hotspots.

# 5. ODOR ANALYSIS

The Project is a mixed use commercial and residential development, and therefore is not anticipated to be a potential odor source. However, the Project was evaluated against the three-pronged approach proposed in the ConnectMenlo EIR.

First, the Project was evaluated against the land uses identified in BAAQMD's Odor Screening Distances (BAAQMD 2017). BAAQMD's Odor Screening Distances Table identifies land uses that could create objectional odors and distances where odors are not expected to be experienced. The Project may contain minor composting and recycling operations typical of a mixed-use development. Recycling and composting facilities are land uses listed in BAAQMD's Odor Screening Distances Table. However, these operations at the Project would not be considered similar in size to what would be considered a Composting Facility or Recycling Facility and therefore should not be considered.

The Project would also contain a wastewater pump station in the southwest corner of the site. Wastewater Pumping Facilities are land uses listed in BAAQMD's Odor Screening Distances Table. While the Wastewater Pumping Facilities considered in the Odor Screening Distance is likely a much larger scale than the one envisioned for the Project, the pumping station at Willow Village may have the potential to emit objectionable odors. Therefore, the pump station design should include a molecular neutralizer that would convert hydrogen sulfide to harmless, biodegradable effluent, ensuring that odors from the pump station would be appropriate for urban areas. With the installation of the molecular neutralizer, the Project is not expected to expose sensitive land uses to objectionable odors expected in urban areas.

As stated in the ConnectMenlo EIR, the following General Plan goals and policies would serve to minimize potential conflicts between land uses:

- Goal LU-2: Maintain and enhance the character, variety and stability of Menlo Park's residential neighborhoods.
    - Policy LU-2.3: Mixed Use Design. Allow mixed-use projects with residential units if project design addresses potential compatibility issues such as traffic, parking, light spillover, dust, odors, and transport and use of potentially hazardous materials.
- Goal LU-4: Promote the development and retention of business uses that provide goods or services needed by the community that generate benefits to the City, and avoid or minimize potential environmental and traffic impacts.
    - Policy LU-4.5: Business Uses and Environmental Impacts. Allow modifications to business operations and structures that promote revenue generating uses for which potential environmental impacts can be mitigated.

As stated above, the Project is not expected to create objectionable odors to sensitive receptors and thus would not create compatibility uses related to odor as stated in Policy LU-2.3. Specifically, the office, residential, and commercial uses proposed by the Project are compatible with each other because none produce substantial objectionable odors. All cooking areas in commercial kitchens will be covered with hoods. The exhaust from culinary uses is intended to go to the roof of the buildings and be disbursed with grease rated fans. In this case the odors dissipate before they can get back to occupied areas. For areas with low roofs needing grease exhaust that is adjacent to occupied areas, the Project proposes to use a pollution control unit (PCU) to clean the air. The wastewater pumping station would be equipped with a molecular neutralizer, which would reduce odors before release to the environment to acceptable levels in urban areas. Further, consistent with Policy LU-4.5, the Project would develop and retain business uses without creating objectionable odors. Therefore, the Project is consistent with the goals and policies in the General Plan related to odor.

Last, BAAQMD Regulation 7 contains requirements on the discharge of odorous substances after the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel or residence [BAAQMD 7-102]. The operations within the Project will be subject to this regulation and will comply with the requirements if the regulation becomes applicable via BAAQMD 7-102, which is not expected. Therefore, the Project would be in compliance with BAAQMD Regulation 7.

Because the Project does not contain land uses in BAAQMD's odor screening distances, is consistent with the goals and policies of the General Plan related to odor, and would be in compliance with BAAQMD Regulation 7, the impact of the Project would be considered less than significant with respect to odors.

# 6. HEALTH RISK ASSESSMENT

In February 2015, OEHHA released the updated Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2015a), which combines information from previously released and adopted technical support documents to delineate OEHHA's revised risk assessment methodologies based on current science. The BAAQMD issued guidelines on adopting the OEHHA 2015 Guidance Manual (BAAQMD 2020c). This evaluation utilizes the 2015 methodology; details of which are discussed below.

## 6.1 Project Construction Sources Evaluated

As discussed in **Section 3.1**, excess lifetime cancer risk, non-cancer chronic hazard index and $PM_{2.5}$ concentration were evaluated for on-site and off-site sensitive receptor exposure to emissions from Proposed Project construction (construction off-road equipment and nearby off-site vehicles). Because buildings will be completed with residents moving in as construction occurs around them, the impact of subsequent construction on on-site residents was evaluated, as discussed below. All modeled construction source groups included in the HRA are presented in **Table 53**. Construction source group locations are presented in **Figures 3, 4,** and **5**.

## 6.2 Project Operational Sources Evaluated

For Project operations, excess lifetime cancer risk, non-cancer chronic hazard index and $PM_{2.5}$ concentration from on-site and off-site sensitive receptor exposure to emissions from Proposed Project generators and Proposed Project operational-related traffic were evaluated. The existing generator currently located at the Project site and existing traffic counts from uses that will be removed as part of the Project were evaluated and subtracted from Project risks in the HRA analysis, resulting in health impacts from net new operational emissions. Operational source group locations are presented in **Figures 6**, **7**, and **8**.

Health risks were estimated from construction and operations, separately as well as together to conservatively estimate the combined cancer risk effect of construction activities and Project operation.

## 6.3 Exposure Assessment

*Potentially Exposed Populations*: This analysis evaluates on- and off-site sensitive receptors based on OEHHA 2015 Hot Spots Guidelines.

Emissions and exposure to sensitive populations would vary across the four year and eleven-month construction period. Therefore, multiple exposure scenarios were evaluated to capture the period of maximum impact on each sensitive population and location. Health impacts were evaluated in four exposure scenarios: 1) exposure beginning at the start of construction; 2) exposure beginning at the start of Grading and Utilities construction for the second area; 3) exposure beginning at the conclusion of Town Square and Residential/Shopping District construction when residents would move in; and 4) exposure beginning at the conclusion of Project construction when the Project is fully operational. **Figure 9** shows a Gantt chart of the construction schedule and the four exposure scenarios.

The four exposure scenarios were developed to capture the maximum risks from Project construction and operations. Due to the complex timing of Project construction, the selection of exposure scenarios took into consideration the magnitude of potential activity associated with each year. Scenario 1 starts at the beginning of construction and captures initial demolition and grading. Scenario 2 starts after construction has begun and is intended to capture the maximum amount of overlapping construction activities that would occur during Project construction. Starting a receptor's exposure any time after these two scenarios would ignore the heaviest construction that occurs at the beginning of the Project. Therefore, these two exposure scenarios are designed to capture the maximum construction impacts. Scenario 3 starts when on-site residents move into the completed buildings while construction is still ongoing around them and captures overlapping construction and operational impacts on on-site residents for informational purposes. Lastly, Scenario 4 captures the fully operational Project once construction has concluded. The four exposure scenarios capture the maximum amount of health risk for on- and off-site receptors experiencing impacts from construction and operations.

For Scenarios 1 and 2, the following off-site receptor types were analyzed: resident child, daycare child, elementary school child, high school child. For Scenario 3, the following on-site receptor types were analyzed: resident child and recreational child. Senior residents living in the affordable senior building were conservatively analyzed using the resident child receptor type, since children have higher exposure parameters (including breathing rate and age sensitivity factor) than seniors.

Scenario 3 analyzes the risk experienced by on-site receptors that would move into the completed buildings while construction is still ongoing around them. Maximum construction risks for off-site receptors are captured in Scenarios 1 and 2 since those exposure scenarios start closer to the start of construction and include more activity, which corresponds to higher impacts. Therefore, off-site receptor types are not included in Scenario 3. For Scenario 3, the construction schedule was used to determine which phases of construction a specific residential building was exposed to. If construction of another building was complete before a residential building became operational, any exposure to construction of the complete building was not included in the exposure assessment. More details can be found in our memorandum regarding "Refinement of Onsite Health Impacts for the Willow Village Project" dated May 17, 2022, shown in Appendix E.

For Scenario 4, all of the above receptor types were analyzed. Similar to Scenario 3, senior residents living in the affordable senior building conservatively analyzed using the resident child receptor type. Two daycare receptor types were analyzed. One daycare child receptor type assumed infants could attend the daycare. One daycare child receptor type assumed only children over 18 months could attend, which is the age range for the daycare at Wund3r School located south of the Project site.[29]

*Exposure Assumptions*: The exposure parameters used to estimate excess lifetime cancer risks for all potentially exposed populations for the construction evaluation for this analysis were obtained using risk assessment guidelines from OEHHA (OEHHA 2015a) and BAAQMD (BAAQMD 2020c). **Table 54** shows the proposed exposure parameters that were used for the HRA.

[29] The Wund3r School is a year-round academic and play-based program for children ages 18-months through Pre-K.

*Calculation of Intake*: The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, $IF_{inh}$, can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF}{AT}$$

Where:

| | | |
|---|---|---|
| $IF_{inh}$ | = | Intake Factor for Inhalation ($m^3$/kg-day) |
| DBR | = | Daily Breathing Rate (L/kg-day) |
| FAH | = | Frequency of time at home (unitless) |
| EF | = | Exposure Frequency (days/year) |
| ED | = | Exposure Duration (years) |
| AT | = | Averaging Time (days) |
| CF | = | Conversion Factor, 0.001 ($m^3$/L) |

The chemical intake or dose was estimated by multiplying the inhalation intake factor, $IF_{inh}$, by the chemical concentration in air, $C_i$. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the current OEHHA Hot Spots guidance (OEHHA 2015a).

### 6.3.1 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories – cancer and non-cancer endpoints. Toxicity values that are used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Toxicity values for all TACs are summarized in **Table 46**.

### 6.3.2 Age Sensitivity Factors

The estimated excess lifetime cancer risks for a resident were adjusted using age sensitivity factors (ASFs) that account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (OEHHA 2009) and OEHHA 2015 Guidance (2015a). Cancer risk estimates were weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) was applied to ages 16 and older. **Table 54** presents the ASF values that were used for the HRA. **Table 55** through **Table 58** show the age sensitivity weighted intake factors by year and age bin by exposure scenario.

## 6.4 Risk Characterization

### 6.4.1 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

The equation that was used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times ASF$$

Where:

$Risk_{inh}$ = Cancer risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)

$C_i$ = Annual average air concentration for $chemical_i$ (µg/m$^3$)

CF = Conversion factor (mg/µg)

$IF_{inh}$ = Intake factor for inhalation (m$^3$/kg-day)

$CPF_i$ = Cancer potency factor for $chemical_i$
(mg chemical/kg body weight-day)$^{-1}$

## 6.5 Estimation of Chronic Noncancer Hazard Indices

The potential for exposure to result in adverse chronic noncancer effects was evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ).

$$HQ_i = C_i / cREL$$

Where:

$HQ_i$ = Chronic hazard quotient for chemical i

$C_i$ = Annual average concentration of chemical i (µg/m$^3$)

$cREL_i$ = Chronic noncancer reference exposure level for chemical i (µg/m$^3$)

## 6.6 Filtration of Indoor Air

Since January 1, 2020, California Title 24 has required all residential heating/cooling and ventilation systems to have Minimum Efficiency Reporting Value (MERV)-13 filters.[30,31] As Project construction would begin after January 1, 2020, residential units on the Project site would have filtration installed. MERV-13 filters have a dust spot efficiency percent of 80-90%.[32] These filters remove particulates from the air that are brought into the building for ventilation and remove particulates from the indoor air when the heating or cooling is recirculating air in the building.

The health impact for onsite residents was refined to account for the filtration of the outdoor air, as discussed in our memorandum "Refinement of Onsite Health Impacts for the Willow Village Project" dated May 17, 2022, shown in Appendix E. Conservative assumptions were incorporated which overestimate the concentrations after filtration is applied to account for residents' preferences and behaviours. However, these estimates were not relied upon in the final estimation of health impacts for onsite residents and are provided in Appendix E and Appendix F for information purposes.

## 6.7 Comparison to Thresholds

Health impacts from construction for each exposure scenario were compared to BAAQMD thresholds discussed in **Section 1.3.3**. Health impacts from operation starting at full buildout were compared to BAAQMD thresholds. Health impacts from Project construction and overlapping Project operations were added together to estimate the combined health risk impacts of construction activities and Project operation for each exposure scenario and were compared to the BAAQMD thresholds.

## 6.8 Health Risk Assessment Results

Health impacts from Project construction and Project operations were added together to estimate the combined health risk impacts of construction activities and operation for Scenarios 1, 2, and 3 discussed above.

### 6.8.1 Impacts from the Project

A summary of results from the HRA is shown in **Summary Table D**. A breakdown of excess lifetime cancer risk from Project construction, operational generators, and operational traffic at the MEIR is shown in **Table 59**. The table also shows the Scenario for which the maximum was identified. Similar breakdowns for chronic HI and $PM_{2.5}$ concentration are shown in **Table 60** and **Table 61**, respectively. These tables also show the Scenario for which the maximums were identified, as well as the year for which the maximum occurred since chronic HI and $PM_{2.5}$ concentrations are annual impacts.

[30] California Energy Commission. 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Title 24, Part 6, and Associated Administrative Regulations in Part 1. Available online at: https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

[31] This requirement is carried forward in the adopted 2022 Building Energy Efficiency Standards that take effect January 1, 2023.

[32] USEPA. 2009. Residential Air Cleaners, A Summary of Available Information. EPA 402-F-09-002. August. Available online at: https://19january2017snapshot.epa.gov/indoor-air-quality-iaq/residential-air-cleaners-second-edition-summary-available-information_.html. Accessed May 11, 2022.

As discussed above, the pump station generator may be located in one of two locations. Reported impacts are the maximum across either location. The maximum impacts reported in Tables 59, 60 and 61 all occur with the pump station generator in Location 1. More detail on the maximum impact between each location can be found in our memorandum "Analysis of the Relocation of the Pump Station Generator for the Willow Village Project" dated June 9, 2022, shown in Appendix F.

Mitigated impacts assume construction equipment have an average of 95 percent and 98 percent Tier 4 Final engines before and after residents move on-site, respectively, and 5 percent and 2 percent Tier 2 engines before and after residents move on-site, respectively. Mitigated impacts include reductions to fugitive dust due to watering.

**Summary Table D. Summary of Health Risk Assessment Results**

| | BAAQMD Threshold of Significance | Unmitigated | | | | Mitigated | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **On-site MEIR** | ***Exceed Threshold?*** | **Off-site MEIR** | ***Exceed Threshold?*** | **On-site MEIR** | ***Exceed Threshold?*** | **Off-site MEIR** | ***Exceed Threshold?*** |
| Excess Lifetime Cancer Risk (in a million) | 10 | 86 | *Yes* | 59 | *Yes* | 7.5 | *No* | 9.5 | *No* |
| Chronic HI | 1 | 0.23 | *No* | 0.11 | *No* | 0.011 | *No* | 0.015 | *No* |
| $PM_{2.5}$ Concentration ($\mu g/m^3$) | 0.3 | 1.1 | *Yes* | 0.56 | *Yes* | 0.13 | *No* | 0.18 | *No* |

Source: Table 59, Table 60, and Table 61 of the Appendix

As discussed in Section 6.6 and in our memorandum "Refinement of Onsite Health Impacts for the Willow Village Project" dated May 17, 2022, shown in Appendix E, the required filtration for new residential units would further reduce health impacts experienced by residents. However, these impacts were conservatively not taken into account. Appendix E and Appendix F contain more information on the effects of filtration for informational purposes.

# 7. CUMULATIVE ANALYSIS

Consistent with the BAAQMD CEQA guidelines, the combined impacts from off-site and on-site sources were evaluated within the "zone of influence" of the Project. Off-site sources include BAAQMD permitted stationary sources, roadways with over 10,000 vehicles per day, and railways.

The cumulative impact was evaluated at the maximally exposed individual sensitive receptor (MEISR) for Project construction and operations. There is an on-site MEISR for informational purposes and, as required by CEQA, an off-site MEISR. The MEISR is the receptor with the highest incremental cancer risk, chronic HQ, and $PM_{2.5}$ concentration from the Project across all populations and exposure scenarios.

Health impacts from all identified sources within 1,000 feet of the Project were evaluated at this single location and added to the results from the Project's impacts. The sources that were considered in this analysis are described below.

Results at the MEISR were compared to the significance thresholds for cumulative impacts:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic non-cancer HI greater than 10; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

## 7.1 Stationary Sources

BAAQMD provides a stationary source GIS map tool to use to evaluate the impacts of off-site stationary sources (BAAQMD 2020a). Consistent with BAAQMD guidance, a request was sent to BAAQMD to provide the emissions from nearby stationary sources within 1,000 feet of the Project boundary. Using emissions made available by BAAQMD, risks, chronic hazard index, and $PM_{2.5}$ concentrations were estimated through the Risk and Hazards Emissions Screening Calculator, Beta Version 4.0 (BAAQMD 2020b).

Where appropriate, the impacts calculated using emissions provided by BAAQMD were scaled by the Diesel Internal Combustion Engine Distance Multiplier (BAAQMD 2012b) or Gasoline Dispensing Facility Multiplier (BAAQMD 2012c), per BAAQMD guidance. A summary of nearby stationary source impacts at the Project MEIR is summarized in **Table 62**.

## 7.2 Roadway Sources

BAAQMD recommends evaluating impacts from all roadways with traffic of over 10,000 vehicles per day within the "zone of influence." To evaluate potential health risk impacts from existing traffic on major roadways above 30,000 AADT and highways, BAAQMD provides raster files of health impacts. Ramboll pulled the corresponding values for the on-site and off-site MEISRs from the raster file. The BAAQMD tool represents the impact from the background traffic on the roadways as opposed to the impacts of net Project traffic as described in **Section 6.2**. These tools were used to estimate cancer risk and $PM_{2.5}$ concentrations from vehicle travel on major roadways and highways surrounding the Project. These tools do not provide specific estimates for chronic HI because the screening levels were found to be extremely low (BAAQMD 2015). Thus, there are no chronic hazard values associated with highways or major streets over 30,000 AADT. The tools developed by BAAQMD are based on an older version of EMFAC, traffic data that is a few years old, and an operational start year of 2017. However, they represent a conservative estimate of health impacts, largely due to the reduction in emissions of the vehicle fleet between 2017 and when project buildout will occur.

BAAQMD recommends evaluating roadways in the area where existing traffic is over 10,000 vehicles per day and under 30,000 vehicles per day, which is the limit for roadways to consider in their raster tool. The Transportation Engineer provided background trip volumes for nearby roadways with volumes between 10,000 and 30,000 vehicles per day. Of the roadways with background traffic in this range, only O'Brien Drive was located within the zone of influence. A summary of background traffic volumes on O'Brien Drive is summarized in **Table 63**. The impacts associated with background traffic on O'Brien Drive were quantified and included in the cumulative analysis. To perform this analysis, Ramboll used methodology consistent with the Project traffic HRA, as described in **Sections 3.1.2** and **3.2.5.2**.

## 7.3 Railway Sources

BAAMQD provides raster files with health impacts from railways. The Project is adjacent to a railway that is rarely used and Caltrain is over 1,000 feet from the Project. The health impacts from the raster file were used to estimate the potential impact from railways at the MEISRs.

## 7.4 Cumulative Summary

As described above, nearby cumulative sources include existing stationary sources, highways, major streets, and railways. Impacts from these cumulative sources are combined with Project construction, operational generator, and operational traffic impacts at the on-site and off-site Project MEIRs. A summary of cumulative impacts at the Project MEIR is shown in **Table 64** and **Summary Table E** below.

**Summary Table E. Summary of Cumulative Health Risk Assessment Results**

| | BAAQMD Threshold of Significance | Mitigated | | | |
|---|---|---|---|---|---|
| | | On-site MEIR | *Exceed Threshold?* | Off-site MEIR | *Exceed Threshold?* |
| Excess Lifetime Cancer Risk (in a million) | 100 | 22 | *No* | 23 | *No* |
| Chronic HI | 10 | 0.015 | *No* | 0.016 | *No* |
| $PM_{2.5}$ Concentration ($\mu g/m^3$) | 0.8 | 0.44 | *No* | 0.69 | *No* |
| Source: Table 64 of the Appendix | | | | | |

# 8. REFERENCES

BAAQMD. 2004. CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC + NOx. Available at: https://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/engines/emissionfactorsfordieselengines.pdf

BAAQMD. 2012a. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en

BAAQMD. 2012b. Diesel Internal Combustion (IC) Engine Distance Multiplier Tool. June 13. Available at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

BAAQMD. 2012c. Gasoline Dispensing Facility Distance Multiplier Tool. June 13. Available at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

BAAQMD. 2015. Roadway Screening Analysis Calculator. April. Available online at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

BAAQMD. 2020a. Permitted Sources Risk and Hazards Map. June. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

BAAQMD. 2020b. Health Risk Calculator with Distance Multipliers. March. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en&rev=dab7d85a772d45caa9c99e59395bf12d

BAAQMD. 2020c. Health Risk Assessment Modeling Protocol. December. Available at: https://www.baaqmd.gov/~/media/files/ab617-community-health/facility-risk-reduction/documents/baaqmd_hra_modeling_protocol-pdf.pdf?la=en

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available online at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en

Cal/EPA. 2020. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. October. http://www.arb.ca.gov/toxics/healthval/contable.pdf

California ARB. 2020. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

California ARB. 2016. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/msprog/truck-idling/13ccr2485_09022016.pdf. Accessed: November 2021.

California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment (OEHHA). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting.

CAPCOA. 2020b. California Emissions Estimator Model Users Guide Appendix F. Available at: http://www.CalEEMod.com/. Accessed: November 2021.

CARB. 2011. Final Regulations Order: Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/diesel/documents/finalreg2011.pdf. Accessed: November 2021.

CARB. 2011a. Off Road Mobile Source Emission factors. Available at: http://www.arb.ca.gov/msei/msei.htm. Accessed: March 2019.

CARB. 2011b. Release. Available at: http://www.arb.ca.gov/msei/modeling.htm. Accessed: March 2019.

CARB. 2021. EMFAC2021 Volume III Technical Document. April. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf

City of East Palo Alto. 2017. Zoning Map. Available at: https://web.archive.org/web/20171116062849/http://www.ci.east-palo-alto.ca.us:80/DocumentCenter/View/6City of Menlo Park Zero Waste Management Plans. Available at: https://www.menlopark.org/zerowastemanagementplans

City of Menlo Park. 2016. ConnectMenlo: General Plan Land Use & Circulation Elements and M-2 Area Zoning Update. Available online at: https://www.menlopark.org/DocumentCenter/View/12063/ConnectMenloFEIR_101016?bidId=

City of Menlo Park. 2019. Zoning Map. Available at: https://www.menlopark.org/DocumentCenter/View/15011/Figure_5_GeneralPlanLandUseDesignations_rev1013?bidId=

Office of Environmental Health Hazard Assessment (OEHHA). 2009. Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures. Office of Environmental Health Hazard Assessment. May. Available at: https://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009

Office of Environmental Health Hazard Assessment (OEHHA). 2015a. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

Office of Environmental Health Hazard Assessment (OEHHA). 2015b. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Appendix D: Risk Assessment Procedures to Evaluate Particulate Emissions from Diesel-Fueled Engines. February.

Peninsula Innovation Partners. January 2021. Willow Village Master Plan Conditional Development Permit. Available online at:

https://www.menlopark.org/DocumentCenter/View/27129/Willow-Village-Masterplan-Entire-Site

Personal communication between Virginia Lau, BAAQMD and Shari Libicki, Ramboll on February 3, 2016.

SB-100. 2018. California Renewables Portfolio Standard Program: emissions of greenhouse gases. September. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

SCAQMD. 2008. Localized Significance Threshold Methodology. July. Available online at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds

Sonoma Technology, Inc (STI). 2011. Default Modeling Parameters for Stationary Sources. Memo from STI to BAAQMD. April 21.

USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P10081RP.PDF?Dockey=P10081RP.PDF

USEPA. 2021. User's Guide for the AMS/EPA Regulatory Model (AERMOD). U.S. EPA Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. Available at: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf

USEPA 2021. Air Quality Dispersion Modeling - Preferred and Recommended Models. U.S. EPA. Available at: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

USEPA. 2012. Haul Road Workgroup Final Report Submission to EPA-OAQPS. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/haul_road_workgroup-final_report_package-20120302.pdf

United States Geological Survey (USGS). 2013. National Elevation Dataset. Available at: http://viewer.nationalmap.gov/viewer/.

# TABLES

**Table 1**
**Land Use Summary**
**Willow Village**
**Menlo Park, California**

| Land Use[1] | CalEEMod® Land Use | Size | Units[2] | Square Footage |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 252 | ksf | 251,530 |
| R&D | Research and Development | 124 | ksf | 123,870 |
| Warehouse | Unrefrigerated Warehouse-No Rail | 501 | ksf | 500,780 |
| Lab & Manufacture | Manufacturing | 24 | ksf | 23,570 |
| Health Center | Health Club | 24 | ksf | 24,060 |
| Former Fire Department Building | General Light Industry | 80 | ksf | 80,100 |
| Parking | Enclosed Parking with Elevator | 2,300 | Spaces | 920,000 |
| **Partial Buildout by Year[3]** | | | | |
| **Land Use Type[4]** | | **Percent Operational by Year** | | |
| | | **Year 4** | **Year 5** | **Year 6** |
| Office | | 3.1% | 58% | 95% |
| Retail | | 10% | 59% | 98% |
| Residential | | 0% | 16% | 64% |
| Hotel | | 0% | 41% | 100% |
| Parking | | 53% | 75% | 96% |
| Park | | 89% | 95% | 100% |
| **Full Buildout** | | | | |
| **Land Use Type[4]** | | **Size** | **Units[2]** | **Square Footage** |
| Office | | 1,600 | ksf | 1,600,000 |
| Retail | | 208 | ksf | 207,690 |
| Residential | | 1,730 | DU | 1,695,976 |
| Hotel | | 193 | Rooms | 172,000 |
| Parking | | 1,869 | ksf | 1,869,240 |
| Park | | 404 | ksf | 403,837 |

**Notes:**

1. Land uses analyzed based on information provided by the Project Applicant, as found in the Project Description. "Office" land use mapped to General Office Building and Research and Development; "Office/Lab" mapped to General Office Building, Research and Development, Health Club, and Manufacturing; "Warehouse" mapped to Unrefrigerated Warehouse-No Rail and General Light Industry, and "Warehouse/Office" mapped to Unrefrigerated Warehouse-No Rail and Research and Development CalEEMod land use types on a building-by-building basis.
2. The Project Applicant provided Project land uses in units of square footage, hotel rooms, and dwelling units. For the existing parking land use, each parking space is assumed to be 400 sqft. This assumption is based on CalEEMod defaults.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area for each land use type that becomes operational each year, based on the construction schedule, as shown in Table 2.
4. For Hamilton Avenue Parcels North and South, only net new square footage was included in the analysis. This is under the conservative assumption that the existing retail area and the retail land use that will replace it have similar operational emissions.

**Abbreviations:**

DU - dwelling unit
sqft - square foot
ksf - 1,000 square feet
CalEEMod® - California Emissions Estimator Model

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 2**
**Construction Phasing Schedule**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Start Month[2] | End Month[2] | Number of Days[3] |
|---|---|---|---|---|
| Area 1 | Demolition | Month 1 | Month 5 | 97 |
| | Grading and Utilities | Month 4 | Month 11 | 143 |
| Parcel 2 Foundations | | Month 15 | Month 23 | 161 |
| Parcel 2 Core and Shell | | Month 23 | Month 31 | 180 |
| Parcel 2 Tenant Improvements | | Month 31 | Month 43 | 261 |
| Parcel 2 Landscaping | | Month 43 | Month 45 | 59 |
| Parcel 3 Foundations | | Month 18 | Month 26 | 161 |
| Parcel 3 Core and Shell | | Month 26 | Month 34 | 180 |
| Parcel 3 Tenant Improvements | | Month 34 | Month 46 | 260 |
| Parcel 3 Landscaping | | Month 46 | Month 48 | 58 |
| North Garage | | Month 12 | Month 25 | 300 |
| Office Building 4 | | Month 14 | Month 35 | 449 |
| Meeting, Collaboration, Park | | Month 12 | Month 52 | 871 |
| Hotel Excavation | | Month 12 | Month 25 | 299 |
| Hotel Construction | | Month 30 | Month 45 | 329 |
| Town Square | | Month 15 | Month 43 | 610 |
| Area 2 | Demolition | Month 7 | Month 9 | 48 |
| | Grading and Utilities | Month 11 | Month 16 | 130 |
| Parcel 7 Foundations | | Month 26 | Month 31 | 116 |
| Parcel 7 Core and Shell | | Month 31 | Month 37 | 129 |
| Parcel 7 Tenant Improvements | | Month 37 | Month 45 | 188 |
| Parcel 7 Landscaping | | Month 45 | Month 48 | 58 |
| Parcel 6 Foundations | | Month 29 | Month 34 | 116 |
| Parcel 6 Core and Shell | | Month 34 | Month 40 | 129 |
| Parcel 6 Tenant Improvements | | Month 40 | Month 48 | 187 |
| Parcel 6 Landscaping | | Month 48 | Month 51 | 59 |
| South Garage | | Month 16 | Month 34 | 390 |
| Office Building 3 | | Month 17 | Month 40 | 501 |
| Office Building 1 | | Month 17 | Month 37 | 428 |
| Office Building 2 | | Month 18 | Month 38 | 426 |
| Office Building 5 | | Month 16 | Month 40 | 521 |
| Office Building 6 | | Month 19 | Month 43 | 520 |
| Area 3 | Grading and Utilities | Month 16 | Month 18 | 22 |
| | Tunnel Construction | Month 18 | Month 29 | 262 |
| | Foundations | Month 36 | Month 42 | 123 |
| | Core and Shell | Month 42 | Month 48 | 139 |
| | Tenant Improvements | Month 48 | Month 58 | 199 |
| | Landscaping | Month 58 | Month 60 | 59 |
| Hamilton Avenue Parcel North and South | Demolition | Month 37 | Month 37 | 22 |
| | Grading and Utilities | Month 37 | Month 38 | 23 |
| | Foundations | Month 38 | Month 40 | 22 |
| | Core and Shell | Month 40 | Month 41 | 43 |
| | Tenant Improvements | Month 41 | Month 43 | 33 |
| Substation Upgrade | PG&E Substation Work | Month 14 | Month 19 | 109 |
| Feeder Line | PG&E Offsite Work | Month 14 | Month 25 | 240 |
| | Surface Improvements | Month 14 | Month 15 | 23 |
| Intersection Improvements | O'Brien and Kavanaugh | Month 14 | Month 14 | 15 |
| | Adams and O'Brien | Month 14 | Month 14 | 10 |
| | Willow Road and Ivy Drive | Month 14 | Month 14 | 10 |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.

2. Construction schedule and phasing information were provided by the Project Applicant. Construction is conservatively assumed to start December 15, 2021. The analysis uses the earliest possible start date to assess conservative impacts. Emissions and impacts would decrease if the construction start date is delayed due to the incorporation of cleaner equipment into the construction fleet with time.

3. Project construction will generally occur on Mondays through Fridays between the hours of 7 AM and 6 PM.

**Table 3**
**Equipment List for Campus and Town Square District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Subphase | Equipment Type[1] | CalEEMod® Equipment Category[2] | Horsepower[1] | Cumulative Hours per Building[1] | Year 2 Average Equipment Hours/Day[1] | Year 3 Average Equipment Hours/Day[1] | Year 4 Average Equipment Hours/Day[1] | Year 5 Average Equipment Hours/Day[1] | Year 6 Average Equipment Hours/Day[1] |
|---|---|---|---|---|---|---|---|---|---|
| North Garage | Air Compressor | Air Compressors | 150 | 144 | 0.47 | 0.48 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 10 | 0 | 0.039 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 10 | 0 | 0.039 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 345 | 0 | 1.3 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 163 | 0.33 | 0.58 | 0 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 163 | 0.33 | 0.58 | 0 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 31 | 0.59 | 0.023 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 612 | 12 | 0.47 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 654 | 4.7 | 1.8 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 900 | 2.9 | 3.0 | 0 | 0 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 1,421 | 2.9 | 5.0 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 306 | 5.9 | 0.23 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 174 | 4.1 | 0 | 0 | 0 | 0 |
| | Pressure Washer | Pressure Washers | 25 | 32 | 0 | 0.12 | 0 | 0 | 0 |
| | Semi Dump Truck | Onsite HHDT | 450 | 459 | 8.8 | 0.35 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 580 | 1.0 | 2.1 | 0 | 0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 438 | 1.2 | 1.5 | 0 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 219 | 2.9 | 0.37 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 111 | 0.15 | 0.41 | 0 | 0 | 0 |
| Office Building 4 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.049 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 306 | 0 | 1.3 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 306 | 0 | 1.3 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 2,091 | 0 | 7.4 | 1.4 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 24 | 0 | 0.10 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 18 | 0 | 0.075 | 0 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 34 | 0 | 0.14 | 0 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 9.2 | 0 | 0.04 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 15 | 0 | 0.06 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 702 | 0 | 2.9 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 216 | 0 | 0.48 | 0.48 | 0 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 438 | 0 | 1.8 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 174 | 0 | 0.72 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 174 | 0 | 0.72 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,120 | 0 | 2.3 | 2.7 | 0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 674 | 0 | 1.5 | 1.5 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 219 | 0 | 0.90 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 190 | 0 | 0.36 | 0.50 | 0 | 0 |
| Meeting, Collaboration, Park | Air Compressor | Air Compressors | 150 | 79 | 0 | 0.30 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 1,098 | 5.9 | 3.3 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 1,098 | 5.9 | 3.3 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 7,749 | 0 | 0.89 | 19 | 9.4 | 0 |
| | Compactor | Other Construction Equipment | 250 | 53 | 0.31 | 0.15 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 79 | 0 | 0.30 | 0 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 158 | 0 | 0.61 | 0 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 639 | 5.9 | 1.5 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 2,412 | 23 | 5.5 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 1,992 | 5.9 | 6.7 | 0 | 0 | 0 |

**Table 3**
**Equipment List for Campus and Town Square District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Subphase | Equipment Type[1] | CalEEMod® Equipment Category[2] | Horsepower[1] | Cumulative Hours per Building[1] | Year 2 Average Equipment Hours/Day[1] | Year 3 Average Equipment Hours/Day[1] | Year 4 Average Equipment Hours/Day[1] | Year 5 Average Equipment Hours/Day[1] | Year 6 Average Equipment Hours/Day[1] |
|---|---|---|---|---|---|---|---|---|---|
| Meeting, Collaboration, Park | Gradall | Forklifts | 350 | 8,661 | 8.8 | 7.7 | 10 | 12 | 12 |
| | Hydro/Crawler Crane | Cranes | 550 | 2,553 | 1.6 | 7.2 | 0.50 | 0.77 | 5.9 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 660 | 4.4 | 1.8 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 654 | 3.1 | 2.0 | 0 | 0 | 0 |
| | Pressure Washer | Pressure Washers | 25 | 40 | 0 | 0.15 | 0 | 0 | 0 |
| | Semi Dump Truck | Onsite HHDT | 450 | 570 | 5.9 | 1.2 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 2,603 | 0.39 | 1.4 | 4.2 | 4.2 | 1.0 |
| | Tire Wash | Other Construction Equipment | 100 | 275 | 1.5 | 0.82 | 0 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 718 | 2.9 | 1.9 | 0.37 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 1,425 | 0.73 | 1.0 | 2.0 | 2.0 | 2.0 |
| Hotel Excavation | Air Compressor | Air Compressors | 150 | 705 | 2.6 | 2.3 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 111 | 2.6 | 0 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 303 | 2.9 | 0.70 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 152 | 1.5 | 0.35 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 612 | 0.42 | 2.3 | 0 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 612 | 0.42 | 2.3 | 0 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 303 | 2.9 | 0.70 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 1,212 | 12 | 2.8 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 2,982 | 5.9 | 11 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 2,982 | 5.9 | 11 | 0 | 0 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 2,487 | 2.6 | 9.2 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 1,212 | 12 | 2.8 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 444 | 11 | 0 | 0 | 0 | 0 |
| | Pressure Washer | Pressure Washers | 25 | 12 | 0 | 0.046 | 0 | 0 | 0 |
| | Semi Dump Truck | Onsite HHDT | 450 | 606 | 5.9 | 1.4 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 115 | 0.16 | 0.42 | 0 | 0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 600 | 2.9 | 1.9 | 0 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 398 | 2.9 | 1.1 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 796 | 2.0 | 2.8 | 0 | 0 | 0 |
| Hotel Construction | Air Compressor | Air Compressors | 150 | 654 | 0 | 0 | 3.0 | 0.84 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 6,768 | 0 | 0 | 21 | 20 | 0 |
| | Concrete Pump | Pumps | 450 | 654 | 0 | 0 | 3.0 | 0.84 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 654 | 0 | 0 | 3.0 | 0.84 | 0 |
| | Gradall | Forklifts | 350 | 3,960 | 0 | 0 | 12 | 12 | 0 |
| | Pressure Washer | Pressure Washers | 25 | 13 | 0 | 0 | 0.060 | 0.017 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,733 | 0 | 0 | 1.9 | 9.1 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 495 | 0 | 0 | 1.5 | 1.5 | 0 |
| | Water Truck | Onsite HHDT | 300 | 158 | 0 | 0 | 0.48 | 0.48 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 400 | 0 | 0 | 1.4 | 1.0 | 0 |
| Town Square | Bob Cat | Tractors/Loaders/Backhoes | 200 | 975 | 0 | 3.0 | 1.0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 848 | 0 | 1.5 | 1.9 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 5.3 | 0 | 0 | 0.020 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 5.3 | 0 | 0 | 0.020 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 975 | 0 | 3.0 | 1.0 | 0 | 0 |
| | Excavator | Excavators | 500 | 3,900 | 0 | 12 | 4.0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 1,572 | 0 | 6.0 | 0.55 | 0 | 0 |
| | Gradall | Forklifts | 350 | 4,788 | 0 | 6.0 | 5.3 | 18 | 0 |

**Table 3**
**Equipment List for Campus and Town Square District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Subphase | Equipment Type[1] | CalEEMod® Equipment Category[2] | Horsepower[1] | Cumulative Hours per Building[1] | Year 2 Average Equipment Hours/Day[1] | Year 3 Average Equipment Hours/Day[1] | Year 4 Average Equipment Hours/Day[1] | Year 5 Average Equipment Hours/Day[1] | Year 6 Average Equipment Hours/Day[1] |
|---|---|---|---|---|---|---|---|---|---|
| Town Square | Hydro/Crawler Crane | Cranes | 550 | 290 | 0 | 0 | 1.0 | 0.18 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 3,900 | 0 | 12.0 | 4.0 | 0 | 0 |
| | Semi Dump Truck | Onsite HHDT | 450 | 1,950 | 0 | 6.0 | 2.0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 397 | 0 | 0.16 | 0.53 | 2.0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 975 | 0 | 3.0 | 1.0 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 975 | 0 | 3.0 | 1.0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 1,084 | 0 | 2.0 | 1.5 | 2.0 | 0 |
| South Garage | Air Compressor | Air Compressors | 150 | 187 | 0 | 0.48 | 0.48 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 11 | 0 | 0.055 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 11 | 0 | 0.055 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 891 | 0 | 0 | 4.7 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 204 | 0 | 0.45 | 0.60 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 218 | 0 | 0.52 | 0.60 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 30 | 0 | 0.15 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 600 | 0 | 3.0 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 654 | 0 | 3.2 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 1,170 | 0 | 3.0 | 3.0 | 0 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 1,688 | 0 | 4.9 | 3.7 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 300 | 0 | 1.5 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 174 | 0 | 0.86 | 0 | 0 | 0 |
| | Pressure Washer | Pressure Washers | 25 | 32 | 0 | 0.16 | 0 | 0 | 0 |
| | Semi Dump Truck | Onsite HHDT | 450 | 450 | 0 | 2.2 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 873 | 0 | 1.9 | 2.6 | 0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 575 | 0 | 1.4 | 1.5 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 216 | 0 | 1.1 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 159 | 0 | 0.32 | 0.50 | 0 | 0 |
| Office Building 3 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.067 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 456 | 0 | 2.6 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 456 | 0 | 2.6 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 2,097 | 0 | 1.7 | 6.9 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 36 | 0 | 0.21 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 23 | 0 | 0.12 | 5.0E-03 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 46 | 0 | 0.25 | 5.0E-03 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 14 | 0 | 0.077 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 23 | 0 | 0.13 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 852 | 0 | 4.8 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 240 | 0 | 0.48 | 0.48 | 0.48 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 588 | 0 | 3.3 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 330 | 0 | 1.9 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 330 | 0 | 1.9 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,223 | 0 | 1.8 | 2.8 | 3.0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 752 | 0 | 1.5 | 1.5 | 1.5 | 0 |
| | Water Truck | Onsite HHDT | 300 | 294 | 0 | 1.7 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 210 | 0 | 0.27 | 0.50 | 0.50 | 0 |
| Office Building 1 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.07 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 402 | 0 | 2.2 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 402 | 0 | 2.2 | 0 | 0 | 0 |

RAMBOLL

**Table 3**
**Equipment List for Campus and Town Square District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Subphase | Equipment Type[1] | CalEEMod® Equipment Category[2] | Horsepower[1] | Cumulative Hours per Building[1] | Year 2 Average Equipment Hours/Day[1] | Year 3 Average Equipment Hours/Day[1] | Year 4 Average Equipment Hours/Day[1] | Year 5 Average Equipment Hours/Day[1] | Year 6 Average Equipment Hours/Day[1] |
|---|---|---|---|---|---|---|---|---|---|
| Office Building 1 | Boom Lift | Aerial Lifts | 40 | 2,076 | 0 | 2.5 | 6.6 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 32 | 0 | 0.18 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 21 | 0 | 0.11 | 5.3E-03 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 41 | 0 | 0.22 | 5.3E-03 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 12 | 0 | 0.067 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 20 | 0 | 0.11 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 792 | 0 | 4.4 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 205 | 0 | 0.48 | 0.48 | 0 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 522 | 0 | 2.9 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 264 | 0 | 1.5 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 264 | 0 | 1.5 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,025 | 0 | 1.9 | 2.7 | 0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 642 | 0 | 1.5 | 1.5 | 0 | 0 |
| | Water Truck | Onsite HHDT | 300 | 261 | 0 | 1.5 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 176 | 0 | 0.29 | 0.50 | 0 | 0 |
| Office Building 2 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.076 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 390 | 0 | 2.5 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 390 | 0 | 2.5 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 2,097 | 0 | 1.2 | 7.3 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 31 | 0 | 0.20 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 21 | 0 | 0.12 | 5.0E-03 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 40 | 0 | 0.25 | 5.0E-03 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 12 | 0 | 0.075 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 20 | 0 | 0.12 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 786 | 0 | 5.0 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 204 | 0 | 0.48 | 0.48 | 0.48 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 522 | 0 | 3.3 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 264 | 0 | 1.7 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 264 | 0 | 1.7 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,020 | 0 | 1.8 | 2.8 | 3.0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 639 | 0 | 1.5 | 1.5 | 1.5 | 0 |
| | Water Truck | Onsite HHDT | 300 | 261 | 0 | 1.7 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 175 | 0 | 0.26 | 0.50 | 0.50 | 0 |
| Office Building 5 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.059 | 0 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 534 | 0 | 2.6 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 534 | 0 | 2.6 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 2,067 | 0 | 2.2 | 6.2 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 43 | 0 | 0.21 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 25 | 0 | 0.12 | 4.8E-03 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 52 | 0 | 0.25 | 4.8E-03 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 16 | 0 | 0.08 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 27 | 0 | 0.13 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 930 | 0 | 4.6 | 0 | 0 | 0 |
| | Gradall | Forklifts | 350 | 250 | 0 | 0.48 | 0.48 | 0.48 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 660 | 0 | 3.3 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 396 | 0 | 2.0 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 396 | 0 | 2.0 | 0 | 0 | 0 |

**Table 3**
**Equipment List for Campus and Town Square District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Subphase | Equipment Type[1] | CalEEMod® Equipment Category[2] | Horsepower[1] | Cumulative Hours per Building[1] | Year 2 Average Equipment Hours/Day[1] | Year 3 Average Equipment Hours/Day[1] | Year 4 Average Equipment Hours/Day[1] | Year 5 Average Equipment Hours/Day[1] | Year 6 Average Equipment Hours/Day[1] |
|---|---|---|---|---|---|---|---|---|---|
| Office Building 5 | Semi Truck | Onsite HHDT | 450 | 1,260 | 0 | 1.8 | 2.8 | 3.0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 782 | 0 | 1.5 | 1.5 | 1.5 | 0 |
| | Water Truck | Onsite HHDT | 300 | 330 | 0 | 1.6 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 217 | 0 | 0.28 | 0.50 | 0.50 | 0 |
| Office Building 6 | Air Compressor | Air Compressors | 150 | 12 | 0 | 0.062 | 0.013 | 0 | 0 |
| | Backhoe | Tractors/Loaders/Backhoes | 350 | 534 | 0 | 3.9 | 0 | 0 | 0 |
| | Bob Cat | Tractors/Loaders/Backhoes | 200 | 534 | 0 | 3.9 | 0 | 0 | 0 |
| | Boom Lift | Aerial Lifts | 40 | 2,097 | 0 | 0 | 8.0 | 0 | 0 |
| | Compactor | Other Construction Equipment | 250 | 43 | 0 | 0.31 | 0 | 0 | 0 |
| | Concrete Pump | Pumps | 450 | 25 | 0 | 0.16 | 0.014 | 0 | 0 |
| | Concrete Truck | Onsite HHDT | 400 | 52 | 0 | 0.35 | 0.014 | 0 | 0 |
| | Dump Truck | Onsite HHDT | 450 | 16 | 0 | 0.12 | 0 | 0 | 0 |
| | Excavator | Excavators | 500 | 27 | 0 | 0.20 | 0 | 0 | 0 |
| | Generator | Generator Sets | 25 | 930 | 0 | 6.0 | 0.44 | 0 | 0 |
| | Gradall | Forklifts | 350 | 250 | 0 | 0.48 | 0.48 | 0.48 | 0 |
| | Hydro/Crawler Crane | Cranes | 550 | 666 | 0 | 4.9 | 0 | 0 | 0 |
| | Loader | Tractors/Loaders/Backhoes | 100 | 408 | 0 | 3.0 | 0 | 0 | 0 |
| | Pile Rig | Bore/Drill Rigs | 600 | 408 | 0 | 3.0 | 0 | 0 | 0 |
| | Semi Truck | Onsite HHDT | 450 | 1,254 | 0 | 1.2 | 2.8 | 3.0 | 0 |
| | Tire Wash | Other Construction Equipment | 100 | 780 | 0 | 1.5 | 1.5 | 1.5 | 0 |
| | Water Truck | Onsite HHDT | 300 | 333 | 0 | 2.4 | 0 | 0 | 0 |
| | Work Truck | Onsite LHDT1 | 200 | 216 | 0 | 0.25 | 0.46 | 0.50 | 0 |

**Notes:**

1. Information on Project equipment list, horsepower, quantity, and hours per equipment per year were provided by the Project Applicant. Cumulative hours per building represents the sum of hours per equipment across all years. All off-road equipment is assumed to have diesel engines except aerial lifts and cranes which were assumed to be electric, as designated by Project Applicant.

2. Work trucks are assumed to be similar to light-heavy duty trucks (Onsite LHDT1) as defined in EMFAC2021. Concrete Trucks, Dump Trucks, Semi Trucks, and Water Trucks are assumed to be similar to heavy-heavy duty trucks (Onsite HHDT). Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT1 and HHDT diesel vehicles (aggregated model year) in San Mateo County. RUNEX emission factors (and IDLEX emission factors for HHDT) are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.

   An average emission factors is calculated using the following criteria:
   - Number of LHDT1/HHDT vehicles and schedule are provided by the client.
   - Hours are calculated as number of equipment * utilization percent * number of construction days * hours/day as provided by the client.
   - Miles are calculated as hours * the speed limit (15 miles per hour).
   - Trips are calculated assuming there is one trip per hour, calculated as number of hours * 1 trip/hour.
   - Total Vehicles are calculated as number of equipment for a given subphase * equipment utilization percent * number of construction subphase days as provided by the client.

**Abbreviations:**

CalEEMod® - CALifornia Emissions Estimator MODel

RAMBOLL

**Table 4**
**Equipment List for Residential / Shopping District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Equipment Type[2] | CalEEMod® Equipment Category[3] | Number[2] | Horsepower[2] | Hours / Day[2] | Utilization Percent[2] |
|---|---|---|---|---|---|---|---|
| Area 1 | Demolition | Excavator | Excavators | 4 | 131 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 12 | 450 | 8 | 25% |
| | | Generator | Generator Sets | 2 | 25 | 6 | 50% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Work Truck | Onsite LHDT1 | 24 | 250 | 0.5 | 100% |
| | | Water Truck | Onsite HHDT | 2 | 300 | 8 | 50% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 6 | 150 | 8 | 80% |
| | | Pressure Washer | Pressure Washers | 2 | 25 | 8 | 100% |
| | | Air Compressor | Air Compressors | 1 | 140 | 6 | 70% |
| | Grading and Utilities | Blade | Graders | 2 | 359 | 8 | 15% |
| | | Semi Dump Truck | Onsite HHDT | 10 | 450 | 8 | 25% |
| | | Scraper | Scrapers | 2 | 41 | 8 | 15% |
| | | Loader | Tractors/Loaders/Backhoes | 4 | 100 | 4 | 90% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Excavator | Excavators | 4 | 359 | 8 | 60% |
| | | Backhoe | Tractors/Loaders/Backhoes | 4 | 350 | 8 | 60% |
| | | Gradall | Forklifts | 4 | 350 | 4 | 60% |
| | | Compactor | Other Construction Equipment | 4 | 250 | 0.5 | 20% |
| | | Paver | Pavers | 2 | 250 | 8 | 1% |
| | | Water Truck | Onsite HHDT | 2 | 300 | 8 | 50% |
| | | Work Truck | Onsite LHDT1 | 38 | 250 | 0.5 | 100% |
| | | Generator | Generator Sets | 1 | 600 | 2 | 10% |
| | | Concrete Truck | Onsite HHDT | 2 | 400 | 2 | 10% |
| Parcel 2 Foundations | | Dump Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 1 | 131 | 8 | 60% |
| | | Semi Trucks | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Crane | Cranes | 1 | 215 | 4 | 50% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 8 | 400 | 8 | 15% |
| | | Concrete Pump | Pumps | 1 | 450 | 8 | 15% |
| Parcel 2 Core and Shell | | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Crane | Cranes | 1 | 600 | 8 | 20% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Manlift | Aerial Lifts | 1 | 48 | 8 | 40% |
| | | Work Truck | Onsite LHDT1 | 8 | 250 | 0.5 | 100% |
| Parcel 2 Tenant Improvements | | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Manlift | Aerial Lifts | 1 | 48 | 0.5 | 90% |
| | | Scissor Lift | Aerial Lifts | 1 | 3 | 4 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 6 | 250 | 0.5 | 90% |
| Parcel 2 Landscaping | | Excavator | Excavators | 1 | 25 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 100% |
| | | Work Truck | Onsite LHDT1 | 5 | 250 | 0.5 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| Parcel 3 Foundations | | Dump Truck | Onsite HHDT | 4 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 1 | 131 | 8 | 60% |
| | | Semi Trucks | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 2 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Crane | Cranes | 1 | 215 | 4 | 50% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 8 | 400 | 8 | 15% |
| | | Concrete Pump | Pumps | 1 | 450 | 8 | 15% |
| Parcel 3 Core and Shell | | Semi Truck | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Crane | Cranes | 1 | 600 | 8 | 20% |
| | | Gradall | Forklifts | 2 | 74 | 4 | 80% |
| | | Manlift | Aerial Lifts | 2 | 48 | 8 | 40% |
| | | Work Truck | Onsite LHDT1 | 8 | 250 | 0.5 | 100% |

RAMBOLL

**Table 4**
**Equipment List for Residential/Shopping District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Equipment Type[2] | CalEEMod® Equipment Category[3] | Number[2] | Horsepower[2] | Hours/Day[2] | Utilization Percent[2] |
|---|---|---|---|---|---|---|---|
| Parcel 3 Tenant Improvements | | Semi Truck | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Manlift | Aerial Lifts | 2 | 48 | 0.5 | 90% |
| | | Scissor Lift | Aerial Lifts | 2 | 3 | 4 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 7 | 250 | 0.5 | 90% |
| Parcel 3 Landscaping | | Excavator | Excavators | 1 | 25 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 100% |
| | | Work Truck | Onsite LHDT1 | 5 | 250 | 0.5 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 2 | 70 | 8 | 80% |
| Area 2 | Demolition | Excavator | Excavators | 4 | 131 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 12 | 450 | 8 | 25% |
| | | Generator | Generator Sets | 2 | 25 | 6 | 50% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Work Truck | Onsite LHDT1 | 24 | 250 | 0.5 | 100% |
| | | Water Truck | Onsite HHDT | 2 | 300 | 8 | 50% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 6 | 150 | 8 | 80% |
| | | Pressure Washer | Pressure Washers | 2 | 25 | 8 | 100% |
| | | Air Compressor | Air Compressors | 1 | 140 | 6 | 70% |
| | Grading and Utilities | Blade | Graders | 2 | 359 | 8 | 15% |
| | | Semi Dump Truck | Onsite HHDT | 10 | 450 | 8 | 25% |
| | | Scraper | Scrapers | 2 | 41 | 8 | 15% |
| | | Loader | Tractors/Loaders/Backhoes | 4 | 100 | 4 | 90% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Excavator | Excavators | 4 | 359 | 8 | 60% |
| | | Backhoe | Tractors/Loaders/Backhoes | 4 | 350 | 8 | 60% |
| | | Gradall | Forklifts | 4 | 350 | 4 | 60% |
| | | Compactor | Other Construction Equipment | 4 | 250 | 0.5 | 20% |
| | | Paver | Pavers | 2 | 250 | 8 | 1% |
| | | Water Truck | Onsite HHDT | 2 | 300 | 8 | 50% |
| | | Work Truck | Onsite LHDT1 | 38 | 250 | 0.5 | 100% |
| | | Generator | Generator Sets | 1 | 600 | 2 | 10% |
| | | Concrete Truck | Onsite HHDT | 2 | 400 | 2 | 10% |
| Parcel 7 Foundations | | Dump Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 1 | 131 | 8 | 60% |
| | | Semi Trucks | Onsite HHDT | 1 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Crane | Cranes | 1 | 215 | 4 | 50% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 1 | 400 | 1.5 | 70% |
| | | Concrete Pump | Pumps | 1 | 450 | 0.25 | 50% |
| Parcel 7 Core and Shell | | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Crane | Cranes | 1 | 600 | 8 | 20% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Manlift | Aerial Lifts | 1 | 48 | 8 | 40% |
| | | Work Truck | Onsite LHDT1 | 8 | 250 | 0.5 | 100% |
| Parcel 7 Tenant Improvements | | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Manlift | Aerial Lifts | 1 | 48 | 0.5 | 90% |
| | | Scissor Lift | Aerial Lifts | 1 | 3 | 4 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 6 | 250 | 0.5 | 90% |
| Parcel 7 Landscaping | | Excavator | Excavators | 1 | 25 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Work Truck | Onsite LHDT1 | 5 | 250 | 0.5 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| Parcel 6 Foundations | | Dump Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 1 | 131 | 8 | 60% |
| | | Semi Trucks | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |

**Table 4**
**Equipment List for Residential / Shopping District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Equipment Type[2] | CalEEMod® Equipment Category[3] | Number[2] | Horsepower[2] | Hours / Day[2] | Utilization Percent[2] |
|---|---|---|---|---|---|---|---|
| Parcel 6 Foundations | | Crane | Cranes | 1 | 215 | 4 | 50% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 1 | 400 | 3 | 70% |
| | | Concrete Pump | Pumps | 1 | 450 | 0.5 | 50% |
| Parcel 6 Core and Shell | | Semi Truck | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Crane | Cranes | 1 | 600 | 8 | 20% |
| | | Gradall | Forklifts | 2 | 74 | 4 | 80% |
| | | Manlift | Aerial Lifts | 1 | 48 | 8 | 40% |
| | | Work Truck | Onsite LHDT1 | 8 | 250 | 0.5 | 100% |
| Parcel 6 Tenant Improvements | | Semi Truck | Onsite HHDT | 2 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Manlift | Aerial Lifts | 1 | 48 | 0.5 | 90% |
| | | Scissor Lift | Aerial Lifts | 2 | 3 | 4 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 7 | 250 | 0.5 | 90% |
| Parcel 6 Landscaping | | Excavator | Excavators | 1 | 25 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Work Truck | Onsite LHDT1 | 5 | 250 | 0.5 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 2 | 70 | 8 | 80% |
| Area 3 | Grading and Utilities | Blade | Graders | 1 | 359 | 8 | 15% |
| | | Semi Dump Truck | Onsite HHDT | 6 | 450 | 8 | 25% |
| | | Scraper | Scrapers | 1 | 41 | 8 | 15% |
| | | Loader | Tractors/Loaders/Backhoes | 2 | 100 | 4 | 90% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 2 | 359 | 8 | 60% |
| | | Backhoe | Tractors/Loaders/Backhoes | 2 | 350 | 8 | 60% |
| | | Gradall | Forklifts | 2 | 350 | 4 | 60% |
| | | Compactor | Other Construction Equipment | 2 | 250 | 0.5 | 20% |
| | | Paver | Pavers | 1 | 250 | 8 | 1% |
| | | Water Truck | Onsite HHDT | 1 | 300 | 8 | 50% |
| | | Work Truck | Onsite LHDT1 | 20 | 250 | 0.5 | 100% |
| | | Generator | Generator Sets | 1 | 600 | 2 | 10% |
| | | Concrete Truck | Onsite HHDT | 2 | 400 | 2 | 10% |
| | Tunnel Construction | Crane | Cranes | 1 | 290 | 6 | 35% |
| | | Excavator | Excavators | 2 | 170 | 6 | 45% |
| | | Loader | Tractors/Loaders/Backhoes | 1 | 250 | 6 | 45% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 103 | 6 | 40% |
| | | Gradall | Forklifts | 1 | 130 | 6 | 35% |
| | | Boom Truck | Onsite HHDT | 1 | 200 | 6 | 35% |
| | | Concrete Truck | Onsite HHDT | 3 | 300 | 5 | 25% |
| | | Dump Truck | Onsite HHDT | 4 | 300 | 5 | 25% |
| | | Work Truck | Onsite LHDT1 | 5 | 250 | 4 | 30% |
| | | Compressor | Air Compressors | 2 | 50 | 6 | 30% |
| | Foundations | Dump Truck | Onsite HHDT | 4 | 450 | 8 | 25% |
| | | Generator | Generator Sets | 2 | 25 | 6 | 100% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Excavator | Excavators | 2 | 131 | 8 | 60% |
| | | Semi Trucks | Onsite HHDT | 4 | 450 | 8 | 25% |
| | | Backhoe | Tractors/Loaders/Backhoes | 2 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 2 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 2 | 74 | 4 | 80% |
| | | Crane | Cranes | 2 | 215 | 4 | 50% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 3 | 400 | 3 | 70% |
| | | Concrete Pump | Pumps | 3 | 450 | 0.5 | 50% |
| | Core and Shell | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Generator | Generator Sets | 2 | 25 | 6 | 100% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Crane | Cranes | 2 | 600 | 8 | 20% |
| | | Gradall | Forklifts | 3 | 74 | 4 | 80% |
| | | Manlift | Aerial Lifts | 3 | 48 | 8 | 40% |
| | | Work Truck | Onsite LHDT1 | 16 | 250 | 0.5 | 100% |
| | Tenant Improvements | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 25% |
| | | Generator | Generator Sets | 2 | 25 | 6 | 85% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Manlift | Aerial Lifts | 3 | 48 | 0.5 | 90% |
| | | Scissor Lift | Aerial Lifts | 3 | 3 | 4 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |

**Table 4**
**Equipment List for Residential / Shopping District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Equipment Type[2] | CalEEMod® Equipment Category[3] | Number[2] | Horsepower[2] | Hours / Day[2] | Utilization Percent[2] |
|---|---|---|---|---|---|---|---|
| Area 3 | Tenant Improvements | Work Truck | Onsite LHDT1 | 13 | 250 | 0.5 | 90% |
| | Landscaping | Excavator | Excavators | 1 | 25 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 6 | 450 | 8 | 25% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Backhoe | Tractors/Loaders/Backhoes | 2 | 90 | 8 | 60% |
| | | Work Truck | Onsite LHDT1 | 10 | 250 | 0.5 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 3 | 70 | 8 | 80% |
| Hamilton Avenue Parcels North and South | Demolition | Excavator | Excavators | 1 | 131 | 8 | 90% |
| | | Semi Truck | Onsite HHDT | 3 | 450 | 8 | 80% |
| | | Generator | Generator Sets | 1 | 25 | 6 | 50% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Work Truck | Onsite LHDT1 | 6 | 250 | 0.5 | 100% |
| | | Water Truck | Onsite HHDT | 1 | 300 | 8 | 100% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 2 | 70 | 8 | 80% |
| | | Pressure Washer | Pressure Washers | 2 | 25 | 8 | 100% |
| | | Air Compressor | Air Compressors | 1 | 140 | 6 | 70% |
| | Grading and Utilities | Semi Dump Truck | Onsite HHDT | 3 | 450 | 8 | 80% |
| | | Loader | Tractors/Loaders/Backhoes | 2 | 100 | 4 | 90% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Excavator | Excavators | 1 | 359 | 8 | 60% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 60% |
| | | Compactor | Other Construction Equipment | 1 | 250 | 0.5 | 20% |
| | | Paver | Pavers | 1 | 250 | 8 | 1% |
| | | Water Truck | Onsite HHDT | 1 | 300 | 8 | 100% |
| | | Work Truck | Onsite LHDT1 | 8 | 250 | 0.5 | 100% |
| | | Generator | Generator Sets | 1 | 600 | 2 | 10% |
| | | Concrete Truck | Onsite HHDT | 2 | 400 | 2 | 10% |
| | Foundations | Dump Truck | Onsite HHDT | 1 | 450 | 8 | 60% |
| | | Generator | Generator Sets | 1 | 25 | 6 | 100% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Semi Trucks | Onsite HHDT | 1 | 450 | 8 | 80% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Bob Cat | Tractors/Loaders/Backhoes | 1 | 70 | 8 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 2 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 1 | 400 | 3 | 60% |
| | | Concrete Pump | Pumps | 1 | 450 | 6 | 30% |
| | Core and Shell | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 75% |
| | | Generator | Generator Sets | 1 | 25 | 6 | 100% |
| | | Tire Wash | Other Construction Equipment | 1 | 100 | 4 | 90% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 4 | 250 | 0.5 | 100% |
| | | Concrete Truck | Onsite HHDT | 1 | 400 | 6 | 30% |
| | | Concrete Pump | Pumps | 1 | 450 | 6 | 45% |
| | Tenant Improvements | Semi Truck | Onsite HHDT | 1 | 450 | 8 | 60% |
| | | Generator | Generator Sets | 1 | 25 | 6 | 85% |
| | | Tire Wash | Other Construction Equipment | 2 | 100 | 4 | 90% |
| | | Scissor Lift | Aerial Lifts | 1 | 3 | 6 | 80% |
| | | Gradall | Forklifts | 1 | 74 | 4 | 80% |
| | | Work Truck | Onsite LHDT1 | 3 | 250 | 0.5 | 90% |
| Substation Upgrade | PG&E Substation Work | Backhoe | Tractors/Loaders/Backhoes | 2 | 90 | 8 | 60% |
| | | Loader | Tractors/Loaders/Backhoes | 2 | 100 | 8 | 45% |
| Feeder Line | PG&E Offsite Work | Excavator | Excavators | 2 | 131 | 8 | 90% |
| | | Loader | Tractors/Loaders/Backhoes | 1 | 100 | 8 | 45% |
| | Surface Improvements | Paver | Pavers | 1 | 250 | 8 | 60% |
| | | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | | Vibratory Roller | Other Construction Equipment | 1 | 250 | 8 | 20% |
| | | Finish Roller | Other Construction Equipment | 1 | 250 | 8 | 20% |

**Table 4**
**Equipment List for Residential / Shopping District Construction**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Equipment Type[2] | CalEEMod® Equipment Category[3] | Number[2] | Horsepower[2] | Hours / Day[2] | Utilization Percent[2] |
|---|---|---|---|---|---|---|---|
| Intersection Improvements | O'Brien and Kavanaugh | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | Adams and O'Brien | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |
| | Willow Road and Ivy Drive | Backhoe | Tractors/Loaders/Backhoes | 1 | 90 | 8 | 60% |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. Information on Project equipment list, horsepower, quantity, and utilization factor were provided by the Project Applicant. All off-road equipment is assumed to have diesel engines except aerial lifts which were assumed to be electric, as designated by Project Applicant. Utilizations for duration represent the usage percentage during the indicated equipment date range. Utilization percentage is multiplied by the number of hours per day in the calculation of off-road emissions.
3. Work trucks are assumed to be similar to light-heavy duty trucks (Onsite LHDT1) as defined in EMFAC2021. Concrete Trucks, Dump Trucks, Semi Trucks, and Water Trucks are assumed to be similar to heavy-heavy duty trucks (Onsite HHDT). Emission factors are from EMFAC2021 ("Emission Rates" mode) for LHDT1 and HHDT diesel vehicles (aggregated model year) in San Mateo County. RUNEX emission factors (and IDLEX emission factors for HHDT) are specific to vehicle speed of 15 mph. All other emission factor types are for aggregated speed. Emission factors were multiplied by the appropriate usage parameter based on the units. Emission factors in units of g/trip, g/mi, and g/vehicle/day, were multiplied by trips, miles, and total vehicles, respectively, in order to obtain mass emissions.

   An average emission factors is calculated using the following criteria:
   - Number of LHDT1/HHDT vehicles and schedule are provided by the client.
   - Hours are calculated as number of equipment * utilization percent * number of construction days * hours/day as provided by the client.
   - Miles are calculated as hours * the speed limit (15 miles per hour).
   - Trips are calculated assuming there is one trip per hour, calculated as number of hours * 1 trip/hour.
   - Total Vehicles are calculated as number of equipment for a given subphase * equipment utilization percent * number of construction subphase days as provided by the client.

**Abbreviations:**

CalEEMod® - CALifornia Emissions Estimator MODel

**Table 5**
**Construction Equipment OFFROAD Emission Factors**
**Willow Village**
**Menlo Park, California**

| CalEEMod Equipment Name | Year[1] | HP | Emission Factor (g/bhp-hr)[2] | | | | |
|---|---|---|---|---|---|---|---|
| | | | ROG | NOx | $CO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Aerial Lifts | 2022 | 50 | 0.35 | 4.0 | 639 | 0.12 | 0.11 |
| Aerial Lifts | 2023 | 50 | 0.33 | 3.9 | 639 | 0.11 | 0.10 |
| Aerial Lifts | 2024 | 50 | 0.35 | 3.9 | 639 | 0.11 | 0.10 |
| Aerial Lifts | 2025 | 50 | 0.36 | 3.9 | 639 | 0.11 | 0.10 |
| Aerial Lifts | 2026 | 50 | 0.35 | 3.8 | 639 | 0.091 | 0.083 |
| Air Compressors | 2023 | 50 | 0.18 | 2.0 | 370 | 0.052 | 0.048 |
| Air Compressors | 2024 | 50 | 0.18 | 2.1 | 374 | 0.075 | 0.069 |
| Air Compressors | 2021 | 175 | 0.085 | 1.1 | 326 | 0.044 | 0.040 |
| Air Compressors | 2022 | 175 | 0.077 | 0.87 | 329 | 0.033 | 0.030 |
| Air Compressors | 2023 | 175 | 0.069 | 0.64 | 333 | 0.024 | 0.022 |
| Air Compressors | 2024 | 175 | 0.071 | 0.67 | 336 | 0.025 | 0.023 |
| Air Compressors | 2025 | 175 | 0.068 | 0.58 | 340 | 0.020 | 0.018 |
| Air Compressors | 2026 | 175 | 0.069 | 0.57 | 344 | 0.020 | 0.018 |
| Bore/Drill Rigs | 2022 | 600 | 0.10 | 0.94 | 521 | 0.032 | 0.029 |
| Bore/Drill Rigs | 2023 | 600 | 0.10 | 0.81 | 521 | 0.028 | 0.026 |
| Bore/Drill Rigs | 2024 | 600 | 0.10 | 0.77 | 522 | 0.028 | 0.025 |
| Bore/Drill Rigs | 2025 | 600 | 0.10 | 0.83 | 521 | 0.030 | 0.027 |
| Bore/Drill Rigs | 2026 | 600 | 0.10 | 0.76 | 521 | 0.027 | 0.025 |
| Cranes | 2023 | 300 | 0.31 | 3.5 | 527 | 0.15 | 0.13 |
| Cranes | 2024 | 300 | 0.29 | 3.2 | 528 | 0.13 | 0.12 |
| Cranes | 2025 | 300 | 0.27 | 2.8 | 528 | 0.12 | 0.11 |
| Cranes | 2022 | 600 | 0.24 | 2.6 | 527 | 0.10 | 0.10 |
| Cranes | 2023 | 600 | 0.21 | 2.2 | 528 | 0.089 | 0.082 |
| Cranes | 2024 | 600 | 0.21 | 2.1 | 528 | 0.086 | 0.079 |
| Cranes | 2025 | 600 | 0.20 | 2.0 | 528 | 0.079 | 0.073 |
| Cranes | 2026 | 600 | 0.20 | 1.8 | 527 | 0.075 | 0.069 |
| Crushing/Proc. Equipment | 2021 | 300 | 0.10 | 1.2 | 232 | 0.040 | 0.037 |
| Crushing/Proc. Equipment | 2022 | 300 | 0.10 | 1.0 | 232 | 0.033 | 0.031 |
| Crushing/Proc. Equipment | 2022 | 600 | 0.069 | 0.50 | 231 | 0.017 | 0.016 |
| Crushing/Proc. Equipment | 2023 | 600 | 0.068 | 0.47 | 231 | 0.016 | 0.015 |
| Crushing/Proc. Equipment | 2024 | 600 | 0.064 | 0.42 | 231 | 0.014 | 0.013 |
| Crushing/Proc. Equipment | 2025 | 600 | 0.062 | 0.38 | 231 | 0.013 | 0.012 |
| Crushing/Proc. Equipment | 2026 | 600 | 0.060 | 0.34 | 231 | 0.011 | 0.010 |
| Excavators | 2025 | 25 | 4.0 | 7.6 | 590 | 1.1 | 1.0 |
| Excavators | 2026 | 25 | 4.0 | 7.6 | 589 | 1.1 | 1.0 |
| Excavators | 2021 | 175 | 0.22 | 2.1 | 531 | 0.10 | 0.092 |
| Excavators | 2022 | 175 | 0.19 | 1.7 | 531 | 0.083 | 0.076 |
| Excavators | 2023 | 175 | 0.18 | 1.5 | 531 | 0.073 | 0.067 |
| Excavators | 2024 | 175 | 0.17 | 1.3 | 531 | 0.067 | 0.061 |

**Table 5**
**Construction Equipment OFFROAD Emission Factors**
**Willow Village**
**Menlo Park, California**

| CalEEMod Equipment Name | Year[1] | HP | Emission Factor (g/bhp-hr)[2] | | | | |
|---|---|---|---|---|---|---|---|
| | | | ROG | NOx | $CO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Excavators | 2025 | 175 | 0.16 | 1.2 | 531 | 0.058 | 0.053 |
| Excavators | 2022 | 600 | 0.13 | 1.0 | 529 | 0.035 | 0.032 |
| Excavators | 2023 | 600 | 0.12 | 0.89 | 529 | 0.030 | 0.028 |
| Excavators | 2024 | 600 | 0.12 | 0.83 | 530 | 0.028 | 0.026 |
| Excavators | 2025 | 600 | 0.12 | 0.72 | 530 | 0.025 | 0.023 |
| Excavators | 2026 | 600 | 0.12 | 0.69 | 530 | 0.024 | 0.022 |
| Forklifts | 2023 | 75 | 1.8 | 15 | 528 | 1.0 | 0.92 |
| Forklifts | 2024 | 75 | 2.0 | 10 | 562 | 0.83 | 0.76 |
| Forklifts | 2025 | 75 | 1.5 | 12 | 530 | 0.88 | 0.81 |
| Forklifts | 2026 | 75 | 1.5 | 12 | 530 | 0.89 | 0.82 |
| Forklifts | 2023 | 175 | 0.23 | 2.0 | 528 | 0.13 | 0.12 |
| Forklifts | 2024 | 175 | 0.20 | 1.7 | 528 | 0.11 | 0.10 |
| Forklifts | 2022 | 600 | 0.069 | 0.59 | 525 | 0.0089 | 0.0082 |
| Forklifts | 2023 | 600 | 0.072 | 0.59 | 524 | 0.0090 | 0.0083 |
| Forklifts | 2024 | 600 | 0.071 | 0.53 | 528 | 0.0091 | 0.0084 |
| Forklifts | 2025 | 600 | 0.074 | 0.53 | 528 | 0.0092 | 0.0084 |
| Forklifts | 2026 | 600 | 0.077 | 0.53 | 528 | 0.0093 | 0.0085 |
| Generator Sets | 2021 | 50 | 0.20 | 1.3 | 235 | 0.019 | 0.018 |
| Generator Sets | 2022 | 50 | 0.20 | 1.3 | 237 | 0.019 | 0.018 |
| Generator Sets | 2023 | 50 | 0.21 | 1.3 | 240 | 0.019 | 0.018 |
| Generator Sets | 2024 | 50 | 0.21 | 1.3 | 243 | 0.020 | 0.018 |
| Generator Sets | 2025 | 50 | 0.21 | 1.4 | 245 | 0.020 | 0.018 |
| Generator Sets | 2026 | 50 | 0.21 | 1.4 | 248 | 0.020 | 0.019 |
| Generator Sets | 2022 | 600 | 0.085 | 0.53 | 213 | 0.023 | 0.021 |
| Generator Sets | 2023 | 600 | 0.083 | 0.50 | 216 | 0.022 | 0.020 |
| Generator Sets | 2024 | 600 | 0.083 | 0.49 | 218 | 0.021 | 0.020 |
| Generator Sets | 2025 | 600 | 0.077 | 0.36 | 221 | 0.017 | 0.015 |
| Graders | 2022 | 600 | 0.34 | 4.5 | 530 | 0.14 | 0.13 |
| Graders | 2023 | 600 | 0.34 | 3.8 | 526 | 0.14 | 0.12 |
| Graders | 2024 | 600 | 0.29 | 3.1 | 525 | 0.12 | 0.11 |
| Graders | 2025 | 600 | 0.29 | 3.1 | 526 | 0.11 | 0.10 |
| Graders | 2026 | 600 | 0.22 | 2.1 | 524 | 0.078 | 0.072 |
| Other Construction Equipment | 2021 | 100 | 0.46 | 4.3 | 528 | 0.31 | 0.29 |
| Other Construction Equipment | 2022 | 100 | 0.41 | 3.9 | 527 | 0.27 | 0.25 |
| Other Construction Equipment | 2023 | 100 | 0.38 | 3.5 | 528 | 0.24 | 0.22 |
| Other Construction Equipment | 2024 | 100 | 0.34 | 3.2 | 528 | 0.21 | 0.19 |
| Other Construction Equipment | 2025 | 100 | 0.30 | 2.9 | 528 | 0.17 | 0.16 |
| Other Construction Equipment | 2026 | 100 | 0.28 | 2.7 | 528 | 0.16 | 0.15 |
| Other Construction Equipment | 2022 | 300 | 0.24 | 2.7 | 529 | 0.10 | 0.10 |

**Table 5**
**Construction Equipment OFFROAD Emission Factors**
**Willow Village**
**Menlo Park, California**

| CalEEMod Equipment Name | Year[1] | HP | Emission Factor (g/bhp-hr)[2] | | | | |
|---|---|---|---|---|---|---|---|
| | | | ROG | NOx | $CO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Other Construction Equipment | 2023 | 300 | 0.22 | 2.4 | 529 | 0.094 | 0.086 |
| Other Construction Equipment | 2024 | 300 | 0.21 | 2.2 | 529 | 0.087 | 0.080 |
| Other Construction Equipment | 2025 | 300 | 0.21 | 2.2 | 529 | 0.085 | 0.078 |
| Other Construction Equipment | 2026 | 300 | 0.20 | 2.0 | 529 | 0.081 | 0.075 |
| Pavers | 2022 | 300 | 0.15 | 2.0 | 528 | 0.061 | 0.056 |
| Pavers | 2023 | 300 | 0.14 | 1.7 | 528 | 0.054 | 0.050 |
| Pavers | 2024 | 300 | 0.13 | 1.5 | 528 | 0.048 | 0.044 |
| Pavers | 2025 | 300 | 0.11 | 1.1 | 528 | 0.036 | 0.033 |
| Pavers | 2026 | 300 | 0.11 | 1.0 | 528 | 0.034 | 0.031 |
| Pressure Washers | 2021 | 25 | 0.53 | 4.4 | 564 | 0.20 | 0.18 |
| Pressure Washers | 2022 | 25 | 0.53 | 4.4 | 572 | 0.19 | 0.18 |
| Pressure Washers | 2023 | 25 | 0.53 | 4.4 | 570 | 0.18 | 0.17 |
| Pressure Washers | 2024 | 25 | 0.53 | 4.3 | 572 | 0.18 | 0.17 |
| Pressure Washers | 2025 | 25 | 0.52 | 4.3 | 568 | 0.18 | 0.16 |
| Pressure Washers | 2026 | 25 | 0.52 | 4.3 | 573 | 0.17 | 0.16 |
| Pumps | 2022 | 600 | 0.043 | 0.46 | 213 | 0.018 | 0.017 |
| Pumps | 2023 | 600 | 0.043 | 0.45 | 216 | 0.018 | 0.016 |
| Pumps | 2024 | 600 | 0.041 | 0.39 | 218 | 0.016 | 0.014 |
| Pumps | 2025 | 600 | 0.038 | 0.27 | 221 | 0.012 | 0.011 |
| Pumps | 2026 | 600 | 0.039 | 0.27 | 223 | 0.012 | 0.011 |
| Scrapers | 2022 | 75 | 1.0 | 7.8 | 528 | 0.67 | 0.62 |
| Scrapers | 2023 | 75 | 0.88 | 6.8 | 528 | 0.58 | 0.53 |
| Scrapers | 2022 | 600 | 0.24 | 2.7 | 529 | 0.10 | 0.093 |
| Scrapers | 2023 | 600 | 0.24 | 2.5 | 529 | 0.095 | 0.087 |
| Scrapers | 2024 | 600 | 0.23 | 2.3 | 529 | 0.089 | 0.081 |
| Scrapers | 2025 | 600 | 0.20 | 1.9 | 529 | 0.074 | 0.068 |
| Scrapers | 2026 | 600 | 0.20 | 1.7 | 529 | 0.068 | 0.062 |
| Tractors/Loaders/Backhoes | 2023 | 75 | 1.6 | 12 | 529 | 1.0 | 0.93 |
| Tractors/Loaders/Backhoes | 2024 | 75 | 1.6 | 13 | 528 | 1.0 | 0.94 |
| Tractors/Loaders/Backhoes | 2025 | 75 | 1.6 | 13 | 527 | 1.0 | 0.94 |
| Tractors/Loaders/Backhoes | 2026 | 75 | 1.6 | 12 | 528 | 1.0 | 0.92 |
| Tractors/Loaders/Backhoes | 2022 | 100 | 0.25 | 2.5 | 530 | 0.13 | 0.12 |
| Tractors/Loaders/Backhoes | 2023 | 100 | 0.23 | 2.3 | 530 | 0.11 | 0.10 |
| Tractors/Loaders/Backhoes | 2024 | 100 | 0.22 | 2.2 | 530 | 0.10 | 0.089 |
| Tractors/Loaders/Backhoes | 2025 | 100 | 0.20 | 2.0 | 530 | 0.077 | 0.071 |
| Tractors/Loaders/Backhoes | 2026 | 100 | 0.18 | 1.9 | 530 | 0.063 | 0.058 |
| Tractors/Loaders/Backhoes | 2021 | 175 | 0.22 | 2.1 | 525 | 0.10 | 0.10 |
| Tractors/Loaders/Backhoes | 2022 | 175 | 0.20 | 1.8 | 525 | 0.089 | 0.082 |
| Tractors/Loaders/Backhoes | 2023 | 175 | 0.18 | 1.5 | 526 | 0.077 | 0.071 |

**Table 5**
**Construction Equipment OFFROAD Emission Factors**
**Willow Village**
**Menlo Park, California**

| CalEEMod Equipment Name | Year[1] | HP | Emission Factor (g/bhp-hr)[2] | | | | |
|---|---|---|---|---|---|---|---|
| | | | ROG | NOx | $CO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Tractors/Loaders/Backhoes | 2024 | 175 | 0.18 | 1.4 | 526 | 0.069 | 0.063 |
| Tractors/Loaders/Backhoes | 2022 | 300 | 0.19 | 2.0 | 527 | 0.070 | 0.065 |
| Tractors/Loaders/Backhoes | 2023 | 300 | 0.18 | 1.8 | 527 | 0.064 | 0.059 |
| Tractors/Loaders/Backhoes | 2024 | 300 | 0.18 | 1.6 | 526 | 0.060 | 0.055 |
| Tractors/Loaders/Backhoes | 2025 | 300 | 0.16 | 1.4 | 527 | 0.053 | 0.049 |
| Tractors/Loaders/Backhoes | 2026 | 300 | 0.16 | 1.3 | 528 | 0.050 | 0.046 |
| Tractors/Loaders/Backhoes | 2022 | 600 | 0.16 | 1.5 | 524 | 0.055 | 0.050 |
| Tractors/Loaders/Backhoes | 2023 | 600 | 0.15 | 1.2 | 525 | 0.047 | 0.043 |
| Tractors/Loaders/Backhoes | 2024 | 600 | 0.15 | 1.2 | 526 | 0.044 | 0.041 |
| Tractors/Loaders/Backhoes | 2025 | 600 | 0.14 | 1.0 | 526 | 0.038 | 0.035 |
| Tractors/Loaders/Backhoes | 2026 | 600 | 0.14 | 0.88 | 526 | 0.034 | 0.031 |

**Notes:**

1. Construction schedule and phasing information were provided by the Project Applicant. Construction is conservatively assumed to start December 15, 2021 and full buildout is expected to occur in 2027. The analysis uses the earliest possible start date to assess conservative impacts. Emissions and impacts would decrease if the construction start date is delayed due to the incorporation of cleaner equipment into the construction fleet with time.
2. Emission factors in (g/bhp-hr) were calculated by dividing OFFROAD's pollutant emissions by both OFFROAD's equipment horsepower hours per year and the equipment's default load factor from CalEEMod.

**References:**

CARB. OFFROAD 2017 - ORION v1.0.1. Available at: https://www.arb.ca.gov/orion/.

CAPCOA. 2021. CalEEMOD Appendix D Default Data Tables. Available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=12 [Appendix D-11].

**Abbreviations:**

ROG - reactive organic gases
HP - horsepower
PM - particulate matter

**Table 6**
**Offroad Electric Construction Equipment Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1] | Construction Subphase[2] | Equipment Type[2] | CalEEMod® Equipment Category | Fuel[2] | Number[2] | Horsepower[2] | kW[2] | Hours of Operation per Day[2] | Utilization Percent[2] | Usage (kWh/day) |
|---|---|---|---|---|---|---|---|---|---|---|
| Parcel 2 Core and Shell | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 8.0 | 40% | 115 |
| Parcel 2 TI | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 0.50 | 90% | 16 |
| | | Scissor Lift | Aerial Lifts | Electric | 1 | 3.0 | 2.2 | 4.0 | 80% | 7.2 |
| Parcel 3 Core and Shell | | Manlift | Aerial Lifts | Electric | 2 | 48 | 36 | 8.0 | 40% | 229 |
| Parcel 3 TI | | Manlift | Aerial Lifts | Electric | 2 | 48 | 36 | 0.50 | 90% | 32 |
| | | Scissor Lift | Aerial Lifts | Electric | 2 | 3.0 | 2.2 | 4.0 | 80% | 14 |
| Parcel 7 Core and Shell | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 8.0 | 40% | 115 |
| Parcel 7 TI | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 0.50 | 90% | 16 |
| | | Scissor Lift | Aerial Lifts | Electric | 1 | 3.0 | 2.2 | 4.0 | 80% | 7.2 |
| Parcel 6 Core and Shell | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 8.0 | 40% | 115 |
| Parcel 6 TI | | Manlift | Aerial Lifts | Electric | 1 | 48 | 36 | 0.50 | 90% | 16 |
| | | Scissor Lift | Aerial Lifts | Electric | 2 | 3.0 | 2.2 | 4.0 | 80% | 14 |
| Area 3 | Core and Shell | Manlift | Aerial Lifts | Electric | 3 | 48 | 36 | 8.0 | 40% | 344 |
| | TI | Manlift | Aerial Lifts | Electric | 3 | 48 | 36 | 0.50 | 90% | 48 |
| | | Scissor Lift | Aerial Lifts | Electric | 3 | 3.0 | 2.2 | 4.0 | 80% | 21 |
| Hamilton Avenue Parcels North and South | Core and Shell | Manlift | Aerial Lifts | Electric | 0 | 48 | 36 | 8.0 | 40% | 0 |
| | TI | Scissor Lift | Aerial Lifts | Electric | 1 | 3.0 | 2.2 | 6.0 | 80% | 11 |

| Construction Area[1] | Construction Subphase[2] | Days in Each Construction Year (Days/Year) | | | | Usage in Each Construction Year (kWh/Year) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Year 3 | Year 4 | Year 5 | Year 6 | Year 3 | Year 4 | Year 5 | Year 6 |
| Parcel 2 Core and Shell | | 64 | 116 | 0 | 0 | 7,331 | 13,287 | 0 | 0 |
| Parcel 2 TI | | 0 | 147 | 114 | 0 | 0 | 3,420 | 2,652 | 0 |
| Parcel 3 Core and Shell | | 0 | 180 | 0 | 0 | 0 | 41,234 | 0 | 0 |
| Parcel TI | | 0 | 82 | 178 | 0 | 0 | 3,816 | 8,283 | 0 |
| Parcel 7 Core and Shell | | 0 | 129 | 0 | 0 | 0 | 14,776 | 0 | 0 |
| Parcel 7 TI | | 0 | 17 | 171 | 0 | 0 | 396 | 3,978 | 0 |
| Parcel 6 Core and Shell | | 0 | 81 | 48 | 0 | 0 | 9,278 | 5,498 | 0 |
| Parcel 6 TI | | 0 | 0 | 187 | 0 | 0 | 0 | 5,689 | 0 |
| Area 3 | Core and Shell | 0 | 0 | 139 | 0 | 0 | 0 | 47,763 | 0 |
| | TI | 0 | 0 | 25 | 174 | 0 | 0 | 1,745 | 12,145 |
| Hamilton Avenue Parcels North and South | Core and Shell | 0 | 0 | 43 | 0 | 0 | 0 | 0 | 0 |
| | TI | 0 | 0 | 33 | 0 | 0 | 0 | 354 | 0 |
| | **Total - Equipment** | **64** | **752** | **938** | **174** | **7,331** | **86,205** | **75,963** | **12,145** |

| Year | $CO_2e$ Intensity Factor[3] | Usage | Electric Equipment $CO_2e$ Emissions |
|---|---|---|---|
| | lb/MWh | MWh/Year | MT/Year |
| Year 3 | 215 | 7.3 | 0.71 |
| Year 4 | 204 | 86 | 8.0 |
| Year 5 | 194 | 76 | 6.7 |
| Year 6 | 183 | 12 | 1.0 |
| | **Total** | **182** | **16** |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. Information on Project equipment list, fuel type, quantity, horsepower, and utilization factor were provided by the Project Applicant. The equipment kilowatt usage was determined by converting from horsepower to kilowatts.
3. The energy intensity factors were taken from the local utility Pacific Gas & Electric. See Table 29 for derivation of factors. Values shown above are scaled linearly between the 2020 and 2026 values. Values were scaled to meet the requirements for 33% of energy from renewable sources in 2020 and 50% of energy from renewable sources in 2026 as required under Senate Bill 100.

**Abbreviations:**

CalEEMod® - CALifornia Emissions Estimator MODel
kW - kilowatt
kWh - kilowatt-hour
MWh - megawatt-hour
MT - metric tons
lb - pound
$CO_2e$ - carbon dioxide equivalent

**Table 7a**
**Construction Trips**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Year | Construction Roundtrips[2] | | |
|---|---|---|---|---|---|
| | | | Average Worker Trips[3,4] | Average Vendor Trips[3] | Hauling Trips[3] |
| | | | (trips/day) | (trips/day) | (trips/phase) |
| Area 1 | Demolition | Year 1 | 20 | -- | 1,252 |
| | | Year 2 | 20 | -- | 8,092 |
| | Grading and Utilities | Year 2 | 60 | -- | 16,320 |
| Campus District | Foundations + Core and Shell | Year 2 | -- | 5.6 | -- |
| | | Year 3 | -- | 5.6 | -- |
| | | Year 4 | -- | 5.6 | -- |
| | | Year 5 | -- | 5.6 | -- |
| | Tenant Improvements | Year 4 | -- | 3.1 | -- |
| | | Year 5 | -- | 3.1 | -- |
| | | Year 6 | -- | 3.1 | -- |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | -- | 0.86 | -- |
| | | Year 4 | -- | 0.86 | -- |
| | Core and Shell | Year 3 | -- | 1.0 | -- |
| | | Year 4 | -- | 1.0 | -- |
| | Tenant Improvements | Year 4 | -- | 1.1 | -- |
| | | Year 5 | -- | 1.1 | -- |
| | Landscaping | Year 5 | -- | 0.78 | -- |
| Campus District | O4 and NG Worker Mobile Trips | Year 2 | 200 | -- | -- |
| | | Year 3 | 200 | -- | -- |
| | | Year 4 | 200 | -- | -- |
| | MCS Worker Mobile Trips | Year 2 | 150 | -- | -- |
| | | Year 3 | 150 | -- | -- |
| | | Year 4 | 150 | -- | -- |
| | | Year 5 | 150 | -- | -- |
| | | Year 6 | 150 | -- | -- |
| Area 1 Town Square and Residential/Shopping District | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 225 | -- | -- |
| | | Year 4 | 225 | -- | -- |
| | | Year 5 | 225 | -- | -- |
| | Landscaping Worker Mobile Trips | Year 5 | 60 | -- | -- |
| Area 2 | Demolition | Year 2 | 20 | -- | 9,344 |
| | Grading and Utilities | Year 2 | 60 | -- | 8,160 |
| | | Year 3 | 60 | -- | 8,160 |
| Campus District | Foundations + Core and Shell | Year 3 | -- | 5.5 | -- |
| | | Year 4 | -- | 5.5 | -- |
| | Tenant Improvements | Year 4 | -- | 7.2 | -- |
| | | Year 5 | -- | 7.2 | -- |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | -- | 1.1 | -- |
| | Core and Shell | Year 4 | -- | 1.3 | -- |
| | | Year 5 | -- | 1.3 | -- |
| | Tenant Improvements | Year 4 | -- | 1.4 | -- |
| | | Year 5 | -- | 1.4 | -- |
| | Landscaping | Year 5 | -- | 0.78 | -- |
| | | Year 6 | -- | 0.78 | -- |
| Campus District | Worker Mobile Trips | Year 3 | 430 | -- | -- |
| | | Year 4 | 430 | -- | -- |
| | | Year 5 | 430 | -- | -- |
| Area 2 Town Square and Residential/Shopping District | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 225 | -- | -- |
| | | Year 5 | 225 | -- | -- |
| | Landscaping Worker Mobile Trips | Year 5 | 60 | -- | -- |
| | | Year 6 | 60 | -- | -- |
| Area 3 | Grading and Utilities | Year 3 | 296 | -- | 1,232 |
| | Tunnel Construction | Year 3 | 655 | 4.0 | -- |
| | | Year 4 | 655 | 4.0 | -- |
| | Foundations | Year 4 | 655 | 5.0 | -- |
| | | Year 5 | 655 | 5.0 | -- |
| | Core and Shell | Year 5 | 655 | 5.8 | -- |

**Table 7a**
**Construction Trips**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Construction Subphase | Year | Construction Roundtrips[2] | | |
|---|---|---|---|---|---|
| | | | Average Worker Trips[3,4] | Average Vendor Trips[3] | Hauling Trips[3] |
| | | | (trips/day) | (trips/day) | (trips/phase) |
| Area 3 | Tenant Improvements | Year 5 | 655 | 5.9 | -- |
| | | Year 6 | 655 | 5.9 | -- |
| | Landscaping | Year 6 | 30 | 3.3 | -- |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 10 | -- | 211 |
| | Grading and Utilities | Year 4 | 10 | -- | 9 |
| | | Year 5 | 10 | -- | 204 |
| | Foundations | Year 5 | -- | 6.2 | -- |
| | Core and Shell | Year 5 | -- | 2.8 | -- |
| | Tenant Improvements | Year 5 | -- | 4.6 | -- |
| | Worker Mobile Trips | Year 5 | 141 | -- | -- |
| Substation Upgrade | PG&E Substation Work | Year 3 | 8 | 0.5 | -- |
| Feeder Line | PG&E Offsite Work | Year 3 | 10 | 0.5 | -- |
| | Surface Improvements | Year 3 | 10 | 0.5 | -- |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 6 | 1.7 | -- |
| | Adams and O'Brien | Year 3 | 6 | 2.5 | -- |
| | Willow Road and Ivy Drive | Year 3 | 6 | 2.5 | -- |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. Construction trip rates were provided by the Project Applicant for each subphase.
3. CalEEMod® default fleet mixes were used for Worker (LD_Mix), Vendor (MHDT/HHDT), and Hauling (HHDT) trips. LD_Mix was assumed to be 100% gasoline vehicles and MHDT/HHDT and HHDT were assumed to be 100% diesel vehicles.
4. Worker mobile trips for Town Square and Residential/Shopping District and Campus District phases are presented in separate phase-wide subphases as reported by the Project Applicant.

**Abbreviations:**

LD_Mix - light duty mix
MHDT - medium-heavy duty trucks
HHDT - heavy-heavy duty trucks
CalEEMod® - CALifornia Emissions Estimator MODel
VMT - vehicle miles traveled

**Table 7b**
**Construction Trip Lengths**
**Willow Village**
**Menlo Park, CA**

| Trip Type | One-Way Trip Length (mi) |
|---|---|
| Worker[1] | 10.8 |
| Vendor[2] | 40.0 |
| Haul[3] | 22.9 |
| Haul - Grading & Utilities Subphases[4] | 8.2 |

**Notes:**

1. Consistent with CalEEMod methodology, worker trip length is based on the default Home-to-Work trip length for San Mateo County as reported in the CalEEMod® user guide, Appendix D.
2. Vendor trip length was provided by the Project Applicant. Most construction supplies will be available within 40 miles of the Project site. This is a conservative assumption as it is twice the default vendor trip length reported in CalEEMod.
3. Haul trip length was provided by the Project Applicant. A 50/25/25 split was assumed between Zanker Landfill, Ox Mountain Landfill, and Kirby Canyon landfill. The primary landfill was assumed to be Zanker Landfill, due to proximity.
4. Haul trip length for Grading & Utilities subphases was provided by the Project Applicant.

**Abbreviations:**

CalEEMod - CALifornia Emissions Estimator MODel
mi - mile

**Table 8**
**Fugitive Road Dust Emission Factors**
**Willow Village**
**Menlo Park, California**

**Road Dust Equation**[1]

E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

| Parameter | Value |
|---|---|
| k = particle size multiplier for $PM_{10}$ [lb/VMT] | 0.0022 |
| sL = roadway silt loading [grams per square meter - $g/m^2$] | 0.032 |
| W = average weight of vehicles traveling the road [tons] | 2.4 |
| P = number of “wet” days in county with at least 0.01 in of precipitation during the annual averaging period | 74 |
| N = number of days in the averaging period | 365 |
| $PM_{10}$ speciation profile fraction | 0.46 |
| $PM_{2.5}$ speciation profile fraction | 0.069 |
| E = Fugitive $PM_{10}$ Emission Factor [g/VMT] | 0.10 |
| E = Fugitive $PM_{2.5}$ Emission Factor [g/VMT][2] | 0.015 |
| E = Fugitive $PM_{10}$ Emission Factor with Street Sweeping Reduction [g/VMT][3] | 0.075 |
| E = Fugitive $PM_{2.5}$ Emission Factor with Street Sweeping Reduction [g/VMT][3] | 0.011 |

**Notes:**

1. Road dust equation is based on the U.S. EPA AP-42 Chapter 13.2.1: Paved Roads. Parameter values were obtained from the 2021 California ARB Miscellaneous Process Methodology using major roadways silt loading, annual San Mateo county "wet" days, and statewide average vehicle fleet weight.
2. $PM_{2.5}$ emission factor was scaled from the $PM_{10}$ value based on the ARB's guidance.
3. A 26% reduction in the $PM_{10}$ emission factor was taken for street sweeping of arterial/collector streets, based on SCAQMD's Fugitive Dust Table XI-C. The $PM_{2.5}$ emissions factor was scaled from the $PM_{10}$ value based on the ARB's guidance.

**Abbreviations:**

ARB - Air Resource Board
lb - pounds
g - grams
$m^2$ - square meters
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
$PM_{10}$ - particulate matter less than 10 microns in diameter
SCAQMD - South Coast Air Quality Management District
USEPA - United States Environmental Protection Agency
VMT - vehicle miles traveled

**References:**


USEPA. 2011. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 13.2.1, Paved Roads. Available online at: https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

SCAQMD. 2007. Table XI-C Mitigation Measure Examples: Dust From Paved Roads. Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust


RAMBOLL

**Table 9a**
**Fugitive Dust Emissions from Building Demolition Waste**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1,2,3] | Year | Number of Days | Building Waste | Building Waste[4] | Emission Factor - Mechanical or Explosive Dismemberment[5] | Emission Factor - Debris Loading[6] | Uncontrolled Emissions[7,8] | | Controlled Emissions[7,8] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $PM_{2.5}$ | $PM_{2.5}$ | $PM_{2.5}$ | | $PM_{2.5}$ | |
| | | days | cy | ton | lb / ton | lb / ton | lb / day | ton / yr | lb / day | ton / yr |
| Area 1 | Year 1 | 13 | 123,169 | 155,706 | 1.7E-04 | 0.0031 | 3.48 | 0.023 | 1.6 | 0.010 |
| | Year 2 | 84 | | | | | | 0.15 | | 0.066 |
| Area 2 | Year 2 | 48 | | | | | | 0.08 | | 0.038 |
| Hamilton Avenue Parcels North and South | Year 4 | 22 | 3,563 | 4,504 | | | 0.66 | 0.0073 | 0.30 | 0.0033 |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. The modeled fugitive dust source groups included in the health risk assessment are shown in Figures 3 and 4. Figure 3 shows the modeled locations of Area 1 and Area 2, and Figure 4 shows the modeled location of Hamilton Avenue Parcels North and South (which is labeled as "RETAIL" in the figure).
3. Area 3 (Parcels 4, 5, and Tunnel Construction) do not require demolition, and thus do not have any associated fugitive dust emissions from demolition activities.
4. Conversion of building waste to tons assumes an average soil density of 1.5 grams per cubic centimeter, per the CalEEMod® User's Guide, Appendix A Truck Loading.
5. Emission factor calculated following guidance in the CalEEMod® User's Guide, Appendix A Mechanical or Explosive Dismemberment, which is based of AP 42 Section 13.2.4.3 for batch drop operations. The equation is:
   $EF = k*(0.0032)*(U/5)^{1.3}/(M/2)^{1.4}$ (lb/ton of debris)

   0.053 = $k_{PM2.5}$ Particle size multiplier (dimensionless)
   4.92 = U, mean wind speed (mph)
   2 = M, material moisture content (%)
6. Emission factor calculated following guidance in the CalEEMod® User's Guide, Appendix A Debris Loading, which is based of AP 42 Section 13.2. The equation is:
   $EF = k*EF_{L-TSP}$

   0.35 = $k_{PM10}$ Particle size multiplier (dimensionless)
   0.053 = $k_{PM2.5}$ Particle size multiplier (dimensionless)
   0.058 = $EF_{L-TSP}$, lb/ton
7. Fugitive $PM_{2.5}$ emissions from demolition will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 55% per CalEEMod® recommendation.
8. The mass emissions shown below are converted from ton per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.

**Abbreviations:**

CalEEMod® - California Emissions Estimator Model
cy - cubic yards
EF - emission factor
lb - pounds
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter
VMT - vehicle miles traveled
yr - years

**Table 9b**
**Fugitive Dust Emissions from Grading Activity**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1,2] | Year | Maximum Area Disturbed[3] | VMT[4] | Uncontrolled $PM_{2.5}$ Emission Factor[5] | Uncontrolled Emissions[6,7] | | Controlled Emissions[6,7] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $PM_{2.5}$ | | $PM_{2.5}$ | |
| | | acre/day | mile/day | lb/VMT | lb/day | ton/yr | lb/day | ton/yr |
| Area 1 | Year 2 | 1 | 0.69 | 0.17 | 0.11 | 0.0082 | 0.052 | 0.0037 |
| Area 2 | Year 2 | 1 | 0.69 | 0.17 | 0.11 | 0.0037 | 0.052 | 0.0017 |
| | Year 3 | 1 | 0.69 | 0.17 | 0.11 | 0.0037 | 0.052 | 0.0017 |
| Area 3 | Year 3 | 1 | 0.69 | 0.17 | 0.11 | 0.0013 | 0.052 | 5.7E-04 |
| Hamilton Avenue Parcels North and South | Year 4 | 1 | 0.69 | 0.17 | 0.11 | 5.7E-05 | 0.052 | 2.6E-05 |
| | Year 5 | 1 | 0.69 | 0.17 | 0.11 | 0.0013 | 0.052 | 5.7E-04 |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.

2. The modeled fugitive dust source groups included in the health risk assessment are shown in Figures 3. The name of the construction area aligns with the name of the source groups presented in the figure.

3. Maximum graded area is based on Project-specific estimate.

4. VMT per day calculated following guidance in the CalEEMod® User's Guide, Appendix A, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   VMT = $A_S/W_b$ x (43,560 sqft/acre)/(5,280 ft/mile), where:
   $A_S$ = $A_S$, acres graded per day (varies by sub-activity)
   12 = $W_b$, blade width of grading equipment (CalEEMod® default)

5. Emission factor calculated following guidance in the CalEEMod® User's Guide, Appendix A, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
   $EF_{PM2.5} = 0.04 \times (S)^{2.5} \times F_{PM2.5}$, where:
   7.1 = S, mean vehicle speed (mph) (AP-42 default)
   0.031 = $F_{PM2.5}$, $PM_{2.5}$ scaling factor (AP-42 default)

6. Fugitive $PM_{2.5}$ emissions from demolition will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 55% per CalEEMod® recommendation.

7. The mass emissions shown below are converted from ton per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.

**Abbreviations:**

CalEEMod® - California Emissions Estimator Model
EF - emission factor
ft - feet
lb - pounds
mph - miles per hour
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter
VMT - vehicle miles traveled
yr - years

**Table 9c**
**Fugitive Dust Emissions from Truck Loading Activity**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1,2] | Construction Subphase | Year | Material Loaded | Uncontrolled Emission Factor[3] | Uncontrolled Emissions[4,5] | | Controlled Emissions[4,5] | |
|---|---|---|---|---|---|---|---|---|
| | | | | $PM_{2.5}$ | $PM_{2.5}$ | | $PM_{2.5}$ | |
| | | | ton | lb / ton | lb / day | ton / yr | lb / day | ton / yr |
| Area 1 | Demolition | Year 1 | 3,786 | 1.35E-05 | 3.9E-03 | 2.6E-05 | 1.8E-03 | 1.2E-05 |
| | | Year 2 | 24,468 | | 3.9E-03 | 1.7E-04 | 1.8E-03 | 7.4E-05 |
| | Grading and Utilities | Year 2 | 49,348 | | 4.7E-03 | 3.3E-04 | 2.1E-03 | 1.5E-04 |
| Area 2 | Demolition | Year 2 | 28,254 | | 8.0E-03 | 1.9E-04 | 3.6E-03 | 8.6E-05 |
| | Grading and Utilities | Year 2 | 24,674 | | 5.1E-03 | 1.7E-04 | 2.3E-03 | 7.5E-05 |
| | | Year 3 | 24,674 | | 5.1E-03 | 1.7E-04 | 2.3E-03 | 7.5E-05 |
| Area 3 | Grading and Utilities | Year 3 | 3,725 | | 1.2E-03 | 2.5E-05 | 5.4E-04 | 1.1E-05 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 638 | | 3.9E-04 | 4.3E-06 | 1.8E-04 | 1.9E-06 |
| | Grading and Utilities | Year 4 | 27 | | 3.7E-04 | 1.8E-07 | 1.7E-04 | 8.3E-08 |
| | | Year 5 | 617 | | 3.8E-04 | 4.2E-06 | 1.7E-04 | 1.9E-06 |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. The modeled fugitive dust source groups included in the health risk assessment are shown in Figures 3 and 4. Figure 3 shows the modeled locations of Area 1, Area 2, and Area 3, and Figure 4 shows the modeled location of Hamilton Avenue Parcels North and South (which is labeled as "RETAIL" in the figure).
3. Emission factor calculated following guidance in the CalEEMod® User's Guide, Appendix A, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:
   $EF = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$ , where the following default values are used:

   0.053 = $k_{PM2.5}$, $PM_{2.5}$ particle size multiplier
   2.2 = mean wind speed (U), meters per second
   4.9 = mean wind speed (U), miles per hour
   12 = material moisture content (M), %
4. Fugitive $PM_{2.5}$ emissions from demolition will be controlled by watering the construction site two times per day, which is estimated to reduce emissions by 55% per CalEEMod® recommendation.
5. The mass emissions shown below are converted from ton per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.

**Abbreviations:**

CalEEMod® - California Emissions Estimator Model
EF - emission factor
lbs - pounds
$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter

RAMBOLL

**Table 10**
**Construction Water Use Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1] | Construction Subphase | Year | Number of Work Days | Average Acreage Needing Water[2] | Water Usage[2] | Total Water Usage | Electricity Usage[3] | PG&E Energy Intensity Factor[4] | Total $CO_2e$ Emissions |
|---|---|---|---|---|---|---|---|---|---|
| | | | days | acre | gal/acre/day | million gal | MWh | lbs $CO_2e$/MWh | MT |
| Area 1 | Demolition | Year 1 | 13 | 18 | 500 | 0.11 | 0.40 | 235 | 0.043 |
| | | Year 2 | 84 | 18 | 500 | 0.74 | 2.6 | 225 | 0.27 |
| | Grading and Utilities | Year 2 | 143 | 18 | 500 | 1.3 | 4.4 | 225 | 0.45 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 224 | 4.0 | 143 | 0.13 | 0.45 | 215 | 0.044 |
| | | Year 4 | 1 | 4.0 | 143 | 0.0006 | 0.0 | 204 | 1.9E-04 |
| | Core and Shell | Year 3 | 64 | 4.0 | 148 | 0.038 | 0.1 | 215 | 0.013 |
| | | Year 4 | 180 | 4.0 | 148 | 0.11 | 0.372 | 204 | 0.034 |
| | Tenant Improvements | Year 4 | 147 | 4.0 | 161 | 0.094 | 0.3 | 204 | 0.031 |
| | | Year 5 | 178 | 4.0 | 161 | 0.11 | 0.40 | 194 | 0.035 |
| | Landscaping | Year 5 | 123 | 4.0 | 130 | 0.064 | 0.22 | 194 | 0.020 |
| Campus District | Vertical Construction | Year 2 | 42 | 4.5 | 200 | 0.038 | 0.13 | 225 | 0.014 |
| | | Year 3 | 260 | 4.5 | 200 | 0.24 | 0.82 | 215 | 0.080 |
| | | Year 4 | 262 | 4.5 | 200 | 0.24 | 0.83 | 204 | 0.077 |
| | | Year 5 | 261 | 4.5 | 200 | 0.24 | 0.83 | 194 | 0.073 |
| | | Year 6 | 46 | 4.5 | 200 | 0.042 | 0.15 | 183 | 0.012 |
| Area 2 | Demolition | Year 2 | 48 | 13 | 500 | 0.31 | 1.1 | 225 | 0.11 |
| | Grading and Utilities | Year 2 | 65 | 13 | 500 | 0.42 | 1.5 | 225 | 0.15 |
| | | Year 3 | 65 | 13 | 500 | 0.42 | 1.5 | 215 | 0.14 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 180 | 4.0 | 129 | 0.093 | 0.32 | 204 | 0.030 |
| | Core and Shell | Year 4 | 145 | 4.0 | 134 | 0.078 | 0.27 | 204 | 0.025 |
| | | Year 5 | 48 | 4.0 | 134 | 0.026 | 0.090 | 194 | 0.0079 |
| | Tenant Improvements | Year 4 | 17 | 4.0 | 148 | 0.010 | 0.035 | 204 | 0.0033 |
| | | Year 5 | 235 | 4.0 | 148 | 0.14 | 0.49 | 194 | 0.043 |
| | Landscaping | Year 5 | 91 | 4.0 | 96 | 0.035 | 0.12 | 194 | 0.011 |
| | | Year 6 | 32 | 4.0 | 96 | 0.012 | 0.043 | 183 | 0.0036 |
| Campus District | Vertical Construction | Year 3 | 202 | 5.6 | 200 | 0.23 | 0.79 | 215 | 0.077 |
| | | Year 4 | 262 | 5.6 | 200 | 0.29 | 1.0 | 204 | 0.095 |
| | | Year 5 | 122 | 5.6 | 200 | 0.14 | 0.48 | 194 | 0.042 |
| Area 3 | Grading and Utilities | Year 3 | 22 | 5.0 | 500 | 0.055 | 0.19 | 215 | 0.019 |
| | Tunnel Construction | Year 3 | 175 | 5.0 | 500 | 0.44 | 1.5 | 215 | 0.15 |
| | | Year 4 | 87 | 5.0 | 500 | 0.22 | 0.76 | 204 | 0.071 |
| | Foundations | Year 4 | 24 | 5.0 | 200 | 0.024 | 0.084 | 204 | 0.0078 |
| | | Year 5 | 99 | 5.0 | 200 | 0.10 | 0.35 | 194 | 0.030 |
| | Core and Shell | Year 5 | 139 | 5.0 | 200 | 0.14 | 0.487 | 194 | 0.043 |
| | Tenant Improvements | Year 5 | 25 | 5.0 | 200 | 0.025 | 0.088 | 194 | 0.0077 |
| | | Year 6 | 174 | 5.0 | 200 | 0.17 | 0.61 | 183 | 0.051 |
| | Landscaping | Year 6 | 59 | 8.0 | 200 | 0.09 | 0.33 | 183 | 0.027 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 22 | 3.7 | 682 | 0.056 | 0.19 | 204 | 0.018 |
| | Grading and Utilities | Year 4 | 1 | 3.7 | 2891 | 0.011 | 0.037 | 204 | 0.0035 |
| | | Year 5 | 22 | 3.7 | 2891 | 0.24 | 0.82 | 194 | 0.072 |
| | Foundations | Year 5 | 22 | 3.7 | 518 | 0.042 | 0.15 | 194 | 0.013 |
| | Core and Shell | Year 5 | 43 | 3.7 | 316 | 0.050 | 0.18 | 194 | 0.015 |
| | Tenant Improvements | Year 5 | 33 | 3.7 | 515 | 0.063 | 0.22 | 194 | 0.019 |
| Feeder Line | PG&E Offsite Work | Year 3 | 240 | -- | -- | 0.250 | 0.88 | 215 | 0.085 |
| | | | | | | | **Total** | **Year 1** | **0.043** |
| | | | | | | | | **Year 2** | **1.0** |
| | | | | | | | | **Year 3** | **0.61** |
| | | | | | | | | **Year 4** | **0.40** |
| | | | | | | | | **Year 5** | **0.43** |
| | | | | | | | | **Year 6** | **0.094** |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.

2 Information on Project water use was provided by the Project Applicant.

3 Energy usage is calculated by applying the electric intensity factor for outdoor water to total water usage. An electric intensity factor of 3,500 kWh/million gallons was taken from Table 9.2 in Appendix D of the CalEEMod User's Guide as the sum of supply water, treat water and distribute water electric intensity factors. Since the water use reported here is only for construction fugitive dust control, operational indoor water use-related emissions and wastewater treatment-related emissions are not estimated here.

4 The energy intensity factors were taken from the local utility Pacific Gas & Electric. See Table 29 for derivation of factors. Values shown above are scaled linearly between the 2020 and 2026 values. Values were scaled to meet the requirements for 33% of energy from renewable sources in 2020 and 50% of energy from renewable sources in 2026 as required under Senate Bill 100.

**Abbreviations:**

$CO_2e$ - Carbon dioxide-equivalent
gal - Gallons
GHG - Greenhouse gases
kWh - kilowatt-hours
MWh - megawatt-hours
lbs - pounds
MT - Metric Tons
CalEEMod - California Emissions Estimate Model

**References:**

CalEEMod User's Guide (Available online at: http://www.aqmd.gov/caleemod/user's-guide)
PG&E, Pacific Gas and Electric - Gas and power company for California (https://www.pge.com/)

RAMBOLL

**Table 11**
**Project Construction Asphalt Paving Off-Gassing Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[1] | Construction Subphase[2] | Land Use | Asphalt-Paved Area | Asphalt Paving ROG Off-Gassing Emission Factor[3] | ROG Off-Gassing Emissions |
|---|---|---|---|---|---|
| | | | acre | lb/acre | lb/subphase |
| Area 1 | Grading and Utilities | Roadway | 11.7 | 2.62 | 31 |
| Area 3 | Grading and Utilities | Roadway | 1.1 | 2.62 | 2.9 |
| Hamilton Avenue Parcels North and South | Grading and Utilities | Roadway | 1.3 | 2.62 | 3.4 |
| Feeder Line | Surface Improvements | Roadway | 1.09 | 2.62 | 2.9 |
| Intersection Improvements | O'Brien and Kavanaugh | Roadway | 0.11 | 2.62 | 0.3 |
| | Adams and O'Brien | Roadway | 0.11 | 2.62 | 0.3 |
| | Willow Road and Ivy Drive | Roadway | 0.11 | 2.62 | 0.3 |
| | | | | **Total Year 2** | **31** |
| | | | | **Total Year 3** | **6.6** |
| | | | | **Total Year 5** | **3.4** |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction. No paving occurs in Area 2.
2. Asphalt-paved roadway area was provided by the Project Applicant.
3. The VOC off-gassing emission factor is from CalEEMod User's Guide, Appendix A. VOC is assumed to be equivalent to ROG for these purposes.

**Abbreviations:**

lb - pound
VOC - volatile organic compound
ROG - reactive organic gas

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/

**Table 12**
**Project Construction Architectural Coating Off-Gassing Emissions**
**Willow Village**
**Menlo Park, CA**

| Coating Category | Unmitigated Interior | Mitigated Interior | Exterior |
|---|---|---|---|
| **VOC Content (g/L)[1,2]** | 100 | 10 | 150 |
| **Emission Factor (lb/ft$^2$)[3]** | 0.0046 | 0.00046 | 0.0070 |
| **Land Use** | **Fraction of Surface Area Painted[3] (%)** | | **Painted Area Multiplier[3]** |
| | **Interior** | **Exterior** | |
| Residential | 75% | 25% | 2.7 |
| Non-Residential | 75% | 25% | 2 |
| Parking | 0% | 6% | -- |

| Building or Parcel | Land Use[4] | Start Year | End Year | Building Square Footage[5] | | | Painted Surface Area | | Unmitigated ROG Emissions | Mitigated ROG Emissions |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Area | Non-Residential Area | Parking Area | Interior | Exterior | | |
| | | | | ft$^2$ | ft$^2$ | ft$^2$ | ft$^2$ | ft$^2$ | tons | tons |
| Parcel 2 | Residential | Year 4 | Year 5 | 320,569 | -- | -- | 649,152 | 216,384 | 2.3 | 0.90 |
| | Non-Residential | | | -- | 40,000 | -- | 60,000 | 20,000 | 0.21 | 0.083 |
| | Parking | | | -- | -- | 216,862 | -- | 13,012 | 0.045 | 0.045 |
| Parcel 3 | Residential | Year 4 | Year 5 | 410,760 | -- | -- | 831,788 | 277,263 | 2.9 | 1.2 |
| | Non-Residential | | | -- | 55,000 | -- | 82,500 | 27,500 | 0.29 | 0.11 |
| | Parking | | | -- | -- | 233,000 | -- | 13,980 | 0.049 | 0.049 |
| North Garage | Parking | Year 2 | Year 3 | -- | -- | 840,056 | -- | 50,403 | 0.18 | 0.18 |
| Office Building 4 | Non-Residential | Year 4 | | -- | 269,934 | -- | 404,902 | 134,967 | 1.4 | 0.56 |
| Meeting, Collaboration, Park | Non-Residential | Year 5 | Year 6 | -- | 454,563 | -- | 681,844 | 227,281 | 2.4 | 0.95 |
| Hotel | Non-Residential | Year 5 | | -- | 172,000 | -- | 258,000 | 86,000 | 0.90 | 0.36 |
| Other | Non-Residential | Year 4 | | -- | 6,085 | -- | 9,127 | 3,042 | 0.032 | 0.013 |
| | Parking | | | -- | -- | 13,600 | -- | 816 | 2.8E-03 | 2.8E-03 |
| Parcel 7 | Residential | Year 4 | Year 5 | 117,640 | -- | -- | 238,221 | 79,407 | 0.83 | 0.33 |
| | Parking | | | -- | -- | 9,547 | -- | 573 | 2.0E-03 | 2.0E-03 |
| Parcel 6 | Residential | Year 5 | | 174,499 | -- | -- | 353,361 | 117,787 | 1.2 | 0.49 |
| | Parking | | | -- | -- | 26,809 | -- | 1,609 | 5.6E-03 | 5.6E-03 |
| South Garage | Parking | Year 3 | Year 4 | -- | -- | 446,830 | -- | 26,810 | 0.093 | 0.093 |
| Office Building 3 | Non-Residential | Year 4 | Year 5 | -- | 212,805 | -- | 319,207 | 106,402 | 1.1 | 0.44 |
| Office Building 1 | Non-Residential | Year 4 | | -- | 134,237 | -- | 201,355 | 67,118 | 0.70 | 0.28 |
| Office Building 2 | Non-Residential | Year 4 | Year 5 | -- | 164,078 | -- | 246,118 | 82,039 | 0.86 | 0.34 |
| Office Building 5 | Non-Residential | Year 4 | Year 5 | -- | 236,320 | -- | 354,481 | 118,160 | 1.2 | 0.49 |
| Office Building 6 | Non-Residential | Year 4 | Year 5 | -- | 221,978 | -- | 332,967 | 110,989 | 1.2 | 0.46 |
| Parcels 4 + 5 | Residential | Year 5 | Year 6 | 672,508 | -- | -- | 1,361,830 | 453,943 | 4.7 | 1.9 |
| | Non-Residential | | | -- | 5,000 | -- | 7,500 | 2,500 | 0.026 | 0.010 |
| | Parking | | | -- | -- | 82,536 | -- | 4,952 | 0.017 | 0.017 |
| Hamilton Avenues Parcels North and South | Non-Residential | Year 5 | | -- | 7,690 | -- | 11,535 | 3,845 | 0.040 | 0.016 |
| | | | | | | | | **Total Year 2[6]** | **0.025** | **0.025** |
| | | | | | | | | **Total Year 3[6]** | **0.20** | **0.20** |
| | | | | | | | | **Total Year 4[6]** | **7.5** | **3.1** |
| | | | | | | | | **Total Year 5[6]** | **9.7** | **3.9** |
| | | | | | | | | **Total Year 6[6]** | **5.2** | **2.1** |

**Table 12**
**Project Construction Architectural Coating Off-Gassing Emissions**
**Willow Village**
**Menlo Park, CA**

**Notes:**

1. VOC content of paint is assumed to be consistent with BAAQMD Regulation 8, Rule 3 for flat and nonflat coatings. VOC is assumed to be equivalent to ROG for these purposes.
2. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions are estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumes use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC is assumed to be equivalent to ROG for these purposes.
3. The emission factor is calculated using CalEEMod default architectural coating emissions parameters. The default assumptions account for the painting surface area relative to the floor square footage assuming 1 gallon of paint covers 180 sqft of surface area.
4. Consistent with CalEEMod Appendix A, recreational areas were excluded from the floor square footage in calculating VOC emissions due to architectural coatings.
5. Project square footage by land use was provided by the Project Applicant.
6. ROG emissions are allocated to each year based on the construction schedule for each building or parcel.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator MODel
CEQA - California Environmental Quality Act
$ft^2$ - square feet
g - gram
gal - gallons
L - liters
lb - pounds
ROG - reactive organic gas
sqft - square feet
VOC - volatile organic compound

**References:**

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). 2016. Appendix A. Available at: http://www.caleemod.com

**Table 13**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

**Off-Road Emissions[1,2]**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 34 | 376 | 15 | 14 |
| | | Year 2 | 196 | 2,133 | 82 | 76 |
| | Grading and Utilities | Year 2 | 436 | 4,632 | 159 | 146 |
| Parcel 2 Foundations | | Year 3 | 285 | 2,758 | 163 | 150 |
| Parcel 2 Core and Shell | | Year 3 | 31 | 296 | 16 | 15 |
| | | Year 4 | 57 | 451 | 25 | 23 |
| Parcel 2 Tenant Improvements | | Year 4 | 52 | 371 | 24 | 22 |
| | | Year 5 | 32 | 302 | 18 | 16 |
| Parcel 2 Landscaping | | Year 5 | 134 | 896 | 70 | 65 |
| Parcel 3 Foundations | | Year 3 | 373 | 3,494 | 219 | 202 |
| | | Year 4 | 2.4 | 21 | 1.3 | 1.2 |
| Parcel 3 Core and Shell | | Year 4 | 128 | 938 | 54 | 50 |
| Parcel 3 Tenant Improvements | | Year 4 | 30 | 235 | 13 | 12.2 |
| | | Year 5 | 52 | 531 | 28 | 25 |
| Parcel 3 Landscaping | | Year 5 | 160 | 1,093 | 87 | 80 |
| North Garage | | Year 2 | 62 | 644 | 20 | 19 |
| | | Year 3 | 152 | 1,615 | 62 | 57 |
| Office Building 4 | | Year 3 | 132 | 1,355 | 54 | 50 |
| | | Year 4 | 17 | 227 | 7.3 | 6.8 |
| Meeting, Collaboration, Park | | Year 2 | 102 | 992 | 31 | 29 |
| | | Year 3 | 433 | 4,090 | 159 | 147 |
| | | Year 4 | 96 | 1,075 | 24 | 22 |
| | | Year 5 | 81 | 842 | 18 | 17 |
| | | Year 6 | 26 | 229 | 8.0 | 7.4 |
| Hotel Excavation | | Year 2 | 99 | 995 | 34 | 31 |
| | | Year 3 | 421 | 4,048 | 173 | 160 |
| Hotel Construction | | Year 4 | 94 | 1,011 | 27 | 25 |
| | | Year 5 | 71 | 845 | 18 | 16 |
| Town Square | | Year 3 | 608 | 5,208 | 301 | 277 |
| | | Year 4 | 256 | 2,207 | 120 | 111 |
| | | Year 5 | 26 | 218 | 3.7 | 3.4 |
| Area 2 | Demolition | Year 2 | 112 | 1,219 | 47 | 43 |
| | Grading and Utilities | Year 2 | 198 | 2,106 | 72 | 67 |
| | | Year 3 | 289 | 2,620 | 132 | 122 |
| Parcel 7 Foundations | | Year 4 | 200 | 1,666 | 113 | 104 |
| Parcel 7 Core and Shell | | Year 4 | 63 | 482 | 28 | 26 |
| Parcel 7 Tenant Improvements | | Year 4 | 6.0 | 41 | 2.7 | 2.5 |
| | | Year 5 | 48 | 438 | 26 | 24 |
| Parcel 7 Landscaping | | Year 5 | 110 | 704 | 55 | 51 |
| Parcel 6 Foundations | | Year 4 | 202 | 1,728 | 113 | 104 |
| Parcel 6 Core and Shell | | Year 4 | 58 | 410 | 24 | 22 |
| | | Year 5 | 27 | 256 | 14 | 13 |
| Parcel 6 Tenant Improvements | | Year 5 | 54 | 538 | 29 | 27 |
| Parcel 6 Landscaping | | Year 5 | 64 | 426 | 34 | 32 |
| | | Year 6 | 74 | 488 | 40 | 37 |
| South Garage | | Year 3 | 188 | 1,854 | 77 | 71 |
| | | Year 4 | 83 | 889 | 32 | 29 |
| Office Building 3 | | Year 3 | 168 | 1,611 | 72 | 66 |
| | | Year 4 | 35 | 442 | 13 | 12 |
| | | Year 5 | 3.9 | 58 | 1.6 | 1.5 |
| Office Building 1 | | Year 3 | 147 | 1,427 | 62 | 57 |
| | | Year 4 | 33 | 411 | 13 | 12 |
| Office Building 2 | | Year 3 | 142 | 1,366 | 60 | 56 |
| | | Year 4 | 36 | 448 | 14 | 13 |
| | | Year 5 | 0.44 | 6.4 | 0.18 | 0.17 |
| Office Building 5 | | Year 3 | 197 | 1,875 | 84 | 78 |
| | | Year 4 | 33 | 418 | 13 | 12 |
| | | Year 5 | 3.6 | 52 | 1.5 | 1.4 |

**Table 13**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 189 | 1,775 | 82 | 75 |
| | | Year 4 | 39 | 476 | 14 | 13 |
| | | Year 5 | 7.6 | 112 | 3.2 | 3.0 |
| Area 3 | Grading and Utilities | Year 3 | 49 | 443 | 22 | 21 |
| | Tunnel Construction | Year 3 | 145 | 1,476 | 68 | 63 |
| | | Year 4 | 71 | 710 | 33 | 31 |
| | Foundations | Year 4 | 86 | 725 | 47 | 43 |
| | | Year 5 | 333 | 2,939 | 190 | 174 |
| | Core and Shell | Year 5 | 151 | 1,358 | 71 | 65 |
| | Tenant Improvements | Year 5 | 13 | 118 | 5.6 | 5.2 |
| | | Year 6 | 85 | 803 | 38 | 35 |
| | Landscaping | Year 6 | 210 | 1,522 | 119 | 110 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 42 | 428 | 23 | 21 |
| | Grading and Utilities | Year 4 | 2.1 | 20 | 1.2 | 1.1 |
| | | Year 5 | 45 | 441 | 25 | 23 |
| | Foundations | Year 5 | 35 | 309 | 20 | 18 |
| | Core and Shell | Year 5 | 18 | 189 | 7.9 | 7.3 |
| | Tenant Improvements | Year 5 | 14 | 141 | 7.1 | 6.5 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 223 | 1,749 | 142 | 131 |
| Feeder Line | PG&E Offsite Work | Year 3 | 180 | 1,438 | 99 | 91 |
| | Surface Improvements | Year 3 | 20 | 186 | 11 | 10 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 8.4 | 66 | 5.3 | 4.9 |
| | Adams and O'Brien | Year 3 | 5.6 | 44 | 3.6 | 3.3 |
| | Willow Road and Ivy Drive | Year 3 | 5.6 | 44 | 3.6 | 3.3 |

**On-Road and Paving[1]**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 0.0064 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

**Table 13**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.32 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 483 | 622 | 9.5 | 8.8 |
| | Tenant Improvements | Year 5 | 87 | 112 | 1.7 | 1.6 |
| | | Year 6 | 571 | 724 | 11 | 10 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 1.0 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

**Summary of Project Construction Unmitigated Annual CAP Emissions by Year**

| Year | Emissions[4] | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | ton/year | | | |
| Year 1 | 0.022 | 0.44 | 0.010 | 9.0E-03 |
| Year 2 | 0.82 | 12 | 0.26 | 0.24 |
| Year 3 | 3.5 | 23 | 1.06 | 0.98 |
| Year 4 | 9.5 | 9.8 | 0.41 | 0.38 |
| Year 5 | 11 | 8.1 | 0.39 | 0.36 |
| Year 6 | 5.7 | 2.0 | 0.11 | 0.10 |
| **Total** | 31 | 55 | 2.2 | 2.1 |

**Summary of Project Construction Unmitigated Daily CAP Emissions by Year**

| Year | Emissions | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | lb/day | | | |
| Year 1 | 2.8 | **56** | 1.2 | 1.1 |
| Year 2 | 4.5 | **64** | 1.4 | 1.3 |
| Year 3 | 19 | **124** | 5.8 | 5.4 |
| Year 4 | 52 | 53 | 2.3 | 2.1 |
| Year 5 | **63** | 45 | 2.1 | 2.0 |
| Year 6 | 35 | 12 | 0.68 | 0.62 |
| **Threshold[5]** | 54 | 54 | 82 | 54 |

**Notes:**

1. Construction emissions were estimated with methodology equivalent to CalEEMod 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD2017. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Unmitigated construction emissions from offroad equipment are calculated using fleet-average emission factors.
3. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
4. The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Bolded values indicate threshold exceedances. Fugitive emissions sources are excluded from comparison to this threshold.

**Abbreviations:**

CAP - criteria air pollutant
CalEEMod - California Emissions Estimate Model
ROG - reactive organic gases
$NO_X$ - nitrous oxide

**Table 14**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

**Off-Road Emissions[1,2]**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 13 | 168 | 2.4 | 2.4 |
| | | Year 2 | 79 | 1,045 | 15 | 15 |
| | Grading and Utilities | Year 2 | 189 | 2,033 | 36 | 35 |
| Parcel 2 Foundations | | Year 3 | 48 | 933 | 8.4 | 8.4 |
| Parcel 2 Core and Shell | | Year 3 | 7.3 | 81 | 1.4 | 1.4 |
| | | Year 4 | 13 | 143 | 2.5 | 2.4 |
| Parcel 2 Tenant Improvements | | Year 4 | 9.3 | 133 | 1.8 | 1.7 |
| | | Year 5 | 6.8 | 95 | 1.1 | 1.0 |
| Parcel 2 Landscaping | | Year 5 | 10 | 165 | 1.3 | 1.3 |
| Parcel 3 Foundations | | Year 3 | 53 | 1,008 | 9.5 | 9.4 |
| | | Year 4 | 0.33 | 6.2 | 0.059 | 0.058 |
| Parcel 3 Core and Shell | | Year 4 | 24 | 333 | 4.3 | 4.2 |
| Parcel 3 Tenant Improvements | | Year 4 | 6.1 | 102 | 1.11 | 1.09 |
| | | Year 5 | 13 | 207 | 1.9 | 1.9 |
| Parcel 3 Landscaping | | Year 5 | 11 | 215 | 1.3 | 1.3 |
| North Garage | | Year 2 | 31 | 310 | 5.7 | 5.7 |
| | | Year 3 | 57 | 568 | 11 | 11.0 |
| Office Building 4 | | Year 3 | 46 | 562 | 8.4 | 8.4 |
| | | Year 4 | 7.0 | 138 | 1.2 | 1.2 |
| Meeting, Collaboration, Park | | Year 2 | 50 | 453 | 9.3 | 9.3 |
| | | Year 3 | 172 | 1,532 | 32 | 32 |
| | | Year 4 | 55 | 818 | 10 | 10 |
| | | Year 5 | 50 | 561 | 7.2 | 7.2 |
| | | Year 6 | 12 | 69 | 1.8 | 1.8 |
| Hotel Excavation | | Year 2 | 50 | 441 | 10 | 9 |
| | | Year 3 | 160 | 1,462 | 32 | 32 |
| Hotel Construction | | Year 4 | 63 | 814 | 13 | 13 |
| | | Year 5 | 42 | 643 | 6.1 | 6.1 |
| Town Square | | Year 3 | 141 | 1,493 | 27 | 27 |
| | | Year 4 | 67 | 676 | 13 | 13 |
| | | Year 5 | 21 | 147 | 3.4 | 3.4 |
| Area 2 | Demolition | Year 2 | 45 | 597 | 8.7 | 8.6 |
| | Grading and Utilities | Year 2 | 86 | 924 | 16 | 16 |
| | | Year 3 | 83 | 886 | 16 | 16 |
| Parcel 7 Foundations | | Year 4 | 25 | 412 | 4.4 | 4.4 |
| Parcel 7 Core and Shell | | Year 4 | 14 | 139 | 2.7 | 2.7 |
| Parcel 7 Tenant Improvements | | Year 4 | 1.1 | 14 | 0.21 | 0.20 |
| | | Year 5 | 10 | 126 | 1.6 | 1.6 |
| Parcel 7 Landscaping | | Year 5 | 8.6 | 153 | 1.1 | 1.1 |
| Parcel 6 Foundations | | Year 4 | 27 | 474 | 4.7 | 4.6 |
| Parcel 6 Core and Shell | | Year 4 | 11 | 138 | 1.9 | 1.9 |
| | | Year 5 | 6.1 | 75 | 0.91 | 0.89 |
| Parcel 6 Tenant Improvements | | Year 5 | 13 | 198 | 2.0 | 2.0 |
| Parcel 6 Landscaping | | Year 5 | 4.6 | 96 | 0.54 | 0.54 |
| | | Year 6 | 5.4 | 112 | 0.63 | 0.63 |
| South Garage | | Year 3 | 68 | 674 | 13 | 13 |
| | | Year 4 | 34 | 372 | 6.5 | 6.5 |
| Office Building 3 | | Year 3 | 55 | 532 | 10 | 10 |
| | | Year 4 | 14 | 289 | 2.4 | 2.4 |
| | | Year 5 | 1.8 | 35 | 0.25 | 0.25 |
| Office Building 1 | | Year 3 | 48 | 492 | 9.2 | 9.1 |
| | | Year 4 | 13 | 269 | 2.2 | 2.2 |
| Office Building 2 | | Year 3 | 46 | 454 | 8.8 | 8.8 |
| | | Year 4 | 14 | 293 | 2.5 | 2.4 |
| | | Year 5 | 0.20 | 3.8 | 0.029 | 0.028 |
| Office Building 5 | | Year 3 | 63 | 617 | 12 | 12 |
| | | Year 4 | 13 | 271 | 2.3 | 2.3 |
| | | Year 5 | 1.7 | 31 | 0.23 | 0.23 |

**Table 14**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 60 | 540 | 11 | 11 |
| | | Year 4 | 16 | 316 | 2.7 | 2.7 |
| | | Year 5 | 3.6 | 67 | 0.50 | 0.49 |
| Area 3 | Grading and Utilities | Year 3 | 14 | 150 | 2.7 | 2.7 |
| | Tunnel Construction | Year 3 | 43 | 557 | 7.6 | 7.5 |
| | | Year 4 | 21 | 275 | 3.7 | 3.7 |
| | Foundations | Year 4 | 12 | 208 | 2.2 | 2.1 |
| | | Year 5 | 49 | 796 | 6.5 | 6.5 |
| | Core and Shell | Year 5 | 41 | 445 | 5.9 | 5.8 |
| | Tenant Improvements | Year 5 | 4.2 | 52 | 0.61 | 0.60 |
| | | Year 6 | 29 | 361 | 4.1 | 4.1 |
| | Landscaping | Year 6 | 18 | 336 | 2.2 | 2.2 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 9.0 | 200 | 1.5 | 1.5 |
| | Grading and Utilities | Year 4 | 0.34 | 6.8 | 0.062 | 0.061 |
| | | Year 5 | 7.2 | 138 | 1.1 | 1.1 |
| | Foundations | Year 5 | 5.4 | 97 | 0.78 | 0.78 |
| | Core and Shell | Year 5 | 8.1 | 117 | 1.4 | 1.4 |
| | Tenant Improvements | Year 5 | 3.6 | 54 | 0.51 | 0.50 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 10 | 68 | 2.4 | 2.4 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 207 | 6.5 | 6.5 |
| | Surface Improvements | Year 3 | 3.3 | 22 | 0.66 | 0.65 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 0.36 | 2.6 | 0.091 | 0.091 |
| | Adams and O'Brien | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |
| | Willow Road and Ivy Drive | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |

**On-Road and Paving[1]**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 6.4E-03 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Area 1 Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

**Table 14**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.3 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 483 | 622 | 9.5 | 8.8 |
| | Tenant Improvements | Year 5 | 87 | 112 | 1.7 | 1.6 |
| | | Year 6 | 571 | 724 | 11 | 10 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 0.98 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

**Summary of Project Construction Mitigated Annual CAP Emissions by Year**

| Year | Emissions[4] | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | ton/year | | | |
| Year 1 | 0.012 | 0.34 | 3.5E-03 | 3.4E-03 |
| Year 2 | 0.48 | 8.2 | 0.089 | 0.087 |
| Year 3 | 1.9 | 8.6 | 0.142 | 0.140 |
| Year 4 | 4.4 | 5.3 | 0.069 | 0.067 |
| Year 5 | 5.1 | 4.0 | 0.047 | 0.046 |
| Year 6 | 2.4 | 0.88 | 0.011 | 0.011 |
| **Total** | 14 | 27 | 0.36 | 0.35 |

**Summary of Project Construction Mitigated Daily CAP Emissions by Year**

| Year | Emissions | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | lb/day | | | |
| Year 1 | 1.5 | 43 | 0.44 | 0.42 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 |
| Year 3 | 10 | 47 | 0.78 | 0.77 |
| Year 4 | 24 | 29 | 0.38 | 0.37 |
| Year 5 | 28 | 22 | 0.26 | 0.25 |
| Year 6 | 15 | 5.4 | 0.068 | 0.065 |
| **Threshold[5]** | 54 | 54 | 82 | 54 |

**Notes:**

1. Construction emissions were estimated with methodology equivalent to CalEEMod® 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Mitigated construction emissions from offroad equipment are calculated using Tier 4 Final emission factors for 95 percent of the equipment before residents move on-site in Year 5 and 98 percent of the equipment after residents move on-site in Year 5. The other 5 percent and 2 percent (before and after on-site residents, repspectively) of non-Tier 4 equipment are assumed to be Tier 2.
3. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
4. The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold.

**Abbreviations:**

CAP - criteria air pollutant
CalEEMod® - California Emissions Estimate Model
ROG - reactive organic gases
$NO_X$ - nitrous oxide

RAMBOLL

**Table 15**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village**
**Menlo Park, CA**

**Off-Road Emissions[1]**

| Construction Area[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 45 | 8.0E-03 | 2.3E-03 | 46 |
| | | Year 2 | 287 | 5.2E-02 | 1.5E-02 | 292 |
| | Grading and Utilities | Year 2 | 705 | 1.5E-01 | 2.5E-02 | 716 |
| Parcel 2 Foundations | | Year 3 | 179 | 2.3E-02 | 1.3E-02 | 184 |
| Parcel 2 Core and Shell | | Year 3 | 24 | 4.7E-03 | 1.0E-03 | 24 |
| | | Year 4 | 43 | 8.5E-03 | 1.8E-03 | 44 |
| Parcel 2 Tenant Improvements | | Year 4 | 29 | 4.5E-03 | 1.9E-03 | 30 |
| | | Year 5 | 22 | 3.5E-03 | 1.5E-03 | 23 |
| Parcel 2 Landscaping | | Year 5 | 32 | 6.0E-03 | 1.6E-03 | 32 |
| Parcel 3 Foundations | | Year 3 | 200 | 2.7E-02 | 1.4E-02 | 205 |
| | | Year 4 | 1.2 | 1.7E-04 | 8.5E-05 | 1.3 |
| Parcel 3 Core and Shell | | Year 4 | 83 | 1.5E-02 | 4.2E-03 | 84 |
| Parcel 3 Tenant Improvements | | Year 4 | 21 | 2.6E-03 | 1.8E-03 | 22 |
| | | Year 5 | 45 | 5.5E-03 | 3.7E-03 | 46 |
| Parcel 3 Landscaping | | Year 5 | 32 | 6.1E-03 | 1.6E-03 | 32 |
| North Garage | | Year 2 | 118 | 2.9E-02 | 2.6E-03 | 119 |
| | | Year 3 | 206 | 4.9E-02 | 3.9E-03 | 208 |
| Office Building 4 | | Year 3 | 162 | 3.8E-02 | 4.0E-03 | 164 |
| | | Year 4 | 29 | 3.7E-03 | 2.3E-03 | 29.7 |
| Meeting, Collaboration, Park | | Year 2 | 192 | 4.9E-02 | 2.9E-03 | 194 |
| | | Year 3 | 640 | 1.7E-01 | 8.6E-03 | 647 |
| | | Year 4 | 190 | 4.3E-02 | 5.8E-03 | 193 |
| | | Year 5 | 185 | 4.3E-02 | 5.0E-03 | 187 |
| | | Year 6 | 45 | 1.2E-02 | 3.4E-04 | 45 |
| Hotel Excavation | | Year 2 | 185 | 4.8E-02 | 2.6E-03 | 187 |
| | | Year 3 | 529 | 1.2E-01 | 8.1E-03 | 535 |
| Hotel Construction | | Year 4 | 193 | 3.5E-02 | 4.2E-03 | 195 |
| | | Year 5 | 156 | 2.9E-02 | 6.4E-03 | 158 |
| Town Square | | Year 3 | 545 | 1.3E-01 | 1.4E-02 | 553 |
| | | Year 4 | 261 | 6.3E-02 | 6.0E-03 | 264 |
| | | Year 5 | 83 | 2.2E-02 | 1.2E-03 | 84 |
| Area 2 | Demolition | Year 2 | 164 | 3.0E-02 | 8.4E-03 | 167 |
| | Grading and Utilities | Year 2 | 320 | 7.0E-02 | 1.1E-02 | 326 |
| | | Year 3 | 319 | 7.0E-02 | 1.1E-02 | 324 |
| Parcel 7 Foundations | | Year 4 | 87 | 1.6E-02 | 4.4E-03 | 88 |
| Parcel 7 Core and Shell | | Year 4 | 48 | 9.5E-03 | 2.0E-03 | 48 |
| Parcel 7 Tenant Improvements | | Year 4 | 3.3 | 5.2E-04 | 2.2E-04 | 3.4 |
| | | Year 5 | 33 | 5.3E-03 | 2.2E-03 | 34 |
| Parcel 7 Landscaping | | Year 5 | 28 | 5.0E-03 | 1.6E-03 | 28 |
| Parcel 6 Foundations | | Year 4 | 97 | 1.6E-02 | 5.7E-03 | 99 |
| Parcel 6 Core and Shell | | Year 4 | 36 | 6.5E-03 | 1.9E-03 | 37 |
| | | Year 5 | 21 | 3.9E-03 | 1.1E-03 | 22 |
| Parcel 6 Tenant Improvements | | Year 5 | 47 | 5.8E-03 | 3.9E-03 | 48 |
| Parcel 6 Landscaping | | Year 5 | 13 | 2.4E-03 | 7.2E-04 | 13 |
| | | Year 6 | 15 | 2.8E-03 | 8.4E-04 | 16 |
| South Garage | | Year 3 | 255 | 6.2E-02 | 5.3E-03 | 258 |
| | | Year 4 | 120 | 2.7E-02 | 2.5E-03 | 122 |
| Office Building 3 | | Year 3 | 201 | 5.1E-02 | 3.5E-03 | 204 |
| | | Year 4 | 49 | 7.7E-03 | 3.0E-03 | 50 |
| | | Year 5 | 8.4 | 9.4E-04 | 7.4E-04 | 8.6 |
| Office Building 1 | | Year 3 | 178 | 4.4E-02 | 3.4E-03 | 180 |
| | | Year 4 | 45 | 7.2E-03 | 2.8E-03 | 46 |
| Office Building 2 | | Year 3 | 171 | 4.3E-02 | 3.1E-03 | 173 |
| | | Year 4 | 49 | 8.0E-03 | 3.0E-03 | 50 |
| | | Year 5 | 0.94 | 1.1E-04 | 8.3E-05 | 0.97 |
| Office Building 5 | | Year 3 | 234 | 5.9E-02 | 4.0E-03 | 237 |
| | | Year 4 | 47 | 7.4E-03 | 3.0E-03 | 48 |
| | | Year 5 | 7.7 | 8.6E-04 | 6.8E-04 | 7.9 |

**Table 15**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village**
**Menlo Park, CA**

**Off-Road Emissions[1]**

| Phase | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Office Building 6 | | Year 3 | 224 | 5.8E-02 | 3.2E-03 | 226 |
| | | Year 4 | 52 | 8.5E-03 | 2.9E-03 | 53 |
| | | Year 5 | 16 | 1.8E-03 | 1.5E-03 | 17 |
| Area 3 | Grading and Utilities | Year 3 | 56 | 1.2E-02 | 2.1E-03 | 57 |
| | Tunnel Construction | Year 3 | 156 | 2.6E-02 | 9.4E-03 | 159 |
| | | Year 4 | 77 | 1.3E-02 | 4.6E-03 | 79 |
| | Foundations | Year 4 | 40 | 7.0E-03 | 2.1E-03 | 41 |
| | | Year 5 | 163 | 2.9E-02 | 8.4E-03 | 167 |
| | Core and Shell | Year 5 | 121 | 2.3E-02 | 5.3E-03 | 123 |
| | Tenant Improvements | Year 5 | 12 | 1.7E-03 | 8.4E-04 | 12 |
| | | Year 6 | 81 | 1.2E-02 | 5.8E-03 | 83 |
| | Landscaping | Year 6 | 54 | 9.6E-03 | 3.1E-03 | 55 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 35 | 3.8E-03 | 2.9E-03 | 36 |
| | Grading and Utilities | Year 4 | 1.6 | 2.0E-04 | 1.3E-04 | 1.7 |
| | | Year 5 | 35 | 4.4E-03 | 2.9E-03 | 36 |
| | Foundations | Year 5 | 17 | 2.1E-03 | 1.1E-03 | 18 |
| | Core and Shell | Year 5 | 24 | 2.2E-03 | 1.4E-03 | 24 |
| | Tenant Improvements | Year 5 | 12 | 2.0E-03 | 6.6E-04 | 12 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 34 | 9.8E-03 | 0 | 34 |
| Feeder Line | PG&E Offsite Work | Year 3 | 108 | 3.1E-02 | 0 | 109 |
| | Surface Improvements | Year 3 | 12 | 2.3E-03 | 0 | 12 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.3 | 3.7E-04 | 0 | 1.3 |
| | Adams and O'Brien | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |
| | Willow Road and Ivy Drive | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |

**On-Road Emissions[1]**

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 112 | 2.5E-04 | 1.7E-02 | 117 |
| | | Year 2 | 717 | 1.4E-03 | 1.1E-01 | 750 |
| | Grading and Utilities | Year 2 | 585 | 3.1E-03 | 8.5E-02 | 610 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 27 | 3.3E-05 | 4.3E-03 | 28 |
| | | Year 4 | 0.12 | 1.4E-07 | 1.9E-05 | 0.13 |
| | Core and Shell | Year 3 | 7.7 | 9.5E-06 | 1.2E-03 | 8.1 |
| | | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Tenant Improvements | Year 4 | 18 | 2.0E-05 | 2.8E-03 | 18 |
| | | Year 5 | 21 | 2.2E-05 | 3.3E-03 | 22 |
| | Landscaping | Year 5 | 15 | 1.5E-05 | 2.3E-03 | 15 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 340 | 1.1E-02 | 9.6E-03 | 344 |
| | | Year 4 | 391 | 1.2E-02 | 1.0E-02 | 395 |
| | | Year 5 | 261 | 7.7E-03 | 6.7E-03 | 263 |
| | Landscaping Worker Mobile Trips | Year 5 | 48 | 1.4E-03 | 1.2E-03 | 49 |
| Campus District | Foundations + Core and Shell | Year 2 | 28 | 4.8E-05 | 4.5E-03 | 30 |
| | | Year 3 | 173 | 2.1E-04 | 2.7E-02 | 181 |
| | | Year 4 | 172 | 2.0E-04 | 2.7E-02 | 180 |
| | | Year 5 | 170 | 1.8E-04 | 2.7E-02 | 177 |
| | Tenant Improvements | Year 4 | 70 | 7.9E-05 | 1.1E-02 | 73 |
| | | Year 5 | 92 | 9.7E-05 | 1.5E-02 | 97 |
| | | Year 6 | 16 | 1.6E-05 | 2.5E-03 | 17 |
| | O4 and NG Worker Mobile Trips | Year 2 | 58 | 2.1E-03 | 1.7E-03 | 58 |
| | | Year 3 | 351 | 1.2E-02 | 9.9E-03 | 355 |
| | | Year 4 | 275 | 8.6E-03 | 7.3E-03 | 277 |
| | MCS Worker Mobile Trips | Year 2 | 43 | 1.6E-03 | 1.3E-03 | 44 |
| | | Year 3 | 263 | 8.9E-03 | 7.4E-03 | 266 |
| | | Year 4 | 261 | 8.2E-03 | 7.0E-03 | 263 |
| | | Year 5 | 255 | 7.5E-03 | 6.5E-03 | 257 |
| | | Year 6 | 44 | 1.2E-03 | 1.1E-03 | 45 |

**Table 15**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village**
**Menlo Park, CA**

**On-Road Emissions[1]**

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 2 | Demolition | Year 2 | 821 | 1.3E-03 | 1.3E-01 | 859 |
| | Grading and Utilities | Year 2 | 290 | 1.5E-03 | 4.2E-02 | 302 |
| | | Year 3 | 286 | 1.3E-03 | 4.2E-02 | 298 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Core and Shell | Year 4 | 26 | 3.0E-05 | 4.1E-03 | 27 |
| | | Year 5 | 8.5 | 8.9E-06 | 1.3E-03 | 8.9 |
| | Tenant Improvements | Year 4 | 3.1 | 3.5E-06 | 4.8E-04 | 3.2 |
| | | Year 5 | 42 | 4.4E-05 | 6.6E-03 | 44 |
| | Landscaping | Year 5 | 11 | 1.1E-05 | 1.7E-03 | 11 |
| | | Year 6 | 3.7 | 3.6E-06 | 5.9E-04 | 3.9 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 388 | 1.2E-02 | 1.0E-02 | 392 |
| | | Year 5 | 345 | 1.0E-02 | 8.8E-03 | 348 |
| | Landscaping Worker Mobile Trips | Year 5 | 36 | 1.0E-03 | 9.1E-04 | 36 |
| | | Year 6 | 12 | 3.4E-04 | 3.0E-04 | 12 |
| Campus District | Foundations + Core and Shell | Year 3 | 134 | 1.7E-04 | 2.1E-02 | 141 |
| | | Year 4 | 153 | 1.7E-04 | 2.4E-02 | 160 |
| | Tenant Improvements | Year 4 | 129 | 1.5E-04 | 2.0E-02 | 135 |
| | | Year 5 | 101 | 1.1E-04 | 1.6E-02 | 106 |
| | Worker Mobile Trips | Year 3 | 587 | 2.0E-02 | 1.6E-02 | 592 |
| | | Year 4 | 748 | 2.4E-02 | 2.0E-02 | 754 |
| | | Year 5 | 342 | 1.0E-02 | 8.8E-03 | 345 |
| Area 3 | Grading and Utilities | Year 3 | 83 | 1.5E-03 | 7.4E-03 | 85 |
| | Tunnel Construction | Year 3 | 859 | 2.6E-02 | 3.5E-02 | 870 |
| | | Year 4 | 420 | 1.2E-02 | 1.7E-02 | 425 |
| | Foundations | Year 4 | 119 | 3.3E-03 | 5.1E-03 | 120 |
| | | Year 5 | 481 | 1.3E-02 | 2.0E-02 | 487 |
| | Core and Shell | Year 5 | 692 | 1.8E-02 | 3.1E-02 | 702 |
| | Tenant Improvements | Year 5 | 124 | 3.2E-03 | 5.5E-03 | 126 |
| | | Year 6 | 852 | 2.0E-02 | 3.7E-02 | 863 |
| | Landscaping | Year 6 | 34 | 3.4E-04 | 3.8E-03 | 35 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 19 | 6.4E-05 | 2.9E-03 | 20 |
| | Grading and Utilities | Year 4 | 0.36 | 2.5E-06 | 4.7E-05 | 0.37 |
| | | Year 5 | 7.7 | 5.2E-05 | 1.0E-03 | 8.0 |
| | Foundations | Year 5 | 16 | 1.7E-05 | 2.5E-03 | 17 |
| | Core and Shell | Year 5 | 14 | 1.5E-05 | 2.3E-03 | 15 |
| | Tenant Improvements | Year 5 | 18 | 1.9E-05 | 2.8E-03 | 19 |
| | Worker Mobile Trips | Year 5 | 89 | 2.6E-03 | 2.3E-03 | 90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 12 | 2.1E-04 | 1.1E-03 | 12 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 5.6E-04 | 2.6E-03 | 31 |
| | Surface Improvements | Year 3 | 2.9 | 5.4E-05 | 2.5E-04 | 3.0 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 3.6 | 2.4E-05 | 4.9E-04 | 3.8 |
| | Adams and O'Brien | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |
| | Willow Road and Ivy Drive | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |

**Summary of Project Construction Annual GHG Emissions by Year**

| Year | Emissions[4,5] | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | MT/year | | | |
| Year 1 | 157 | 0.0083 | 0.020 | 163 |
| Year 2 | 4,514 | 0.44 | 0.44 | 4,657 |
| Year 3 | 7,605 | 1.1 | 0.30 | 7,722 |
| Year 4 | 4,871 | 0.40 | 0.25 | 4,954 |
| Year 5 | 4,304 | 0.28 | 0.23 | 4,379 |
| Year 6 | 1,157 | 0.059 | 0.056 | 1,175 |
| | | | **Total** | **23,050** |

**Notes:**

1. Emissions were estimated using onroad emissions factors from EMFAC2021 and offroad construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
3. Carbon dioxide equivalent emissions were determined using IPCC 5th Assessment Report Global Warming Potentials for $CH_4$ and $N_2O$.
4. The Summary of Project Construction Annual GHG Emissions by Year is the sum of the values represented above as well as Construction Water Use Emissions, shown in Table 10.
5. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions.

**Abbreviations:**

CalEEMod® - California Emissions Estimate Model
GHG - greenhouse gases
$CH_4$ - methane
$CO_2$ - carbon dioxide
$N_2O$ - nitrous oxide
$CO_2e$ - carbon dioxide equivalent
MT - metric ton
IPCC - Intergovernmental Panel on Climate Change

**Table 16**
**Building Operational Capacity For Emissions Scaling**
**Willow Village**
**Menlo Park, California**

| Building or Parcel[1] | | Percent Breakdown of Land Use Type by Building | | | | | | Percent of Year Building is Operational[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Office | Retail | Residential | Hotel | Parking | Park | Year 4 | Year 5 | Year 6 |
| North Garage | | -- | -- | -- | -- | 45% | -- | 100% | 100% | 100% |
| Office Building 4 | | 11% | 48% | -- | -- | -- | -- | 21% | 100% | 100% |
| Meeting, Collaboration, Park | | 28% | -- | -- | -- | -- | -- | 0% | 0% | 82% |
| Hotel Construction | | -- | -- | -- | 100% | -- | -- | 0% | 41% | 100% |
| Town Square | | -- | -- | -- | -- | -- | 14% | 0% | 58% | 100% |
| Parcel 2 | | -- | 19% | 19% | -- | 12% | -- | 0% | 34% | 100% |
| Parcel 3 | | -- | 26% | 24% | -- | 12% | -- | 0% | 10% | 100% |
| Other | | 0.38% | -- | -- | -- | 0.73% | 86% | 100% | 100% | 100% |
| South Garage | | -- | -- | -- | -- | 23.9% | -- | 29% | 100% | 100% |
| Office Building 3 | | 13% | -- | -- | -- | -- | -- | 0% | 76% | 100% |
| Office Building 1 | | 8.4% | -- | -- | -- | -- | -- | 5% | 100% | 100% |
| Office Building 2 | | 10% | -- | -- | -- | -- | -- | 0% | 98% | 100% |
| Office Building 5 | | 15% | -- | -- | -- | -- | -- | 0% | 78% | 100% |
| Office Building 6 | | 14% | -- | -- | -- | -- | -- | 0% | 53% | 100% |
| Parcel 6 | | -- | -- | 10% | -- | 1.4% | -- | 0% | 0% | 88% |
| Parcel 7 | | -- | -- | 6.9% | -- | 0.5% | -- | 0% | 99% | 100% |
| Parcels 4 + 5 | | -- | 2.4% | 40% | -- | 4.4% | -- | 0% | 0% | 11% |
| Hamilton Avenue Parcels North and South | | -- | 3.7% | -- | -- | -- | -- | 0% | 54% | 100% |
| **Partial Buildout by Year and Land Use Type[3]** | **Year 4** | 3.1% | 10% | 0% | 0% | 53% | 86% | | | |
| | **Year 5** | 58% | 59% | 16% | 41% | 75% | 94% | | | |
| | **Year 6** | 95% | 98% | 64% | 100% | 96% | 100% | | | |

**Notes:**

1. Construction area/subphasing information and full buildout square footage by building provided by Project Applicant.
2. The percentage of year that each building is operational is calculated using the last day of construction for each building. For each partial year of construction, the building is assumed to be operational during the fraction of the year between the last day of construction and the end of that year. The building is assumed to be 0% operational for each full year of construction and 100% operational for each year full year after the end of construction.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area that becomes operational each year over the total building area for each land use type.

**Abbreviations:**

% - percent

RAMBOLL

## Table 17
## Traffic Data Provided by the Transportation Engineer
## Willow Village
## Menlo Park, California

**Daily Trips Rates and VMT**

| Land Use | Fleet Type / Land Use | Trip Rate Units[1] | Weekday Trips per Day per Unit[1] | Weekday daily VMT[2] |
|---|---|---|---|---|
| | | | TOTAL | TOTAL |
| Main Project Site - Existing Conditions | Cars | per 1,000 s.f. | 9.19 | 110,860 |
| | Trucks | per 1,000 s.f. | 0.22 | 2,640 |
| | Shuttles | per 1,000 s.f. | 0.66 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.66 | 7,919 |
| Campus District - Full Buildout | Cars | per 1,000 s.f. | 10.05 | 178,766 |
| | Trucks | per 1,000 s.f. | 0.23 | 4,056 |
| | Shuttles | per 1,000 s.f. | 0.44 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.68 | 12,168 |
| Town Square and the Residential/Shopping District - Full Buildout | Residential | per d.u. | 4.35 | 71,524 |
| | Retail[3] | per 1,000 s.f. | 25.07 | 33,594 |
| | Hamilton Avenue Parcels North and South[3] | per 1,000 s.f. | 28.31 | 1,461 |
| | Park | per acre | 42.80 | 1,147 |
| | Hotel | per room | 6.69 | 14,814 |

**Notes:**

1. Daily project trip rates were provided by the Transportation Engineer in terms of trip rates per land use amount.
2. Daily Project VMT provided by the Transportation Engineer include reductions for pass-by and diverted trips. Daily VMT is given in VMT per day.
3. The trip rates and VMT for Hamilton Avenue Parcels North and South were provided separately and added to retail totals in calculations.

**Abbreviations:**

VMT - Vehicle miles traveled
s.f. - Square feet
d.u. - Dwelling unit

RAMBOLL

**Table 18**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Project Area[1] | Land Use | Fleet Type[2] | Total Weekday Daily VMT[3] | Total Weekday Daily Trips[3] | Total Average Daily VMT[4] | Total Average Daily Trips[4] | Total Annual VMT[5] | Total Annual Trips[5] |
|---|---|---|---|---|---|---|---|---|
| | | | VMT/day | trips/day | VMT/day | trips/day | VMT/year | trips/year |
| Existing Conditions | Campus District | Cars | 110,860 | 9,221 | 84,225 | 7,006 | 30,742,244 | 2,557,040 |
| | | Trucks | 2,640 | 220 | 2,005 | 167 | 731,958 | 60,882 |
| | | Shuttles | 21,088 | 659 | 15,063 | 470 | 3,916,358 | 122,319 |
| | | On-Demand | 7,919 | 659 | 5,656 | 470 | 1,470,590 | 122,319 |
| Year 4 | Campus District | Cars | 5,480 | 493 | 4,079 | 367 | 1,488,677 | 133,874 |
| | | Trucks | 124 | 11 | 93 | 8.3 | 33,776 | 3,037 |
| | | Shuttles | 646 | 22 | 462 | 15 | 120,048 | 3,996 |
| | | On-Demand | 373 | 34 | 266 | 24 | 69,267 | 6,229 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 3,563 | 510 | 3,442 | 492 | 1,256,238 | 179,684 |
| | Park | San Mateo | 987 | 147 | 3,652 | 545 | 1,332,917 | 198,943 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| Year 5 | Campus District | Cars | 104,523 | 9,400 | 77,797 | 6,996 | 28,395,923 | 2,553,590 |
| | | Trucks | 2,371 | 213 | 1,765 | 159 | 644,259 | 57,937 |
| | | Shuttles | 12,330 | 410 | 8,807 | 293 | 2,289,859 | 76,227 |
| | | On-Demand | 7,114 | 640 | 5,082 | 457 | 1,321,238 | 118,816 |
| | Residential | San Mateo | 11,209 | 1,180 | 10,956 | 1,153 | 3,999,096 | 420,957 |
| | Retail | San Mateo | 20,794 | 2,974 | 20,085 | 2,873 | 7,331,178 | 1,048,602 |
| | Park | San Mateo | 1,080 | 161 | 3,993 | 596 | 1,457,557 | 217,546 |
| | Hotel | San Mateo | 6,049 | 527 | 5,816 | 507 | 2,122,939 | 184,925 |
| Year 6 | Campus District | Cars | 169,737 | 15,264 | 126,336 | 11,361 | 46,112,784 | 4,146,833 |
| | | Trucks | 3,851 | 346 | 2,866 | 258 | 1,046,226 | 94,085 |
| | | Shuttles | 20,023 | 667 | 14,302 | 476 | 3,718,554 | 123,787 |
| | | On-Demand | 11,553 | 1,039 | 8,252 | 742 | 2,145,589 | 192,949 |
| | Residential | San Mateo | 45,534 | 4,793 | 44,507 | 4,685 | 16,244,920 | 1,709,992 |
| | Retail | San Mateo | 34,307 | 4,907 | 33,137 | 4,740 | 12,095,154 | 1,730,009 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |
| Full Buildout | Campus District | Cars | 178,766 | 16,076 | 133,057 | 11,966 | 48,565,689 | 4,367,418 |
| | | Trucks | 4,056 | 365 | 3,019 | 271 | 1,101,879 | 99,090 |
| | | Shuttles | 21,088 | 702 | 15,063 | 501 | 3,916,358 | 130,371 |
| | | On-Demand | 12,168 | 1,094 | 8,691 | 782 | 2,259,721 | 203,212 |
| | Residential | San Mateo | 71,524 | 7,529 | 69,910 | 7,359 | 25,517,254 | 2,686,027 |
| | Retail | San Mateo | 35,055 | 5,014 | 33,860 | 4,843 | 12,358,799 | 1,767,718 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |

**Table 18**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

**Notes:**

1. Partial years are scaled from the full buildout based on the portion of each land use that becomes operational for each year of construction. See Table 16 for more details.
2. The fleet type for each land use was provided by the Transportation Engineer. The Campus District will have various fleets for specific uses. Town Square and the Residential/Shopping District land uses (Residential, Retail, Park, and Hotel) are analyzed assuming a default San Mateo fleet. Hamilton Avenue Parcels North and South are combined with retail land uses. See Table 19 for more information.
3. Daily VMT and trip rates were provided by the Transportation Engineer on October 5, 2021. Total trip rates are calculated using land uses in Table 1.
4. Weekday VMT and trip rates provided by the Transportation Engineer were scaled to average trip rates using the ratio between CalEEMod® weekday and weekend one-way trip rates.
5. Annual trips and VMT are calculated by multiplying daily values by 365 for all fleets with the exception of shuttles and on-demand, which are multiplied by 260 days/year.

**Abbreviations:**

VMT - vehicle miles traveled

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 19**
**Summary of Fleet Mix Categories**
**Willow Village**
**Menlo Park, California**

| Land Use | Fleet Type | EMFAC2007 Category[1] | Fuel[1,2] |
|---|---|---|---|
| Town Square and the Residential/Shopping District[3] | San Mateo County Mix | All | Mix of Gasoline, Diesel, Electric, and Natural Gas |
| Campus District[4] | Cars | LDA, LDT1, LDT2, MCY Mix | Mix of Gasoline and Diesel |
| | On-Demand | LDA | Gasoline |
| | Shuttles | Motor Coach, All Other Buses Mix | Diesel |
| | Trams | LDT1, LDT2 | Mix of Gasoline and Diesel |
| | Trucks | HHDT, LHDT1, LHDT2, MHDT Mix | Mix of Gasoline, Diesel, and Natural Gas |

**Notes:**

1. EMFAC2007 categories and fuel types were chosen to match vehicle type descriptions provided by Meta Transportation Operations Team.
2. Electric vehicles were not considered in the emission factors of the Campus District fleets because Campus District-specific emissions reductions are applied later.
3. Land uses other than the Campus District were assumed to have the same distribution of vehicle types as San Mateo County, per EMFAC2021. Hamilton Avenue Parcels North and South were combined with the retail land uses having the EMFAC2021 fleet for San Mateo County.
4. Default split between EMFAC categories assumed for all fleets associated with the Office (Existing and Full Buildout).

**Abbreviations:**

HHDT - heavy-heavy duty trucks
LDA - light duty auto (passenger cars)
LDT- light duty trucks
LHDT - light-heavy duty trucks
LHDT - light-heavy duty trucks
MHDT - medium-heavy duty trucks
MCY - motorcycles

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 20a**
**Mobile CAP Emission Factors**
**Willow Village**
**Menlo Park, California**

| Fleet Type[2] | Calendar Year[3] | CAPs Emission Factors[1] | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | | | | | | $NO_x$ | | | $PM_{10}$ | | | | | $PM_{2.5}$ | | | | |
| | | RUNEX | RUNLOSS | STREX | IDLEX | DIURN | HOTSOAK | RUNEX | STREX | IDLEX | RUNEX | PMTW | PMBW | STREX | IDLEX | RUNEX | PMTW | PMBW | STREX | IDLEX |
| | | g/mile | | g/trip | | | | g/mile | g/trip | | g/mile | | | g/trip | | g/mile | | | g/trip | |
| San Mateo Fleet | 2019 | 0.031 | 0.038 | 0.46 | 0.0057 | 0.29 | 0.12 | 0.23 | 0.41 | 0.088 | 0.0041 | 0.0083 | 0.011 | 0.0023 | 4.7E-04 | 0.0039 | 0.0021 | 0.0039 | 0.0022 | 4.5E-04 |
| | 2024 | 0.016 | 0.033 | 0.30 | 0.0046 | 0.23 | 0.10 | 0.10 | 0.32 | 0.050 | 0.0020 | 0.0083 | 0.012 | 0.0018 | 1.4E-04 | 0.0019 | 0.0021 | 0.0041 | 0.0017 | 1.4E-04 |
| | 2025 | 0.015 | 0.033 | 0.28 | 0.0045 | 0.22 | 0.094 | 0.092 | 0.30 | 0.048 | 0.0019 | 0.0083 | 0.012 | 0.0017 | 1.3E-04 | 0.0018 | 0.0021 | 0.0041 | 0.0016 | 1.3E-04 |
| | 2026 | 0.014 | 0.033 | 0.26 | 0.0044 | 0.21 | 0.091 | 0.085 | 0.29 | 0.046 | 0.0018 | 0.0084 | 0.012 | 0.0017 | 1.3E-04 | 0.0017 | 0.0021 | 0.0041 | 0.0015 | 1.2E-04 |
| Cars | 2019 | 0.024 | 0.039 | 0.50 | 0 | 0.33 | 0.14 | 0.090 | 0.36 | 0 | 0.0017 | 0.0080 | 0.0072 | 0.0027 | 0 | 0.0016 | 0.0020 | 0.0025 | 0.0025 | 0 |
| | 2024 | 0.014 | 0.037 | 0.34 | 0 | 0.27 | 0.12 | 0.048 | 0.26 | 0 | 0.0013 | 0.0080 | 0.0072 | 0.0021 | 0 | 0.0012 | 0.0020 | 0.0025 | 0.0020 | 0 |
| | 2025 | 0.014 | 0.037 | 0.32 | 0 | 0.26 | 0.12 | 0.044 | 0.25 | 0 | 0.0013 | 0.0080 | 0.0072 | 0.0021 | 0 | 0.0012 | 0.0020 | 0.0025 | 0.0019 | 0 |
| | 2026 | 0.013 | 0.037 | 0.30 | 0 | 0.25 | 0.12 | 0.041 | 0.24 | 0 | 0.0012 | 0.0080 | 0.0073 | 0.0020 | 0 | 0.0011 | 0.0020 | 0.0025 | 0.0018 | 0 |
| Trucks | 2019 | 0.15 | 0.050 | 0.12 | 0.045 | 0.10 | 0.030 | 2.3 | 0.62 | 0.72 | 0.046 | 0.014 | 0.074 | 2.8E-04 | 0.0040 | 0.044 | 0.0034 | 0.026 | 2.6E-04 | 0.0038 |
| | 2024 | 0.057 | 0.035 | 0.083 | 0.034 | 0.070 | 0.019 | 0.84 | 0.66 | 0.37 | 0.013 | 0.013 | 0.075 | 1.5E-04 | 0.0011 | 0.012 | 0.0033 | 0.026 | 1.4E-04 | 0.0011 |
| | 2025 | 0.053 | 0.034 | 0.078 | 0.032 | 0.065 | 0.017 | 0.76 | 0.64 | 0.35 | 0.012 | 0.013 | 0.075 | 1.4E-04 | 0.0010 | 0.011 | 0.0033 | 0.026 | 1.3E-04 | 0.0010 |
| | 2026 | 0.049 | 0.033 | 0.073 | 0.031 | 0.061 | 0.016 | 0.69 | 0.62 | 0.33 | 0.011 | 0.013 | 0.075 | 1.3E-04 | 0.0010 | 0.011 | 0.0033 | 0.026 | 1.2E-04 | 9.3E-04 |
| Shuttles | 2019 | 0.0056 | 0 | 0 | 0.021 | 0 | 0 | 0.36 | 1.5 | 0.48 | 0.0029 | 0.012 | 0.048 | 0 | 1.4E-04 | 0.0028 | 0.0030 | 0.017 | 0 | 1.3E-04 |
| | 2024 | 0.0072 | 0 | 0 | 0.024 | 0 | 0 | 0.47 | 1.5 | 0.51 | 0.0040 | 0.012 | 0.049 | 0 | 1.5E-04 | 0.0038 | 0.0030 | 0.017 | 0 | 1.4E-04 |
| | 2025 | 0.0073 | 0 | 0 | 0.025 | 0 | 0 | 0.47 | 1.5 | 0.48 | 0.0041 | 0.012 | 0.049 | 0 | 1.6E-04 | 0.0039 | 0.0030 | 0.017 | 0 | 1.5E-04 |
| | 2026 | 0.0075 | 0 | 0 | 0.026 | 0 | 0 | 0.47 | 1.5 | 0.46 | 0.0043 | 0.012 | 0.049 | 0 | 1.6E-04 | 0.0041 | 0.0030 | 0.017 | 0 | 1.5E-04 |
| On Demand | 2019 | 0.015 | 0.033 | 0.45 | 0 | 0.31 | 0.10 | 0.069 | 0.32 | 0 | 0.0016 | 0.0080 | 0.0068 | 0.0027 | 0 | 0.0015 | 0.0020 | 0.0024 | 0.0024 | 0 |
| | 2024 | 0.0078 | 0.032 | 0.32 | 0 | 0.27 | 0.083 | 0.038 | 0.25 | 0 | 0.0013 | 0.0080 | 0.0067 | 0.0021 | 0 | 0.0012 | 0.0020 | 0.0023 | 0.0020 | 0 |
| | 2025 | 0.0070 | 0.032 | 0.30 | 0 | 0.27 | 0.081 | 0.035 | 0.24 | 0 | 0.0012 | 0.0080 | 0.0067 | 0.0021 | 0 | 0.0011 | 0.0020 | 0.0023 | 0.0019 | 0 |
| | 2026 | 0.0063 | 0.032 | 0.28 | 0 | 0.26 | 0.077 | 0.032 | 0.23 | 0 | 0.0012 | 0.0080 | 0.0067 | 0.0020 | 0 | 0.0011 | 0.0020 | 0.0023 | 0.0018 | 0 |

**Notes:**

1. Emission factors for each fleet type were developed by creating weighted emission factors based on the vehicle classes in each fleet type. EMFAC emissions were summed across each year for each vehicle class within a fleet type, then a vehicle class emission factor based on VMT and trip counts for the vehicle class was calculated. Emission factors for each vehicle class within a fleet type were weighted based on total VMTs and trips to create a fleet-wide emission factor for each year.
2. Emission factors for the Project fleets (all except the San Mateo Fleet) were calculated without electric vehicles because electric vehicle reductions are calculated separately.
3. The existing conditions for this analysis used emission factors from 2019. Partial buildout years 4, 5, and 6 used emission factors from years 2024, 2025, and 2026, respectively. Full buildout emissions used emission factors from 2026 to conservatively estimate emissions.

**Abbreviations:**

ROG - Reactive organic gases
$NO_x$ - Nitrogen oxides
$PM_{10}$ - Particulate matter less than 10 microns in diameter
$PM_{2.5}$ - Particulate matter less than 2.5 microns in diameter
RUNEX - Running exhaust emissions
RUNLOSS - Evaporative losses
STREX - Start exhaust tailpipe emissions
IDLEX - Idle exhaust emissions
DIURN - Diurnal Evaporative Hydrocarbon Emissions
HOTSOAK - Hot soak evaporative hydrocarbon emissions

**References**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 20b**
**Mobile GHG Emission Factors**
**Willow Village**
**Menlo Park, California**

| Fleet Type[2,3] | Calendar Year | GHG Emission Factors[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $CO_2$ | | | $CH_4$ | | | $N_2O$ | | | $CO_2e$ | | |
| | | RUNEX | STREX | IDLEX | RUNEX | STREX | IDLEX | RUNEX | STREX | IDLEX | RUNEX | STREX | IDLEX |
| | | g/mile | g/trip | | g/mile | g/trip | | g/mile | g/trip | | g/mile | g/trip | |
| San Mateo Fleet | 2019 | 377 | 76 | 11 | 0.0076 | 0.091 | 0.0024 | 0.014 | 0.037 | 0.0016 | 382 | 89 | 11 |
| | 2026 | 341 | 65 | 8.9 | 0.0055 | 0.055 | 0.0023 | 0.011 | 0.028 | 0.0013 | 345 | 75 | 9.4 |
| Cars | 2019 | 318 | 82 | 0 | 0.0050 | 0.10 | 0 | 0.0073 | 0.038 | 0 | 321 | 96 | 0 |
| | 2026 | 289 | 72 | 0 | 0.0028 | 0.063 | 0 | 0.0044 | 0.030 | 0 | 290 | 83 | 0 |
| Trucks | 2019 | 1,131 | 17 | 86 | 0.056 | 0.024 | 0.019 | 0.11 | 0.031 | 0.013 | 1,164 | 27 | 90 |
| | 2026 | 979 | 15 | 65 | 0.034 | 0.015 | 0.017 | 0.093 | 0.025 | 0.010 | 1,007 | 23 | 68 |
| Shuttles | 2019 | 1,264 | 0 | 138 | 0.0047 | 0 | 0.0025 | 0.20 | 0 | 0.022 | 1,323 | 0 | 144 |
| | 2026 | 1,214 | 0 | 123 | 9.0E-04 | 0 | 0.0015 | 0.19 | 0 | 0.019 | 1,271 | 0 | 128 |
| On Demand | 2019 | 295 | 76 | 0 | 0.0037 | 0.092 | 0 | 0.0062 | 0.036 | 0 | 297 | 89 | 0 |
| | 2026 | 264 | 67 | 0 | 0.0017 | 0.060 | 0 | 0.0038 | 0.029 | 0 | 266 | 77 | 0 |

**Notes:**

1. Emission factors for each fleet type were developed by creating weighted emission factors based on the vehicle classes in each fleet type. EMFAC emissions were summed across each year for each vehicle class within a fleet type, then a vehicle class emission factor based on VMT and trip counts for the vehicle class was calculated. Emission factors for each vehicle class within a fleet type were weighted based on total VMTs and trips to create a fleet-wide emission factor for each year.

2. Vehicle classes within a fleet type were determined as the best match based on information provided from the Project Applicant.
3. Emission factors for all fleets except the San Mateo Fleet were calculated without electric vehicles because reductions are calculated separately.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - Carbon Dioxide
$N_2O$ - Nitrous Oxide
$CH_4$ - Methane
$CO_2e$ - Carbon dioxide equivalent

RUNEX - Running exhaust emissions
STREX - Start exhaust tailpipe emissions
IDLEX - Idle exhaust emissions

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 21a**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village**
**Menlo Park, California**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | CAP Emissions[3,4] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ |
| | | | trips/year | VMT/year | tons/year | | | | lb/day | | | |
| **Existing Conditions** | Campus District | Cars | 2,557,040 | 30,742,244 | 4.9 | 4.1 | 3.1 | 0.59 | 27 | 22 | 17 | 3.3 |
| | | Trucks | 60,882 | 731,958 | 0.18 | 2.0 | 0.17 | 0.068 | 1.0 | 11 | 0.92 | 0.37 |
| | | Shuttles | 122,319 | 3,916,358 | 0.027 | 1.8 | 0.59 | 0.15 | 0.15 | 10 | 3.3 | 0.80 |
| | | On-Demand | 122,319 | 1,470,590 | 0.19 | 0.15 | 0.15 | 0.028 | 1.1 | 0.8 | 0.81 | 0.15 |
| | | | **2,862,559** | **36,861,150** | **5.3** | **8.0** | **4.0** | **0.84** | **29** | **44** | **22** | **4.6** |
| **Partial Buildout - Year 4** | Campus District | Cars | 133,874 | 1,488,677 | 0.19 | 0.12 | 0.15 | 0.028 | 1.1 | 0.65 | 0.82 | 0.15 |
| | | Trucks | 3,037 | 33,776 | 0.0041 | 0.035 | 0.0065 | 0.0020 | 0.023 | 0.19 | 0.036 | 0.011 |
| | | Shuttles | 3,996 | 120,048 | 0.0011 | 0.071 | 0.018 | 0.0046 | 0.0058 | 0.39 | 0.10 | 0.025 |
| | | On-Demand | 6,229 | 69,267 | 0.0077 | 0.0046 | 0.0069 | 0.0013 | 0.042 | 0.025 | 0.038 | 0.0071 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 179,684 | 1,256,238 | 0.19 | 0.21 | 0.13 | 0.027 | 1.1 | 1.2 | 0.74 | 0.15 |
| | Park | San Mateo | 198,943 | 1,332,917 | 0.21 | 0.23 | 0.14 | 0.029 | 1.2 | 1.2 | 0.78 | 0.16 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | **525,763** | **4,300,922** | **0.61** | **0.67** | **0.46** | **0.092** | **3.4** | **3.7** | **2.5** | **0.50** |
| **Partial Buildout - Year 5** | Campus District | Cars | 2,553,590 | 28,395,923 | 3.6 | 2.1 | 2.9 | 0.53 | 20 | 11 | 16 | 2.9 |
| | | Trucks | 57,937 | 644,259 | 0.073 | 0.60 | 0.12 | 0.037 | 0.40 | 3.3 | 0.68 | 0.20 |
| | | Shuttles | 76,227 | 2,289,859 | 0.021 | 1.4 | 0.35 | 0.089 | 0.11 | 7.4 | 1.9 | 0.49 |
| | | On-Demand | 118,816 | 1,321,238 | 0.14 | 0.081 | 0.13 | 0.025 | 0.78 | 0.45 | 0.72 | 0.13 |
| | Residential | San Mateo | 420,957 | 3,999,096 | 0.49 | 0.57 | 0.43 | 0.085 | 2.7 | 3.1 | 2.3 | 0.47 |
| | Retail | San Mateo | 1,048,602 | 7,331,178 | 1.1 | 1.1 | 0.78 | 0.16 | 5.9 | 6.3 | 4.3 | 0.86 |
| | Park | San Mateo | 217,546 | 1,457,557 | 0.22 | 0.23 | 0.16 | 0.031 | 1.2 | 1.3 | 0.85 | 0.17 |
| | Hotel | San Mateo | 184,925 | 2,122,939 | 0.23 | 0.29 | 0.23 | 0.045 | 1.3 | 1.6 | 1.2 | 0.25 |
| | | | **4,678,601** | **47,562,050** | **5.8** | **6.3** | **5.1** | **1.0** | **32** | **35** | **28** | **5.5** |
| **Partial Buildout - Year 6** | Campus District | Cars | 4,146,833 | 46,112,784 | 5.6 | 3.1 | 4.6 | 0.86 | 31 | 17 | 25 | 4.7 |
| | | Trucks | 94,085 | 1,046,226 | 0.11 | 0.89 | 0.20 | 0.059 | 0.62 | 4.9 | 1.1 | 0.33 |
| | | Shuttles | 123,787 | 3,718,554 | 0.034 | 2.2 | 0.57 | 0.15 | 0.19 | 12 | 3.1 | 0.80 |
| | | On-Demand | 192,949 | 2,145,589 | 0.22 | 0.12 | 0.21 | 0.040 | 1.2 | 0.68 | 1.2 | 0.22 |
| | Residential | San Mateo | 1,709,992 | 16,244,920 | 1.9 | 2.1 | 1.7 | 0.35 | 10 | 12 | 9.5 | 1.9 |
| | Retail | San Mateo | 1,730,009 | 12,095,154 | 1.7 | 1.8 | 1.3 | 0.26 | 9.3 | 10 | 7.1 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **8,681,672** | **88,110,903** | **10** | **11** | **9.4** | **1.9** | **57** | **61** | **51** | **10** |
| **Full Buildout** | Campus District | Cars | 4,367,418 | 48,565,689 | 5.9 | 3.3 | 4.9 | 0.91 | 32 | 18 | 27 | 5.0 |
| | | Trucks | 99,090 | 1,101,879 | 0.12 | 0.94 | 0.21 | 0.062 | 0.65 | 5.2 | 1.2 | 0.34 |
| | | Shuttles | 130,371 | 3,916,358 | 0.036 | 2.3 | 0.61 | 0.15 | 0.20 | 13 | 3.3 | 0.84 |
| | | On-Demand | 203,212 | 2,259,721 | 0.23 | 0.13 | 0.23 | 0.042 | 1.3 | 0.71 | 1.2 | 0.23 |
| | Residential | San Mateo | 2,686,027 | 25,517,254 | 3.0 | 3.4 | 2.7 | 0.54 | 16 | 18 | 15 | 3.0 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 1.7 | 1.8 | 1.3 | 0.26 | 9.5 | 10 | 7.2 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **9,937,855** | **100,467,375** | **12** | **13** | **11** | **2.1** | **64** | **70** | **59** | **12** |

**Table 21a**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village**
**Menlo Park, California**

**Notes:**

1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. Trip counts and VMTs by land use type were broken out by year using a scaling factor representing the percent of each fleet that is operational in a given year leading up to full buildout. This percent was determined based on the square footage of the land use associated with each fleet that is operational in a given year relative to that land use's full buildout square footage. See Table 16 for more details on scaling. See Table 18 for Project Trip Rates and VMT.
3. Criteria air pollutants are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in Table 20a.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

| | |
|---|---|
| EV - electric vehicle | $PM_{10}$ - particulate matter less than 10 microns in diameter |
| lb - pound | $PM_{2.5}$ - particulate matter less than 2.5 microns in diameter |
| $NO_x$ - nitrogen oxides | ROG - reactive organic gases |
| VMT- vehicle miles traveled | |

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 21b**
**Summary of Mobile GHG Emissions Before EV Reductions**
**Willow Village**
**Menlo Park, California**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | GHGs Emissions[3,4] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | trips/year | VMT/year | MT/year | | | |
| Existing Conditions | Campus District | Cars | 2,557,040 | 30,742,244 | 9,997 | 0.41 | 0.32 | 10,104 |
| | | Trucks | 60,882 | 731,958 | 834 | 0.043 | 0.082 | 859 |
| | | Shuttles | 122,319 | 3,916,358 | 4,965 | 0.019 | 0.78 | 5,199 |
| | | On-Demand | 122,319 | 1,470,590 | 444 | 0.017 | 0.014 | 448 |
| | | | **2,862,559** | **36,861,150** | **16,240** | **0.48** | **1.2** | **16,610** |
| Full Buildout | Campus District | Cars | 4,367,418 | 48,565,689 | 14,353 | 0.41 | 0.34 | 14,465 |
| | | Trucks | 99,090 | 1,101,879 | 1,086 | 0.040 | 0.11 | 1,119 |
| | | Shuttles | 130,371 | 3,916,358 | 4,772 | 0.0037 | 0.75 | 4,996 |
| | | On-Demand | 203,212 | 2,259,721 | 611 | 0.016 | 0.015 | 616 |
| | Residential | San Mateo | 2,686,027 | 25,517,254 | 8,912 | 0.29 | 0.36 | 9,025 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 4,351 | 0.17 | 0.19 | 4,411 |
| | Park | San Mateo | 231,140 | 1,548,641 | 546 | 0.022 | 0.024 | 554 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 1,809 | 0.055 | 0.070 | 1,831 |
| | | | **9,937,855** | **100,467,375** | **36,439** | **1.0** | **1.9** | **37,016** |

**Notes:**

1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. VMT and trip rates were provided by the Transportation Engineer on October 5, 2021 and are summarized in Table 18.
3. Greenhouse Gases are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in Table 20b.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
EV - electric vehicle
MT - Metric Ton
VMT- vehicle miles traveled

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 22**
**EV Assumptions for Campus District**
**Willow Village**
**Menlo Park, California**

**Campus District EV Parameters**

| Description | Units | Value |
|---|---|---|
| Electricity required per mile charged[1] | kWh/mi | 0.30 |
| Total Charging Energy of Meta Campuses[2] | kWh/year | 3,791,856 |
| Total Area of Meta Campuses[2] | sqf | 4,753,594 |
| Total Meta Campus Energy per Area[2] | kWh/sqf | 0.80 |
| Existing Conditions Fleet eVMT per Total VMT[3] | Percent | 5.5% |
| Full Buildout Fleet MSS eVMT per Total VMT[4] | Percent | 14% |
| Electricity Loss Factor[5] | Percent | 10% |
| Existing Conditions Charging Energy Usage[6] | kWh/year | 534,955 |
| Full Buildout Charging Energy Usage[7] | kWh/year | 2,925,608 |

**eVMTs from Project Chargers at the proposed Campus District**

| Year | Land Use Category[8] | Project Increase in Annual eVMTs[9] |
|---|---|---|
| | | eVMT/year |
| Existing Conditions | Campus District | 1,783,182 |
| Partial Buildout - Year 4 | | 298,927 |
| Partial Buildout - Year 5 | | 5,701,922 |
| Partial Buildout - Year 6 | | 9,259,481 |
| Full Buildout | | 9,752,026 |

**Notes:**

1. An average EV fuel economy of 0.30 kWh per mile was used. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. Meta provided energy usage and areas for EV charging at their existing campuses: Classic, Bayfront, Chilco, Willow, Gateway. The provided data was used to evaluate an average ratio of EV charging energy usage per campus area.
3. The percent eVMT for existing conditions is calculated by dividing the eVMT in existing conditions by the annual VMT from the 'Car' and 'On-Demand' vehicle types in existing conditions. For existing conditions VMT, see Table 18.
4. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1) estimating future fleet characteristics. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The increase in annual eVMTs charged by the Campus District is scaled from the increase in fleet eVMT from existing conditions to full buildout.
5. A 10% Loss Factor was applied to the annual project energy uses to account for expected losses. Source available at: https://www.fueleconomy.gov/

**Table 22**
**EV Assumptions for Campus District**
**Willow Village**
**Menlo Park, California**

6. The EV charging energy consumption for existing conditions was based on existing charger energy usage data for Willow Village for 2019 provided by the Project applicant. The total energy usage was reduced assuming a 10% loss factor.

7. The EV charging energy consumption for the Project at full buildout was determined using an average ratio of existing charging sites kWh/sqf and multiplying it by the Campus District land use area at full buildout (1.6 million sqf). This number was scaled by the increase in fleet eVMT from existing conditions to full buildout based on the MSS scenario of the VISION model. A 10% loss factor was applied to the total energy usage per year. All relevant data sources were provided by the Project applicant.

8. Meta offers an EV charging program to its workers. Charging on campus is free and valets move cars into chargers to maximize charging time. Therefore, the EV charging annual electricity for the Campus District was provided based on studies from Meta's existing campuses in the area. The electricity for EV charging at the Project would be supplied with 100% renewable energy.

9. For years where the Campus District is only operational a proportion of the year, the annual kWh is multiplied by a scaling fraction for the Campus District land use, found in Table 16.

**Abbreviations:**

EV - Electric vehicle (includes battery electric or plug-in hybrid technology)
eVMT- Electric vehicle miles traveled
kWh - Kilowatt hour
sqf- Square foot
MSS - Mobile Source Strategy

**References:**

City of Menlo Park Nonresidential EV Charging Requirements. Published July 17, 2019. Available at: https://www.menlopark.org/DocumentCenter/View/22382/Nonresidential-EV-Charging-Requirements

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

CalEEMod Appendix D. Available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=12

**Table 23**
**EV Assumptions for Town Square and the Residential/Shopping District**
**Willow Village**
**Menlo Park, CA**

**EV Assumptions**

| Description | Units | Input |
|---|---|---|
| Miles Charged per Hour Charged[1] | (miles/hr) | 21 |
| Scenario1[2] | - | Reference |
| Scenario 2[2] | - | MSS |
| Number of Chargers[3] | Total # | 249 |
| Average Daily Hours for Charging per Charger[4] | hr | 10 |
| Annual Days of Charger Activity[4] | days/yr | 365 |

**eVMTs from Project Chargers - Reference Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **4.7%** | 17,714 | 121,137 | 131 | 477,218 | 10,021,583 | Under Capacity | **121,137** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **5.2%** | 97,457 | 776,244 | 187 | 683,944 | 14,362,828 | Under Capacity | **776,244** |
| **Partial Buildout - Year 6** | 4,124,018 | 35,087,750 | **5.6%** | 229,894 | 1,955,968 | 239 | 871,770 | 18,307,160 | Under Capacity | **1,955,968** |
| **Full Buildout** | 5,137,763 | 44,623,729 | **5.9%** | 304,407 | 2,643,906 | 249 | 908,850 | 19,085,850 | Under Capacity | **2,643,906** |

**eVMTs from Project Chargers - Mobile Source Strategy (MSS) Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **8.3%** | 31,482 | 215,280 | 131 | 477,218 | 10,021,583 | Under Capacity | **215,280** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **10.6%** | 198,125 | 1,578,074 | 187 | 683,944 | 14,362,828 | Under Capacity | **1,578,074** |
| **Partial Buildout - Year 6** | 4,124,018 | 35,087,750 | **13.1%** | 538,834 | 4,584,475 | 239 | 871,770 | 18,307,160 | Under Capacity | **4,584,475** |
| **Full Buildout** | 5,137,763 | 44,623,729 | **15.8%** | 811,528 | 7,048,476 | 249 | 908850 | 19,085,850 | Under Capacity | **7,048,476** |

**Notes:**

1. The miles charged per hour charged is representative of a typical charge rate for an EV of 6.25 kWh per hour and a fuel economy of 0.30 kWh per mile. The charge rate is based on capability of existing battery-electric vehicles and Level 2 charging stations. Reference: Chargepoint. 2017. Level Up Your EV Charging Knowledge. Available at: https://www.chargepoint.com/blog/level-your-ev-charging-knowledge/. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. The two scenarios analyzed are the Reference and the Mobile Source Strategy scenarios. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1). The 2020 MSS uses "scenario planning to take an integrated approach to identifying the technology trajectories and programmatic concepts" to model projected years of electric vehicle miles for assessed scenarios. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The 2020 update only considers passenger vehicles (LDA, LDT1, LDT2, and MDV). To determine the eVMT percent of the passenger vehicle fleets, the 2020 MSS update was downloaded in July 13, 2021. The increase in annual eVMTs charged by the Project from the Reference Scenario to the MSS Scenario is used to determine the eVMTs the Project can take credit for based on providing additional charging infrastructure for the state to reach aspirational EV fleet penetration.
3. The number of chargers in the Town Square and the Residential/Shopping District was provided by the Project Applicant in the Willow Village Mixed Use Development Concept Level Energy Use Summary, dated June 14, 2021, detailing chargers available for all mixed-use traffic. 249 EV Charging Stations are available to serve the 1,694 residential spaces and 500 commercial spaces.
4. Meta offers a valet service to charge EVs from 7am to 7pm, average daily hours of availability for charging per charger is conservatively assumed to be 10 hours per day. When demand is met, the full 10 hours will be used for charging, with each vehicle cycling out of the charging spot before or as the car reaches full charge. The number of chargers are available for all Town Square and the Residential/Shopping District land uses, and it is expected that there will be 10 hours a day of active charging taking place due to the frequency of turnover associated with retail, restaurant, hotel, and park land uses. Town Square and the Residential/Shopping District land uses are assumed to operate 365 days per year. Any charging inefficiencies associated with cars remaining plugged in after reaching full charge is assumed to balance out due the likelihood of more than 10 hours of activity a day associated with Town Square and the Residential/Shopping District activity.
5. Town Square and the Residential/Shopping District Total VMT and trips includes all proposed Project residential, retail, park, and hotel land uses, consistent with Table 18. Retail land uses include Hamilton Parcels North and South and are added to total VMT and trips.
6. EV Annual Trips and EV Annual VMT are determined based on Project trips and VMTs and the VISION Reference Scenario percent of Electric Fleet. These eVMTs (electric vehicle miles traveled) represents the number of project VMTs that are driven by electric vehicles.
7. 249 EV Charging Stations are proposed for the full buildout. To reflect the EV charging stations that will come online during construction in the partial years leading up to full buildout, a scaling factor was applied based on the ratio of square feet of the parking land use that is built out in a given year to the total square feet that will be built. The scaling factor for a given year was applied to the 249 chargers at full buildout. To see scaling factors used, refer to the parking land use from Table 16.
8. Total annual charge hours available from the project are determined by multiplying the average daily hours of charging per charger (10 hours) by the annual days of charger activity (365 days). The annual charge hours available from the project are then multiplied by 25 miles charged per charge hour to determine the number of eVMT available from the project.
9. The Project EV chargers for Town Square and the Residential/Shopping District land uses are determined to be at capacity, meaning used fully for all available charge hours per day, when the electric vehicle miles associated with the Project are in excess of the maximum electric vehicle miles the Project chargers can charge. If there is a surplus of chargers relative to EVs coming to the site, then the Project chargers are under-capacity, and only a fraction of chargers will be used as the number of EVs coming to the site are fewer than the total number of charger capacity. If there is a surplus of EVs coming to the site relative to the chargers at the site, all chargers will be used and the site will be at capacity. In the scenario when the chargers are at capacity, the full capacity of VMTs the site can charge are assumed to be charged.

**Abbreviations:**

EV - electric vehicle (includes battery electric or plug-in hybrid technology)
Hr - hour
TDM - Transportation Demand Management
VMT - vehicle miles travelled
eVMT - electric vehicle mile traveled

**References:**


U.S. Census. 2019. Factfinder. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/
California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/
California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning


RAMBØLL

**Table 24a**
**EV CAP Emissions Reductions Summary**
**Willow Village**
**Menlo Park, California**

**Town Square and the Residential / Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT CAP Emissions Reduction (lb / year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT / year | trips / year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | Reference | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MSS | 0 | 0 | | | | | | |
| Year 4 | Reference | 121,137 | 17,714 | 94,143 | 13,767 | -33 | -18 | -0.34 | -0.31 |
| | MSS | 215,280 | 31,482 | | | | | | |
| Year 5 | Reference | 776,244 | 97,457 | 801,830 | 100,669 | -246 | -133 | -2.7 | -2.5 |
| | MSS | 1,578,074 | 198,125 | | | | | | |
| Year 6 | Reference | 1,955,968 | 229,894 | 2,628,507 | 308,940 | -746 | -396 | -8.3 | -7.7 |
| | MSS | 4,584,475 | 538,834 | | | | | | |
| Full Buildout | Reference | 2,643,906 | 304,407 | 4,404,570 | 507,121 | -1,234 | -658 | -14 | -13 |
| | MSS | 7,048,476 | 811,528 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[5] | Trip Counts from additional Project Chargers[5,6] | Electric VMT CAP Emissions Reduction (lb / year)[3,4] | | | |
|---|---|---|---|---|---|---|
| | eVMT / year | trips / year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | 1,783,182 | 148,319 | -564 | -472 | -7.6 | -7.0 |
| Year 4 | 298,927 | 26,882 | -78 | -47 | -1.0 | -0.91 |
| Year 5 | 5,701,922 | 512,763 | -1,432 | -833 | -18 | -17 |
| Year 6 | 9,259,481 | 832,687 | -2,249 | -1,262 | -28 | -26 |
| Full Buildout | 9,752,026 | 876,981 | -2,369 | -1,329 | -30 | -27 |

| Year | Electric VMT CAP Emissions Reduction (lb / year) | | | |
|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | -564 | -472 | -7.6 | -7.0 |
| Partial Buildout- Year 4 | -111 | -65 | -1.3 | -1.2 |
| Partial Buildout- Year 5 | -1,677 | -966 | -21 | -19 |
| Partial Buildout- Year 6 | -2,995 | -1,658 | -37 | -34 |
| Full Buildout | -3,603 | -1,988 | -44 | -40 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.

2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.

3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).
4. EVs emit particulate matter brake wear and tire wear, therefore those emissions are not considered in the reductions.
5. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Table 22.
6. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

eVMT - electric vehicle miles traveled
lb - pound
EV - electric vehicle
ROG - reactive organic gases
NOx - nitrogen oxides
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 24b**
**EV GHG Emissions Reductions Summary**
**Willow Village**
**Menlo Park, California**

**Town Square and the Residential/Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT GHG Emissions Reduction (MT/year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Full Buildout | Reference | 2,643,906 | 304,407 | 4,404,570 | 507,121 | -1,310 | -0.044 | -0.034 | -1,321 |
| | MSS | 7,048,476 | 811,528 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[4] | Trip Counts from additional Project Chargers[4,5] | Electric VMT GHG Emissions Reduction (MT/year)[3] | | | |
|---|---|---|---|---|---|---|
| | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | 1,783,182 | 148,319 | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | 9,752,026 | 876,981 | -2,882 | -0.082 | -0.069 | -2,905 |

| Year | Electric VMT GHG Emissions Reduction (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | -4,192 | -0.13 | -0.10 | -4,226 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.

2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.

3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).

4. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Table 22.

5. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
eVMT - electric vehicle miles traveled
MT - metric ton
EV - electric vehicle

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 25a**
**Summary of Mobile CAP Emissions**
**Willow Village**
**Menlo Park, California**

**Total Emissions Before Reductions:[1]**

| Year | CAP Emissions without Reductions (ton/year) | | | |
|---|---|---|---|---|
| | **ROG** | **$NO_x$** | **$PM_{10}$[2]** | **$PM_{2.5}$[2]** |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.61 | 0.67 | 0.46 | 0.092 |
| Year 5 | 5.8 | 6.3 | 5.1 | 1.0 |
| Year 6 | 10 | 11 | 9.4 | 1.9 |
| **Full Buildout** | 12 | 13 | 11 | 2.1 |
| **Net Emissions by Year** | | | | |
| Year 4 | -4.4 | -7.3 | -3.6 | -0.74 |
| Year 5 | 0.8 | -1.7 | 1.0 | 0.17 |
| Year 6 | 5.3 | 3.1 | 5.4 | 1.0 |
| **Full Buildout** | **6.8** | **4.7** | **6.7** | **1.3** |

**Total Emissions with Reductions:[4]**

| Year | CAP Emissions with Reductions (ton/year) | | | |
|---|---|---|---|---|
| | **ROG** | **$NO_x$** | **$PM_{10}$[2]** | **$PM_{2.5}$[2]** |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.56 | 0.64 | 0.46 | 0.091 |
| Year 5 | 5.0 | 5.9 | 5.1 | 1.0 |
| Year 6 | 8.8 | 10 | 9.4 | 1.8 |
| **Full Buildout** | **10** | **12** | **11** | **2.1** |
| **Net Emissions by Year** | | | | |
| Year 4 | -4.4 | -7.4 | -3.6 | -0.74 |
| Year 5 | 0.0 | -2.2 | 1.0 | 0.16 |
| Year 6 | 3.9 | 2.3 | 5.3 | 1.0 |
| **Full Buildout** | **5.0** | **3.7** | **6.6** | **1.3** |

**Notes:**

1. Calculations of CAP emissions before reductions are shown in detail in Table 21a. Net emissions subtract the emissions from the existing conditions in 2019.
2. PM10 and PM2.5 emissions include exhaust, tire wear, brake wear, and fugitive dust. Fugitive dust emissions factors are calculated in Table 8.
3. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
4. CAP Emissions after reductions account for the reductions associated with EVs as shown in Table 24a. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

| | |
|---|---|
| lb - pound | NOx - nitrogen oxides |
| MT - metric ton | $PM_{10}$ - particulate matter less than 10 microns in diameter |
| EV - electric vehicle | $PM_{2.5}$ - particulate matter less than 2.5 microns in diameter |
| ROG - reactive organic gases | |

**References:**


California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

## Table 25b
## Summary of Mobile GHG Emissions
## Willow Village
## Menlo Park, California

**Total Emissions Before Reductions:**[1]

| Year | GHG Emissions without Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 36,439 | 1.0 | 1.9 | 37,016 |
| **Net Emissions** | | | | |
| **Full Buildout** | **20,779** | **0.55** | **0.67** | **20,992** |

**Total Emissions with Reductions:**[3]

| Year | GHG Emissions with Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 32,247 | 0.88 | 1.7 | 32,790 |
| **Net Emissions** | | | | |
| **Full Buildout** | **16,587** | **0.42** | **0.57** | **16,766** |

**Notes:**

1. Calculations of GHG emissions before reductions are shown in detail in Table 21b. Net emissions subtract the emissions from the existing conditions in 2019.
2. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
3. GHG Emissions after reductions account for the reductions associated with EVs as shown in Table 24b. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
MT - metric ton
EV - electric vehicle

**References:**

California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 26**
**Generator Emission Factors for Diesel Engines**
**Willow Village**
**Menlo Park, California**

| Fuel | Engine Tier | Generator Size Range (hp) | | Engine Emission Factors[1] (g/bhp-hr) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Minimum | Maximum | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
| Diesel | Tier 2 | 750 | 1,200 | 0.26 | 4.6 | 0.15 | 0.15 | 523 |
| Diesel | Tier 3 | 300 | 600 | 0.16 | 2.9 | 0.15 | 0.15 | 523 |
| Diesel | Tier 4 | 1,200 | -- | 0.15 | 0.50 | 0.020 | 0.020 | 523 |

**Notes:**

1. Engine emission factors for $PM_{10}$ and $PM_{2.5}$ (assumed all engines are diesel fueled and that all $PM_{10}$ is diesel particulate matter) based on ARB standards for diesel generator engines. Emission factors for TOG and ROG were converted from NMHC values provided in the Tier standards using EPA hydrocarbon conversion factors. When an emission factor was specified as a combined NMHC+NOx factor, the NMHC/NOx ratio of 5%/95% were taken from BAAQMD guidance. The emission factors for $CO_2e$ are based on diesel emergency generator $CO_2$ and $CH_4$ emission factors from CalEEMod User's Guide Appendix D, Table 12.1, along with a GWP of 25 for $CH_4$.

**Abbreviations:**

ARB - [California] Air Resources Board
BAAQMD - Bay Area Air Quality Management District
CalEEMod - CALifornia Emissions Estimator MODel
CEIDERS - California Emission Inventory Data and Reporting System
$CO_2e$ - carbon dioxide equivalents
EPA - US Environmental Protection Agency
g/bhp-hr - Grams per Brake Horsepower Hour
GWP - global warming potential

**References:**


CalEEMod Version 2020.4.0. Available online at: http://www.caleemod.com

Californi Air Resources Board. Non-road Diesel Engine Certification Tier Chart. Available online at: https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart

USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P10081RP.PDF?Dockey=P10081RP.PDF

BAAQMD. 2004. CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC + NOx. Available at: https://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/engines/emissionfactorsfordieselengines.pdf

## Table 27
## Generator Emissions from Existing Conditions and Project Operations
## Willow Village
## Menlo Park, California

**Generator Information[1]**

| Scenario | Number of Generators | Engine Control[2] | Size | Fuel Type | Annual Operation[3] |
|---|---|---|---|---|---|
| | | | HP | | hr/yr |
| Existing Conditions | 1 | Tier 3 | 324 | Diesel | 50 |
| Full Buildout | 2 | Tier 3 | 324 | Diesel | 50 |
| | 1 | Tier 3 | 464 | Diesel | 50 |
| | 3 | Tier 2 | 755 | Diesel | 50 |
| | 1 | Tier 2 | 900 | Diesel | 50 |
| | 3 | Tier 4 | 1,220 | Diesel | 50 |
| | 1 | Tier 4 | 1,490 | Diesel | 50 |
| | 2 | Tier 4 | 2,900 | Diesel | 50 |

**Generator Emissions**

| Size (hp) | Quantity | Annual Emissions | | | | |
|---|---|---|---|---|---|---|
| | | (ton/yr) | | | | (MT/yr) |
| | | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
| **Existing Conditions Generator Emissions[3]** | | | | | | |
| 324 | 1 | 0.0029 | 0.051 | 2.7E-03 | 2.7E-03 | 8.5 |
| | **Total Emissions** | **0.0029** | **0.051** | **0.0027** | **0.0027** | **8.5** |
| **Full Buildout Conditions Generator Emissions[3]** | | | | | | |
| 324 | 2 | 5.7E-03 | 1.0E-01 | 5.4E-03 | 5.4E-03 | 17 |
| 464 | 1 | 4.1E-03 | 7.3E-02 | 3.8E-03 | 3.8E-03 | 12 |
| 755 | 3 | 3.2E-02 | 5.7E-01 | 1.9E-02 | 1.9E-02 | 59 |
| 900 | 1 | 1.3E-02 | 2.3E-01 | 7.4E-03 | 7.4E-03 | 24 |
| 1,220 | 3 | 3.0E-02 | 1.0E-01 | 4.0E-03 | 4.0E-03 | 96 |
| 1,490 | 1 | 1.2E-02 | 4.1E-02 | 1.6E-03 | 1.6E-03 | 39 |
| 2,900 | 2 | 4.8E-02 | 1.6E-01 | 6.4E-03 | 6.4E-03 | 152 |
| | **Total Emissions** | **0.15** | **1.3** | **0.047** | **0.047** | **399** |

**Notes:**

1. Number, size, and fuel of emergency generators were provided by the Project Applicant.
2. All generators over 1,000 HP were assumed to be Tier 4, consistent with BAAQMD BACT guidelines.
3. Operation for routine maintenance and testing was conservatively assumed to be 50 hours per year, the maximum allowable by the Airborne Toxics Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR 93115).

**Abbreviations:**

BACT - Best Available Control Technology
$CO_2$ - carbon dioxide
$CO_2e$ - carbon dioxide equivalents
g - grams
hp - horsepower
hr - hour
MT - metric tons
NOx - oxides of nitrogen
PM - particulate matter
$PM_{10}$ - PM less than 10 microns in diameter
$PM_{2.5}$ - PM matter less than 2.5 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

BAAQMD. Best Available Constrol Technology (BACT) Guideline. Available online at: https://www.baaqmd.gov/~/media/files/engineering/bact-tbact-workshop/combustion/96-1-5.pdf?la=en.

**Table 28**
**Energy Usage for Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Floor Area (sqft) (DU - Residential) | Annual Electricity Use (MWh/yr) | Annual Natural Gas Use (MMBtu/yr) |
|---|---|---|---|
| **Existing Conditions (2019)[1]** | | | |
| All | 1,923,910 | 12,050 | 30,039 |
| **Total Existing Energy Usage** | | **12,050** | **30,039** |
| **Full Buildout[2,3]** | | | |
| Office | 1,600,000 | 23,828 | 0 |
| Retail | 207,690 | 4,517 | 2,195 |
| Residential | 1,730 | 16,855 | 0 |
| Hotel | 172,000 | 2,528 | 0 |
| Parking | 1,869,240 | 32,183 | 0 |
| Park | 403,837 | 38 | 0 |
| **Total Full Buildout Energy Usage** | | **79,950** | **2,195** |

**Notes:**

1. Energy use rates for existing conditions were provided for 2019 by the Project Applicant via email on August 10, 2021.
2. Electricity and natural gas usage rates for the retail, residential, and parking land uses were provided by PAE in the June 14, 2021 memorandum. Electricity usage rates for Office, Hotel, and Park were provided by Hines on June 21, 2021. The hotel and office do not use natural gas. The electricity usage includes 27,986 MWh/year of electricity use associated with the Campus District EV charging stations, which is summarized in the parking land use category. Electricity and energy use rates for the Willow Road Retail were calculated based on the CalEEMod defaults the retail land use type in Climate Zone 5.
3. Natural gas for the project is only used for Hamilton Avenue Parcels North and South and the supermarket and restaurant land uses, which are summarized in the retail category.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
DU - dwelling unit
kBTU - thousand British Thermal Units
kWh - kilowatt-hour
MMBTU - million British Thermal Units
MWh - Megawatt-hour
sqft - square feet
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

## Table 29
## Energy Usage Emission Factors
## Willow Village
## Menlo Park, California

### Historical Electricity Intensity - PG&E

| Annual Electricity Data | 2016 | 2017 | 2018 | Average[1] | Units |
|---|---|---|---|---|---|
| $CO_2$ Intensity Factor per Total Energy Delivered[2] | 294 | 210 | 206 | 237 | lbs $CO_2$/MWh delivered |
| CO2e Intensity Factor per Total Energy Delivered | 296 | 213 | 209 | 239 | lbs $CO_2e$/MWh delivered |
| % of Total Energy From RPS-Eligible Renewables[3] | 33% | 33% | 39% | 35% | - |
| $CO_2$ Intensity Factor per Total Non-RPS-Eligible Energy[4] | 437 | 314 | 338 | 364 | lbs $CO_2$/MWh delivered |
| $CO_2e$ Intensity Factor per Total Non-RPS-Eligible Energy[4] | 441 | 318 | 342 | 368 | lbs $CO_2e$/MWh delivered |

### Estimated Intensity Factor for Total Energy Delivered by PG&E[5]

| Year | 2016 | 2017 | 2018 | Average[5] | Units |
|---|---|---|---|---|---|
| 2019 (35%) | 294 | 210 | 206 | 237 | lbs $CO_2$/MWh delivered |
| | 296 | 213 | 209 | 239 | lbs $CO_2e$/MWh delivered |
| 2024 (44%) | 240 | 173 | 186 | 200 | lbs $CO_2$/MWh delivered |
| | 242 | 175 | 188 | 202 | lbs $CO_2e$/MWh delivered |
| 2025 (47%) | 229 | 165 | 177 | 191 | lbs $CO_2$/MWh delivered |
| | 231 | 167 | 179 | 193 | lbs $CO_2e$/MWh delivered |
| 2026 (50%) | 219 | 157 | 169 | 181 | lbs $CO_2$/MWh delivered |
| | 220 | 159 | 171 | 183 | lbs $CO_2e$/MWh delivered |
| 2030 (60%) | 175 | 126 | 135 | 145 | lbs $CO_2$/MWh delivered |
| | 176 | 127 | 137 | 147 | lbs $CO_2e$/MWh delivered |

### Estimated Intensity Factor for Total Energy Delivered by PCE[6]

| Model Year | 2016 | 2017 | 2018 | Average[1] | Units |
|---|---|---|---|---|---|
| 86% Renewable (2019 - 2030) | 59 | 42 | 45 | 49 | lbs $CO_2$/MWh delivered |
| | 62 | 45 | 48 | 51 | lbs $CO_2e$/MWh delivered |
| 100% Renewable (Campus District) | 0 | 0 | 0 | 0 | lbs $CO_2$/MWh delivered |
| | 0 | 0 | 0 | 0 | lbs $CO_2e$/MWh delivered |

### Greenhouse Gas Energy Emission Factors

| Greenhouse Gas | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ | Units |
|---|---|---|---|---|---|
| Global Warming Potential[7] | 1 | 25 | 298 | - | - |
| 2019 - 2030 Electricity Use Emission Factor[8] | 49 | 0.029 | 0.0062 | 51 | lb/MWh |
| | 2.2E-02 | 1.3E-05 | 2.8E-06 | 2.3E-02 | MT/MWh |
| Natural Gas Use Emission Factor[9] | 118 | 0.0023 | 0.0022 | 118 | lb/MMBTU |
| | 0.0053 | 0.0000 | 0.0000 | 0.0054 | MT/therm |

### Criteria Air Pollutant Energy Emission Factors[9]

| Land Use Type | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | Units |
|---|---|---|---|---|---|
| Residential | 0.011 | 0.092 | 0.0075 | 0.0075 | lb/MMBtu |
| Nonresidential | 0.011 | 0.10 | 0.0075 | 0.0075 | lb/MMBtu |

**Notes:**

1. This average uses the most recent three years of data.
2. Total $CO_2$ intensity factors from The Climate Registry. Available at: https://www.theclimateregistry.org/our-members/cris-public-reports/. Accessed: April 2021.
3. Percent of total energy from eligible renewables is from the PG&E 2017, 2018, and 2019 Corporate Responsibility Report.
4. The emissions metric presented here was calculated based on the total CO2 intensity factor divided by the percent of energy delivered from non-RPS-eligible sources. This CO2 intensity factor includes both fossil fuel and carbon-free sources of energy, such as largescale hydro and nuclear. Diablo Canyon Nuclear Plant, which accounts for a portion of the carbon-free energy in this CO2 intensity factor, is planned to be closed by 2024-2025 (https://www.pge.com/en_US/safety/how-the-system-works/diablo-canyon-power-plant/diablo-canyon-power-plant/engagement-panel.page). According to SB 1090 (approved 9/2018), "The [California Public Utilities] commission shall ensure that integrated resource plans are designed to avoid any increase in emissions of greenhouse gases as a result of the retirement of the Diablo Canyon Units 1 and 2 powerplant." This was incorporated into CPUC section 712.7(2)(b). Based on this information, the total Non-RPS-Eligible energy CO2 intensity factor was assumed to remain constant.
5. The RPS of 44% by 2024, 52% by 2027, and 60% for 2030 are consistent with SB 100. The RPS for 2026 and 2027 were estimated by assuming a linear increase between 2024 and 2027. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. The average percentage of energy from renewables for 2016-2018 is greater than the 2020 RPS of 33% as required by SB100. Thus, it is assumed that the 2016-2018 average CO2 and CO2e intensity factors remain constant through 2020, at which point the carbon intensity then decreases each year to comply with the future RPS requirements.
6. The intensity factor for total energy delivered was estimated by multiplying the percentage of energy delivered from non-RPS-eligible renewable energy by the $CO_2$ emissions per total non-RPS-eligible energy metric calculated above.

**Table 29**
**Energy Usage Emission Factors**
**Willow Village**
**Menlo Park, California**

7. Global Warming Potentials (GWP) are based on the IPCC Fourth Assessment Report. CH4 and N2O emission factors are from the CalEEMod® version 2020.4.0 defaults for PGE, and are conservatively assumed not to change from these estimates. As more renewable energy is integrated into the electricity grid, these intensity factors will also decrease.
8. Peninsula Clean Energy comes from 51% renewable sources, 35% hydro electric and 14% unspecified sources. The 14% unspecified sources were assumed to come from the same mix as the non-renewable PG&E mix of power. This is assumed to remain constant until 2030, after which the renewable percentage of the power mix is assumed to linearly increase to 100% in 2045, conistent with SB 100. Available at:
9. Natural Gas Use emission factors from Table 8.2 of CalEEMod User's Guide Appendix D.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CH_4$ - methane
$CO_2$ - carbon dioxide
$CO_2e$ - carbon dioxide equivalents
CPUC - California Public Utilities Commission
GWP - global warming potential
lb - pound(s)
MMBtu - million British Thermal Units
MT - metric ton(s)
MWh - megawatt-hour
$N_2O$ - nitrous oxide
$NO_x$ - nitrogen oxides
PCE - Peninsula Clean Energy
PG&E - Pacific Gas & Electric
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
RPS - Renewable Portolio Standard
SB - Senate Bill

**References:**


California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com/

IPCC. 2007. AR4 Climate Change 2007: The Physical Science Basis. Available online at: https://www.ipcc.ch/report/ar4/wg1/

PG&E 2017 Corporate Resonsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2017/assets/PGE_CRSR_2017.pdf. Accessed: July 2021.

PG&E 2018 Corporate Responsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2018/assets/PGE_CRSR_2018.pdf. Accessed: July 2021

PG&E 2019 Corporate Responsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2019/assets/PGE_CRSR_2019.pdf. Accessed: July 2021

The Climate Registry. Available at: https://www.theclimateregistry.org/our-members/cris-public-reports/. Accessed: July 2021.

Peninsula Clean Energy. Energy Sources. Available at: https://www.peninsulacleanenergy.com/energy-sources/ Accessed: April 2021

SB-100 California Renewables Portfolio Standard Program. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.

**Table 30**
**Energy Usage Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Location | Natural Gas Emissions[1,2] | | | | | Electricity Emissions[1,2] |
|---|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ | |
| | (tons/yr) | | | | (MT/yr) | |
| **Existing Conditions (2019)** | | | | | | |
| All | 0.16 | 1.5 | 0.11 | 0.11 | 1,613 | 0 |
| **Total Existing Emissions** | **0.16** | **1.5** | **0.11** | **0.11** | **1,613** | **0** |
| **Full Buildout** | | | | | | |
| Retail | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 118 | 0 |
| **Total Full Buildout Emissions** | **0.012** | **0.11** | **8.2E-03** | **8.2E-03** | **118** | **0** |
| **Partial Buildout[3]** | | | | | | |
| Total Year 4 Emissions | 0.0012 | 0.011 | 8.3E-04 | 8.3E-04 | 12 | 0 |
| Total Year 5 Emissions | 0.0070 | 0.064 | 4.9E-03 | 4.9E-03 | 70 | 0 |
| Total Year 6 Emissions | 0.012 | 0.11 | 8.0E-03 | 8.0E-03 | 115 | 0 |

**Notes:**

1. CAP emissions result from the combustion of natural gas. As a result, CAP emissions were only calculated for natural gas usage. In compliance with the City of Menlo Park Municipal Code, natural gas usage for the Project will be offset; however, since the carbon intensity of the offset production is not known at this time, GHG emissions from natural gas were conservatively included alongside electricity GHG emissions.
2. Emissions were calculated based on energy use, shown in Table 28, and energy emission factors, shown in Table 29. Existing electricity is sourced from PCE. Project electricity will be sourced from 100% renewable sources; as such, emissions from Project electricity use are expected to be zero. Project natural gas will only be used in retail land uses for commercial cooking equipment.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CAP - Criteria Air Pollutants
$CO_2e$ - carbon dioxide equivalents
GHG - Greenhouse Gas
MT - metric ton(s)
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

RAMBOLL

**Table 31**
**Water Usage for Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

**Water Usage**

| Land Use | CalEEMod® Land Use Subtype | Size | Size Metric | Indoor Water (million gal/year) | Outdoor Water (million gal/year) |
|---|---|---|---|---|---|
| **Existing Conditions (2019)[1]** | | | | | |
| Office | General Office Building | 251,530 | sqft | 45 | 27 |
| Commercial | Research and Development | 123,870 | sqft | 61 | 0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 500,780 | sqft | 116 | 0 |
| Industrial - Manufacturing | Manufacturing | 23,570 | sqft | 5.5 | 0 |
| Recreational | Health Club | 24,060 | sqft | 1.4 | 0.87 |
| Light Industrial | General Light Industry | 80,100 | sqft | 19 | 0 |
| Parking | Enclosed Parking with Elevator | 920,000 | sqft | 0 | 0 |
| **Full Buildout[2]** | | | | | |
| Office | | 1,600,000 | sqft | 35 | 10 |
| Retail | | 207,690 | sqft | 4.2 | 0.36 |
| Residential | | 1,695,976 | sqft | 67 | 6.3 |
| Hotel | | 172,000 | sqft | 7.6 | 2.5 |
| Parking | | 1,869,240 | sqft | 0 | 1.4 |
| Park | | 403,837 | sqft | 0 | 14 |
| **Partial Buildout[3]** | | | | | |
| | | | Total Year 4 Usage[3] | 1.5 | 13 |
| | | | Total Year 5 Usage[3] | 37 | 23 |
| | | | Total Year 6 Usage[3] | 88 | 32 |

**Notes:**

1. Existing water use was calculated using the CalEEMod default water consumption profile for each land use.
2. Project indoor water use rates and outdoor water use for all parcels except Hamilton Avenue Parcels North and South were provided by the Project Applicant on June 14, 2021. Indoor and outdoor water use rates for Hamilton Avenue Parcels North and South were calculated using the CalEEMod default water consumption profile for the retail land use type.
3. Partial buildout usage rates were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
gal - gallon
kWh - kilowatt-hours
ksf - thousand square feet
sqft - square feet

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 32**
**Water Usage and Wastewater Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Electricity Indirect Emissions[1,2] | Septic Tank Direct Emissions[1,2] | Aerobic Direct Emissions[1,2] | Facultative Lagoon Direct Emissions[1,2] | Total Emissions |
|---|---|---|---|---|---|
| | (MT $CO_2e$ / yr) | (MT $CO_2e$ / yr) | (MT $CO_2e$ / yr) | (MT $CO_2e$ / yr) | (MT CO2e / yr) |
| **Existing Conditions (2019)** | | | | | |
| Office | 37 | 27 | 24 | 10 | 98 |
| Commercial | 36 | 37 | 33 | 13.1 | 119 |
| Industrial - Warehouse | 68 | 71 | 62 | 25 | 226 |
| Industrial - Manufacturing | 3.2 | 3.3 | 2.9 | 1.2 | 10.6 |
| Recreational | 1.2 | 0.87 | 0.76 | 0.30 | 3.1 |
| Light Industrial | 11 | 11.3 | 9.9 | 4.0 | 36 |
| Parking | 0 | 0 | 0 | 0 | 0 |
| **Total Existing Emissions** | **156** | **151** | **132** | **53** | **492** |
| **Full Buildout** | | | | | |
| Office | 19 | 21 | 19 | 7.5 | 67 |
| Retail | 2.0 | 2.6 | 2.3 | 0.91 | 7.8 |
| Residential | 32 | 41 | 36 | 14 | 123 |
| Hotel | 4.1 | 4.6 | 4.1 | 1.6 | 14 |
| Parking | 0.42 | 0 | 0 | 0 | 0.42 |
| Park | 4.2 | 0 | 0 | 0 | 4.2 |
| **Total Full Buildout Emissions** | **62** | **70** | **61** | **24** | **217** |
| **Partial Buildout[3]** | | | | | |
| Total Year 4 Emissions[3] | 5.0 | 0.92 | 0.81 | 0.32 | 7.1 |
| Total Year 5 Emissions[3] | 24 | 22 | 20 | 7.9 | 74 |
| Total Year 6 Emissions[3] | 49 | 54 | 47 | 19 | 168 |

**Notes:**

1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. The Water Electricity Intensity, Water Treatment Types, and Wastewater Treatment Direct Emission Factors used in the calculation can be found in Tables 9.2, 9.3 and 9.4 of Appendix D of the CalEEMod user guide, respectively. These calculations were performed using water use rates, shown in Table 31, and energy emission factors, shown in Table 29.
2. Consistent with CalEEMod, indoor water use was assumed to be processed as wastewater and outdoor water use was assumed to not be processed as wastewater.
3. Partial buildout direct emissions from Septic Tank, Aerobic, and Facultative Lagoon wastewater treatment were calculated from full buildout using scaling factors by land use type and year, as shown in Table 1. For partial buildout indirect electricity emissions from water usage and wastewater treatment, usage rates rather than emission were scaled to account for year specific energy emission factors from PG&E, as shown in Table 29.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

## Table 33
## Solid Waste Generation for Existing Conditions and Project Operations
## Willow Village
## Menlo Park, California

**Solid Waste Generation[1]**

| Land Use | Size | Units | Solid Waste Disposal Rate (ton/year) |
|---|---|---|---|
| **Existing Conditions (2019)** | | | |
| Office | 251,530 | sqft | 42 |
| Commercial | 123,870 | sqft | 10 |
| Industrial - Warehouse | 500,780 | sqft | 471 |
| Industrial - Manufacturing | 23,570 | sqft | 29 |
| Recreational | 24,060 | sqft | 137 |
| Light Industrial | 80,100 | sqft | 99 |
| Parking | 920,000 | sqft | 0 |
| **Full Buildout Conditions** | | | |
| Office | 1,600,000 | sqft | 268 |
| Retail | 207,690 | sqft | 218 |
| Residential | 1,730 | DU | 796 |
| Hotel | 0,193 | sqft | 106 |
| Parking | 1,869,240 | sqft | 0 |
| Park | 403,837 | sqft | 0.83 |

**Notes:**

1. Solid Waste Generation Rates are from Table 10.1 of Appendix D of the CalEEMod User's Guide. An 82% diversion rate, provided by the Project Applicant via email communication dated August 2, 2021, is applied to default solid waste generation rates for the existing and project office land use to account for recycling and composting. The diversion rate is generated using data from Recology with the assumption that all bins are at 100% capacity and 0% contamination.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model

DU - dwelling unit

sqft - square feet

**References**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 34**
**Solid Waste Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

**Solid Waste Emissions[1]**

| Location | CalEEMod® Land Use Subtype | $CO_2$ (MT/year) | $CH_4$ (MT/year) | $CO_2e$ (MT/year) |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 8.5 | 0.51 | 21 |
| Commercial | Research and Development | 2.0 | 0.12 | 5.0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 96 | 5.6 | 237 |
| Industrial - Manufacturing | Manufacturing | 5.9 | 0.35 | 15 |
| Recreational | Health Club | 28 | 1.6 | 69 |
| Light Industrial | General Light Industry | 20 | 1.2 | 50 |
| Parking | Enclosed Parking with Elevator | 0 | 0 | 0 |
| | **Total Existing Emissions** | **160** | **9.5** | **397** |
| **Full Buildout Conditions** | | | | |
| Office | | 54 | 3.2 | 135 |
| Retail | | 44 | 2.6 | 110 |
| Residential | | 162 | 9.5 | 400 |
| Hotel | | 22 | 1.3 | 53 |
| Parking | | 0 | 0 | 0 |
| Park | | 0.17 | 0.010 | 0.42 |
| | **Total Full Buildout Emissions** | **282** | **17** | **698** |
| **Partial Buildout[2]** | | | | |
| | Total Year 4 Emissions[2] | 6.3 | 0.37 | 16 |
| | Total Year 5 Emissions[2] | 92 | 5.5 | 229 |
| | Total Year 6 Emissions[2] | 220 | 13 | 544 |

**Notes:**

1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. These calculations were performed using default waste use rates by land use type and an 82% diversion rate for office land use types provided by the Project Applicant, shown in Table 33, and default solid waste landfill gas emission factors from Table 10.2 of CalEEMod User's Guide Appendix D.

2. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CH_4$ - methane
$CO_2$ - carbon dioxide
$CO_2e$ - carbon dioxide equivalents
LFG - Landfill Gas
MT - metric ton

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 35**
**Unmitigated Architectural Coating Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Existing Conditions (2019)** | | | | | | |
| Office | 251,530 | 503,060 | 10% | 100 | 150 | 262 |
| Commercial | 123,870 | 247,740 | 10% | 100 | 150 | 129 |
| Industrial - Warehouse | 500,780 | 1,001,560 | 10% | 100 | 150 | 522 |
| Industrial - Manufacturing | 23,570 | 47,140 | 10% | 100 | 150 | 25 |
| Recreational | 24,060 | 48,120 | 10% | 100 | 150 | 25 |
| Light Industrial | 80,100 | 160,200 | 10% | 100 | 150 | 84 |
| Parking | 920,000 | 55,200 | 10% | 0 | 150 | 9.6 |
| | | | | | **Total Existing Conditions Emissions** | **1,057** |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 100 | 150 | 1,669 |
| Retail | 207,690 | 415,380 | 10% | 100 | 150 | 217 |
| Residential | 1,695,976 | 4,579,135 | 10% | 100 | 150 | 2,388 |
| Hotel | 172,000 | 344,000 | 10% | 100 | 150 | 179 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| | | | | | **Total Full Buildout Emissions** | **4,473** |
| **Partial Buildout[5]** | | | | | | |
| | | | | | Total Year 4 Emissions[5] | 83 |
| | | | | | Total Year 5 Emissions[5] | 1,567 |
| | | | | | Total Year 6 Emissions[5] | 3,515 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Consistent with CalEEMod Appendix D Table 6.1, which is based on BAAQMD Regulation 8 Rule 3 paint VOC regulations, use VOC EF of 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**


BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 36**
**Mitigated Architectural Coating Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 10 | 150 | 668 |
| Retail | 207,690 | 415,380 | 10% | 10 | 150 | 87 |
| Residential | 1,695,976 | 4,579,135 | 10% | 10 | 150 | 955 |
| Hotel | 172,000 | 344,000 | 10% | 10 | 150 | 72 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| **Total Full Buildout Emissions** | | | | | | **1,801** |
| **Partial Buildout[5]** | | | | | | |
| Total Year 4 Emissions[5] | | | | | | 40 |
| Total Year 5 Emissions[5] | | | | | | 635 |
| Total Year 6 Emissions[5] | | | | | | 1,417 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions were estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumed use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC was assumed to be equivalent to ROG for these purposes.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

South Coast Air Quality Management District. Super Compliant Architectural Coatings per Rule 1113. Accessed July 2021. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings&parent=other-low-voc-products.

RAMBOLL

**Table 37**
**Consumer Product Emission Factor Refinement**
**Willow Village**
**Menlo Park, California**

| Year[1] | Consumer Products VOC inventory (tons/day)[2] | San Mateo County Population[3] | Total Building Square Footage[4] | Consumer Products VOC Emission Factor (lb/square foot/day) |
|---|---|---|---|---|
| 2010 | 4.93 | 718,451 | 537,446,060 | 1.83E-05 |
| 2020 | 5.20 | 764,442 | 571,850,190 | 1.82E-05 |

**Notes:**

1. 2010 data are used because total building square footage was available only for 2010. Building square footage for 2020 was estimated by multiplying 2010 building square footage with the ratio of population in 2020 to that in 2010.

2. VOC inventory obtained from California Air Resources Board's emission inventory for Consumer Products under Solvent Evaporation for the respective years.

3. Population estimates obtained from US Census Bureau's QuickFacts for San Mateo County for the respective years.

4. Total building square footage for 2010 obtained from FEMA HAZUS-MH software.

**Abbreviations:**

lb - pound

VOC - Volatile Organic Compound

**References:**

California Air Resources Board. Almanac Emission Projection Data. Available online at https://www.arb.ca.gov/app/emsinv/emssumcat.php. Accessed November 2021.

US Census Bureau QuickFacts. Available online at https://www.census.gov/quickfacts/fact/table/US/PST045219. Accessed November 2021.

US Federal Emergency Management Agency's Hazus software (HAZUS-MH), Version 5.1. Available online at https://msc.fema.gov/portal/resources/hazus.

RAMBOLL

**Table 38**
**Consumer Product Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Building Area | Consumer Products VOC EF[1,2] | Days per Year | Consumer Products VOC emissions |
|---|---|---|---|---|
| | (sqft) | (lb / sqft / day) | | (lb / yr) |
| **Existing Conditions (2019)** | | | | |
| Office | 251,530 | 1.8E-05 | 365 | 1,670 |
| Commercial | 123,870 | 1.8E-05 | 365 | 822 |
| Industrial - Warehouse | 500,780 | 1.8E-05 | 365 | 3,324 |
| Industrial - Manufacturing | 23,570 | 1.8E-05 | 365 | 156 |
| Recreational | 24,060 | 1.8E-05 | 365 | 160 |
| Light Industrial | 80,100 | 1.8E-05 | 365 | 532 |
| Parking | 920,000 | 3.5E-07 | 365 | 119 |
| | | | **Existing Conditions Emissions** | **6,783** |
| **Full Buildout** | | | | |
| Office | 1,600,000 | 1.8E-05 | 365 | 10,621 |
| Retail | 207,690 | 1.8E-05 | 365 | 1,379 |
| Residential | 1,695,976 | 1.8E-05 | 365 | 11,258 |
| Hotel | 172,000 | 1.8E-05 | 365 | 1,142 |
| Parking | 1,869,240 | 3.5E-07 | 365 | 242 |
| Park | 403,837 | 5.2E-08 | 365 | 7.6 |
| | | | **Total Full Buildout Emissions** | **24,649** |
| **Partial Buildout[3]** | | | | |
| | | | Total Year 4 Emissions[3] | 599 |
| | | | Total Year 5 Emissions[3] | 9,447 |
| | | | Total Year 6 Emissions[3] | 19,982 |

**Notes:**

1. The consumer products VOC EF for office, retail, and residential land uses was derived using methodology consistent with CalEEMod with adjusted parameters for San Mateo County, as described in Table 37. The default emissions factor assumes 2020 consumer products VOC inventory for San Mateo County. The default building square footage used is from 2010, which was updated to 2020 using population growth of San Mateo County, as shown in Table 37.
2. Consumer product VOC EFs for parking and open space were taken from CalEEMod 2020.4.0. These defaults take into account pesticide and fertilizer use in city parks and degreaser use in parking areas.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

ARB - Air Resources Board
CalEEMod - California Emissions Estimator Model
EF - emission factor
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 39**
**Landscaping Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Year[2] | Emissions from Landscaping Equipment[1] | | | | |
|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
| | (tons/yr) | | | | (MT/yr) |
| Existing Conditions | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.063 |
| Year 4 | 0.33 | 0.13 | 0.061 | 0.061 | 19 |
| Year 5 | 0.37 | 0.14 | 0.067 | 0.067 | 20 |
| Year 6 | 0.39 | 0.15 | 0.071 | 0.071 | 22 |
| Full Buildout | 0.39 | 0.15 | 0.071 | 0.071 | 22 |

**Notes:**

1. Landscape emissions calculated using CalEEMod 2020.4.0 based on information regarding building square footage and acreage, shown in Appendix D.
2. Emissions in partial years were calculated by scaling full buildout emissions by the maximum percentage of land uses operational during that year.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton(s)
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 40**
**Summary of Unmitigated Operational CAP Emissions**
**Willow Village**
**Menlo Park, California**

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions (2019)[3] | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| **Total Emissions** | **9.1** | **10** | **4.1** | **0.95** | **50** | **52** | **23** | **5.2** |
| Full Buildout Conditions[4] | | | | | | | | |
| Architectural Coating | 2.2 | -- | -- | -- | 12 | -- | -- | -- |
| Consumer Products | 12 | -- | -- | -- | 68 | -- | -- | -- |
| Landscaping | 0.39 | 0.15 | 0.071 | 0.071 | 2.1 | 0.81 | 0.39 | 0.39 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.1 | 55 | 64 | 58 | 11 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| **Total Emissions** | **25** | **13** | **11** | **2.2** | **137** | **73** | **59** | **12** |
| Partial Buildout Emissions[6] | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.53 | 0.16 | 7.0 | 5.9 | 2.9 | 0.90 |
| Total Year 5 Emissions | 11 | 6.7 | 5.1 | 1.1 | 60 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 21 | 11 | 9.5 | 2.0 | 116 | 63 | 52 | 11 |
| Net Emissions[7] | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.5 | -3.6 | -0.79 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.9 | -2.8 | 1.0 | 0.14 | 10 | -16 | 5.5 | 0.76 |
| Net Year 6 Emissions | 12 | 2.0 | 5.3 | 1.0 | 66 | 11 | 29 | 5.5 |
| **Net Full Buildout Emissions** | **16** | **3.7** | **6.7** | **1.3** | **88** | **21** | **37** | **7.0** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions. Net emissions were calculated as the difference between full buildout emissions and existing condition emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 41**
**Summary of Mitigated Operational CAP Emissions**
**Willow Village**
**Menlo Park, California**

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| **Existing Conditions (2019)[3]** | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| **Total Emissions** | **9.1** | **9.5** | **4.1** | **0.95** | **50** | **52** | **23** | **5.2** |
| **Full Buildout Conditions[4]** | | | | | | | | |
| Architectural Coating | 0.90 | -- | -- | -- | 4.9 | -- | -- | -- |
| Consumer Products | 12 | -- | -- | -- | 68 | -- | -- | -- |
| Landscaping | 0.39 | 0.15 | 0.071 | 0.071 | 2.1 | 0.81 | 0.39 | 0.39 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.1 | 55 | 64 | 58 | 11 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| **Total Emissions** | **24** | **13** | **11** | **2.2** | **130** | **73** | **59** | **12** |
| **Partial Buildout Emissions[6]** | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.53 | 0.16 | 6.9 | 5.9 | 2.9 | 0.90 |
| Total Year 5 Emissions | 10.5 | 6.7 | 5.1 | 1.1 | 57 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 20 | 11.5 | 9.5 | 2.0 | 110 | 63 | 52 | 11 |
| **Net Emissions[7]** | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.5 | -3.6 | -0.79 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.4 | -2.8 | 1.0 | 0.14 | 7.8 | -16 | 5.5 | 0.76 |
| Net Year 6 Emissions | 11.0 | 2.0 | 5.3 | 1.0 | 60 | 10.8 | 29 | 5.5 |
| **Net Full Buildout Emissions** | **15** | **3.7** | **6.7** | **1.3** | **80** | **21** | **37** | **7.0** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0. The mitigated scenario for the Project is equivalent to the unmitigated scenario for all sources except Architectural Coating, as shown in Table 36.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 42**
**Summary of Operational GHG Emissions**
**Willow Village**
**Menlo Park, California**

| Emissions Source | GHG Emissions[1] (MT/yr) $CO_2e$ | |
|---|---|---|
| | **Existing Conditions (2019)[2]** | **Full Buildout Conditions[3]** |
| Landscaping | 0.063 | 22 |
| Electricity Use | 0 | 0 |
| Natural Gas Use[4] | 1613 | 118 |
| Water Use | 492 | 217 |
| Waste Disposed | 397 | 698 |
| Emergency Generators | 8.5 | 399 |
| **Total Emissions** | **2,509** | **1,453** |
| | **Net Emissions[5]** | **-1,056** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
3. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
4. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
5. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

CalEEMod® - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
MT - metric ton
yr - year

**References:**

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 43**
**Unmitigated Construction and Net New Operational CAP Emissions by Year**
**Willow Village**
**Menlo Park, California**

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only | | | | Net Operational Emissions[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.12 | 2.4 | 0.053 | 0.050 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 4.5 | 64 | 1.4 | 1.3 | -50 | -52 | -23 | -5.2 | -45 | 11 | -21 | -3.9 |
| Year 3 | 19 | 124 | 5.8 | 5.4 | -50 | -52 | -23 | -5.2 | -31 | 72 | -17 | 0.15 |
| Year 4 | 52 | 53 | 2.3 | 2.1 | -43 | -46 | -20 | -4.3 | 9.3 | 7.2 | -17 | -2.2 |
| Year 5 | 63 | 45 | 2.1 | 2.0 | 10 | -16 | 5.5 | 0.76 | 73 | 29 | 7.7 | 2.7 |
| Year 6 | 31 | 11 | 0.60 | 0.55 | 66 | 11 | 29 | 5.5 | 97 | 21 | 30 | 6.1 |
| Full Buildout | -- | -- | -- | -- | 88 | 21 | 37 | 7.0 | 88 | 21 | 37 | 7.0 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Unmitigated construction emissions can be found in Table 13. Net unmitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 42.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 44**
**Mitigated Construction and Net New Operational CAP Emissions by Year**
**Willow Village**
**Menlo Park, California**

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only[3] | | | | Net Operational Emissions Only[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.064 | 1.9 | 0.019 | 0.019 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 | -50 | -52 | -23 | -5.2 | -47 | -7.6 | -22 | -4.7 |
| Year 3 | 10 | 47 | 0.78 | 0.77 | -50 | -52 | -23 | -5.2 | -39 | -5.1 | -22 | -4.4 |
| Year 4 | 24 | 29 | 0.38 | 0.37 | -43 | -46 | -20 | -4.3 | -19 | -17 | -19 | -3.9 |
| Year 5 | 28 | 22 | 0.26 | 0.25 | 8 | -16 | 5.5 | 0.76 | 36 | 6.3 | 5.8 | 1.0 |
| Year 6 | 13 | 4.8 | 0.060 | 0.058 | 60 | 10.8 | 29 | 5.5 | 74 | 16 | 29 | 5.6 |
| Full Buildout | -- | -- | -- | -- | 80 | 20.5 | 37 | 7.0 | 80 | 21 | 37 | 7.0 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Mitigated construction emissions can be found in Table 14. Net mitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 43.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 45**
**Speciation Profiles**
**Willow Village**
**Menlo Park, California**

| TAC | CAS | Weight Fraction of Emissions by Pollutant[1] | |
|---|---|---|---|
| | | TOG | |
| | | Evaporate | Exhaust |
| Ethylbenzene | 100414 | 0.0012 | 0.011 |
| Toluene | 108883 | 0.017 | 0.058 |
| Hexane | 110543 | 0.015 | 0.016 |
| Xylenes | 1330207 | 0.0058 | 0.048 |
| Benzene | 71432 | 0.0036 | 0.025 |
| Styrene | 100425 | -- | 0.0012 |
| 1,3-Butadiene | 106990 | -- | 0.0055 |
| Acrolein | 107028 | -- | 0.0013 |
| Propylene | 115071 | -- | 0.031 |
| Formaldehyde | 50000 | -- | 0.016 |
| Methanol | 67561 | -- | 0.0012 |
| Acetaldehyde | 75070 | -- | 0.0028 |
| Methyl Ethyl Ketone | 78933 | -- | 0.0002 |
| Naphthalene | 91203 | -- | 0.0005 |

**Notes:**

1. Speciation profiles are taken from the BAAQMD's guidance on Recommended Methods for Screening and Modeling Local Risks and Hazards. Speciation profiles for Gasoline Exhaust are located in Table 14 and Gasoline Evaporative are located in Table 15 of the BAAQMD's guidance.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CAS - chemical abstract services
TAC - toxic air contaminant
TOG - total organic gases

**Reference:**

BAAQMD. 2011. Recommended Methods for Screening and Modeling Local Risks and Hazards. Table 14 and Table 15. Available at:
https://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx

**Table 46**
**Toxicity Values**
**Willow Village**
**Menlo Park, California**

| Source | Chemical[1] | CAS Number | Cancer Potency Factor | Chronic Noncancer Reference Exposure Level |
|---|---|---|---|---|
| | | | $(mg/kg\text{-}day)^{-1}$ | $(\mu g/m^3)$ |
| $PM_{10}$ | Diesel PM | 9-90-1 | 1.1 | 5.0 |
| TOG | Acetaldehyde | 75-07-0 | 0.010 | 140 |
| | Acrolein | 107-02-8 | -- | 0.35 |
| | Benzene | 71-43-2 | 0.1 | 3.0 |
| | 1,3-Butadiene | 106-99-0 | 0.6 | 2.0 |
| | Ethylbenzene | 100-41-4 | 0.0087 | 2000 |
| | Formaldehyde | 50-00-0 | 0.021 | 9.0 |
| | Hexane | 110-54-3 | -- | 7000 |
| | Methanol | 67-56-1 | -- | 4000 |
| | Methyl Ethyl Ketone | 78-93-3 | -- | -- |
| | Naphthalene | 91-20-3 | 0.12 | 9.0 |
| | Propylene | 115-07-1 | -- | 3000 |
| | Styrene | 100-42-5 | -- | 900 |
| | Toluene | 108-88-3 | -- | 420 |
| | Xylenes | 1330-20-7 | -- | 700 |

**Notes:**

1. Toxicity values are taken from ARB's Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values.

**Abbreviations:**

ARB - Air Resources Board
Cal/EPA - California Environmental Protection Agency
CAS - chemical abstract services
mg/kg-day - milligrams per kilogram per day
OEHHA - Office of Environmental Health Hazard Assessment
$\mu g/m^3$ - micrograms per cubic meter

**Reference:**

Cal/EPA. 2020. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. March. Available at: http://www.arb.ca.gov/toxics/healthval/contable.pdf.

**Table 47**
**Summary of Full Buildout Traffic Volumes by Roadway Segment**
**Willow Village**
**Menlo Park, CA**

**Offsite Roadways[1]**

| Source Group Name | Distance (m) | Campus District | | | | | | Town Square and Residential/Shopping District | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cars | | On-Demand | | Trucks | | San Mateo Default Fleet | |
| | | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) |
| ADAMS_CT | 223 | 62 | 8.6 | 4 | 0.58 | 1 | 0.19 | 87 | 12 |
| ADAMSD01 | 57 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 2.9 |
| ADAMSD02 | 160 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 8.0 |
| ADAMSD03 | 76 | 66 | 3.1 | 5 | 0.21 | 2 | 0.071 | 8 | 0.35 |
| ADAMSD04 | 83 | 66 | 3.4 | 5 | 0.23 | 2 | 0.077 | 8 | 0.38 |
| ADAMSD05 | 147 | 66 | 6.0 | 5 | 0.41 | 2 | 0.14 | 8 | 0.68 |
| ADAMSD06 | 81 | 66 | 3.3 | 5 | 0.23 | 2 | 0.076 | 8 | 0.38 |
| BAY_EAST | 1185 | 657 | 484 | 45 | 33 | 15 | 11 | 1,536 | 1,131 |
| BAY_EFB | 718 | 0 | 0 | 0 | 0 | 0 | 0 | 1,566 | 698 |
| BAY_M01 | 110 | 525 | 36 | 36 | 2.4 | 12 | 0.81 | 1,557 | 106 |
| BAY_M02 | 135 | 525 | 44 | 36 | 3.0 | 12 | 1.0 | 1,557 | 131 |
| BAY_M03 | 117 | 525 | 38 | 36 | 2.6 | 12 | 0.86 | 1,557 | 113 |
| BAY_M04 | 143 | 525 | 47 | 36 | 3.2 | 12 | 1.1 | 1,557 | 138 |
| BAY_M05 | 350 | 525 | 114 | 36 | 7.8 | 12 | 2.6 | 1,557 | 338 |
| BAY_WFB1 | 419 | 0 | 0 | 0 | 0 | 0 | 0 | 1,284 | 334 |
| BAY_WFB2 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 1,284 | 168 |
| BAY_WFB3 | 124 | 0 | 0 | 0 | 0 | 0 | 0 | 1,284 | 99 |
| BAY_WFB4 | 328 | 0 | 0 | 0 | 0 | 0 | 0 | 1,284 | 262 |
| BAY_WFB5 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 1,566 | 110 |
| BAY_WFB6 | 542 | 0 | 0 | 0 | 0 | 0 | 0 | 1,566 | 527 |
| BAY_WFB7 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 1,566 | 132 |
| OBRIEN01 | 320 | 1,480 | 294 | 101 | 20 | 34 | 6.7 | 991 | 197 |
| OBRIEN02 | 138 | 1,480 | 127 | 101 | 8.7 | 34 | 2.9 | 991 | 85 |
| OBRIEN03 | 35 | 1,480 | 33 | 101 | 2.2 | 34 | 0.74 | 991 | 22 |
| OBRIEN04 | 29 | 1,480 | 27 | 101 | 1.8 | 34 | 0.61 | 991 | 18 |
| OBRIEN05 | 28 | 1,480 | 26 | 101 | 1.8 | 34 | 0.59 | 991 | 17 |
| OBRIEN06 | 52 | 1,480 | 48 | 101 | 3.3 | 34 | 1.1 | 991 | 32 |
| OBRIEN07 | 43 | 3,842 | 103 | 262 | 7.0 | 87 | 2.3 | 2,398 | 64 |
| OBRIEN08 | 20 | 3,842 | 49 | 262 | 3.3 | 87 | 1.1 | 2,398 | 30 |
| OBRIEN09 | 20 | 3,842 | 47 | 262 | 3.2 | 87 | 1.1 | 2,398 | 30 |
| OBRIEN10 | 21 | 3,842 | 50 | 262 | 3.4 | 87 | 1.1 | 2,398 | 31 |
| OBRIEN11 | 44 | 3,842 | 105 | 262 | 7.2 | 87 | 2.4 | 2,398 | 66 |
| OBRIEN12 | 102 | 3,842 | 243 | 262 | 17 | 87 | 5.5 | 2,398 | 151 |
| OBRIEN13 | 32 | 3,842 | 76 | 262 | 5.2 | 87 | 1.7 | 2,398 | 47 |
| OBRIEN14 | 112 | 3,842 | 268 | 262 | 18 | 87 | 6.1 | 2,398 | 167 |
| OBRIEN15 | 242 | 3,870 | 581 | 263 | 40 | 88 | 13 | 2,325 | 349 |
| OBRIEN16 | 48 | 3,870 | 115 | 263 | 7.8 | 88 | 2.6 | 2,325 | 69 |
| OBRIEN17 | 54 | 3,870 | 130 | 263 | 8.8 | 88 | 2.9 | 2,325 | 78 |
| UNIV_01 | 110 | 339 | 23 | 23 | 1.6 | 8 | 0.53 | 309 | 21 |
| UNIV_02 | 91 | 339 | 19 | 23 | 1.3 | 8 | 0.43 | 309 | 17 |
| UNIV_03 | 222 | 339 | 47 | 23 | 3.2 | 8 | 1.1 | 309 | 43 |
| UNIV_04 | 121 | 339 | 26 | 23 | 1.7 | 8 | 0.58 | 309 | 23 |
| UNIV_05 | 80 | 339 | 17 | 23 | 1.2 | 8 | 0.38 | 309 | 15 |
| UNIV_06 | 69 | 339 | 15 | 23 | 0.99 | 8 | 0.33 | 309 | 13 |
| UNIV_07 | 258 | 339 | 54 | 23 | 3.7 | 8 | 1.2 | 309 | 49 |
| UNIV_08 | 185 | 410 | 47 | 28 | 3.2 | 9 | 1.1 | 516 | 59 |
| UNIV_09 | 142 | 3,255 | 287 | 222 | 20 | 74 | 6.5 | 1,707 | 150 |
| UNIV_10 | 310 | 3,243 | 624 | 221 | 42 | 74 | 14 | 1,737 | 334 |
| UNIV_11 | 115 | 3,243 | 232 | 221 | 16 | 74 | 5.3 | 1,737 | 124 |
| UNIV_12 | 63 | 3,243 | 232 | 221 | 16 | 74 | 5 | 1,737 | 124 |
| UNIV_13 | 128 | 3,243 | 232 | 221 | 16 | 74 | 5 | 1,737 | 124 |
| UNIV_14 | 201 | 3,243 | 232 | 221 | 16 | 74 | 5 | 1,737 | 124 |
| UNIV_15 | 647 | 3,243 | 232 | 221 | 16 | 74 | 5 | 1,737 | 124 |
| WILLOW01 | 97 | 89 | 5.3 | 6 | 0.36 | 2 | 0.12 | 2,976 | 179 |
| WILLOW02 | 174 | 89 | 10 | 6 | 0.65 | 2 | 0.22 | 2,976 | 321 |
| WILLOW03 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW04 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW05 | 201 | 0 | 0 | 0 | 0 | 0 | 0 | 6,362 | 796 |
| WILLOW06 | 110 | 0 | 0 | 0 | 0 | 0 | 0 | 6,362 | 436 |
| WILLOW07 | 281 | 580 | 101 | 39 | 6.9 | 13 | 2.3 | 6,875 | 1,201 |
| WILLOW08 | 93 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |
| WILLOW09 | 39 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |
| WILLOW10 | 31 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |
| WILLOW11 | 180 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |
| WILLOW12 | 256 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |
| WILLOW13 | 216 | 580 | 101 | 39 | 7 | 13 | 2 | 6,875 | 1,201 |

**Onsite Roadways[2]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| ONSITE | 2570 | 10,782 | 17,217 |

**Intercampus Shuttles[3]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| SHUTTLES | 7278 | 361 | 1,633 |

**Notes:**

1. Net new offsite traffic volumes for both the Campus District and the Town Square were provided by Hexagon in the data request received in October 2021. Offsite traffic for the Campus District was modeled using a percent breakdown of the fleet (88% cars, 6% on-demand, 2% trucks), provided by Hexagon. Offsite traffic for the Town Square and Residential/Shopping District was modeled as the default San Mateo fleet. A summary of fleet mix categories can be found in Table 19. Modeled offsite roadway segments can be found in Figure 8.

2. Net new onsite traffic volumes were provided by Hexagon in the data request received in October 2021. Onsite traffic volumes were taken as the sum of all net new onsite traffic volumes divided by two to account for round trips. Onsite traffic was modeled exclusively as the cars fleet type. A summary of the cars fleet mix can be found in Table 19. Modeled onsite roadway segments can be found in Figure 7.

3. Shuttle traffic volumes, which account for the remaining 4% of the offsite fleet mix, were conservatively modeled as the sum of all inbound and outbound vehicle trips across all regions and routes, divided by two to account for round trips. Inbound and outbound vehicle trips were provided by the Project Applicant in June 2021. A summary of the shuttles fleet mix can be found in Table 19. Modeled shuttle roadway segments can be found in Figure 9.

**Abbreviations:**

VMT - Vehicle Miles Traveled | m - meter | mi - mile

**Table 48**
**Traffic Emission Factors**
**Willow Village**
**Menlo Park, California**

| Vehicle Type | % Diesel[1] | DPM[1,2] | $PM_{2.5}$[2] | TOG[2] Evaporate | TOG[2] Exhaust |
|---|---|---|---|---|---|
| | | g / mi | | | |
| San Mateo Default Fleet | 41% | 7.4E-04 | 0.019 | 0.033 | 0.021 |
| Cars | 2% | 1.9E-05 | 0.017 | 0.037 | 0.017 |
| Trucks | 94% | 0.011 | 0.051 | 0.033 | 0.089 |
| Shuttles | 100% | 0.0043 | 0.024 | -- | -- |
| On-Demand | 2% | 2.0E-05 | 0.017 | 0.032 | 0.0091 |

**Notes:**

1. The DPM emission factor for Cars, On-Demand, Trucks, and the San Mateo Default Fleet vehicle types is reduced by the the fraction of total $PM_{10}$ emissions that are from diesel for each fleet type. This fraction was calculated as the sum of $PM_{10}$ running and idling exhaust emissions from all diesel vehicles in the fleet over the sum of all $PM_{10}$ running and idling exhaust emissions for all vehicles in the fleet.
2. A detailed description of mobile emission factors can be found in Table 20. DPM emissions are represented by the running exhaust $PM_{10}$ emission factor for 2026; $PM_{2.5}$ emissions are represented by the sum of the running exhaust, brake wear, tire wear, and controlled resuspended road dust emission factors for 2026; TOG exaporate emissions are represented by the TOG running loss emission factor for 2026; and TOG exhaust emissions are represented by the TOG running exhaust emission factor for 2026.

**Abbreviations:**

DPM - diesel particulate matter
g - gram
mi - mile
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
$PM_{10}$ - particulate matter less than 10 microns in diameter
TOG - total organic gases

**Table 49**
**Diurnal Traffic Patterns for San Mateo Fleet and Shuttles**
**Willow Village**
**Menlo Park, California**

| Hour of Day | Percent of Total Daily San Mateo Fleet VMT[1] | Shuttle Schedule[2] |
|---|---|---|
| | | (number of shuttles) |
| 1 | 1.1% | 0 |
| 2 | 0.5% | 0 |
| 3 | 0.6% | 0 |
| 4 | 0.2% | 0 |
| 5 | 0.5% | 16 |
| 6 | 0.9% | 44 |
| 7 | 3.7% | 130 |
| 8 | 7.7% | 115 |
| 9 | 7.1% | 52 |
| 10 | 4.4% | 2 |
| 11 | 4.7% | 0 |
| 12 | 5.9% | 0 |
| 13 | 6.1% | 0 |
| 14 | 6.0% | 2 |
| 15 | 7.0% | 41 |
| 16 | 7.1% | 92 |
| 17 | 7.5% | 102 |
| 18 | 8.2% | 83 |
| 19 | 5.7% | 36 |
| 20 | 4.3% | 6 |
| 21 | 3.2% | 1 |
| 22 | 3.2% | 0 |
| 23 | 2.4% | 0 |
| 24 | 1.9% | 0 |

**Notes:**

1. The percent of total daily VMT is calculated using EMFAC2021 data for all vehicle types in San Mateo County in 2026. It is equal to the hourly VMT divided by total daily VMT.

2. Daily shuttle schedule was provided by the Project Applicant in June 2021.

**Abbreviations:**

VMT - Vehicle Miles Traveled

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

RAMBOLL

**Table 50**
**Construction Source Parameters**
**Willow Village**
**Menlo Park, California**

| Source | Source Type | Number of Sources[1] | Release Height[2] | Source Width | Initial Horizontal Dimension | Initial Vertical Dimension[3] |
|---|---|---|---|---|---|---|
| | | | (m) | (m) | (m) | (m) |
| Construction Equipment | Area | Multiple | 5.0 | -- | -- | 1.16 |
| On-Road Trucks | Line | Multiple | 2.55 | Width of Road + 6 | -- | 2.37 |
| Feeder Line Equipment | Volume | Multiple | 5.0 | 2.0 | 0.93 | 1.16 |

**Notes:**

1. The number of modeled construction equipment sources is based on the number of distinct construction work areas. The number of on-road vehicle sources is based on the geometry of the truck or traffic routes.

2. BAAQMD does not have guidance on construction modeling, therefore construction equipment parameters used are based on BAAQMD's San Francisco Citywide Health Risk Assessment (SFDPH). According to the SFDPH methodology, release height of a modeled area source representing construction equipment is set to 5 meters. On-road truck release height will be based on USEPA haul road guidance, assuming vehicle heights of 3 meters for heavy-duty vehicles and 2 meters for light-duty vehicles.

3. According to USEPA's AERMOD guidance, initial vertical dimension of the modeled construction equipment area sources is the release height divided by 4.3. According to the USEPA Haul Road Guidance, the initial vertical dimension for line sources is the top of plume height divided by 2.15, where the top of the plume is equal to 2*Release Height. According to USEPA's AERMOD guidance, the initial horizontal dimension for construction volume sources is the source width divided by 2.15.

**Abbreviations:**

AERMOD - Atmospheric Dispersion MODeling
BAAQMD - Bay Area Air Quality Management District
m - meter
SFDPH - San Francisco Department of Public Health
USEPA - United States Environmental Protection Agency

**References:**


San Francisco Department of Public Health. February 2020. San Francisco Citywide Health Risk Assessment: Technical Support Documentation. Available online at: https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf

BAAQMD. 2017. California Environmental Quality Act: Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed November 2018.

United States Environmental Protection Agency (USEPA). 2012. Haul Road Workgroup Final Report Submission to EPA-OAQPS. U.S. EPA Office of Air Quality and Planning Standards, Research Triangle Park, North Carolina. Available at: https://www3.epa.gov/scram001/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf

USEPA. 2012. Haul Road Workgroup Final Report Submission to EPA-OAQPS. U.S. EPA Office of Air Quality and Planning Standards, Research Triangle Park, North Carolina. Available at: https://www3.epa.gov/scram001/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf

USEPA. 2019. User's Guide for the AMS/EPA Regulatory Model (AERMOD). U.S. EPA Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. Available at: https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf

**Table 51**
**Operational Source Parameters**
**Willow Village**
**Menlo Park, California**

| Source[1,2,3] | Source Type | Number of Sources | Release Height | Exit Temperature | Exit Velocity | Exit Diameter | Initial Vertical Dimension |
|---|---|---|---|---|---|---|---|
| | | | (m) | (K) | (m/s) | (m) | (m) |
| On-Road Passenger Vehicles | Line | Multiple | 1.7 | -- | -- | -- | 1.58 |
| Shuttles | Line | Multiple | 3.39 | -- | -- | -- | 3.15 |
| Existing Generator | Point | 1 | 3.7 | 804 | 26 | 0.19 | -- |
| North Garage Generators | Point | 2 | 27.74 | 739.82 | 45.3 | 0.18 | -- |
| Parcel 2 and 5 Generators | Point | 2 | 23.47 | 739.82 | 45.3 | 0.18 | -- |
| Parcel 3 Generator | Point | 1 | 26.82 | 739.82 | 45.3 | 0.18 | -- |
| Parcel 4 Generator | Point | 1 | 23.77 | 739.82 | 45.3 | 0.18 | -- |
| Parcel 6 Generator | Point | 1 | 24.38 | 739.82 | 45.3 | 0.18 | -- |
| Parcel 7 Generator | Point | 1 | 23.16 | 739.82 | 45.3 | 0.18 | -- |
| South Garage Generators | Point | 2 | 24.69 | 739.82 | 45.3 | 0.18 | -- |
| Pumping Station Generator | Point | 1 | 3.78 | 739.82 | 45.3 | 0.18 | -- |
| Hamilton Avenue Generator | Point | 1 | 2.99 | 739.82 | 45.3 | 0.18 | -- |
| Town Square Generator | Point | 1 | 25.91 | 739.82 | 45.3 | 0.18 | -- |

**Notes:**

1. Since passenger vehicles occupy the majority of offsite and onsite vehicle traffic, the on-road passenger vehicle source parameters were used to model cars, trucks and on-demand vehicle traffic. The source parameters are consistent with the San Francisco Citywide Health Risk Assessment Technical Support Document (SFDPH) and a vehicle height of 2 meters and USEPA Haul Road Guidance. The source width is the width of the road plus 6 meters to account for the turbulent mixing of air behind vehicles.
2. Intercampus shuttles were modeled using the actual vehicle height of 4 meters as provided by the Project Applicant and USEPA Haul Road Guidance. The source width is the width of the road plus 6 meters to account for the turbulent mixing of air behind vehicles.
3. Project generators were modeled using default values for exit temperature, velocity, and diameter from the San Francisco Citywide Health Risk Assessment Technical Support Document, which are consistent with median stack parameters from the BAAQMD technical memorandum. Release heights of the exhaust are assumed to be the height of the building.

**Abbreviations:**

AERMOD - Atmospheric Dispersion MODeling
BAAQMD - Bay Area Air Quality Management District
K - Kelvin
m - meter
s - second
USEPA - United States Environmental Protection Agency

**References:**


BAAQMD. 2012. San Francisco Community Risk Reduction Plan (SFCRRP). Available at: https://www.gsweventcenter.com/Appeal_Response_References/2012_1201_BAAQMD.pdf

SFDPH. 2020. San Francisco Citywide Health Risk Assessment Technical Support Document. February. Available at: https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf

Sonoma Technology, Inc. 2011. Default modeling Parameters for Stationary Sources. Technical Memorandum. April 1.

USEPA. 2012. Haul Road Guidance. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/haul_road_workgroup-final_report_package-20120302.pdf

**Table 52**
**Modeling Adjustment Factor**
**Willow Village**
**Menlo Park, California**

| Receptor Type | Modeling Adjustment Factor |
|---|---|
| Residential | 1 |
| Recreational | 2.55 |
| Daycare Child | 2.55 |
| Daycare Child (18 months +) | 2.55 |
| Elementary School | 2.55 |
| High School | 2.55 |

**Notes:**

1. Modeling adjustment factors are calculated based on the methodology from BAAQMD's Health Risk Assessment Modeling Protocol (2020).

2. The MAF for all non-residential receptor types is calculated to adjust from 24 hours/day to 11 hours/day and from 7 days/week to 6 days/week ([24 hours/11 hours] * [7 days/6 days] = 2.55).

**References:**

BAAQMD. 2020. Health Risk Assessment Modeling Protocol. Available at: https://www.baaqmd.gov/~/media/files/ab617-community-health/facility-risk-reduction/documents/baaqmd_hra_modeling_protocol_august_2020-pdf.pdf?la=en

**Table 53**
**Summary of Construction Source Groups**
**Willow Village**
**Menlo Park, California**

**Off-Road Emissions:**

| Construction Area[1] | Subphase | Off-Road Source Group[2,3,4,5] |
|---|---|---|
| Area 1 | Demolition | PHS_1A |
| | Grading and Utilities | PHS_1A |
| Area 1 Campus District | North Garage | NG |
| | Office Building 4 | O4 |
| | Meeting, Collaboration, Park | MCP |
| | Hotel Excavation | EXCAVATE |
| | Hotel Construction | HTL |
| | Town Square | TS |
| Area 1 Town Square and Residential/Shopping District | Parcel 2 Foundations | RS2 |
| | Parcel 2 Core and Shell | RS2 |
| | Parcel 2 Tenant Improvements | RS2 |
| | Parcel 2 Landscaping | RS2 |
| | Parcel 3 Foundations | RS3 |
| | Parcel 3 Core and Shell | RS3 |
| | Parcel 3 Tenant Improvements | RS3 |
| | Parcel 3 Landscaping | RS3 |
| Area 2 | Demolition | PHS_1B |
| | Grading and Utilities | PHS_1B |
| Area 2 Campus District | South Garage | SG |
| | Office Building 3 | O3 |
| | Office Building 1 | O1 |
| | Office Building 2 | O2 |
| | Office Building 5 | O5 |
| | Office Building 6 | O6 |
| Area 2 Town Square and Residential/Shopping District | Parcel 7 Foundations | RS7 |
| | Parcel 7 Core and Shell | RS7 |
| | Parcel 7 Tenant Improvements | RS7 |
| | Parcel 7 Landscaping | RS7 |
| | Parcel 6 Foundations | RS6 |
| | Parcel 6 Core and Shell | RS6 |
| | Parcel 6 Tenant Improvements | RS6 |
| | Parcel 6 Landscaping | RS6 |
| Area 3 | Grading and Utilities | PHS_2X |
| | Tunnel Construction | TUNNEL |
| | Foundations | RS45 |
| | Core and Shell | RS45 |
| | Tenant Improvements | RS45 |
| | Landscaping | RS45 |
| Hamilton Avenue Parcels North and South | Demolition | RETAIL |
| | Grading and Utilities | RETAIL |
| | Foundations | RETAIL |
| | Core and Shell | RETAIL |
| | Tenant Improvements | RETAIL |
| Substation Upgrade | PG&E Substation Work | RVWSS |
| Feeder Line | PG&E Offsite Work | ROUTE1/ROUTE2 |
| | Surface Improvements | ROUTE1/ROUTE2 |
| Intersection Improvements | O'Brien and Kavanaugh | CCODKD |
| | Adams and O'Brien | ADOD |
| | Willow Road and Ivy Drive | WRID |

**On-Road Emissions:**

| Construction Area | Subphase | Off-Road Source Group[1,3,5] | On-Road Source Group[1,3,5] | Trip Type[6] |
|---|---|---|---|---|
| Area 1 | Demolition | PHS_1A | TRUCKS | Hauling trips |
| | Grading and Utilities | PHS_1A | TRUCKS | Hauling trips |
| Area 1 Campus District | Foundations + Core and Shell | PHS_1A | TRUCKS | Vendor trips |
| | Tenant Improvements | PHS_1A | TRUCKS | Vendor trips |
| | O4 and NG Worker Mobile Trips | -- | TRUCKS | Worker trips |
| | MCS Worker Mobile Trips | -- | TRUCKS | Worker trips |
| Area 1 Town Square and Residential/Shopping District | Foundations | PHS_1A | TRUCKS | Vendor trips |

RAMBOLL

**Table 53**
**Summary of Construction Source Groups**
**Willow Village**
**Menlo Park, California**

| Construction Area[1] | Subphase | Off-Road Source Group[1,3,5] | On-Road Source Group[1,3,5] | Trip Type[6] |
|---|---|---|---|---|
| Area 1 Town Square and Residential/Shopping District | Core and Shell | PHS_1A | TRUCKS | Vendor trips |
| | Tenant Improvements | PHS_1A | TRUCKS | Vendor trips |
| | Landscaping | PHS_1A | TRUCKS | Vendor trips |
| | Town Square and Residential/Shopping District Worker Mobile Trips | -- | TRUCKS | Worker trips |
| | Landscaping Worker Mobile Trips | -- | TRUCKS | Worker trips |
| Area 2 | Demolition | PHS_1B | TRUCKS | Hauling trips |
| | Grading and Utilities | PHS_1B | TRUCKS | Hauling trips |
| Area 2 Campus District | Foundations + Core and Shell | PHS_1B | TRUCKS | Vendor trips |
| | Tenant Improvements | PHS_1B | TRUCKS | Vendor trips |
| | Worker Mobile Trips | -- | TRUCKS | Worker trips |
| Area 2 Town Square and Residential/Shopping District | Foundations | PHS_1B | TRUCKS | Vendor trips |
| | Core and Shell | PHS_1B | TRUCKS | Vendor trips |
| | Tenant Improvements | PHS_1B | TRUCKS | Vendor trips |
| | Landscaping | PHS_1B | TRUCKS | Vendor trips |
| | Town Square and Residential/Shopping District Worker Mobile Trips | -- | TRUCKS | Worker trips |
| | Landscaping Worker Mobile Trips | -- | TRUCKS | Worker trips |
| Area 3 | Grading and Utilities | PHS_2X | TRUCKS | Hauling trips |
| | Tunnel Construction | PHS_2X | TRUCKS | Vendor trips and Worker trips |
| | Foundations | PHS_2X | TRUCKS | Vendor trips and Worker trips |
| | Core and Shell | PHS_2X | TRUCKS | Vendor trips and Worker trips |
| | Tenant Improvements | PHS_2X | TRUCKS | Vendor trips and Worker trips |
| | Landscaping | PHS_2X | TRUCKS | Vendor trips and Worker trips |
| Hamilton Avenue Parcels North and South | Demolition | RETAIL | TRUCKS | Hauling trips and Worker trips |
| | Grading and Utilities | RETAIL | TRUCKS | Hauling trips and Worker trips |
| | Foundations | RETAIL | TRUCKS | Vendor trips |
| | Core and Shell | RETAIL | TRUCKS | Vendor trips |
| | Tenant Improvements | RETAIL | TRUCKS | Vendor trips |
| | Worker Mobile Trips | RETAIL | TRUCKS | Worker trips |
| Substation Upgrade | PG&E Substation Work | -- | TRUCKS | Vendor trips and Worker trips |
| Feeder Line | PG&E Offsite Work | -- | TRUCKS | Vendor trips and Worker trips |
| | Surface Improvements | -- | TRUCKS | Vendor trips and Worker trips |
| Intersection Improvements | O'Brien and Kavanaugh | -- | TRUCKS | Vendor trips and Worker trips |
| | Adams and O'Brien | -- | TRUCKS | Vendor trips and Worker trips |
| | Willow Road and Ivy Drive | -- | TRUCKS | Vendor trips and Worker trips |

**Notes:**

1. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
2. Source group locations are presented in Figures 3, 4, and 5.
3. Source groups RS4 and RS5 are modeled together as RS45.
4. All on-road source groups are modeled as On-Road Trucks and all off-road source groups are modeled as Construction Equipment.
5. The EXCAVATE source group is modeled as the HTL and TS source groups combined, as excavation will occur near the proposed Hotel and Town Square. This is shown as the Specific Hotel Excavation Area in Figure 3.
6. On-road emissions from hauling and vendor trips are allocated to an on-road source group and off-road source group. Any emissions derived from a g/mile process (e.g., running, brakewear, tirewear, runloss) are allocated to the phase's corresponding on-road source group. Any emissions derived from a g/trip process (e.g., idling, startup, etc.) are allocated to the phase's corresponding off-road source group. This allocation allows for a more accurate representation of where emissions from the g/trip processes occur, since they would be happening on-site.
7. On-road construction worker trips were expected to have negligible impact and were therefore not included in the HRA analysis for excess lifetime cancer risk and chronic HI. $PM_{2.5}$ emissions associated with on-road construction worker trips were included in the construction HRA analysis for $PM_{2.5}$ concentration modeling.

**Abbreviations:**

HI - hazard index

HRA - health risk assessment

$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**Table 54**
**Exposure Parameters**
**Willow Village**
**Menlo Park, California**

| Receptor Type | Receptor Age Group[1] | Exposure Parameters | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Daily Breathing Rate (DBR)[2,3,4,5] | Annual Exposure Duration (ED)[6] | Fraction of Time at Home (FAH)[7] | Exposure Frequency (EF)[8] | Averaging Time (AT) | Intake Factor, Inhalation ($If_{inh}$) | Age Sensitivity Factor (ASF)[9,10] |
| | | (L/kg-day) | (years) | (unitless) | (days/year) | (days) | ($m^3$/kg-day) | (unitless) |
| Resident | 3rd Trimester | 361 | 1 | 1 | 350 | 25,550 | 0.0049 | 10 |
| | Age 0-<2 Years | 1090 | 1 | 1 | | | 0.015 | 10 |
| | Age 2-<9 Years | 631 | 1 | 1 | | | 0.0086 | 3 |
| | Age 2-<16 Years | 572 | 1 | 1 | | | 0.0078 | 3 |
| | Age 16-30 Years | 261 | 1 | 0.73 | | | 0.0026 | 1 |
| Daycare Child | Age 0-<2 Years | 750 | 1 | 1 | 250 | | 0.0073 | 10 |
| | Age 2-<9 Years | 415 | 1 | 1 | | | 0.0041 | 3 |
| Daycare Child (18 months +) | Age 0-<2 Years | 750 | 1 | 1 | 250 | | 0.0073 | 10 |
| | Age 2-<9 Years | 415 | 1 | 1 | | | 0.0041 | 3 |
| Elementary School Child | Age 2-<9 Years | 640 | 1 | 1 | 180 | | 0.0045 | 3 |
| High School Child | Age 2-<16 Years | 520 | 1 | 1 | 180 | | 0.0037 | 3 |
| Recreational | Age 0-<2 Years | 300 | 1 | 1 | 180 | | 0.0021 | 10 |
| | Age 2-<9 Years | 160 | 1 | 1 | | | 0.0011 | 3 |
| | Age 2-<16 Years | 130 | 1 | 1 | | | 9.2E-04 | 3 |
| | Age 16-30 Years | 60 | 1 | 0.73 | | | 3.1E-04 | 1 |

**Notes:**

1. Age bin 2-<9 Years will be used where applicable, and age bin 2-<16 Years will be conservatively used for ages 9-<16 Years.
2. Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows:
   95th percentile 24-hour daily breathing rate for age 3rd trimester and 0-<2 years
   80th percentile 24-hour daily breathing rate for age 2-<9 years
   80th percentile 24-hour daily breathing rate for age 2-<16 years
   80th percentile 24-hour daily breathing rate for age 16-30 years
3. Daily breathing rates for daycare children assumes 2 hour moderate intensity and 6 hour light intensity activity.
4. Daily breathing rates for elementary and high school children assume 95th Percentile Eight-Hour Breathing Rates for Moderate Intensity Activities.
5. Daily breathing rates for recreational receptors assume 95th Percentile Eight-Hour Breathing Rates for Moderate Intensity Activities, scaled to 2 hours per day.
6. Annual exposure duration represents one full year. Specific exposure durations in each age bin are given in Tables 55, 56, 57, and 58.
7. Fraction of time spent at home is conservatively assumed to be 1 (i.e. 24 hours/day) for all age bins except Age 16-30 Years. Fraction of time spent at home is assumed to be 0.73 for Ages 16-30 Years.
8. Exposure frequency was determined as follows:
   Residents: reflects default residential exposure frequency from Cal/EPA 2015.
   Daycare: reflects default worker exposure frequency from Cal/EPA 2015, assuming a daycare child is at the daycare center when the parents are at work.
   School: reflects default number of school days per year.
   Recreational: reflects default number of school days per year, assuming 2 hours of exposure each day.
9. Age sensitivity factors account for an “anticipated special sensitivity to carcinogens” of infants and children as recommended in the OEHHA Technical Support Document (Cal/EPA 2009) and current OEHHA guidance (Cal/EPA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD (BAAQMD 2016).
10. Adjustment factor is applicable to each receptor type listed for the age group relevant to that receptor type.

**Abbreviations:**

AT - averaging time
Cal/EPA - California Environmental Protection Agency
DBR - daily breathing rate
EF - exposure frequency
FAH - fraction of time at home
kg - kilogram
L - liter

**Reference:**

Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

**Table 55**
**Age Sensitivity Weighted Intake Factors by Year and Age Bin for Scenario 1**
**Willow Village**
**Menlo Park, California**

| Year[1] | Resident | | | | | | Recreational | | | | | Daycare Child | | | Daycare Child (18 months +) | | | Elementary School | | High School | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fraction of Year in Age Bin[2,3] | | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin[6] | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] |
| | 3rd Trimester | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 2-9 | ($m^3$/kg-day) | 2-16 | ($m^3$/kg-day) |
| Year 1 | 1 | | | | | 0.049 | 1 | | | | 0.021 | 1 | | 0.073 | 1 | | 0.073 | 1 | 0.014 | 1 | 0.011 |
| Year 2 | 0.20 | 0.80 | | | | 0.13 | 1 | | | | 0.021 | 1 | | 0.073 | 0.45 | 0.55 | 0.040 | 1 | 0.014 | 1 | 0.011 |
| Year 3 | | 1 | | | | 0.15 | 0.95 | 0.05 | | | 0.020 | 0.95 | 0.05 | 0.071 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 4 | | 0.20 | 0.80 | | | 0.051 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 5 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 6 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 7 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 8 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 9 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.0122 | | | | |
| Year 10 | | | 1 | | | 0.026 | | 0.95 | 0.05 | | 0.0034 | | 1 | 0.012 | | | | | | | |
| Year 11 | | | 0.20 | 0.80 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 12 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 13 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 14 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 15 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 16 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 17 | | | | 1 | | 0.0235 | | | 0.95 | 0.05 | 0.00263 | | | | | | | | | | |
| Year 18 | | | | 0.20 | 0.80 | 0.0069 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 19 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 20 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 21 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 22 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 23 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 24 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 25 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 26 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 27 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 28 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 29 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 30 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 31 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 32 | | | | | 1 | 0.0026 | | | | | | | | | | | | | | | |

**Notes:**

1. Exposure Scenario 1 begins at the start of construction in Year 1.
2. The exposure duration for all years is 1, as the health risk assessment is based on annual emissions. While the 3rd Trimester is only 3 months, the exposure duration for the first year is set to 1 since annual average concentrations are used to calculate risks.
3. Age bin 2-16 Years was selected to conservatively represent ages 9-16.
4. The Intake Factors have been multiplied by the Age Sensitivity Factors and weighted by the exposure duration for each age bin.
5. Intake Factors are based on exposure assumptions in Table 44.
6. Exposure for High School receptors is conservatively included in the 2-16 age bin.

**Abbreviations:**

IF - intake factor
$m^3$ - cubic meter
kg - kilogram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

**Table 56**
**Age Sensitivity Weighted Intake Factors by Year and Age Bin for Scenario 2**
**Willow Village**
**Menlo Park, California**

| Year[1] | Resident | | | | | | Recreational | | | | | Daycare Child | | | Daycare Child (18 months +) | | | Elementary School | | High School | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fraction of Year in Age Bin[2,3] | | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin[6] | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] |
| | 3rd Trimester | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 2-9 | ($m^3$/kg-day) | 2-16 | ($m^3$/kg-day) |
| Year 2 | 0.99 | 0.0082 | | | | 0.050 | 1 | | | | 0.021 | 1 | | 0.073 | 1 | | 0.073 | 1 | 0.014 | 1 | 0.011 |
| Year 3 | | 1 | | | | 0.15 | 1 | | | | 0.021 | 1 | | 0.073 | 0.25 | 0.75 | 0.027 | 1 | 0.014 | 1 | 0.011 |
| Year 4 | | 0.998 | 0.0021 | | | 0.15 | 0.75 | 0.25 | | | 0.017 | 0.75 | 0.25 | 0.058 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 5 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 6 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 7 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 8 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 9 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 10 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | | | | |
| Year 11 | | | 0.998 | 0.0021 | | 0.026 | | 0.75 | 0.25 | | 0.0032 | | 1 | 0.012 | | | | | | | |
| Year 12 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 13 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 14 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 15 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 16 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 17 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 18 | | | | 0.998 | 0.0021 | 0.023 | | | 0.75 | 0.25 | 0.0021 | | | | | | | | | | |
| Year 19 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 20 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 21 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 22 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 23 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 24 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 25 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 26 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 27 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 28 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 29 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 30 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 31 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 32 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |

**Notes:**

1. Exposure Scenario 2 begins at the start of Grading and Utilities for Area 2 construction in Year 2.
2. The exposure duration for all years is 1, as the health risk assessment is based on annual emissions. While the 3rd Trimester is only 3 months, the exposure duration for the first year is set to 1 since annual average concentrations are used to calculate risks.
3. Age bin 2-16 Years was selected to conservatively represent ages 9-16.
4. The Intake Factors have been multiplied by the Age Sensitivity Factors and weighted by the exposure duration for each age bin.
5. Intake Factors are based on exposure assumptions in Table 44.
6. Exposure for High School receptors is conservatively included in the 2-16 age bin.

**Abbreviations:**

IF - intake factor
$m^3$ - cubic meter
kg - kilogram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

**Table 57**
**Age Sensitivity Weighted Intake Factors by Year and Age Bin for Scenario 3**
**Willow Village**
**Menlo Park, California**

| Year[1] | Resident | | | | | | Recreational | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fraction of Year in Age Bin[2,3] | | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] |
| | 3rd Trimester | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) |
| Year 5 | 0.37 | 0.63 | | | | 0.11 | 1 | | | | 0.021 |
| Year 6 | | 1 | | | | 0.15 | 1 | | | | 0.021 |
| Year 7 | | 0.58 | 0.42 | | | 0.097 | 0.33 | 0.67 | | | 0.0093 |
| Year 8 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 9 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 10 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 11 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 12 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 13 | | | 1 | | | 0.026 | | 1 | | | 0.0034 |
| Year 14 | | | 0.58 | 0.42 | | 0.025 | | 0.33 | 0.67 | | 0.0030 |
| Year 15 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 16 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 17 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 18 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 19 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 20 | | | | 1 | | 0.024 | | | 1 | | 0.0027 |
| Year 21 | | | | 0.58 | 0.42 | 0.015 | | | 0.33 | 0.67 | 0.0011 |
| Year 22 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 23 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 24 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 25 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 26 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 27 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 28 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 29 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 30 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 31 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 32 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 33 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 34 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 |
| Year 35 | | | | | 0.58 | 0.0015 | | | | 1 | 0.00031 |

**Notes:**

1. Exposure Scenario 3 begins at the conclusion of Town Center and Residential/Shopping District construction when residents move onsite in 2025.
2. The exposure duration for all years is 1, as the health risk assessment is based on annual emissions. While the 3rd Trimester is only 3 months, the exposure duration for the first year is set to 1 since annual average concentrations are used to calculate risks.
3. Age bin 2-16 Years was selected to conservatively represent ages 9-16.
4. The Intake Factors have been multiplied by the Age Sensitivity Factors and weighted by the exposure duration for each age bin.
5. Intake Factors are based on exposure assumptions in Table 44.

**Abbreviations:**

IF - intake factor
$m^3$ - cubic meter
kg - kilogram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

**Table 58**
**Age Sensitivity Weighted Intake Factors by Year and Age Bin for Scenario 4**
**Willow Village**
**Menlo Park, California**

| Year[1] | Resident | | | | | | Recreational | | | | | Daycare Child | | | Daycare Child (18 months +) | | | Elementary School | | High School | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fraction of Year in Age Bin[2,3] | | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] | Fraction of Year in Age Bin[6] | Age Sensitivity Weighted Intake Factor by Year, Inhalation[4,5] |
| | 3rd Trimester | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | 2-16 | 16-30 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 0-2 | 2-9 | ($m^3$/kg-day) | 2-9 | ($m^3$/kg-day) | 2-16 | ($m^3$/kg-day) |
| Year 7 | 0.25 | 0.75 | | | | 0.12 | 1 | | | | 0.021 | 1 | | 0.073 | 0.5 | 0.5 | 0.043 | 1 | 0.014 | 1 | 0.011 |
| Year 8 | | 1 | | | | 0.15 | 1 | | | | 0.0211 | 1 | | 0.073 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 9 | | 0.25 | 0.75 | | | 0.057 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 10 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | 1 | 0.011 |
| Year 11 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 12 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 13 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | 1 | 0.014 | | |
| Year 14 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | 1 | 0.012 | | | | |
| Year 15 | | | 1 | | | 0.026 | | 1 | | | 0.0034 | | 1 | 0.012 | | | | | | | |
| Year 16 | | | 0.25 | 0.75 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 17 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 18 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 19 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 20 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 21 | | | | 1 | | 0.024 | | | 1 | | 0.0027 | | | | | | | | | | |
| Year 22 | | | | 1 | | 0.0235 | | | 1 | | 0.00275 | | | | | | | | | | |
| Year 23 | | | | 0.25 | 0.75 | 0.0078 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 24 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 25 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 26 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 27 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 28 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 29 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 30 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 31 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 32 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 33 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 34 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 35 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 36 | | | | | 1 | 0.0026 | | | | 1 | 0.00031 | | | | | | | | | | |
| Year 37 | | | | | 0.25 | 0.00065 | | | | | | | | | | | | | | | |

**Notes:**
1. Scenario 4 begins at the conclusion of Project construction when the Project is fully operational in 2027.
2. The exposure duration for all years is 1, as the health risk assessment is based on annual emissions. While the 3rd Trimester is only 3 months, the exposure duration for the first year is set to 1 since annual average concentrations are used to calculate risks.
3. Age bin 2-16 Years was selected to conservatively represent ages 9-16.
4. The Intake Factors have been multiplied by the Age Sensitivity Factors and weighted by the exposure duration for each age bin.
5. Intake Factors are based on exposure assumptions in Table 44.
6. Exposure for High School receptors is conservatively included in the 2-16 age bin.

**Abbreviations:**
IF - intake factor
$m^3$ - cubic meter
kg - kilogram

**References:**
OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

**Table 59**
**Project Cancer Risk at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 2** | **Scenario 3** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Construction | 83 | 57 | 0 | 7.6 | -- | -- |
| Operational Generators | 1.6 | 0.99 | 7.3 | 0.99 | 7.3 | 1.8 |
| Operational Traffic | 1.1 | 0.89 | 0.19 | 0.89 | 0.19 | 1.6 |
| **Total Project Contribution** | **86** | **59** | **7.5** | **9.5** | **7.5** | **3.4** |

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (µg/m3)
   CF = Conversion Factor (mg/µg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 59**
**Project Cancer Risk at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,215 | 575,500 | 575,275 | 575,500 | 575,275 | 575,500 |
| UTMy (m) | 4,148,075 | 4,147,960 | 4,148,145 | 4,147,960 | 4,148,145 | 4,147,960 |
| Receptor Height (m) | 4.8 | 1.8 | 22.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 60**
**Project Chronic Hazard Index at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** |
| Construction | 0.23 | 0.11 | 8.8E-03 | 0.011 | -- | -- |
| Operational Generators | 4.0E-04 | 5.8E-04 | 3.9E-04 | 7.0E-04 | 8.8E-04 | 8.1E-04 |
| Operational Traffic | 2.1E-03 | 1.4E-03 | 2.3E-03 | 3.3E-03 | 6.0E-03 | 3.9E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.011** | **0.015** | **6.9E-03** | **4.7E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i / cREL$
   Where:
   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)
   $C_i$ = Annual Average Air Concentration for Chemical "i" ($\mu g/m^3$)
   cREL = Chronic Reference Exposure Level ($\mu g/m^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 60**
**Project Chronic Hazard Index at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,245 | 575,400 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year I | Year I |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 61**
**Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| **Source Category** | **$PM_{2.5}$ Concentration[1] ($\mu g/m^3$)** | | | | | |
|---|---|---|---|---|---|---|
| | **Construction + Operations** | | | | **Operations Only** | |
| | **Unmitigated[2]** | | **Mitigated[2]** | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** |
| Construction | 1.1 | 0.52 | 0.038 | 0.063 | -- | -- |
| Operational Generators | 2.0E-03 | 2.9E-03 | 2.2E-03 | 4.1E-03 | 4.4E-03 | 4.1E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.13** | **0.18** | **0.11** | **0.12** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

   The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

   $C_i = E \times D_i$

   Where:

   C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)

   $D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($(\mu g/m^3)/(g/s)$)

   E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. On-site and off-site MEIR locations are documented below:

## Table 61
## Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR
## Willow Village
## Menlo Park, California

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 62**
**Summary of Nearby Stationary Source Impacts at Project MEIR**
**Willow Village**
**Menlo Park, California**

**Off-Site MEIR**

| Facility ID (Plant Number)[1] | Facility Name[1] | Unscaled Values[2] | | | Distance from MEIR (ft) | | | Decay Type[2] | Decay Factor[2] | | | Scaled Values[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cancer Risk | Hazard Risk | $PM_{2.5}$ | Cancer Risk MEIR | Hazard Risk MEIR | $PM_{2.5}$ MEIR | | Cancer Risk MEIR | Hazard Risk MEIR | $PM_{2.5}$ MEIR | Cancer Risk | Hazard Risk | $PM_{2.5}$ |
| | | in a million | -- | μg/m³ | feet | | | | unitless | | | in a million | unitless | μg/m³ |
| 18066 | Menlo Business Park | 0.58 | 3.6 | 0 | 1,327 | 1,469 | 1,503 | Diesel ICE | 0 | 0 | 0 | 0 | 0 | 0 |
| 20079 | Pacific Biosciences | 1.5 | 0.057 | 0.54 | 1,759 | 1,339 | 1,520 | Diesel ICE | 0 | 0 | 0 | 0 | 0 | 0 |
| 21312 | West Bay Sanitary District | 0.033 | 0.0013 | 0 | 1,988 | 1,696 | 1,731 | Diesel ICE | 0 | 0 | 0 | 0 | 0 | 0 |
| 22664 | CS Bio Company | 0.13 | 0.0052 | 0 | 980 | 677 | 715 | Diesel ICE | 0.040 | 0.080 | 0.080 | 5.3E-03 | 4.2E-04 | 0 |
| 100092 | Chevron | 15 | 0.073 | 0 | 2,150 | 1,730 | 1,908 | Generic Decay | 0 | 0 | 0 | 0 | 0 | 0 |
| 108593 | United Parcel Service | 4.7 | 0.023 | 0 | 1,460 | 1,379 | 1,509 | Generic Decay | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | **Total:** | **5.3E-03** | **4.2E-04** | **0** |

**On-Site MEIR**

| Facility ID (Plant Number)[1] | Facility Name[1] | Unscaled Values[2] | | | Distance from MEIR (ft) | | | Decay Type[2] | Decay Factor[2] | | | Scaled Values[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cancer Risk | Hazard Risk | $PM_{2.5}$ | Cancer Risk MEIR | Hazard Risk MEIR | $PM_{2.5}$ MEIR | | Cancer Risk MEIR | Hazard Risk MEIR | $PM_{2.5}$ MEIR | Cancer Risk | Hazard Risk | $PM_{2.5}$ |
| | | in a million | -- | μg/m³ | feet | | | | unitless | | | in a million | unitless | μg/m³ |
| 18066 | Menlo Business Park | 0.58 | 3.6 | 0 | 1,773 | 1,923 | 1,822 | Diesel ICE | 0 | 0 | 0 | 0 | 0 | 0 |
| 20079 | Pacific Biosciences | 1.5 | 0.057 | 0.54 | 803 | 938 | 848 | Diesel ICE | 0.060 | 0.040 | 0.060 | 0.09 | 2.3E-03 | 0.033 |
| 21312 | West Bay Sanitary District | 0.033 | 0.0013 | 0 | 1,432 | 1,231 | 1,357 | Diesel ICE | 0 | 0 | 0 | 0 | 0 | 0 |
| 22664 | CS Bio Company | 0.13 | 0.0052 | 0 | 587 | 308 | 484 | Diesel ICE | 0.10 | 0.25 | 0.14 | 0.013 | 1.3E-03 | 0 |
| 100092 | Chevron | 15 | 0.073 | 0 | 1,195 | 1,308 | 1,234 | Generic Decay | 0 | 0 | 0 | 0 | 0 | 0 |
| 108593 | United Parcel Service | 4.7 | 0.023 | 0 | 1,444 | 1,676 | 1,525 | Generic Decay | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | **Total:** | **0.10** | **3.6E-03** | **0.033** |

**Notes:**

1. Consistent with BAAQMD guidance, Ramboll included all facilities within 1,000 feet of the Project boundary as per the BAAQMD Permitted Stationary Sources Risks and Hazards Map. Facility information was obtained from the Permitted Stationary Sources Risks and Hazards Map with additional details provided by BAAQMD.

2. Unscaled health risk values were estimated using facility emissions provided by BAAQMD and BAAQMD's Health Risk Calculator Tool. These values were scaled by distance using the diesel IC engines multiplier tool or the BAAQMD's generic distance decay curve, as indicated above. If a stationary source is located over 1,000 feet away from the MEIR, the decay factor is zero (i.e., the impact of the stationary source is zero at the MEIR).

**Abbreviations:**

IC - internal combustion
ICE - internal combustion engine
MEIR - maximally exposed individual receptor
μg/m³ - micrograms per cubic meters
$PM_{2.5}$ - particulate matter less than 2.5 micrometers in diameter

**References**


Bay Area Air Quality Management District (BAAQMD). 2020. Permitted Sources Risk and Hazards Map. June. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

Bay Area Air Quality Management District (BAAQMD). 2020. Health Risk Calculator Beta 4.0. March. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en&rev=dab7d85a772d45caa9c99e59395bf12d

**Table 63**
**Background Traffic Volumes**
**Willow Village**
**Menlo Park, California**

| Source Group Name | Distance (m) | San Mateo Default Fleet | |
|---|---|---|---|
| | | Volume (vehicles/day) | VMT (mi/day) |
| OBRIEN01 | 320 | 14,729 | 2,929 |
| OBRIEN02 | 138 | 14,729 | 1,265 |
| OBRIEN03 | 35 | 14,729 | 324 |
| OBRIEN04 | 29 | 14,729 | 266 |
| OBRIEN05 | 28 | 14,729 | 259 |
| OBRIEN06 | 52 | 14,729 | 476 |
| OBRIEN07 | 43 | 14,729 | 394 |
| OBRIEN08 | 20 | 14,729 | 186 |
| OBRIEN09 | 20 | 14,729 | 182 |
| OBRIEN10 | 21 | 14,729 | 191 |
| OBRIEN11 | 44 | 14,729 | 403 |
| OBRIEN12 | 102 | 14,729 | 930 |
| OBRIEN13 | 32 | 14,729 | 290 |
| OBRIEN14 | 112 | 14,729 | 1,026 |
| OBRIEN15 | 242 | 14,729 | 2,211 |
| OBRIEN16 | 48 | 14,729 | 438 |
| OBRIEN17 | 54 | 14,729 | 493 |

**Notes:**

1. The background traffic volumes were provided by Hexagon in the data request received in October 2021.
2. Modeled roadway segments are shown in Figures 7.

**Abbreviations:**

VMT - Vehicle Miles Traveled

m - meter

mi - mile

**Table 64**
**Summary of Cumulative Impacts at Project MEIR**
**Willow Village**
**Menlo Park, California**

| Nearby Sources[1] | Offsite MEIR | | | Onsite MEIR | | |
|---|---|---|---|---|---|---|
| | Excess Lifetime Cancer Risk | Noncancer Chronic HI | $PM_{2.5}$ Concentration | Excess Lifetime Cancer Risk | Noncancer Chronic HI | $PM_{2.5}$ Concentration |
| | (in a million) | (unitless) | ($\mu g/m^3$) | (in a million) | (unitless) | ($\mu g/m^3$) |
| Existing Stationary Sources[2] | 5.3E-03 | 4.2E-04 | 0.0 | 0.10 | 3.6E-03 | 0.033 |
| Roadways[3] | 1.3 | 8.5E-04 | 0.20 | 0.043 | 2.3E-04 | 7.6E-03 |
| Highways[4] | 8.0 | -- | 0.21 | 8.9 | -- | 0.19 |
| Major Streets[4,5] | 2.1 | -- | 0.086 | 3.5 | -- | 0.077 |
| Railways[4] | 2.5 | -- | 4.6E-03 | 2.4 | -- | 4.6E-03 |
| Project Construction | 7.6 | 0.011 | 0.063 | 0.0 | 8.8E-03 | 0.038 |
| Project Operational Generators | 0.99 | 7.0E-04 | 4.1E-03 | 7.3 | 3.9E-04 | 2.2E-03 |
| Project Operational Traffic | 0.89 | 3.3E-03 | 0.12 | 0.19 | 2.3E-03 | 0.092 |
| **Total** | **23** | **0.016** | **0.69** | **22** | **0.015** | **0.44** |
| **BAAQMD Threshold** | **100** | **10** | **0.80** | **100** | **10** | **0.80** |

**Notes:**

1. Details for existing stationary sources are shown in the preceeding table. If the cell is marked with "--", no risk was calculated. For roadways, highways, major streets, and railways, chronic HI is not calculated in the BAAQMD screening tools.

2. Consistent with BAAQMD guidance, Ramboll included all facilities within 1,000 feet of the Project boundary as per the BAAQMD Permitted Stationary Sources Risks and Hazards Map. Facility information was obtained from the Permitted Stationary Sources Risks and Hazards Map with additional details provided by BAAQMD. Values have been adjusted accordingly for distance from the MEIRs using BAAQMD guidance.

3. BAAQMD recommends evaluating roadways in the area where existing traffic is over 10,000 vehicles per day and under 30,000 vehicles per day, which is the limit for roadways to consider in their raster tool. Hexagon provided background trip volumes for nearby roadways with volumes between 10,000 and 30,000 vehicles per day. Of the roadways with background traffic in this range, only O'Brien Drive was located within the zone of influence. The impacts associated with background traffic on O'Brien Drive were quantified and included in the cumulative analysis.

4. Nearby major streets, highway, and railway cancer and $PM_{2.5}$ impacts were taken from BAAQMD raster files for the Project area. The BAAQMD's raster screening tools do not estimate chronic hazards since the screening levels were found to be extremely low. Thus, there are no chronic hazard values associated with highways, railways, or major streets.

5. Major streets, as evaluated in the BAAQMD raster screening tools, include all streets with average daily traffic above 30,000 vehicles per day.

**Abbreviations:**

µg - microgram
HI - hazard index
$m^3$ - cubic meter
MEIR - maximum exposed individual receptor
$PM_{2.5}$ - fine particulate matter less than 2.5 micrometers in diameter

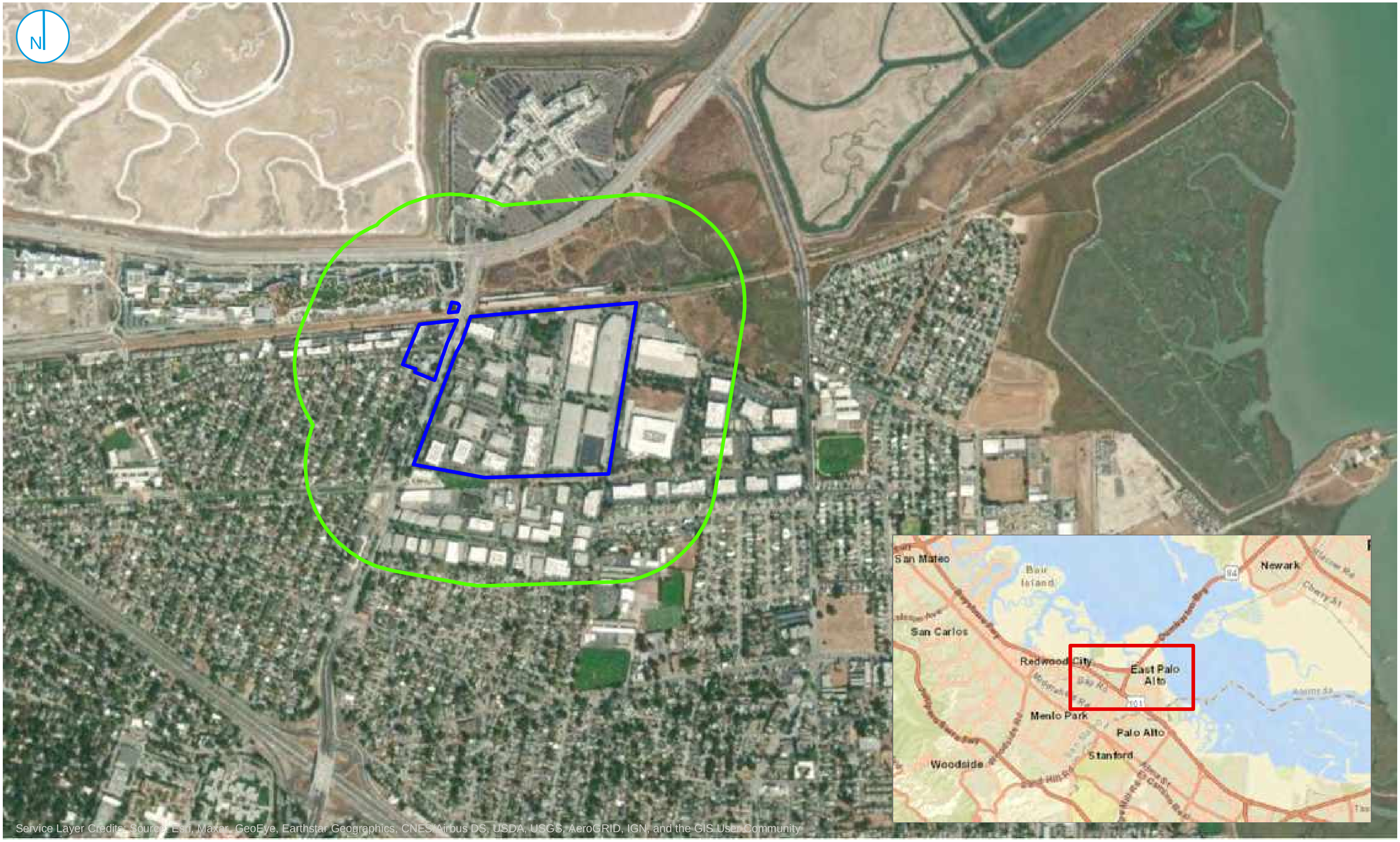
**References**


Bay Area Air Quality Management District (BAAQMD). 2020. Permitted Sources Risk and Hazards Map. June. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

City of Menlo Park. Traffic volume data. Available at: https://www.menlopark.org/1543/Traffic-volume-data

# FIGURES

PROJECT: 1690010687-004| DATED: 9/15/2021 | DESIGNER: MMCCARTHY C:\Users\mmccarthy\OneDrive - Ramboll\ArcGIS Local\FB Willow Village\Figure1_revised.mxd




Project Boundary
1000 ft Buffer

0 500 1,000 2,000 Meters

## PROJECT AREA AND BOUNDARY

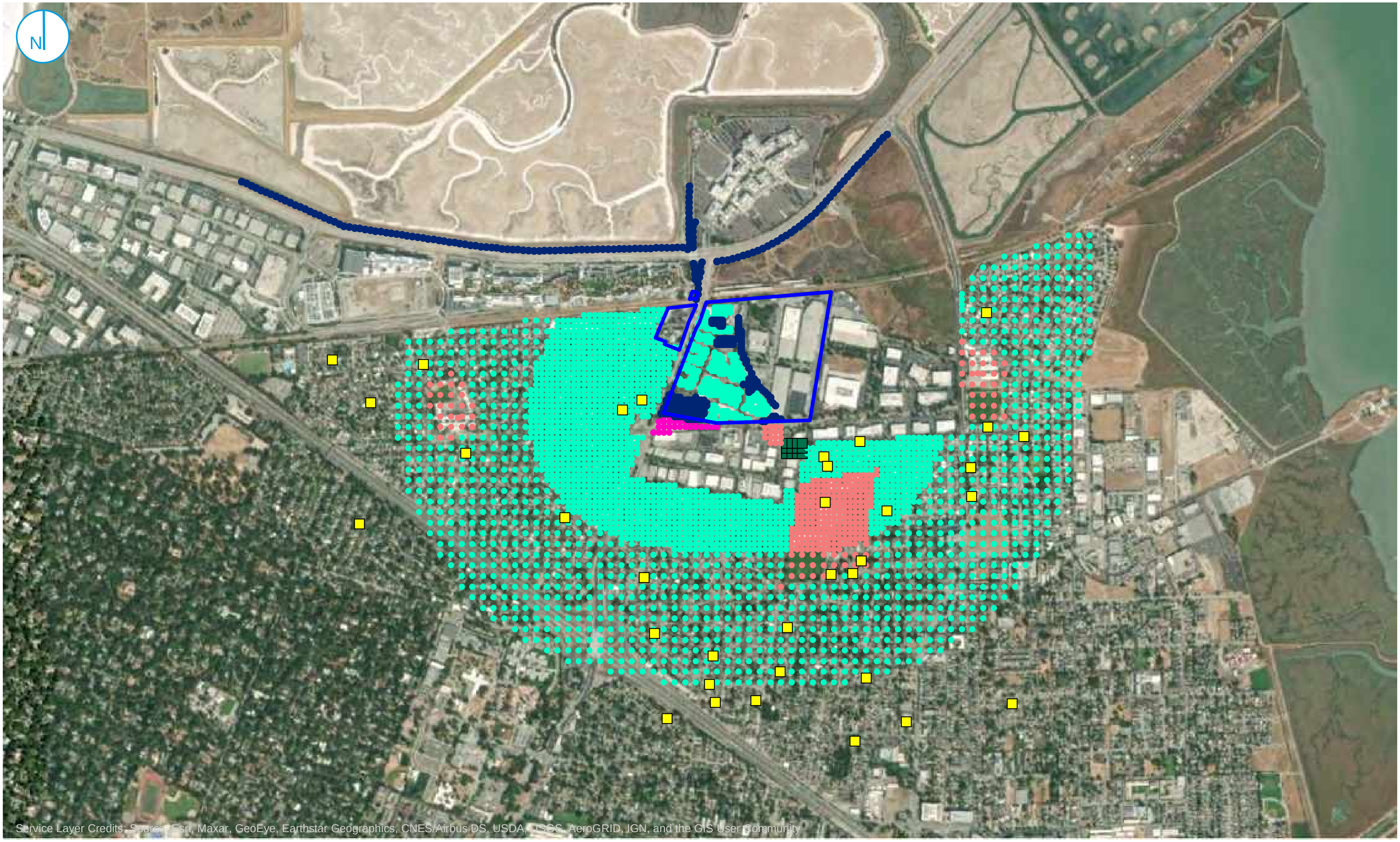
**Willow Village**
Menlo Park, California

## FIGURE 01

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

PROJECT: 1690010687-004 | DATED: 9/15/2021 | DESIGNER: MMCCARTHY

C:\Users\mmccarthy\OneDrive - Ramboll\ArcGIS Local\FB Willow Village\Figure3_(2)_sofia.mxd




Daycare Child (18+ months)
Daycare Child
Elementary School Child
High School Child
Recreational
Resident
Project Boundary

0 500 1,000 Meters

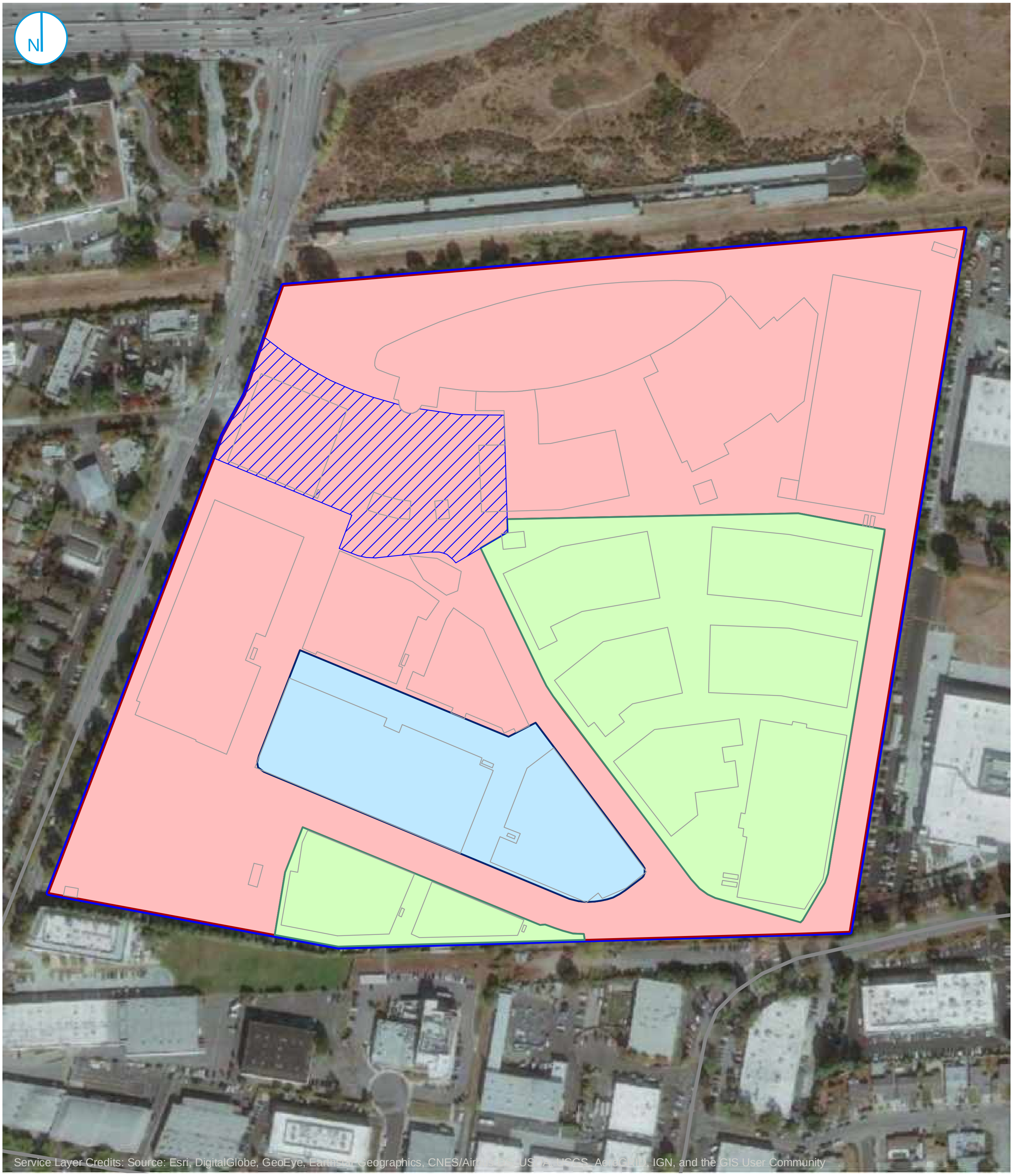
## MODELED RECEPTOR LOCATIONS

**Willow Village**
Menlo Park, California

## FIGURE 02

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

C:\ArcGIS\facebook.willow\cons.fig2.mxd




PROJECT: 1690010687-004 | DATED: 6/29/2021 | DESIGNER: DWILTON

Project Boundary Grading Phases

Area 1
Area 2
Area 3
Specific Hotel Excavation Area
(Excavation for RS2 and RS3 are in the areas shown in Figure 4)

0 100 200 Meters

## CONSTRUCTION SOURCES (GRADING AND EXCAVATION)

**Willow Village**
Menlo Park, California

## FIGURE 03

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL


PROJECT: 1690010687-004 | DATED: 6/29/2021 | DESIGNER: DWILTON

Project Boundary

Buildings & Structures

Area source abbreviations are defined in Table 46 of the report.

0 100 200 Meters

## CONSTRUCTION SOURCES

**Willow Village**
Menlo Park, California

## FIGURE 04

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY


PROJECT: 169000XXXX | DATED: 6/29/2021 | DESIGNER: DWILTON

Project Boundary
Haul Roads

0 250 500 Meters

**CONSTRUCTION SOURCES**
**HAUL ROADS**

**Willow Village**
Menlo Park, California

**FIGURE 05**

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY


PMP Location 1

PMP Location 2

Generator Locations

Project Buildings

## GENERATOR LOCATIONS

## FIGURE 6a

**Willow Village**
Menlo Park, California

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 169000XXXX | DATED: 6/17/2022 | DESIGNER: SBISOGNO

C:\Users\sbisogno\OneDrive - Ramboll\Documents\Facebook Willow Village\Pumping Station\Pumping Station\Pumping Station.aprx\Ramboll_ANSI_A_Portrait


Project Boundary
1000 ft Buffer
Onsite Vehicle Routes

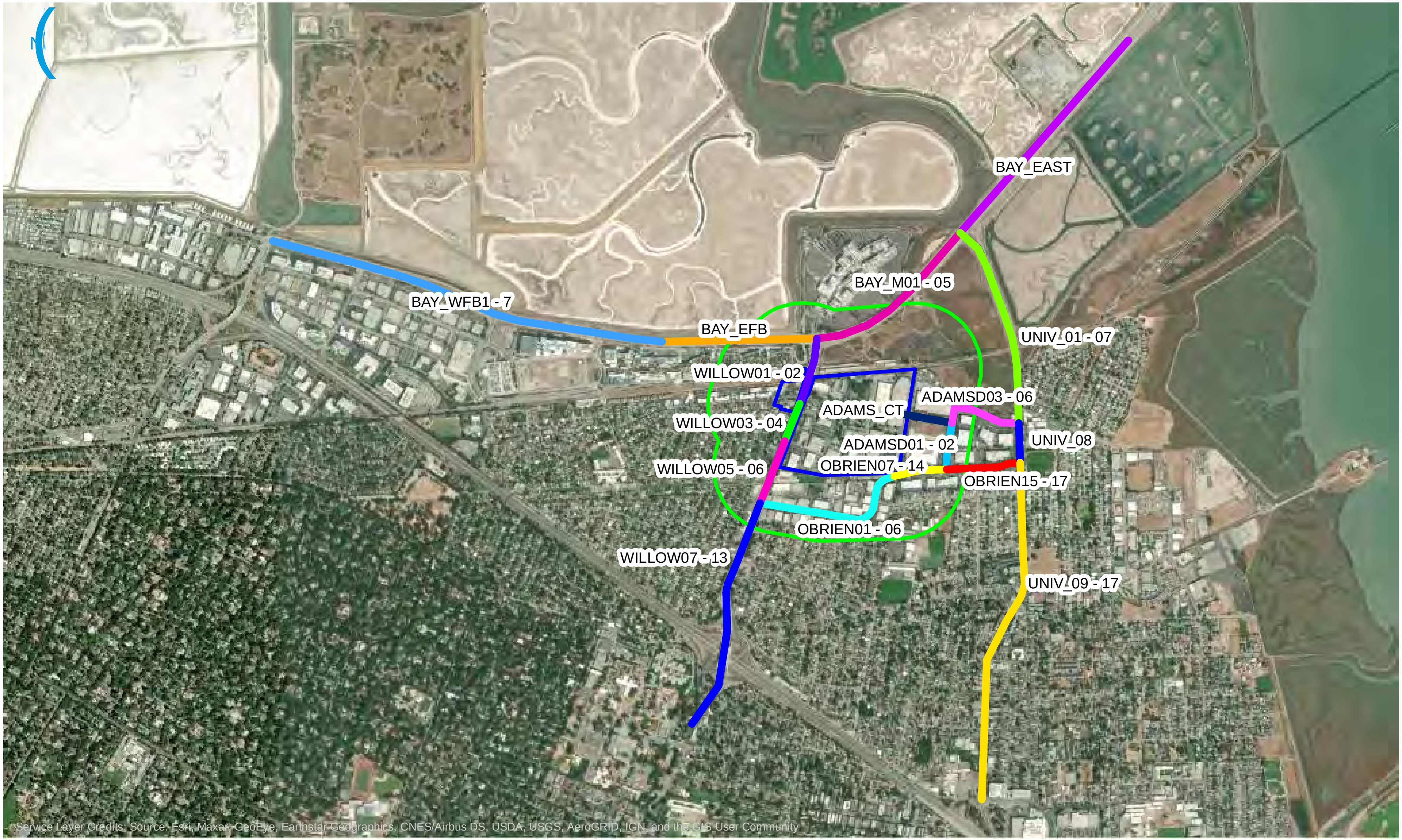
0 500 1,000 Meters

## MODELED ONSITE TRAFFIC ROUTES

**Willow Village**
Menlo Park, California

## FIGURE 6b

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY




Project Boundary
1000 ft Buffer

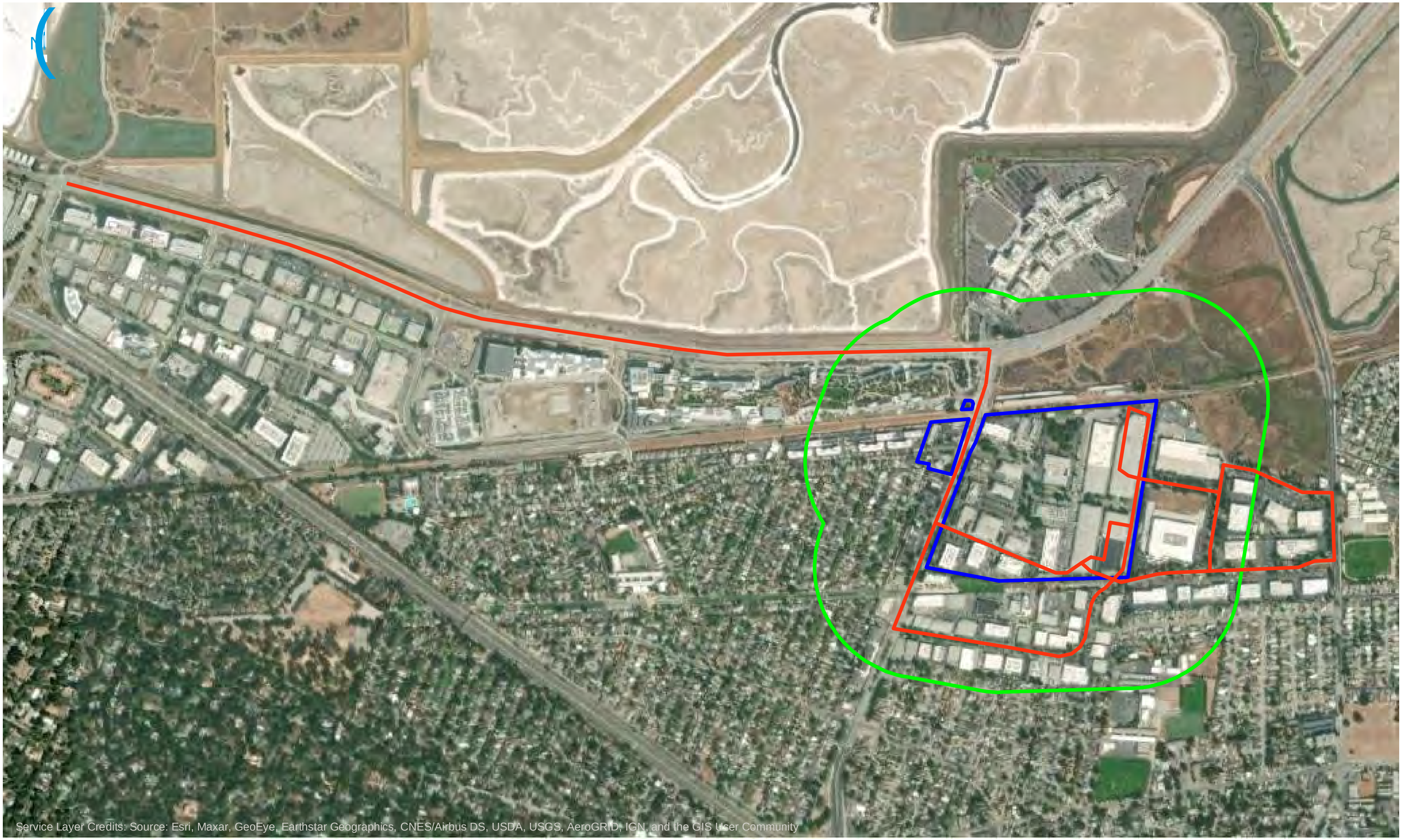
0 500 1,000 Meters

# MODELED OFFSITE TRAFFIC ROUTES

**Willow Village**
Menlo Park, California

**FIGURE 07**

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY




Shuttles
Project Boundary
1000 ft Buffer

0 500 1,000 Meters

# MODELED SHUTTLE ROUTES

**Willow Village**
Menlo Park, California

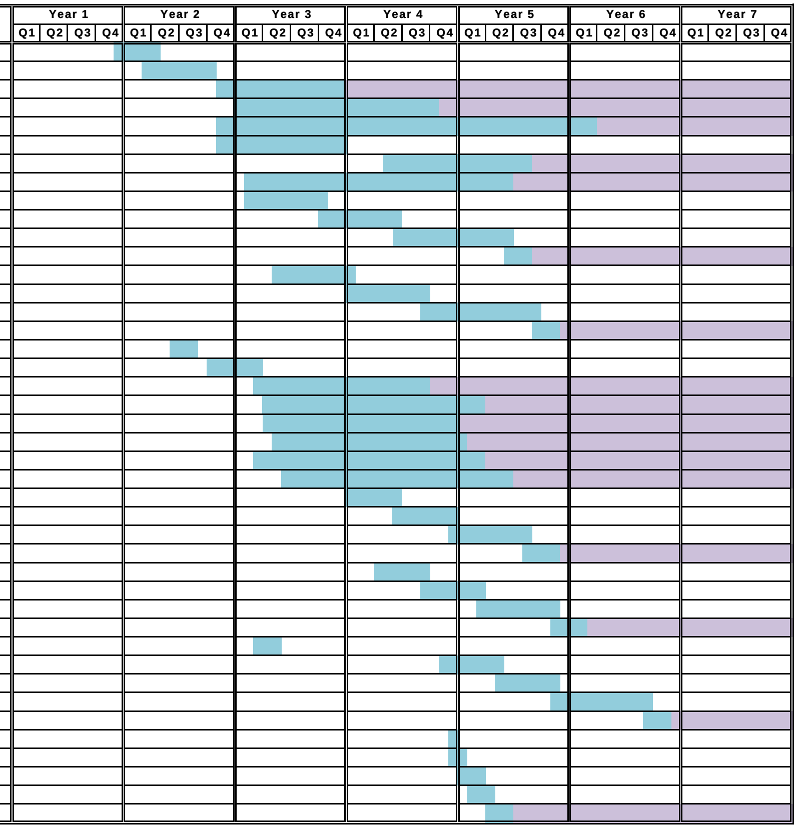
## FIGURE 08

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

## Figure 9

**Exposure Scenarios**
**Willow Village**
**Menlo Park, CA**

| Area | Subphase | Construction Schedule: Start Month | Construction Schedule: End Month | Number of Days | Operational Year |
|---|---|---|---|---|---|
| Area 1 | Demolition | Month 1 | Month 5 | 97 | -- |
| | Grading and Utilities | Month 4 | Month 11 | 143 | -- |
| Area 1 Campus District | North Garage | Month 12 | Month 25 | 300 | Year 3 |
| | Office Building 4 | Month 14 | Month 35 | 449 | Year 4 |
| | Meeting, Collaboration, Park | Month 12 | Month 52 | 871 | Year 6 |
| | Hotel Excavation | Month 12 | Month 25 | 299 | -- |
| | Hotel Construction | Month 30 | Month 45 | 329 | Year 5 |
| | Town Square | Month 15 | Month 43 | 610 | Year 5 |
| Area 1 Town Square and Residential/Shopping District | Parcel 2 Foundations | Month 15 | Month 23 | 161 | -- |
| | Parcel 2 Core and Shell | Month 23 | Month 31 | 180 | -- |
| | Parcel 2 Tenant Improvements | Month 31 | Month 43 | 261 | -- |
| | Parcel 2 Landscaping | Month 43 | Month 45 | 59 | Year 5 |
| | Parcel 3 Foundations | Month 18 | Month 26 | 161 | -- |
| | Parcel 3 Core and Shell | Month 26 | Month 34 | 180 | -- |
| | Parcel 3 Tenant Improvements | Month 34 | Month 46 | 260 | -- |
| | Parcel 3 Landscaping | Month 46 | Month 48 | 58 | Year 5 |
| Area 2 | Demolition | Month 7 | Month 9 | 48 | -- |
| | Grading and Utilities | Month 11 | Month 16 | 130 | -- |
| Area 2 Campus District | South Garage | Month 16 | Month 34 | 390 | Year 4 |
| | Office Building 3 | Month 17 | Month 40 | 501 | Year 5 |
| | Office Building 1 | Month 17 | Month 37 | 428 | Year 4 |
| | Office Building 2 | Month 18 | Month 38 | 426 | Year 5 |
| | Office Building 5 | Month 16 | Month 40 | 521 | Year 5 |
| | Office Building 6 | Month 19 | Month 43 | 520 | Year 5 |
| Area 2 Town Square and Residential/Shopping District | Parcel 7 Foundations | Month 26 | Month 31 | 116 | -- |
| | Parcel 7 Core and Shell | Month 31 | Month 37 | 129 | -- |
| | Parcel 7 Tenant Improvements | Month 37 | Month 45 | 188 | -- |
| | Parcel 7 Landscaping | Month 45 | Month 48 | 58 | Year 5 |
| | Parcel 6 Foundations | Month 29 | Month 34 | 116 | -- |
| | Parcel 6 Core and Shell | Month 34 | Month 40 | 129 | -- |
| | Parcel 6 Tenant Improvements | Month 40 | Month 48 | 187 | -- |
| | Parcel 6 Landscaping | Month 48 | Month 51 | 59 | Year 6 |
| Area 3 | Grading and Utilities | Month 16 | Month 18 | 22 | -- |
| | Foundations | Month 36 | Month 42 | 123 | -- |
| | Core & Shell | Month 42 | Month 48 | 139 | -- |
| | Tenant Improvements | Month 48 | Month 58 | 199 | -- |
| | Landscaping | Month 58 | Month 60 | 59 | Year 6 |
| Hamilton Avenue Parcels North and South | Demolition | Month 37 | Month 37 | 22 | -- |
| | Grading and Utilities | Month 37 | Month 38 | 23 | -- |
| | Foundations | Month 38 | Month 40 | 22 | -- |
| | Core & Shell | Month 40 | Month 41 | 43 | -- |
| | Tenant Improvements | Month 41 | Month 43 | 33 | Year 5 |

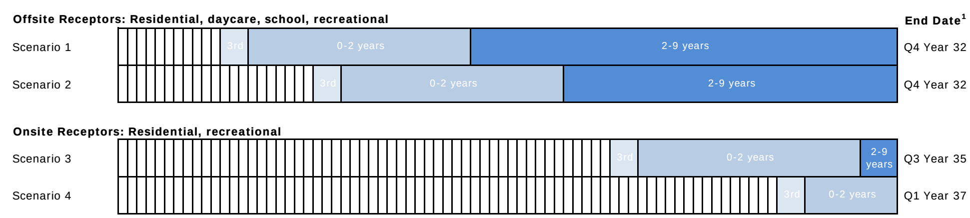



**Key:**

- Active Construction Period
- Full Operation

**Age bins:**

- 3rd trimester
- 0-2 years
- 2-9 years
- 2-16 years
- 16-30 years




**Notes:**

1. Additional details on exposure scenarios are presented in AQTR Tables 55 through 58.

# APPENDIX A
# CONSISTENCY WITH APPLICABLE AIR PLANS

# CEQA ANALYSIS
# CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN

## WILLOW VILLAGE

## MENLO PARK, CALIFORNIA

San Mateo County is currently designated a nonattainment area for the federal ozone standard, a maintenance area for the federal CO standard, and nonattainment for state ozone, $PM_{10}$, and $PM_{2.5}$ standards. The most recently adopted regional air quality plan is the Bay Area Air Quality Management District (BAAQMD) 2017 Clean Air Plan, which includes all feasible measures to reduce emissions of $NO_X$ and ROG, which are ozone precursors, reduce transport of ozone and its precursors, and reduce emissions of fine particulate matter and toxic air contaminants. The Plan focuses on protecting public health and the climate. The Plan is established pursuant to air quality panning requirements defined in the California Health and Safety Code.

In determining consistency with the Clean Air Plan, this analysis considers whether the Project would (1) support the primary goals of the Clean Air Plan, (2) include applicable control measures from the Clean Air Plan, and (3) avoid disrupting or hindering implementation of control measures identified in the Clean Air Plan.

The 2017 Clean Air Plan defines a control strategy based on reducing emissions from all key sources, reducing "super-GHGs",[1] decreasing demand for fossil fuels, and decarbonizing the energy system. The control strategy contains 85 control measures that are specific actions to reduce air pollutants and GHGs in the San Francisco Bay Area Air Basin. These control strategies are grouped into the following categories:

- Stationary source measures;
- Transportation control measures;
- Energy control measures;
- Building control measures;
- Agricultural control measures;
- Natural and working lands control measures;
- Waste management control measures;
- Water control measures; and
- Super-GHG control measures

Many of the 85 control measures are beyond the scope and control of the Project. Some address stationary sources and will be implemented by BAAQMD using its permit authority and therefore are not suited to implementation through local planning efforts or project approval actions. The Clean Air Plan measures potentially applicable to the Project are listed below along with how the Project would be consistent with the measures. The measures are largely directed at BAAQMD action. The summary below describes how Project features would support the BAAQMD's implementation of the measures.

[1] "Super-GHGs" are defined in the Clean Air Plan as methane, black carbon, and fluorinated gases.

| **Table 1. Consistency of Project with CAP Community Strategies** | | |
|---|---|---|
| **Measure** | **Measure Description[2]** | **Project Consistency** |
| TR1 - Clean Air Teleworking Initiative | Develop teleworking best practices for employers and develop additional strategies to promote telecommuting. Promote teleworking on Spare the Air Days. | **Supporting.** Many of the Project's employees have the ability to telecommute and the Project promotes commuting by non-single-occupancy vehicles through its TDM (see below). |
| TR2 - Trip Reduction Programs | Implement the regional Commuter Benefits Program (Rule 14-1) that requires employers with 50 or more Bay Area employees to provide commuter benefits. Encourage trip reduction policies and programs in local plans, e.g., general and specific plans while providing grants to support trip reduction efforts. Encourage local governments to require mitigation of vehicle travel as part of new development approval, to adopt transit benefits ordinances in order to reduce transit costs to employees, and to develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. Fund various employer-based trip reduction programs. | **Supporting.** The Project would implement Transportation Demand Management (TDM) programs for the Campus District, Town Square District, and Residential/Shopping District. The Project's TDM programs may include, but is not limited to, the following measures:<br>• Improve biking/walking network<br>• Provide bicycle amenities<br>• Improve public transit service<br>• Car share program<br>• Tram service<br>• Commuter shuttles<br>• Parking management<br>• Emergency ride-home program<br>• Carpool and vanpool programs<br>• Commute assistance center<br>• On-site housing<br>The Project would include a commuter shuttle service for Campus District workers and a Campus District trip cap. |
| TR5 - Transit Efficiency and Use | Improve transit efficiency and make transit more convenient for riders through continued operation of 511 Transit, full implementation of Clipper® fare payment system and the Transit Hub Signage Program. | **Supporting**. While the explicit requirements of this measure are outside the control of the Project, the Project would be making improvements to intersections, bike lanes and pedestrian connections that will upgrade infrastructure that will benefit roadways, pedestrian and bicycle circulation systems, which will benefit transit efficiency. |
| TR8 - Ridesharing | Promote carpooling and vanpooling by providing funding to continue regional and local ridesharing programs, and support the expansion of carsharing programs. Provide incentive funding for pilot | **Supporting.** The proposed Project would implement trip reduction programs as part of the TDM programs that may include, but is not limited to, carpool and vanpool programs, tram service, and commuter shuttles. |

[2] Bay Area Air Quality Management District, 2017. Spare the Air Cool the Climate: Final 2017 Clean Air Plan. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf

| | | |
|---|---|---|
| | projects to evaluate the feasibility and cost-effectiveness of innovative ridesharing and other last-mile solution trip reduction strategies. Encourage employers to promote ridesharing and carsharing to their employees. | |
| TR9 - Bicycle and Pedestrian Access and Facilities | Encourage planning for bicycle and pedestrian facilities in local plans, e.g., general and specific plans, fund bike lanes, routes, paths and bicycle parking facilities. | **Supporting.** The Project promotes walking, biking, and other sustainable transportation through approximately two miles of dedicated pedestrian walks, one mile of bicycle paths and lanes, and a two-acre elevated park that provides safe and convenient access to Willow Village while relieving traffic circulation on the road below. The elevated park would connect the Project Site to the adjacent Belle Haven neighborhood via an overpass at Willow Road with bicycle and pedestrian access from Hamilton Avenue Parcel North. The Project would create a bicycle- and pedestrian-friendly environment that enhances connectivity between the Project Site and surrounding areas. The Project would also include the addition of the Willow Tunnel, which would provide pedestrian and bicycle access to the Bay Trail via a separate path, reducing the use of surface streets. The Project provides a connection from existing pedestrian and bicycle paths to the Bay Trail.<br>Safety lighting for vehicles and pedestrians would be provided. Passenger loading and building servicing would be designed to minimize conflicts between pedestrians and vehicles. |
| TR10 - Land Use Strategies | Support implementation of Plan Bay Area, maintain and disseminate information on current climate action plans and other local best practices, and collaborate with regional partners to identify innovative funding mechanisms to help local governments address air quality and climate change in their general plans. | **Supporting.** The Project consists of a dense, walkable, mixed-used development that balances jobs and housing while considering safety, traffic, retail amenities, and other community needs. The Project would be designed to meet LEED Gold standards or equivalent, and implements features that reduce air pollutant and greenhouse gas emissions, such as extensive TDM program, electrification of buildings, besides culinary, and purchase of 100% carbon-free electricity. More discussion on the Project's consistency with Plan Bay Area can be found in Appendix B. |
| TR13 - Parking Policies | Encourage parking policies and programs in local plans, e.g., reduce minimum parking requirements; limit the supply of off-street parking in transit-oriented areas; unbundle the price of parking spaces; support implementation of demand-based pricing (such as "SF Park") in high-traffic areas. | **Supporting.** The Project would limit parking below permitted City code maximum and would include shared parking. The Project also proposes a reduced parking ratio for senior housing. The price of parking spaces would be unbundled for market-rate housing. |
| TR14 - Cars and Light Trucks | Commit regional clean air funds toward qualifying vehicle purchases and infrastructure development. Partner with private, local, state and federal | **Supporting.** The Project would offer an advanced EV charging program to Campus District employees. Electric vehicle (EV) charging in the Campus District is free and valets move cars into chargers to maximize charging time. |

| | | |
|---|---|---|
| | programs to promote the purchase and lease of battery-electric and plug-in hybrid electric vehicles. | The proposed Project would also install EV charging stations in the Residential/Shopping District and Town Square District. |
| TR22 - Construction, Freight and Farming Equipment | Provide incentives for the early deployment of electric, Tier 3 and 4 off-road engines used in construction, freight and farming equipment. Support field demonstrations of advanced technology for off-road engines and hybrid drive trains. | **Supporting**. The majority of the construction equipment used during the construction of the Project would have Tier 4 engines. |
| EN1 - Decarbonize Electricity Production | Engage with PG&E, municipal electric utilities and CCEs to maximize the amount of renewable energy contributing to the production of electricity within the Bay Area as well as electricity imported into the region. Work with local governments to implement local renewable energy programs. Engage with stakeholders including dairy farms, forest managers, water treatment facilities, food processors, public works agencies and waste management to increase use of biomass in electricity production. | **Supporting.** The Project would install solar photovoltaic that would be designed to produce approximately 3,900,000 kWh per year of renewable electricity. The Project would purchase 100% carbon free electricity for the Campus District and any non-carbon free power used in the Residential/Shopping and Town Square Districts would be offset by the solar produced onsite. |
| BL1 - Green Buildings | Collaborate with partners such as KyotoUSA to identify energy-related improvements and opportunities for onsite renewable energy systems in school districts; investigate funding strategies to implement upgrades. Identify barriers to effective local implementation of the CALGreen (Title 24) statewide building energy code; develop solutions to improve implementation/enforcement. Work with ABAG's BayREN program to make additional funding available for energy-related projects in the buildings sector. Engage with additional partners to target reducing emissions from specific types of buildings. | **Supporting**. This action is directed at the Air District. However, the Project incorporates the goals associated with this measure. The Project would comply with building energy code and would be designed to meet LEED Gold standards or equivalent. |
| BL2 - Decarbonize Buildings | Explore potential Air District rulemaking options regarding the sale of fossil fuel-based space and water heating systems for both residential and commercial use. Explore incentives for property owners to replace their furnace, water heater or natural-gas powered appliances with zero-carbon alternatives. Update Air District guidance documents to recommend that commercial and multi-family | **Supporting**. This action is directed at the Air District. However, the Project incorporates the goals associated with this measure. The Project would be entirely electrically powered with the exception of commercial culinary uses, which supports the decarbonization of buildings. |

| | | |
|---|---|---|
| | developments install ground source heat pumps and solar hot water heaters. | |
| BL4 - Urban Heat Island Mitigation | Develop and urge adoption of a model ordinance for "cool parking" that promotes the use of cool surface treatments for new parking facilities, as well existing surface lots undergoing resurfacing. Develop and promote adoption of model building code requirements for new construction or re-roofing/roofing upgrades for commercial and residential multi-family housing. Collaborate with expert partners to perform outreach to cities and counties to make them aware of cool roofing and cool paving techniques, and of new tools available. | **Supporting**. The Project would include cool roofs and may include cool parking. The Project would demolish existing parking lots and would provide parks and vegetation lined roadways. Surface parking would largely be replaced by parking structures with solar ready rooftops. |
| NW2 - Urban Tree Planting | Develop or identify an existing model municipal tree planting ordinance and encourage local governments to adopt such an ordinance. Include tree planting recommendations the Air District's technical guidance, best practices for local plans and CEQA review. | **Supporting.** The Project would install approximately 700 new trees in the streets, parks and planned open spaces. Trees would be on average a 36" box or greater at the time of installation. |
| WA3 - Green Waste Diversion | Develop model policies to facilitate local adoption of ordinances and programs to reduce the amount of green waste going to landfills. | **Supporting**. The Project would implement a waste reduction strategy in the Campus District that has shown to divert over 80 percent of waste in existing campuses. |
| WA4 - Recycle and Waste Reduction | Develop or identify and promote model ordinances on community-wide zero waste goals and recycling of construction and demolition materials in commercial and public construction projects. | |
| WR2 - Support Water Conservation | Develop a list of best practices that reduce water consumption and increase on-site water recycling in new and existing buildings; incorporate into local planning guidance. | **Supporting**. The Project would be designed to meet LEED Gold standards or equivalent and would implement features that reduce water consumption. The Project would also utilize recycled water.<br>The source of recycled water for Willow Village is West Bay Sanitary District's Bayfront Recycled Water Plant that is anticipated to generate recycled water to accommodate existing and future development within Menlo Park's Bayfront District. In the event that West Bay Sanitary District is unable to advance the Bayfront Recycled Water Plant, as an alternative the project proposes on-site recycled water facilities consisting of four plants; one serving the office district, one serving the town square district and two |

| | | |
|---|---|---|
| | | serving the residential/shopping district. Combined the four on-site plants would meet the peak non-potable water demands for the project. |

The Project would meet community needs through planned local retail spaces, restaurants, a grocery store and pharmacy, as well as publicly accessible parks and planned open spaces. Construction phasing prioritizes amenities that serve the community, such as the grocery store and the park, which will serve to reduce VMT, particularly since the existing community is underserved with respect to grocery stores and pharmacies.

In addition, as discussed in the Transportation Impact Study, the TDM programs would meet City of Menlo Park Municipal Code requirements. The Project would also add new retail and a grocery store and pharmacy to an area that lacks these resources. The TDM programs would reduce traffic in the area, but also reduce emissions of criteria air pollutants and toxic air contaminants locally.

The Project plan includes these numerous design and operational measures to promote sustainability and environmental stewardship, which would act to reduce Project-related area and mobile source emissions. By implementing these measures while also considering community needs, the Project supports the goals of the Clean Air Plan and is consistent with applicable control measures from the plan. As discussed above, the Project includes many applicable control measures in its plan, as summarized in Table 1 above.

# APPENDIX B
# CONSISTENCY WITH GREENHOUSE GAS PLANS

# CEQA ANALYSIS
# CONFLICT WITH APPLICABLE PLANS, POLICIES OR REGULATIONS ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES
## WILLOW VILLAGE
## MENLO PARK, CALIFORNIA

There are local, regional, and state policies, plans and regulations aimed at reducing emissions of greenhouse gases. The Project's consistency with the City of Menlo Park Climate Action Plan (CAP), along with SB 743, Plan Bay Area 2040, Plan Bay Area 2050, Advanced Clean Cars Initiative and the State's Zero-Emission Vehicles Mandate, and CARB's 2017 Scoping Plan Update is reviewed. Final Plan Bay Area 2050 was approved on October 21, 2021, but consistency with both Plan Bay Area 2040 and Plan Bay Area 2050 are presented to be conservative.

The City of Menlo Park CAP has been adopted for the purposes of reducing GHG emissions locally. Although not legislatively adopted, Executive Order S-03-05 establishes a long-term statewide goal to reduce GHG emissions to 80 percent below 1990 levels by 2050. SB 743 was passed to reduce greenhouse gas emissions and promote multi-modal transportation networks, providing clean, efficient access to destinations and improving public heath through active transportation. Plan Bay Area has been adopted to establish targets and strategies intended to meet the region's needs for housing at all income levels, while reducing GHGs associated with private passenger and light duty truck traffic. The Advanced Clean Cars Initiative and the State's Zero-Emission Vehicles Mandate were established to set a target of reaching 1.5 million ZEVs (meaning battery electric vehicles and fuel cell electric vehicles) and plug-in hybrid electric vehicles on California's roadways by 2025. CARB's 2017 Scoping Plan outlines the main strategies for California to achieve the legislated GHG emissions target for 2030 and "substantially advance toward our 2050 climate goals." It identifies the reductions needed by each GHG emissions sector (e.g., industry, transportation, electricity generation).

**Consistency with City of Menlo Park Climate Action Plan**

As discussed above, the City of Menlo Park adopted a CAP in 2009 to reduce municipal government and community GHG emissions. In July 2020, the City released a report[1] that updated the CAP with emissions for the years 2005 and 2017 and forecasted emissions to 2030. The 2030 Climate Action Plan provided a list of CAP projects intended to achieve a goal of "zero emissions by 2030". The report was amended in April 2021 to incorporate the scope of work for 2021 implementation. As such, the Project is evaluated for consistency with the 2030 Climate Action Plan Amended 2021, as shown in Table 1.

As shown in Table 3.5-6, the Project would not conflict with any of the applicable measures in the City's CAP. Further, because the Project would not result in GHG emissions that exceed the applicable thresholds, the Project would not impede achievement of the City's CAP GHG emissions reduction target. For the reasons described below, the Project does not conflict with the implementation of the CAP.

---

1 City of Menlo Park. 2020. 2030 Climate Action Plan; A 2030 Plan to Eliminate Carbon Emissions & Protect Our Community from Climate Change. June. Available at: https://www.menlopark.org/ArchiveCenter/ViewFile/Item/11486

| Table 1. Consistency of Project with CAP Community Strategies | | |
|---|---|---|
| **Category** | **Strategy** | **Project Consistency** |
| Energy | Explore policy/program options to convert 95% of existing buildings to all-electric by 2030 | **Not applicable.** The Project is new construction and would not convert any existing buildings. The proposed Project would be entirely electrically powered with the exception of commercial culinary uses. The residential buildings would be entirely electrically powered. |
| | Eliminate the use of fossil fuels from municipal operations | **Not applicable.** The proposed Project is not a municipal project. |
| Transportation | Support setting citywide goal for increasing EVs and decreasing gasoline sales | **Consistent.** The proposed Project would offer an advanced EV charging program to Campus employees. EV charging in the Campus District is free and valets move cars into chargers to maximize charging time. The proposed Project would also install EV charging stations in the Residential/Shopping District. |
| | Expand access to EV charging for multifamily and commercial properties | **Consistent.** The proposed Project would install EV charging capabilities consistent with the City of Menlo Park Code, including residential and commercial areas on the main Project Site, expanding access to EV chargers. |
| | Reduce vehicle miles traveled (VMT) by 25% or an amount recommended by the Complete Streets Commission | **Consistent.** The proposed Project would implement TDM programs for the Campus District, Town Square District, and Residential/Shopping District. The Project's TDM programs may include, but are not limited to, the following measures:<br>• Improve biking/walking network<br>• Provide bicycle amenities<br>• Improve public transit service<br>• Car share program<br>• Tram service<br>• Commuter shuttles<br>• Parking management<br>• Emergency ride-home program<br>• Carpool and vanpool programs<br>• Commute assistance center<br>• On-site housing<br>The TDM programs would meet City of Menlo Park Municipal Code TDM requirements. The Project would also add new retail and a grocery store to an area that lacks these resources. |
| Water | Develop a climate adaptation plan to protect | **Not applicable.** This action is directed toward the City. However, the proposed Project is incorporating resiliency with respect to sea level rise and flooding into its civil plan. As part of the |

| | | |
|---|---|---|
| | the community from sea level rise and flooding | design effort, building finished floor elevations will be proposed to meet City of Menlo Park code and to accommodate a future rise in sea levels:<br>• Raise the building sites through grading activities to a minimum grade elevation of 13 ft NAVD, a minimum of 2 feet above the Base Flood Elevation of 11 ft NAVD.<br>• Proposed buildings will have a minimum finished floor elevation of at least 14 ft NAVD88 and are set high enough such that it is likely site adaptations would not be necessary for even the highest estimates of sea level rise for the useful life of the project.<br>• The entire project storm drain system is designed to drain to the City storm drain main in willow, which in turn drains to the Ravenswood Pump Station (operated by CalTrans) located northeast of the Project site along Bayfront Expressway. The storm drain system is therefore not hydraulically connected to the Bay and will not be impacted by sea level rise. |

**Consistency with SB 743**

SB 743 eliminated vehicular congestion, traditionally expressed as Level of Service (LOS), as the operative metric for identifying transportation impacts, and replaced it with Vehicle Miles Traveled (VMT). The Project would not exceed the City's thresholds of significance for VMT, which are consistent with OPR's 2018 Technical Advisory on Evaluating Transportation Impacts in CEQA, which OPR published to address the changes from SB 743.[2] Therefore, the Project does not conflict with the implementation of SB 743.

**Consistency with Plan Bay Area 2040 and Plan Bay Area 2050**

Pursuant to California Senate Bill 375, the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) adopted *Plan Bay Area 2050* to establish the region's long-term strategic plan focused on the interrelated elements of housing, the economy, transportation, and the environment. *Plan Bay Area 2050*'s core strategy is encouraging growth in existing communities along the existing transportation network, focusing new development in Priority Development Areas (PDAs) and Transit Priority Areas (TPAs) within urbanized centers where there is more public transit and other mobility options available to reduce driving by cars and light trucks. In addition to significant transit and roadway performance investments to encourage focused growth, *Plan Bay Area 2050* directs funding to neighborhood active transportation and complete streets projects, climate initiatives, lifeline transportation and access initiatives, pedestrian and bicycle safety programs, and PDA planning. The *Plan Bay Area 2050* report was recently approved in October 2021, before which *Plan Bay Area 2040* was the most recent final version. The Project is conservatively evaluated for consistency with *Plan Bay Area 2040* and *Plan Bay Area 2050*, as shown in Tables 2 and 3 below. For the reasons described below, the Project does not conflict with the implementation of *Plan Bay Area 2040* or *Plan Bay Area 2050*.

---

2 Governor's Office of Planning and Research, State of California. 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. December. Available at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

| Table 2. Consistency of Project with Plan Bay Area 2040 | | |
|---|---|---|
| **Category** | **Strategy** | **Project Consistency** |
| Climate Protection | Reduce per-capita $CO_2$ emissions | **Consistent**. The proposed Project would be entirely electrically powered with the exception of commercial culinary uses. The residential buildings would be entirely electrically powered. The proposed Project would offer an advanced EV charging program to Facebook employees. EV charging in the Campus District is free and valets move cars into chargers to maximize charging time. The proposed Project would also install EV charging stations in the Residential/Shopping District. The proposed Project would implement a TDM program for the entire project. The Project's TDM program may include, but is not limited to, the following measures:<br>• Improve biking/walking network<br>• Provide bicycle amenities<br>• Improve public transit service<br>• Car share program<br>• Tram service<br>• Commuter shuttles<br>• Parking management<br>• Emergency ride-home program<br>• Carpool and vanpool programs<br>• Commute assistance center<br>• On-site housing |
| Adequate Housing | House the region's population | **Consistent**. The proposed Project would include up to 1,730 residential dwelling units. |
| Healthy and Safe Communities | Reduce adverse health impacts | **Consistent**. The proposed Project would not result in the exposure of future residents or nearby off-site sensitive receptors to adverse health effects exceeding BAAQMD thresholds for excess cancer risk, chronic HI, or $PM_{2.5}$ concentration. Furthermore, the Project would use Tier 4 construction equipment for the majority of Project construction activities, as specified in the mitigation measure, which reduces the health impact on the community. The Project's TDM and EV programs also reduce the health impact from mobile sources. |
| Open Space and Agricultural Preservation | Direct development within urban footprint | **Consistent**. The proposed Project would include a publicly accessible park, a dog park, an elevated park, and a town square to provide green space to the residents, employees, visitors, and surrounding neighborhood. The proposed Project is redevelopment of an underutilized site in the urban footprint. |

| | | |
|---|---|---|
| Equitable Access | Decrease share of lower-income households' budgets spent on housing and transportation | **Consistent**. The proposed Project would include 308 units of affordable housing. Furthermore, the Project would bring amenities (e.g., local serving retail like a grocery store and pharmacy) to an existing neighborhood that does not have amenities, which would reduce transportation needs. |
| | Increase share of affordable housing | **Consistent**. The proposed Project would include 308 units of affordable housing. |
| | Do not increase share of households at risk of displacement | **Consistent**. The proposed Project would include the demolition of existing office, industrial, and warehouse buildings and construction of up to 1,730 new residential dwelling units. The Project would not result in displacement of existing housing. |
| Economic Vitality | Increase share of jobs accessible in congested conditions | **Consistent**. The proposed Project would collocate jobs and housing in a congested area. |
| | Increase jobs in middle-wage industries | **Consistent**. The proposed Project would add up to 200,000 square feet of retail in an area currently without amenities, and a hotel, increasing middle-wage jobs. |
| | Reduce per-capita delay on freight network | **Not applicable.** This action is not directly applicable to the proposed Project. |
| Transportation System Effectiveness | Increase non-auto mode share | **Consistent**. The proposed Project would develop housing units, retail and office space near existing residential, office, commercial, and light manufacturing uses, reducing the demand for travel by single occupancy vehicles. The proposed Project would also implement a TDM program that may include, but is not limited to, the following measures:<br>• Improve biking/walking network<br>• Provide bicycle amenities<br>• Improve public transit service<br>• Car share program<br>• Tram service<br>• Commuter shuttles<br>• Parking management<br>• Emergency ride-home program<br>• Carpool and vanpool programs<br>• Commute assistance center<br>• On-site housing |
| | Reduce vehicle operating and maintenance costs due to pavement conditions | **Consistent.** The roads would be maintained consistent with municipal requirements. |

| | | |
|---|---|---|
| | Reduce per-rider transit delay due to aged infrastructure | **Not applicable.** This action is not directly applicable to the proposed Project. The Project will be making improvements to intersections, bike lanes and pedestrian connections that will upgrade infrastructure that will benefit transit. |

**Table 3. Consistency of Project with Plan Bay Area 2050**

| Category | | Strategy | Project Consistency |
|---|---|---|---|
| Housing Strategies | Protect and Preserve Affordable Housing | Further strengthen renter protections beyond state law | **Not applicable**. This action is not directly applicable to the proposed Project as this requires Municipal action. |
| | | Preserve existing affordable housing | **Not applicable**. This action is not directly applicable to the proposed Project. The proposed Project would include the demolition of existing office, industrial, and warehouse buildings and construction of up to 1,730 new residential dwelling units. The Project would not result in displacement of existing affordable housing and would add additional affordable housing to the area. |
| | Spur Housing Production for Residents of All Income Levels | Allow a greater mix of housing densities and types in Growth Geographies | **Not applicable.** This action is not directly applicable to the proposed Project as it is not located in a Growth Geography; however, the proposed Project would develop housing units, retail, and office space near existing residential, office, commercial, and light manufacturing uses. |
| | | Build adequate affordable housing to ensure homes for all | **Consistent**. The proposed Project would include 308 units of affordable housing. |
| | | Integrate affordable housing into all major housing projects | **Consistent**. The proposed Project would include 308 units of affordable housing. |
| | | Transform aging malls and office parks into neighborhoods | **Consistent**. The proposed Project would demolish aging office, industrial, and warehouse buildings and would include construction of up to 1,730 new residential dwelling units as part of a mix use neighborhood also including retail, hotel, and office uses. |

| | | | |
|---|---|---|---|
| | Create Inclusive Communities | Provide targeted mortgage, rental and small business assistance to Equity Priority Communities | **Not applicable**. This action is not directly applicable to the proposed Project as this requires Municipal action. |
| | | Accelerate reuse of public and community-owned land for mixed-income housing | **Not applicable**. This action is not directly applicable to the proposed Project as it does not utilize any public or community-owned land. |
| **Economic Strategies** | Improve Economic Mobility | Implement a statewide universal basic income | **Not applicable**. This action is not directly applicable to the proposed Project as it requires statewide action. |
| | | Expand job training and incubator programs | **Not applicable**. This action is not directly applicable to the proposed Project as this requires Municipal action. |
| | | Invest in high-speed internet in underserved low-income communities | **Not applicable**. This action is not directly applicable to the proposed Project as this requires Municipal action. |
| | Shift the Location of Jobs | Allow greater commercial densities in Growth Geographies | **Not applicable**. This action is not directly applicable to the proposed Project; however, the proposed Project would add up to 200,000 square feet of retail in an area currently without amenities, and a hotel. |
| | | Provide incentives to employers to shift jobs to housing-rich areas well served by transit | **Not applicable**. This action is not directly applicable to the proposed Project; however, the proposed Project would co-locate jobs and housing. |
| | | Retain and invest in key industrial lands | **Not applicable**. This action is not directly applicable to the proposed Project which is not located on key industrial lands. |
| **Transportation Strategies** | Maintain and Optimize the Existing System | Restore, operate and maintain the existing system | **Not applicable**. This action is not directly applicable to the proposed Project. However, the Project would be making improvements to intersections, bike lanes and pedestrian connections that will upgrade infrastructure that will benefit roadways, pedestrian and bicycle circulation systems. |
| | | Support community-led transportation enhancements in Equity Priority Communities. | **Not applicable.** This action is not directly applicable to the proposed Project. However, the Project would be making improvements to intersections, bike lanes and pedestrian connections that will enhance transportation in the community. |

| | | | |
|---|---|---|---|
| | | Enable a seamless mobility experience | **Not applicable**. This action is not directly applicable to the proposed Project as it requires coordination among the regions existing transit agencies. |
| | | Reform regional transit fare policy | **Not applicable**. This action is not directly applicable to the proposed Project as it requires coordination among the regions existing transit agencies. |
| | | Implement per-mile tolling on congested freeways with transit alternatives | **Not applicable**. This action is not directly applicable to the proposed Project as it requires regional/Caltrans action. |
| | | Improve interchanges and address highway bottlenecks | **Not applicable**. This action is not directly applicable to the proposed Project. The Project would be implementing TDM programs and making improvements to intersections, bike lanes and pedestrian connections that will improve transportation and decrease single-occupancy commuter vehicles. |
| | | Advance other regional programs and local priorities | **Not applicable**. This action is not directly applicable to the proposed Project. The Project will be making improvements to local intersections, bike lanes and pedestrian connections, which help fulfill local transportation priorities. |
| | Create Healthy and Safe Streets | Build a Complete Streets network | **Consistent**. The proposed Project would enhance streets to promote walking, biking, and other micro-mobility by improving biking and walking networks and providing bicycle amenities. |
| | | Advance regional Vision Zero policy through street design and reduced speeds | **Consistent.** The Project would comply with City of Menlo Park requirements in support of Vision Zero. |
| | Build a Next-Generation Transit Network | Enhance local transit frequency, capacity and reliability | **Not applicable.** This action is not directly applicable to the proposed Project; however, the proposed Project would include a private shuttle and tram system for the office uses. |
| | | Expand and modernize the regional rail network | **Not applicable.** This action is not directly applicable to the proposed Project as this requires regional and state level action. |

| | | | |
|---|---|---|---|
| | | Build an integrated regional express lanes and express bus network | **Not applicable.** This action is not directly applicable to the proposed Project as this requires regional and Caltrans action. |
| **Environmental Strategies** | Reduce Risks from Hazards | Adapt to sea level rise | **Not applicable.** This action is directed toward the City. However, the proposed Project is incorporating resiliency with respect to sea level rise and flooding into its civil plan. As part of the design effort, building finished floor elevations will be proposed to meet City of Menlo Park code and to accommodate a future rise in sea levels:<br>• Raise the building sites through grading activities to a minimum grade elevation of 13 ft NAVD, a minimum of 2 feet above the Base Flood Elevation of 11 ft NAVD.<br>• Proposed buildings will have a minimum finished floor elevation of at least 14 ft NAVD88 and are set high enough such that it is likely site adaptations would not be necessary for even the highest estimates of sea level rise for the useful life of the buildings.<br>•<br>• The entire project storm drain system is designed to drain to the City storm drain main in willow, which in turn drains to the Ravenswood Pump Station (operated by CalTrans) located northeast of the Project site along Bayfront Expressway. The storm drain system is not hydraulically connected to the Bay and will not be impacted by sea level rise. |
| | | Provide means-based financial support to retrofit existing residential buildings | **Not applicable.** This action is not directly applicable to the proposed Project as it does not include retrofit of any existing buildings. |
| | | Fund energy upgrades to enable carbon neutrality in all existing commercial and public buildings | **Not applicable.** The Project is new construction and would not convert any existing buildings; however, the proposed Project would be entirely electrically powered with the exception of commercial culinary uses, with a commitment to purchase 100% carbon free power, where |

| | | | |
|---|---|---|---|
| | | | possible. The Project also would replace old less efficient buildings with new efficient buildings. |
| | Expand Access to Parks and Open Space | Maintain urban growth boundaries | **Consistent**. The proposed Project would be constructed within an incorporated city on a site currently developed with urban uses. |
| | | Protect and manage high-value conservation lands | **Not applicable.** This action is not directly applicable to the proposed Project as the Project would re-develop aging buildings and is not located in high-value conservation lands. |
| | | Modernize and expand parks, trails and recreation facilities | **Consistent**. The proposed Project would include a publicly accessible park, a dog park, an elevated park, and a town square to provide green space to the residents, employees, visitors, and community members. Streetscapes would also be lined with vegetation. The Project would also provide a connection for the Bay Trail, which is across Bayfront Expressway. |
| | Reduce Climate Emissions | Expand commute trip reduction programs at major employers | **Consistent**. The proposed Project would implement trip reduction programs as part of the TDM programs that may include, but is not limited to, carpool and vanpool programs, tram service, and commuter shuttles. |
| | | Expand clean vehicle initiatives | **Consistent.** The proposed Project would install EV charging capabilities consistent with the City of Menlo Park Code, expanding access to EV chargers. |
| | | Expand transportation demand management initiatives | **Consistent**. The proposed Project would implement TDM programs that may include, but is not limited to, the following measures:<br>• Improve biking/walking network<br>• Provide bicycle amenities<br>• Improve public transit service<br>• Car share program<br>• Tram service<br>• Commuter shuttles<br>• Parking management<br>• Emergency ride-home program<br>• Carpool and vanpool programs<br>• Commute assistance center<br>• On-site housing |

### Consistency with Advanced Clean Cars Initiative and the State's Zero-Emission Vehicles Mandate

The Project is consistent with State goals for zero-emission vehicles (ZEVs) as expressed in the Advanced Clean Cars Initiative and the ZEV goal established by Executive Order B-16-12, which sets a target of reaching 1.5 million ZEVs (meaning battery electric vehicles and fuel cell electric vehicles) and plug-in hybrid electric vehicles on California's roadways by 2025. The Project is also consistent with State goals established by Executive Order N-79-20, which sets a target that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035.

The Project supports these ZEV goals by installing EV charging capabilities consistent with the City of Menlo Park Code. The Project would also have a comprehensive EV charging program in its Campus District, which would incentivize the further penetration of EVs into the fleet. EV chargers would also be installed with the Project in Mixed Use land uses, including residential areas, contributing to emissions reductions due to increased eVMT charged by the Project chargers. Therefore, the Project does not conflict with the implementation of this initiative.

### Consistency with 2017 Scoping Plan Update

As directed by SB 32, CARB's 2017 Scoping Plan Update describes how the State plans to achieve the 2030 GHG emission reduction goal for California of 40 percent below 1990 levels by 2030. The 2017 Scoping Plan Update's strategy for meeting the State's 2030 GHG target incorporates the full range of legislative actions and state-developed plans that have relevance to the year 2030, including the LCFS, SB 350, the 2016 Mobile Source Strategy, the Sustainable Freight Action Plan, SB 1383, and the State's Cap-and-Trade Program (AB 398). The 2017 Scoping Plan Update does not regulate local land use projects. The 2017 Scoping Plan Update regulates the emissions associated with such projects (i.e., electricity, fuel, etc.), but not the projects themselves.

The Project would be consistent with key State plans and regulatory requirements referenced in the 2017 Scoping Plan Update designed to reduce statewide emissions. According to the 2017 Scoping Plan Update, reductions needed to achieve the 2030 target are expected to be achieved by increasing the RPS to 50 percent of the State's electricity by 2030, greatly increasing the fuel economy of vehicles and the number of zero-emission or hybrid vehicles, reducing the rate of growth in VMT, supporting high speed rail and other alternative transportation options, and increasing the use of high efficiency appliances, water heaters, and HVAC systems. The Project would support and would not impede implementation of these potential reduction strategies identified by CARB, and it would benefit from statewide and utility-provider efforts towards increasing the portion of electricity provided from renewable resources.[3] The Project would also benefit from statewide efforts towards increasing the fuel economy standards of vehicles and reducing the carbon content of fuels. The Project would utilize energy efficiency appliances and equipment, as required by Title 24, and it would provide EV charging stations to support the future use of electric and hybrid-electric vehicles by employees and visitors traveling to and from the site. The Project would install EV charging capabilities consistent with the City of Menlo Park Code. The electricity for EV charging at the Project would be supplied with 100% renewable and/or carbon free energy. For these reasons, the Project would be consistent with the objectives of the 2017 Scoping Plan Update.

[3] As discussed previously, with the passage of SB 100, California's RPS has been increased over what is prescribed by the 2017 Scoping Plan Update, requiring retail sellers and local publicly-owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by the end of 2024, 52 percent by the end of 2027, and 60 percent by the end of 2030; and requires that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by the end of 2045.

The Project will be much more efficient on average than existing development in the City and far more efficient than what the Scoping Plan assumes for new development throughout the state.

In addition, the Project is consistent with the 2017 Scoping Plan Update's guidance on mitigation measures: "To the degree a project relies on GHG mitigation measures, CARB recommends that lead agencies prioritize on-site design features that reduce emissions, especially from VMT, and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits locally. For example, on-site design features to be considered at the planning stage include land use and community design options that reduce VMT, promote transit-oriented development, promote street design policies that prioritize transit, biking, and walking, and increase low carbon mobility choices, including improved access to viable and affordable public transportation, and active transportation opportunities." (CARB, 2017). The Project's design reduces VMT because it provides a mix of land uses and includes pedestrian features to promote walking. The Project would include multiuse pathways to promote bicycle and pedestrian connectivity both within and through the main Project Site. The Project would also provide retail land uses in a retail desert, placing a grocery and pharmacy in close proximity to the adjacent Belle Haven neighborhood. In addition, the Project's TDM Plan include features to reduce VMT.

For the reasons described above, the Project does not conflict with the implementation of the 2017 Scoping Plan Update.

# APPENDIX C
# DATA RECEIVED

**Instructions:** Please fill in all cells highlighted in yellow. Please confirm or update cells highlighted in orange

**Daily Trips Rates and VMT**

| Land Use | Fleet Type / Land Use | Daily Project Trip Rates (Weekday) | | | | Daily Project VMT (Weekday) (including reductions for passby and diverted trips) | | | | EV Percentage of Fleet[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | End of Phase 1a | End of Phase 1b | End of Phase 2 | TOTAL (trips/1,000 sf) | End of Phase 1a | End of Phase 1b | End of Phase 2 | TOTAL | |
| Faceook Office - Existing 2019 | Cars (per 1,000 s.f.) | | | | 9.19 | | | | 110,860 | -- |
| | Trucks (per 1,000 s.f.) | | | | 0.22 | | | | 2,640 | N/A |
| | Shuttles (per 1,000 s.f.) | | | | 0.66 | | | | 21,088 | 0% |
| | On-Demand (per 1,000 s.f.) | | | | 0.66 | | | | 7,919 | 38% |
| Facebook Office | Cars (per 1,000 s.f.) | 9.16 | 10.05 | 10.05 | | 53,996 | 178,766 | 178,766 | | -- |
| | Trucks (per 1,000 s.f.) | 0.23 | 0.23 | 0.23 | | 1,344 | 4,056 | 4,056 | | N/A |
| | Shuttles (per 1,000 s.f.) | 1.32 | 0.44 | 0.44 | | 21,088 | 21,088 | 21,088 | | 0% |
| | On-Demand (per 1,000 s.f.) | 0.68 | 0.68 | 0.68 | | 4,031 | 12,168 | 12,168 | | 38% |
| Mixed Use | Residential (per d.u.) | 4.35 | 4.35 | 4.35 | | 30,841 | 43,077 | 71,524 | | EMFAC2021 Default |
| | Retail[3] (per 1,000 s.f.) | 25.07 | 25.07 | 25.07 | | 25,195 | 33,587 | 33,594 | | EMFAC2021 Default |
| | Park (per acre) | 42.80 | 42.80 | 42.80 | | 860 | 860 | 1,147 | | EMFAC2021 Default |
| | Hotel (per room) | -- | 6.69 | 6.69 | | -- | 14,814 | 14,814 | | EMFAC2021 Default |

**Notes:**

1. Dashes indicate EV percentage will be calculated elsewhere based on charger usage data provided by Facebook.
   Trucks are marked N/A as none of the vehicle categories within the fleet are electric (as shown in the upper table).
   Assume EV percentage of On-Demand remains the same between existing conditions and full buildout. Existing EV Percentage previously provided by Facebook.
   The default EMFAC2021 electrification for San Mateo county will be assumed for vehicles operating in the Mixed Use district.
2. Estimate of trip rate reductions due to implementation of Transportation Demand Management measures.
3. All non-Facebook office space is classified as Retail.

Instructions

**Please provide background traffic volumes for any roadway with over 10,000 vehicles per day in the vicinity of the project.**

| Roadway | Segment Limit | | Vehicles Per Day |
|---|---|---|---|
| Chrysler Drive | Bayfront | Constitution | 20,049 |
| Chrysler Drive | Constitution | Jefferson | 14,148 |
| Chilco St | Mayfront | Consitution | 15,522 |
| O'Brien Dr | Willow | Kavanaugh | 14,729 |
| Ivy Drive | Chilco | Willow | 12,813 |
| Newbridge St | Chilco | Willow | 13,662 |
| Newbridge St | Willow | Ralmar | 15,143 |
| Newbridge St | Ralmar | University | 12,250 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Notes:**

1. Segment limits are the cross streets on each link. Please add additional rows to include all necessary segment limits.

**Instructions:**

Please provide segment limits for each link location listed below, in addition to traffic volumes at full buildout and the fleet make-up of the traffic. Please add additional link locations and rows as needed.

**Facebook Office**

* HEX - net new volumes based on model assignment. Negative values are zeroed for a conservative approach

| Link Location | Segment Limits[1] | | Net New Traffic Volumes - Full Buildout (Vehicles/day) | Percentage of Total Traffic (total Facebook traffic under Project Conditions) | | | |
|---|---|---|---|---|---|---|---|
| | | | | Cars | On-Demand | Shuttles | Trucks |
| Willow Road | Bayfront | Hamilton | 101 | 88% | 6% | 4% | 2.0% |
| Willow Road | Hamilton | Park | 0 | | | | |
| Willow Road | Park | O'Brien | 0 | | | | |
| Willow Road | O'Brien | Newbridge | 658 | | | | |
| Bayfront Expressway | Marsh | Chilco | 0 | | | | |
| Bayfront Expressway | Chilco | Willow | 0 | | | | |
| Bayfront Expressway | Willow | University | 596 | | | | |
| Bayfront Expressway | University | County lim | 745 | | | | |
| University Avenue | Bayfront | Adams | 385 | | | | |
| University Avenue | Adams | O'Brien | 465 | | | | |
| University Avenue | O'Brien | Kavanaugh | 3,693 | | | | |
| University Avenue | Kavanaugh | Bay | 3,679 | | | | |
| O'Brien Drive | Willow | Kavanaugh | 1,679 | | | | |
| O'Brien Drive | Kavanaugh | Adams | 4,358 | | | | |
| O'Brien Drive | Adams | University | 4,390 | | | | |
| Adams Dr | University | Adams Ct | 75 | | | | |
| Adams Dr | Adams Ct | O'Brien | 0 | | | | |
| Adams Ct | | | 70 | | | | |

**Notes:**

1. Segment limits are the cross streets on each link. Please add additional rows to include all necessary segment limits.
If additional link locations (i.e. modeled roadways) are needed, please add them in.

**Please provide the total traffic volumes entering the site, broken down by entrance. This should include cars, on-demand and trucks. The shuttles will be considered separately, based on the schedules as provided by Facebook.**

| Entrance | Net New Traffic Volumes - Full Buildout (Vehicles/day) |
|---|---|
| **Willow/North** | **28** |
| **Willow/Hamilton** | **-541** |
| **Willow/Park** | **-1,043** |
| **O'Brien/Park** | **7,914** |
| **Adams Court** | **179** |

**Instructions:**

Please provide segment limits for each link location listed below, in addition to traffic volumes at full buildout and the fleet make-up of the traffic. Please add additional link locations and rows as needed.

**Mixed Use**

| Link Location | Segment Limits[1] | | Total Traffic Volumes - Full Buildout (Vehicles/day) |
|---|---|---|---|
| Willow Road | Bayfront | Hamilton | 2,976 |
| Willow Road | Hamilton | Park | 0 |
| Willow Road | Park | O'Brien | 6,362 |
| Willow Road | O'Brien | Newbridge | 6,875 |
| Bayfront Expressway | Marsh | Chilco | 1,284 |
| Bayfront Expressway | Chilco | Willow | 1,566 |
| Bayfront Expressway | Willow | University | 1,557 |
| Bayfront Expressway | University | County limit | 1,536 |
| University Avenue | Bayfront | Adams | 309 |
| University Avenue | Adams | O'Brien | 516 |
| University Avenue | O'Brien | Kavanaugh | 1,707 |
| University Avenue | Kavanaugh | Bay | 1,737 |
| O'Brien Drive | Willow | Kavanaugh | 991 |
| O'Brien Drive | Kavanaugh | Adams | 2,398 |
| O'Brien Drive | Adams | University | 2,325 |
| Adams Dr | University | Adams Ct | 8 |
| Adams Dr | Adams Ct | O'Brien | 80 |
| Adams Ct | | | 87 |

**Notes:**

1. Segment limits are the cross streets on each link. Please add additional rows to include all necessary segment limits. If additional link locations (i.e. modeled roadways) are needed, please add them in.

**Please provide the total traffic volumes entering the site, broken down by entrance.**

| Entrance | Net New Traffic Volumes - Full Buildout (Vehicles/day) |
|---|---|
| **Willow / North** | **0** |
| **Willow / Hamilton** | **1,720** |
| **Willow / Park** | **8,691** |
| **O'Brien / Park** | **4,592** |
| **Adams Court** | **23** |

SIGNATURE DEVELOPMENT GROUP

# MEMORANDUM

To: Kyle Perata, City of Menlo Park

From: Faye Brandin, Signature Development Group

Subject: Emergency Backup Generator Memorandum

Date: October 20, 2020 (REVISED December 21, 2021, revisions in red)

---

Dear Kyle:

This is a memorandum following up the email you sent on July 24th, requesting an update to previously submitted documents on June 5th.

Staff comment:

On June 5th you provided two generator supplemental forms that are slightly different. Can you take a look and let me know why two different forms were submitted? Is one of the forms for the grocery store generator and one for the Office Campus generators?

In addition to the forms, the submittal also included a narrative response that included the detailed specifications for two different generators. I also attached that document for reference.

Would you please review the attached documents and provide me with clarification on the number of generators, general size/specs for the generators, and a site plan showing the anticipated locations of the generators.

In addition to the generator supplemental form, the City also requires submittal of its hazardous materials information form (HMIF), and a chemical inventory (inventory would identify the approximate amount of diesel fuel for each generator) for review of applications involving hazardous materials.

Response:

The information has been updated to include a total of twelve emergency backup generators across Willow Village, four in the Campus District, one in the Town Square District, six for the Residential/Shopping District, and one at the Willow Hamilton North Parcel.

The following items are provided are part of this response:

- Site Plan with anticipated locations of the emergency backup generators (updated)
- Campus District emergency backup generator supplements with the following:
    - Two emergency backup generators to service Meeting, Collaboration, and Conference Space, located inside the north garage, sizes: 103"(W)x201"(L)x119"(H) each;
    - Two emergency backup generators servicing Office Buildings 1, 2, 3, 4, 5, and 6, sizes: 110"(W)x270"(L)x164"(H) each;

- Town Square District:  one emergency backup generator to service the Hotel, located inside the basement level of the hotel, size: 77”(W)x167”(L)x78”(H).
- For the Residential/Shopping District, refer to the Preliminary Mixed-Use Emergency Backup Generator Summary and Generator Supplements:
    - Each of the six residential/mixed-use buildings will have their own emergency backup generator
    - Sizes included in the summary from PAE Engineers
- Cut sheet for one generator at the Willow Hamilton North Parcel.

If hazardous materials are associated with emergency backup generator use, we propose submitting the hazardous materials form (HMIF) at the time we submit permits to commence construction on all buildings, but prior to any hazardous materials incidental to all uses, being stored and used on site.

Please do not hesitate to contact me with any questions.  I can be reached at (510) 862-5629.

Sincerely,

Faye Brandin

CITY OF MENLO PARK

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator(s) will be used for life safety egress lighting, accessible egress elevator loads and other misc. standby loads.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Estimated Diesel tank capacity is 4,000 Gallons | **NOISE RATING**<br>85 dBA |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Estimated generator size (2) @ 750kW | **ENCLOSURE COLOR**<br>Generators located interior of parking garage |
| **ROUTE FOR FUELING HOSE ACCESS**<br>Remote fuel station located on exterior of the building | **PARKING LOCATION OF FUELING TRUCK**<br>Exterior, drive up to remote fill station |
| **FREQUENCY OF REFUELING**<br>Two times per year | **HOURS OF SERVICE ON A FULL TANK**<br>24 hours at 100% generator capacity |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Double-wall fuel tank with leak detection and remote fuel fill station with automatic shut off and alarms

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

CITY OF MENLO PARK

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator(s) will be used for life safety egress lighting, accessible egress elevator loads and other misc. standby loads.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Estimated Diesel tank size is 3,200 gallons. | **NOISE RATING**<br>Internal acoustical dampening to 75db at 23' |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Estimated generator size (2) @ 1750kW; 2900hp | **ENCLOSURE COLOR**<br>Generators located interior of parking garage |
| **ROUTE FOR FUELING HOSE ACCESS**<br>Remote fuel fill station located on exterior of buildling | **PARKING LOCATION OF FUELING TRUCK**<br>Exterior, drive up to remote fuel fill station |
| **FREQUENCY OF REFUELING**<br>two times per year | **HOURS OF SERVICE ON A FULL TANK**<br>8 hours at 100% generator capacity |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Double-wall fuel tank with leak detection and remote fuel fill station with automatic shut off and alarms

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

CITY OF MENLO PARK

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator(s) will be used for life safety egress lighting, accessible egress elevator loads and other misc. standby loads.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Estimated Diesel tank size is 1,350 gallons. | **NOISE RATING**<br>Internal acoustical dampening to 75db at 23' |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Estimated generator size (1) @ 600kW, 900hp | **ENCLOSURE COLOR**<br>Generators located interior of parking garage basement level |
| **ROUTE FOR FUELING HOSE ACCESS**<br>Remote fuel fill station located on exterior of buildling | **PARKING LOCATION OF FUELING TRUCK**<br>Exterior, drive up to remote fuel fill station |
| **FREQUENCY OF REFUELING**<br>two times per year | **HOURS OF SERVICE ON A FULL TANK**<br>24 hours at 100% generator capacity |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Double-wall fuel tank with leak detection and remote fuel fill station with automatic shut off and alarms

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

# Memo

| | |
|---|---|
| **Date:** | September 23, 2020 |
| **Project:** | Willow Village Mixed-Use Development |
| **Project Number:** | 18-1489 |
| **To:** | Faye Brandin (SDG) |
| **From:** | Scott Bevan, PE |
| **Subject:** | Mixed-Use Generator Summary (Preliminary) |
| **Distribution:** | PAE Team |

The purpose of this memo is to provide preliminary on-site emergency power system description and sizing for the mixed-use buildings of the Willow Village Mixed-Use District in Menlo Park, CA.

## EMERGENCY POWER SYSTEM SUMMARY

Based on preliminary information, PAE assumes that each mixed-use building will require certain loads to be backed up by generator power due to building codes, operational requirements and owner preference. A dedicated standby generator power system will be provided at each mixed-use building.

Specific loads and tenant requirements are unknown at this time, but it is assumed each generator system will include capacity for (1) fire pump, (1-2) elevator(s), and a provision for non-emergency backup power to Optional Standby tenant loads as determined by tenant. The table below summarizes the load types assumed to require generator backup.

**Table 1: Generator Load Types**

| Classification | System Description | Notes |
|---|---|---|
| Life Safety / Emergency (EM) | Emergency Lighting | |
| | Fire Alarm Panels | |
| | Fire Pump | Assumed to be required for all buildings. |
| Legally Required Standby (LRS) | Elevator(s) | All buildings assumed to be five stories or greater. |
| Optional Standby (OS) | Optional Standby Provision | |
| | Grocery Tenant (RS2 only) | |

Fire pumps are required to have a reliable source of power per CEC 695.3 and NFPA 20. The determination of whether the PG&E service is a reliable source of power is an issue for the AHJ. If the service is deemed to be unreliable, then an alternate source is required, and typically this is a standby diesel generator. Given all the PG&E issues lately, PAE currently assumes that if fire pump is needed at a building, then a generator will be required.

Each standby generator is anticipated to be diesel-engine driven with integral base fuel tank, located within a dedicated indoor equipment room or within an exterior custom acoustic enclosure, constructed in compliance with NFPA 110 requirements. The desired run-time of the generator is unknown at this time but can be approximated to be 8 hours or less.

The generator equipment will be provided with custom acoustic enclosure and/or treatment systems to maintain nighttime and daytime acoustic thresholds at the property line as determined by City of Menlo Park zoning and noise ordinances.

The generator system will operate during utility power interruption in order to maintain critical building operation, or on a monthly basis for testing purposes. The generator system will be selected to meet Tier 2 emission standards and have engine exhaust to the exterior meeting all local city ordinance and code requirements.

Refer to the attached standby generator equipment cutsheets for information on fuel tank volume, acoustic enclosure dimensions, sound data, and weights. These cutsheets are meant to be representative of this equipment. Actual manufacturer equipment shown, and specific equipment attributes are used for preliminary coordination purposes only.

**EMERGENCY POWER SYSTEM LOAD SUMMARY**

The preliminary generator load summary and recommended generator sizes are shown in the table below. Refer to the appendix for more information. These loads will be refined as the design progresses.

**Table 2: Generator Load Summary**

| BUILDING ID | GENERATOR LOAD (KW) | RECOMMENDED GENERATOR SIZE (KW) |
|---|---|---|
| RS2 | 741 | 1,000 |
| RS3 | 571 | 750 |
| RS4 | 407 | 500 |
| RS5 | 361 | 500 |
| RS6 | 199 | 250 |
| RS7 | 125 | 150 |

End of memo.

| Facebook Willow Village Generator Load Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Area (SF)** | **Load (W/SF)** | **Quantity** | **Unit Load (kW)** | **Total Load** | **Generator Branch** | **Notes** |
| **Mixed Use RS2** | | | | | | | |
| Emergency Lighting | 631,657 | 0.25 | | | 158 | EM | |
| Fire Alarm Panels | | | 1 | 15 | 15 | EM | |
| Fire Pump | | | 1 | 150 | 150 | EM | 150 HP |
| Elevators | | | 2 | 34 | 68 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 150 | 150 | OPT | |
| Grocery Provision | | | 1 | 200 | 200 | OPT | |
| | | | | **Sub-Total** | **741** | | |
| **Mixed Use RS3** | | | | | | | |
| Emergency Lighting | 753,901 | 0.25 | | | 188 | EM | |
| Fire Alarm Panels | | | 1 | 15 | 15 | EM | |
| Fire Pump | | | 1 | 150 | 150 | EM | 150 HP |
| Elevators | | | 2 | 34 | 68 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 150 | 150 | OPT | |
| | | | | **Sub-Total** | **571** | | |
| **Mixed Use RS4** | | | | | | | |
| Emergency Lighting | 499,573 | 0.25 | | | 125 | EM | |
| Fire Alarm Panels | | | 1 | 10 | 10 | EM | |
| Fire Pump | | | 1 | 104 | 104 | EM | 100 HP |
| Elevators | | | 2 | 34 | 68 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 100 | 100 | OPT | |
| | | | | **Sub-Total** | **407** | | |
| **Mixed Use RS5** | | | | | | | |
| Emergency Lighting | 316,257 | 0.25 | | | 79 | EM | |
| Fire Alarm Panels | | | 1 | 10 | 10 | EM | |
| Fire Pump | | | 1 | 104 | 104 | EM | 100 HP |
| Elevators | | | 2 | 34 | 68 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 100 | 100 | OPT | |
| | | | | **Sub-Total** | **361** | | |
| **Mixed Use RS6** | | | | | | | |
| Emergency Lighting | 225,800 | 0.25 | | | 56 | EM | |
| Fire Alarm Panels | | | 1 | 5 | 5 | EM | |
| Fire Pump | | | 1 | 54 | 54 | EM | 50 HP |
| Elevators | | | 1 | 34 | 34 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 50 | 50 | OPT | |
| | | | | **Sub-Total** | **199** | | |
| **Mixed Use RS7** | | | | | | | |
| Emergency Lighting | 86,600 | 0.25 | | | 22 | EM | |
| Fire Alarm Panels | | | 1 | 5 | 5 | EM | |
| Fire Pump | | | 1 | 34 | 34 | EM | 30 HP |
| Elevators | | | 1 | 34 | 34 | LRS | 30 HP |
| Optional Standby Provision | | | 1 | 30 | 30 | OPT | |
| | | | | **Sub-Total** | **125** | | |

BUILDING ID: RS2

CITY OF MENLO PARK

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

| | |
|---|---|
| **GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)<br>Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage. | |
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 660 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>75.3db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 1000 kW (approx)<br>Engine output: 1490 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>9 hours at generator fully rated load |
| **PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)<br>Monthly, Sunday, AM | |
| **ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)<br>Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.<br>Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc. | |
| **OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)<br>• Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack<br>• Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school | |

BUILDING ID: RS3


# COMMUNITY DEVELOPMENT DEPARTMENT
# PLANNING DIVISION

701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org


## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

| | |
|---|---|
| **GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)<br>Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage. | |
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 660 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>75.3db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 750 kW (approx)<br>Engine output: 1220 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>13 hours at generator fully rated load |
| **PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)<br>Monthly, Sunday, AM | |
| **ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)<br>Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.<br>Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc. | |
| **OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)<br>• Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack<br>• Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school | |

BUILDING ID: RS4

CITY OF MENLO PARK

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 270 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>73db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 500 kW (approx)<br>Engine output: 755 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>8 hours at generator fully rated load |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday, AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.
Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc.

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

BUILDING ID: RS5


**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org


## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 270 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>73db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 500 kW (approx)<br>Engine output: 755 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>8 hours at generator fully rated load |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday, AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.
Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc.

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

BUILDING ID: RS6


**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org


## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 270 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>72db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 250 kW (approx)<br>Engine output: 464 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>14 hours at generator fully rated load |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday, AM

**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.
Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc.

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

BUILDING ID: RS7

CITY OF MENLO PARK

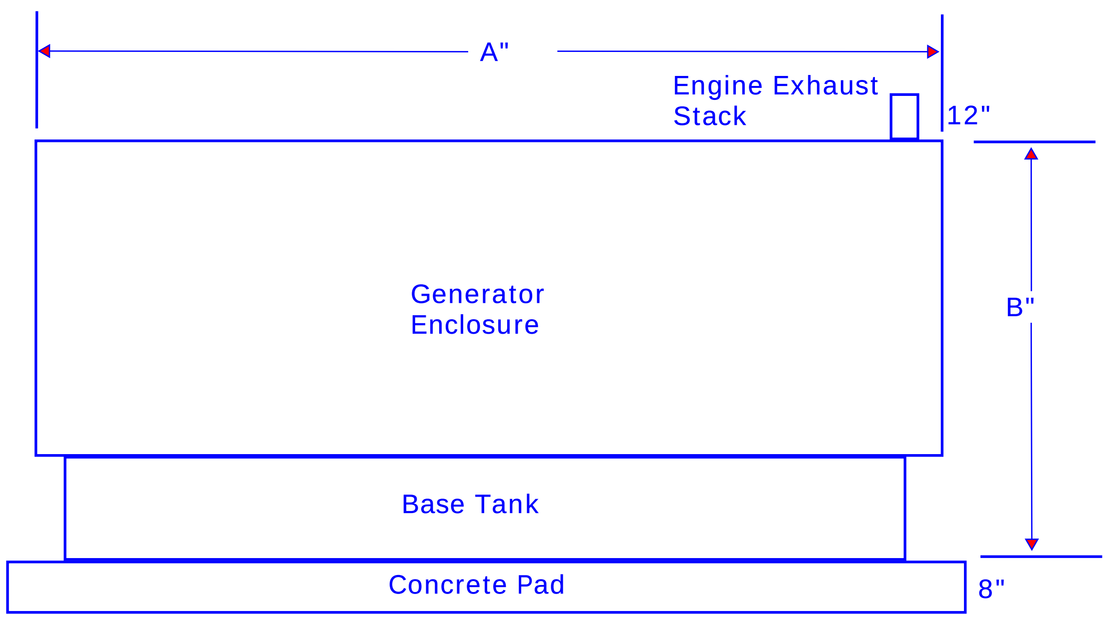
**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

| | |
|---|---|
| **GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)<br>Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage. | |
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 270 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>72db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 150 kW (approx)<br>Engine output: 324 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>24 hours at generator fully rated load |
| **PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)<br>Monthly, Sunday, AM | |
| **ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)<br>Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.<br>Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc. | |
| **OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)<br>• Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack<br>• Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school | |

| GENERATOR SIZE (kW) | DIMENSION 'A' (") | DIMENSION 'B' (") |
|---|---|---|
| 1000 | 315 | 137 |
| 750 | 315 | 137 |
| 500 | 222 | 106 |
| 250 | 222 | 106 |
| 150 | 180 | 93 |




<u>Section</u>
(NTS)

1000KW GENERATOR

Specification sheet

# Diesel generator set QST30 series engine

680 kW - 1000 kW 60 Hz

## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime power applications.

## Features

**Cummins heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent Magnet Generator (PMG)** - Offers enhanced motor starting and fault clearing short circuit capability.

**Circuit breakers** - Option for manually-and/or electrically-operated circuit breakers.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Masterless Paralleling** - An optional electrically operated circuit breaker can be added for a simple masterless paralleling solution.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**NFPA** - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby rating | Prime rating | Continuous rating | Data sheets |
|---|---|---|---|---|
| Model | 60 Hz<br>kW (kVA) | 60 Hz<br>kW (kVA) | 60 Hz<br>kW (kVA) | 60 Hz |
| DQFAA | 750 (938) | 680 (850) | | D-3329 |
| DQFAB | 800 (1000) | 725 (907) | | D-3330 |
| DQFAC | 900 (1125) | 818 (1023) | | D-3331 |
| DQFAD | 1000 (1250) | 900 (1125) | | D-3332 |

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO 8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 0.5% |
| Random voltage variation | ± 0.5% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.25% |
| Radio frequency emissions compliance | IEC 61000-4-2: Level 4 Electrostatic discharge<br>IEC 61000-4-3: Level 3 Radiated susceptibility |

## Engine specifications

| | |
|---|---|
| Bore | 140 mm (5.51 in.) |
| Stroke | 165.0 mm (6.5 in.) |
| Displacement | 30.5 L (1860 $in^3$) |
| Cylinder block | Cast iron, V 12 cylinder |
| Battery capacity | 1800 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F) |
| Battery charging alternator | 35 amps |
| Starting voltage | 24 volt, negative ground |
| Fuel system | Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff |
| Fuel filter | Triple element, 10 micron filtration, spin-on fuel filters with water separator |
| Air cleaner type | Dry replaceable element |
| Lube oil filter type(s) | Four spin-on, combination full flow filter and bypass filters |
| Standard cooling system | High ambient radiator |

## Alternator specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip-proof, revolving field |
| Stator | 2/3 pitch |
| Rotor | Single bearing flexible discs |
| Insulation system | Class H on low and medium voltage, Class F on high voltage |
| Standard temperature rise | 150 °C Standby at 40 °C ambient |
| Exciter type | PMG (Permanent Magnet Generator) |
| Phase rotation | A (U), B (V), C (W) |
| Alternator cooling | Direct drive centrifugal blower fan |
| AC waveform Total Harmonic Distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone Influence Factor (TIF) | < 50 per NEMA MG1-22.43 |
| Telephone Harmonic Factor (THF) | < 3 |

## Available voltages

**60 Hz Line – Neutral/Line - Line**

| | | | |
|---|---|---|---|
| • 120/208 | • 220/380 | • 240/416 | • 347/600 |
| • 139/240 | • 230/400 | • 277/480 | |

Note: Consult factory for other voltages.

## Generator set options

**Engine**
- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)

**Control panel**
- PowerCommand 3.3 with Masterless Load Demand (MLD)
- Run relay package
- Ground fault indication
- Paralleling configuration
- Remote fault signal package
- Exhaust gas temperature sensor
- 120/240 V 100 W control anti-condensation heater

**Alternator**
- 80 °C rise
- 105 °C rise
- 150 °C rise
- 120/240 V 300 W anti-condensation heater
- Temperature sensor - RTDs, 2-phase
- Temperature sensor – alternator bearing RTD
- Differential current transformers

**Exhaust system**
- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

**Cooling system**
- High ambient 50 °C radiator

**Generator set**
- AC entrance box
- Battery
- Battery rack with hold-down - floor standing
- Circuit breaker - set mounted
- Disconnect switch - set mounted
- PowerCommand network
- Remote annunciator panel
- Spring isolators
- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

## PowerCommand 3.3 Control System

An integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

**AmpSentry** – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

**Power management** – Control function provides battery monitoring and testing features and smart starting control system.

**Advanced control methodology** – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

**Communications interface** – Control comes standard with PCCNet and Modbus® interface.

**Regulation compliant** – Prototype tested: UL, CSA and CE compliant.

**Service** - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

**Easily upgradeable** – PowerCommand controls are designed with common control interfaces.

**Reliable design** – The control system is designed for reliable operation in harsh environment.

**Multi-language support**

## Operator panel features

**Operator/display functions**
- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating generator set running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

**Paralleling control functions**
- First Start Sensor System selects first generator set to close to bus
- Phase Lock Loop Synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVar load sharing
- Load govern control for utility paralleling
- Extended Paralleling (Base Load/Peak Shave) Mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions,
- Alternator data
- Line-to-Neutral and Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kW, kVar, power factor kVA (three phase and total)
- Engine data
- DC voltage
- Engine speed
- Lube oil pressure and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)
- Other data
- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)

## Standard control functions

**Digital governing**

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

**Digital voltage regulation**

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire Line-to-Line sensing
- Configurable torque matching

**AmpSentry AC protection**

- AmpSentry protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field overload shutdown

**Engine protection**

- Battery voltage monitoring, protection and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown
- Full authority electronic engine protection

**Control functions**

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (4)
- Remote emergency stop

**Options**

- Auxiliary output relays (2)

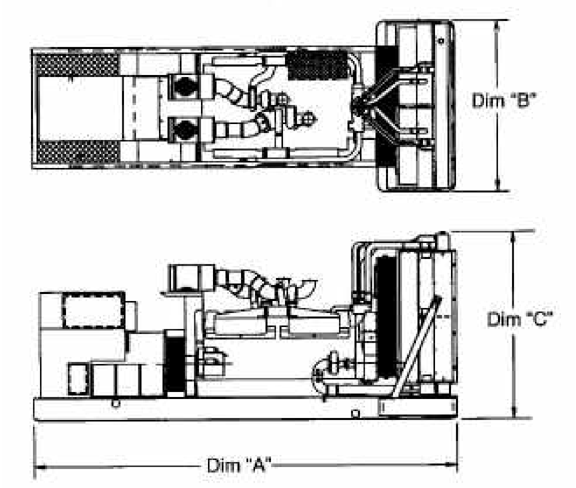
## Ratings definitions

**Emergency Standby Power (ESP)**:
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP)**:
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP)**:
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP):**
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




- This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

| Model | Dim 'A' mm (in.) | Dim 'B' mm (in.) | Dim 'C' mm (in.) | Set Weight dry* (lb) | Set Weight wet* (lb) |
|---|---|---|---|---|---|
| DQFAA | 4287 (168.8) | 1990 (78.3) | 2355 (92.7) | 6671 (14707) | 6969 (15363) |
| DQFAB | 4287 (168.8) | 1990 (78.3) | 2355 (92.7) | 6894 (15199) | 7192 (15855) |
| DQFAC | 4287 (168.8) | 1990 (78.3) | 2355 (92.7) | 7373 (16254) | 7670 (16910) |
| DQFAD | 4287 (168.8) | 1990 (78.3) | 2355 (92.7) | 7631 (16824) | 7929 (17480) |

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | | The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% Continuous operation and also UL 869A Listed Service Equipment. |
| | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | **U.S. EPA** | Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation. |
| | All low voltage models are CSA certified to product class 4215-01. | **International Building Code** | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012. |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**


S-1508 (05/20)

# Generator set data sheet

| | |
|---|---|
| **Model:** | **DQFAD** |
| **Frequency:** | **60 Hz** |
| **Fuel type:** | **Diesel** |
| **kW rating:** | **1000 Standby**<br>**900 Prime** |
| **Emissions level:** | **EPA NSPS Stationary Emergency Tier 2** |

| | |
|---|---|
| **Exhaust emission data sheet:** | **EDS-1063** |
| **Exhaust emission compliance sheet:** | **EPA-1097** |
| **Sound performance data sheet:** | **MSP-1038** |
| **Cooling performance data sheet:** | **MCP-156** |
| **Prototype test summary data sheet:** | **PTS-266** |
| **Standard set-mounted radiator cooling outline:** | **A049K674** |
| **Optional remote radiator cooling outline:** | **A053G787** |

## Fuel consumption

| | **Standby** | | | | **Prime** | | | | **Continuous** |
|---|---|---|---|---|---|---|---|---|---|
| | **kW (kVA)** | | | | **kW (kVA)** | | | | **kW (kVA)** |
| **Ratings** | 1000 (1250) | | | | 900 (1125) | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **Full** |
| **US gph** | 18.7 | 36.4 | 54.2 | 71.9 | 16.9 | 32.4 | 48.0 | 63.5 | |
| **L/hr** | 70.6 | 137.8 | 205.1 | 272.3 | 64.0 | 122.8 | 181.5 | 240.3 | |

## Engine

| | **Standby rating** | **Prime rating** | **Continuous rating** |
|---|---|---|---|
| Engine manufacturer | Cummins Inc. | | |
| Engine model | QST30-G5 NR2 | | |
| Configuration | Cast iron, V 12 cylinder | | |
| Aspiration | Turbocharged and low temperature after-cooled | | |
| Gross engine power output, kWm (bhp) | 1112 (1490) | 1007 (1350) | |
| BMEP at set rated load, kPa (psi) | 2417 (351) | 2160 (313) | |
| Bore, mm (in.) | 140 (5.51) | | |
| Stroke, mm (in.) | 165 (6.5) | | |
| Rated speed, rpm | 1800 | | |
| Piston speed, m/s (ft/min) | 9.91 (1950) | | |
| Compression ratio | 14.7:1 | | |
| Lube oil capacity, L (qt) | 154 (162.8) | | |
| Overspeed limit, rpm | 2100 ±50 | | |
| Regenerative power, kW | 82 | | |

## Fuel flow

| | | |
|---|---|---|
| Maximum fuel flow, L/hr (US gph) | 570 (150) | |
| Maximum fuel inlet restriction, kPa (in Hg) | 27 (8.0) | |
| Maximum fuel inlet temperature, °C (°F) | 66 (150) | |

## Air

| | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Combustion air, $m^3$/min (scfm) | 88 (3150) | 81 (2880) | |
| Maximum air cleaner restriction, kPa (in $H_2O$) | 6.2 (25) | | |
| Alternator cooling air, $m^3$/min (cfm) | 204 (7300) | | |

## Exhaust

| | | | |
|---|---|---|---|
| Exhaust flow at set rated load, $m^3$/min (cfm) | 211 (7540) | 195 (6950) | |
| Exhaust temperature, °C (°F) | 477 (890) | 467 (873) | |
| Maximum back pressure, kPa (in $H_2O$) | 6.8 (27) | | |

## Standard set-mounted radiator cooling

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 56 (132.8) | | |
| Fan load, $kW_m$ (HP) | 33.1 (44.4) | | |
| Coolant capacity (with radiator), L (US gal) | 167 (44) | | |
| Cooling system air flow, $m^3$/min (scfm) | 1097.5 (38753) | | |
| Total heat rejection, MJ/min (Btu/min) | 48.9 (46455) | 43.9 (41660) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |
| Maximum fuel return line restriction kPa (in Hg) | 67.5 (20) | | |

## Optional heat exchanger cooling

| | |
|---|---|
| Set coolant capacity, L (US gal) | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | |
| Total heat radiated to room, MJ/min (Btu/min) | |
| Maximum raw water pressure, jacket water circuit, kPa (psi) | |
| Maximum raw water pressure, aftercooler circuit, kPa (psi) | |
| Maximum raw water pressure, fuel circuit, kPa (psi) | |
| Maximum raw water flow, jacket water circuit, L/min (US gal/min) | |
| Maximum raw water flow, aftercooler circuit, L/min (US gal/min) | |
| Maximum raw water flow, fuel circuit, L/min (US gal/min) | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min) | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min) | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min) | |
| Raw water delta P at min flow, jacket water circuit, kPa (psi) | |
| Raw water delta P at min flow, aftercooler circuit, kPa (psi) | |
| Raw water delta P at min flow, fuel circuit, kPa (psi) | |
| Maximum jacket water outlet temp, °C (°F) | |
| Maximum aftercooler inlet temp, °C (°F) | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | |
| Maximum fuel return line restriction, kPa (in Hg) | |

## Optional remote radiator cooling[1]

| Optional remote radiator cooling[1] | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Max flow rate at max friction head, jacket water circuit, L/min (US gal/min) | 992 (262) | | |
| Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min) | 303 (80) | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | 22.67 (21500) | 21.01 (19925) | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | 18.35 (17400) | 15.69 (14885) | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | 6.1 (5753) | 5.6 (5301) | |
| Maximum friction head, jacket water circuit, kPa (psi) | 69 (10) | | |
| Maximum friction head, aftercooler circuit, kPa (psi) | 48 (7) | | |
| Maximum static head, jacket water circuit, m (ft) | 14 (46) | | |
| Maximum static head, aftercooler circuit, m (ft) | 14 (46) | | |
| Maximum jacket water outlet temp, °C (°F) | 104 (220) | 100 (212) | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | 41 (105) | | |
| Maximum aftercooler inlet temp, °C (°F) | 62 (143) | 56 (133) | |
| Maximum fuel flow, L/hr (US gph) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | 67.5 (20) | | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 7594 (16742) |
| Unit wet weight kgs (lbs) | 7857 (17322) |

**Notes**:

[1] For non-standard remote installations contact your local Cummins representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating factors

| | |
|---|---|
| **Standby** | Engine power available up to 701 m (2300 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 3.5% per 305 m (1000 ft) and 7% per 10 °C (18°F). |
| **Prime** | Engine power available up to 727 m (2385 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 3.5% per 305 m (1000 ft) and 7% per 10 °C (18 °F). |
| **Continuous** | |

## Ratings definitions

| Emergency Standby Power (ESP): | Limited-Time Running Power (LTP): | Prime Power (PRP): | Base Load (Continuous) Power (COP): |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. No sustained overload capability is available at this rating. |

## Alternator data

| Voltage | Connection[1] | Temp rise degrees C | Duty[2] | Single phase factor[3] | Max surge kVA[4] | Surge kW | Alternator data sheet | Feature code |
|---|---|---|---|---|---|---|---|---|
| 120/208-139/240 | 12-lead | 125/105 | S/P | | 4234 | 1019 | ADS-312 | B252 |
| 240/416-277/480 | 12-lead | 125/105 | S/P | | 4234 | 1019 | ADS-312 | B252 |
| 277/480 | Wye, 3-phase | 125/105 | S/P | | 3866 | 1018 | ADS-311 | B276 |
| 220/380-277/480 | Wye, 3-phase | 125/105 | S/P | | 4602 | 1018 | ADS-330 | B282 |
| 220/380-277/480 | Wye, 3-phase | 105/80 | S/P | | 4602 | 1018 | ADS-330 | B283 |
| 210/380-277/480 | Wye, 3-phase | 80 | S | | 5521 | 1024 | ADS-331 | B284 |
| 240/416-277/480 | Wye | 125/105 | S/P | | 4234 | 1019 | ADS-312 | B288 |
| 347/600 | 3-phase | 125/105 | S/P | | 3866 | 1021 | ADS-311 | B300 |
| 347/600 | 3-phase | 105/80 | S/P | | 4234 | 1024 | ADS-312 | B301 |
| 347/600 | 3-phase | 80 | S | | 4602 | 1004 | ADS-330 | B604 |

**Notes**:

[1] Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor[3]. All single phase ratings are at unity power factor.

[2] Standby (S), Prime (P) and Continuous ratings (C).

[3] Factor for the *Single phase output from Three phase alternator* formula listed below.

[4] Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

## Formulas for calculating full load currents:

**Three phase output**

$$\frac{\text{kW x 1000}}{\text{Voltage x 1.73 x 0.8}}$$

**Single phase output**

$$\frac{\text{kW x SinglePhaseFactor x 1000}}{\text{Voltage}}$$

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**

750KW GENERATOR

**Specification sheet**

# Diesel generator set QSK23 series engine

600 kW - 800 kW 60 Hz

Standby

## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime Power applications.

## Features

**Cummins heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent Magnet Generator (PMG)** - Offers enhanced motor starting and fault clearing short circuit capability.

**Circuit breakers** - Option for manually-and/or electrically-operated circuit breakers.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency, and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Peer-to-peer paralleling** - For applications where two or more generators with PowerCommand 3.3 control can be combined with an electrically operated circuit breaker and a combination of transfer switch(s).

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby rating | Prime rating | Continuous rating | Data sheets |
|---|---|---|---|---|
| **Model** | **60 Hz kW (kVA)** | **60 Hz kW (kVA)** | **60 Hz kW (kVA)** | **60 Hz** |
| **DQCA** | 600 (750) | 545 (681) | | D-3352 |
| **DQCB** | 750 (938) | 680 (850) | | D-3353 |
| **DQCC** | 800 (1000) | 725 (906) | | D-3354 |

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 0.5% |
| Random voltage variation | ± 0.5% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.25% |
| Radio frequency emissions compliance | IEC 61000-4-2: Level 4 electrostatic discharge<br>IEC 61000-4-3: Level 3 radiated susceptibility |

## Engine specifications

| | |
|---|---|
| Bore | 169.9 mm (6.69 in) |
| Stroke | 169.9 mm (6.69 in) |
| Displacement | 23.15 liters (1413 $in^3$) |
| Configuration | Cast iron, in line 6 cylinder |
| Battery capacity | 1400 amps minimum at ambient temperature of 0 °C to 10 °C (32 °F to 50 °F) |
| Battery charging alternator | 35 amps |
| Starting voltage | 24 volt, negative ground |
| Fuel system | Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff |
| Fuel filter | Spin-on fuel filters with water separator |
| Air cleaner type | Dry replaceable element with restriction indicator |
| Lube oil filter type(s) | Fleet guard dual venturi spin-on, combination full flow and bypass filters |
| Standard cooling system | High ambient radiator |

## Alternator specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip proof, revolving field |
| Stator | 2/3 pitch |
| Rotor | Single bearing flexible disc |
| Insulation system | Class H |
| Standard temperature rise | 125 ºC Standby at 40 °C ambient |
| Exciter type | Permanent Magnet Generator (PMG) |
| Phase rotation | A (U), B (V), C (W) |
| Alternator cooling | Direct drive centrifugal blower fan |
| AC waveform Total Harmonic Distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone Influence Factor (TIF) | < 50 per NEMA MG1-22.43 |
| Telephone Harmonic Factor (THF) | < 3% |

## Available voltages

**60 Hz Line-Neutral/Line-Line**

| | | | |
|---|---|---|---|
| • 110/190 | • 127/220 | • 230/380 | • 277/480 |
| • 115/200 | • 139/240 | • 240/416 | • 347/600 |
| • 120/208 | • 220/380 | • 255/440 | |

Note: Consult factory for other voltages.

## Generator set options and accessories

**Engine**

- 208/240/480 V coolant heater for ambient above 4.5 ºC (40 ºF)
- Fuel/water separator
- Heavy duty air cleaner

**Alternator**

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 120/240 V anti-condensation heater
- Temperature sensor - alternator bearing RTD

**Control panel**

- PC3.3
- PC3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package
- Run time display

**Cooling system**

- 50 °C ambient

## Generator set options and accessories (continued)

**Exhaust system**

- Industrial grade exhaust silencer (12 to 18 dBA)
- Residential grade exhaust silencer (18 to 25 dBA)
- Critical grade exhaust silencer (25 to 35 dBA)
- Super critical exhaust silencer (35 to 45 dBA)

**Generator set**

- AC entrance box
- Battery
- Battery rack with hold-down
- Circuit breaker - set mounted
- Remote annunciator panel
- Spring isolators

- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

## PowerCommand 2.3 – control system

**PowerCommand 2.3 control** - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface, and isochronous governing (optional).

**Control** - Provides battery monitoring and testing features and smart-starting control system.

**InPower™** - PC based service tool available for detailed diagnostics.

**PCCNet RS485** - Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

**Control boards** - Potted for environmental protection.

**Ambient operation** - Suitable for operation in ambient temperatures from -40 °C to +70 °C and altitudes to 13,000 feet (5000 meters).

**Prototype tested** - UL, CSA, and CE compliant.

**AC protection**

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

**Engine protection**

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (over crank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

**Operator/display panel**

- Manual off switch
- 128 x 128 alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

**Alternator data**

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

**Engine data**

- DC voltage
- Lube oil pressure
- Coolant temperature

**Other data**

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

**Digital governing (optional)**

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

**Digital voltage regulation**

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

**Control functions**

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

**Options**

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

For further detail on PC 2.3, see document S-1569.
For further detail on PC 3.3, see document S-1570.

## Ratings definitions

**Emergency Standby Power (ESP)**:

Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP)**:

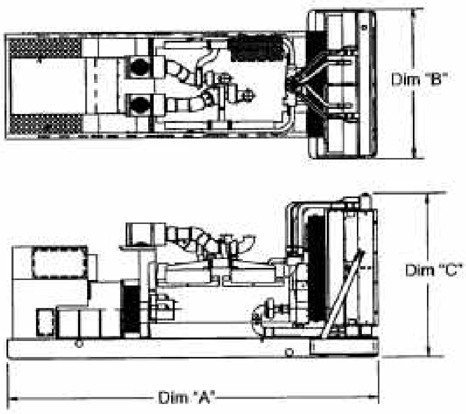
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP)**:

Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP)**:

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

## Dimensions and weights with standard cooling system

| Model | Dim 'A' (mm) (in.) | Dim 'B' (mm) (in.) | Dim 'C' (mm) (in.) | Set weight* dry (kg) (lbs) | Set weight* wet (kg) (lbs) |
|---|---|---|---|---|---|
| **DQCA** | 4395.4 (173) | 1855.5 (73) | 2065.7 (81) | 6075 (13395) | 6337 (13973) |
| **DQCB** | 4395.4 (173) | 1855.5 (73) | 2065.7 (81) | 6075 (13395) | 6337 (13973) |
| **DQCC** | 4395.4 (173) | 1855.5 (73) | 2065.7 (81) | 6075 (13395) | 6337 (13973) |

## Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2

| Model | Dim 'A' (mm) (in.) | Dim 'B' (mm) (in.) | Dim 'C' (mm) (in.) | Set weight* dry (kg) (lbs) | Set weight* wet (kg) (lbs) |
|---|---|---|---|---|---|
| **DQCA** | 4395.4 (173) | 1715 (68) | 2060.1 (81.1) | 6377 (14061) | 6518 (14372) |
| **DQCB** | 4395.4 (173) | 1715 (68) | 2060.1 (81.1) | 6377 (14061) | 6518 (14372) |
| **DQCC** | 4395.4 (173) | 1715 (68) | 2060.1 (81.1) | 6377 (14061) | 6518 (14372) |

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| ISO 9001 | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | UL | The generator set is available listed to UL 2200 for all 60 Hz low voltage models, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment. |
| PTS | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | **U.S. EPA** | Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation. |
| SA | All low voltage models are CSA certified to product class 4215-01. | **International Building Code** | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009, and IBC2012. |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**



S-1551 (09/17)

# Generator Set Data Sheet

| | |
|---|---|
| **Model:** | **DQCB** |
| **Frequency:** | **60 Hz** |
| **Fuel Type:** | **Diesel** |
| **kW Rating:** | **750 Standby**<br>**680 Prime** |
| **Emissions Level:** | **EPA NSPS Stationary Emergency Tier 2** |

| | |
|---|---|
| **Exhaust Emission Data Sheet:** | **EDS-1087** |
| **Exhaust Emission Compliance Sheet:** | **EPA-1121** |
| **Sound Data Sheet:** | **MSP-1159** |
| **Sound Data Sheet – with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHPD):** | **MSP-1013** |
| **Cooling System Data in various Ambient Conditions:** | **MCP-248** |
| **Cooling System Data in various Ambient Conditions – with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHPD):** | **MCP-174** |
| **Prototype Test Summary Data Sheet:** | **PTS-160** |

## Fuel Consumption

| | **Standby** | | | | **Prime** | | | | **Continuous** |
|---|---|---|---|---|---|---|---|---|---|
| | **kW (kVA)** | | | | **kW (kVA)** | | | | **kW (kVA)** |
| **Ratings** | 750 (938) | | | | 680 (850) | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **Full** |
| **US gph** | 16.0 | 28.0 | 40.0 | 51.0 | 15.0 | 25.0 | 36.5 | 48.0 | |
| **L/hr** | 60.6 | 106.0 | 151.4 | 193.1 | 56.8 | 94.6 | 138.2 | 181.7 | |

## Engine

| | **Standby Rating** | **Prime Rating** | **Continuous Rating** |
|---|---|---|---|
| Engine manufacturer | Cummins Inc. | | |
| Engine model | QSK23-G7 NR2 | | |
| Configuration | Cast Iron, in line, 6 cylinder | | |
| Aspiration | Turbocharged and low temperature after-cooled | | |
| Gross engine power output, kWm (bhp) | 910 (1220) | 808 (1085) | |
| BMEP at set rated load, kPa (psi) | 2435 (353) | 2214 (321) | |
| Bore, mm (in.) | 170 (6.69) | | |
| Stroke, mm (in.) | 170 (6.69) | | |
| Rated speed, rpm | 1800 | | |
| Piston speed, m/s (ft/min) | 10.21 (2010) | | |
| Compression ratio | 16:1 | | |
| Lube oil capacity, L (qt) | 102 (108) | | |
| Overspeed limit, rpm | 2100 | | |
| Regenerative power, kW | 93 | | |

## Fuel Flow

| | | |
|---|---|---|
| Maximum fuel flow, L/hr (US gph) | 685 (181) | |
| Maximum fuel inlet restriction, kPa (in Hg) | 13.44 (4) | |
| Maximum fuel inlet temperature, °C (°F) | 71 (160) | |

## Air

| Air | Standby Rating | Prime Rating | Continuous Rating |
|---|---|---|---|
| Combustion air, $m^3$/min (scfm) | 64 (2242) | 62 (2189) | |
| Maximum air cleaner restriction, kPa (in $H_2O$) | 6.2 (25) | | |
| Alternator cooling air, $m^3$/min (cfm) | 117 (4156) | | |

## Exhaust

| | | | |
|---|---|---|---|
| Exhaust flow at set rated load, $m^3$/min (cfm) | 152 (5358) | 146 (5147) | |
| Exhaust temperature, °C (°F) | 476 (888) | 458 (856) | |
| Maximum back pressure, kPa (in $H_2O$) | 10.1 (40.8) | | |

## Standard Set-Mounted Radiator Cooling (Non-Seismic)

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 24 (32) | | |
| Coolant capacity (with radiator), L (US gal) | 109.5 (29) | | |
| Cooling system air flow, $m^3$/min (scfm) | 1069.8 (37779.6) | | |
| Total heat rejection, MJ/min (Btu/min) | 32.3 (30655) | 29.6 (28065) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |
| Maximum fuel return line restriction kPa (in Hg) | 30.47 (9) | | |

## Optional Set-Mounted Radiator Cooling (with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHPD))

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 27 (36) | | |
| Coolant capacity (with radiator), L (US gal) | 89 (23.5) | | |
| Cooling system air flow, $m^3$/min (scfm) | 1252 (44183) | | |
| Total heat rejection, MJ/min (Btu/min) | 32.3 (30655) | 29.6 (28065) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |
| Maximum fuel return line restriction, kPa (in Hg) | 30.47 (9) | | |

## Optional Heat Exchanger Cooling

| | | | |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum raw water pressure, jacket water circuit, kPa (psi) | | | |
| Maximum raw water pressure, aftercooler circuit, kPa (psi) | | | |
| Maximum raw water pressure, fuel circuit, kPa (psi) | | | |
| Maximum raw water flow, jacket water circuit, L/min (US gal/min) | | | |
| Maximum raw water flow, aftercooler circuit, L/min (US gal/min) | | | |
| Maximum raw water flow, fuel circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min) | | | |
| Raw water delta P at min flow, jacket water circuit, kPa (psi) | | | |

| | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Raw water delta P at min flow, aftercooler circuit, kPa (psi) | | | |
| Raw water delta P at min flow, fuel circuit, kPa (psi) | | | |
| Maximum jacket water outlet temp, ℃ (℉) | | | |
| Maximum aftercooler inlet temp, ℃ (℉) | | | |
| Maximum aftercooler inlet temp at 25 ℃ (77 ℉) ambient, ℃ ( ℉) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | | | |

## Optional Remote Radiator Cooling[1]

| | | | |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Max flow rate at max friction head, jacket water circuit, L/min (US gal/min) | | | |
| Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum friction head, jacket water circuit, kPa (psi) | | | |
| Maximum friction head, aftercooler circuit, kPa (psi) | | | |
| Maximum static head, jacket water circuit, m (ft) | | | |
| Maximum static head, aftercooler circuit, m (ft) | | | |
| Maximum jacket water outlet temp, ℃ (℉) | | | |
| Maximum aftercooler inlet temp at 25 ℃ (77 ℉) ambient, ℃ (℉) | | | |
| Maximum aftercooler inlet temp, ℃ (℉) | | | |
| Maximum fuel flow, L/hr (US gph) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | | | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 6075 (13395) |
| Unit wet weight kgs (lbs) | 6337 (13973) |

**Notes:**

[1] For non-standard remote installations contact your local Cummins representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating Factors

| | |
|---|---|
| **Standby** | Engine power available up to 1371 m (4497 ft) at ambient temperatures up to 40 ℃ (104 ℉). Above these elevations, derate at 4.4% per 305 m (1000 ft). Above 40 ℃ (104 ℉), derate 10% per 10 ℃ (18 ℉). |
| **Prime** | Engine power available up to 1084 m (3555 ft) at ambient temperatures up to 40 ℃ (104 ℉). Above these elevations, derate at 4.5% per 305 m (1000 ft). Above 40 ℃ (104 ℉), derate 20.9% per 10 ℃ (18 ℉). |
| **Continuous** | |

## Ratings Definitions

| Emergency Standby Power (ESP): | Limited-Time Running Power (LTP): | Prime Power (PRP): | Base Load (Continuous) Power (COP): |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. No sustained overload capability is available at this rating. |

## Alternator Data

| Voltage | Connection[1] | Temp Rise Degrees C | Duty[2] | Single Phase Factor[3] | Max surge kVA[4] | Winding No. | Alternator Data Sheet | Feature Code |
|---|---|---|---|---|---|---|---|---|
| 380-480 | Wye | 125/105 | S/P | | 3313 | 312 | ADS-310 | B282-2 |
| 220/380 | Wye | 105/80 | S/P | | 4234 | 311 | ADS-312 | B599-2 |
| 480 | Wye | 105/80 | S/P | | 3313 | 312 | ADS-310 | B600-2 |
| 480 | Wye | 80 | S | | 3866 | 312 | ADS-311 | B601-2 |
| 600 | Wye | 105/80 | S/P | | 3313 | 7 | ADS-310 | B603-2 |
| 600 | Wye | 80 | S/P | | 3866 | 7 | ADS-311 | B604-2 |
| 380 | Wye | 80 | S | | 4234 | 312 | ADS-312 | B660-2 |
| 480 | Wye | 125 | P | | 2944 | 312 | ADS-309 | B718-2 |
| 600 | Wye | 125 | P | | 2944 | 7 | ADS-309 | B720-2 |
| 190-480 | Wye | 125/105 | S/P | | 2944 | 311 | ADS-309 | B720-2 |
| 380-480 | Wye | 125/105 | S/P | | 3313 | 311 | ADS-310 | B731-2 |
| 208/416 | Wye | 105/80 | S/P | | 3866 | 311 | ADS-311 | B733-2 |
| 208/416 | Wye | 80 | S | | 4234 | 311 | ADS-312 | B734-2 |
| 400 | Wye | 105 | S | | 3866 | 312 | ADS-311 | B735-2 |
| 480 | Wye | 125 | S | | 2944 | 312 | ADS-309 | B738-2 |
| 600 | Wye | 125 | S | | 2944 | 7 | ADS-309 | B739-2 |
| 416 | Wye | 125/105 | S/P | | 3313 | 312 | ADS-310 | B741-2 |

**Notes**:

[1] Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor[3]. All single phase ratings are at unity power factor.

[2] Standby (S), Prime (P) and Continuous ratings (C).

[3] Factor for the *Single phase output from Three phase alternator* formula listed below.

[4] Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

## Formulas for Calculating Full Load Currents:

| Three phase output | Single phase output |
|---|---|
| $$\frac{\text{kW x 1000}}{\text{Voltage x 1.73 x 0.8}}$$ | $$\frac{\text{kW x SinglePhaseFactor x 1000}}{\text{Voltage}}$$ |

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**



D-3353 PDA056P768 (06/19)

500KW GENERATOR

**Specification sheet**

# Diesel generator set QSX15 series engine

450 kW – 500 kW Standby

## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

## Features

**Cummins heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent Magnet Generator (PMG)** - Offers enhanced motor starting and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby rating | Prime rating | Continuous rating | Data sheets |
|---|---|---|---|---|
| Model | 60 Hz kW (kVA) | 60 Hz kW (kVA) | 60 Hz kW (kVA) | 60 Hz |
| DFEJ | 450 (563) | 410 (513) | | D-3400 |
| DFEK | 500 (625) | 455 (569) | | D-3401 |

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO 8528 part 1 Class G3 |
| Voltage regulation, no load to full load | ± 0.5% |
| Random voltage variation | ± 0.5% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.25% |
| EMS compatibility | IEC 61000-4-2: Level 4 Electrostatic discharge<br>IEC 61000-4-3: Level 3 Radiated susceptibility |

## Engine specifications

| | |
|---|---|
| Design | Turbocharged with air-to-air charge air-cooling |
| Bore | 136.9 mm (5.39 in.) |
| Stroke | 168.9 mm (6.65 in.) |
| Displacement | 14.9 L (912.0 in$^3$) |
| Cylinder block | Cast iron with replaceable wet liners, in-line 6 cylinder |
| Battery capacity | 1400 Amps minimum at ambient temperature 0 °C (32 °F) |
| Battery charging alternator | 35 Amps |
| Starting voltage | 24 volt, negative ground |
| Fuel system | Full authority electronic (FAE) Cummins HPI-TP |
| Fuel filter | |
| Air cleaner type | |
| Lube oil filter type(s) | Single spin-on combination full flow and bypass filters |
| Standard cooling system | 40 ºC (104 ºF) ambient radiator |

## Alternator specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip-proof revolving field |
| Stator | 2/3 pitch |
| Rotor | Single bearing, flexible discs |
| Insulation system | Class H |
| Standard temperature rise | 125 °C standby at 40 °C ambient |
| Exciter type | PMG (Permanent Magnet Generator) |
| Phase rotation | A (U), B (V), C (W) |
| Alternator cooling | Direct drive centrifugal blower fan |
| AC waveform total harmonic distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone influence factor (TIF) | < 50% per NEMA MG1-22.43 |
| Telephone harmonic factor (THF) | < 3% |

## Available voltages

**60 Hz Line – Neutral/Line - Line**

| | | | |
|---|---|---|---|
| • 110/190 | • 110/220 | • 115/200 | • 115/230 |
| • 120/208 | • 127/220 | • 139/240 | • 220/380 |
| • 230/400 | • 240/416 | • 255/440 | • 277/480 |
| • 347/600 | | | |

Note: Consult factory for other voltages.

## Generator set options

### Engine

- 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 ℃ (40℉)
- 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 ℃ (40℉)
- 120 V 300 W lube oil heater
- Heavy duty air cleaner with safety element

### Alternator

- 80 ℃ rise
- 105 ℃ rise
- 150 ℃ rise
- 120/240 V 200 W anti-condensation heater

### Exhaust system

- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

### Fuel system

- 1022 L (270 gal) sub-base tank
- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 3218 L (850 gal) sub-base tank
- 6435 L (1700 gal) sub-base tank
- 9558 L (2525 gal) sub-base tank

### Cooling system

- High ambient 50 ℃ radiator

### Control panel

- PC 3.3
- PC 3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

### Generator set

- AC entrance box
- Battery
- Battery charger
- Export box packaging
- UL 2200 Listed
- Main line circuit breaker
- Paralleling accessories
- Remote annunciator panel
- Spring isolators
- Enclosure: aluminium, steel, weather protective or sound attenuated
- 2 year standby power warranty
- 2 year prime power warranty
- 5 year basic power warranty
- 10 year major components warranty

*Note: Some options may not be available on all models - consult factory for availability.

## Control system 2.3

**The PowerCommand 2.3 control system** - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface and isochronous governing (optional).

**Control** – Provides battery monitoring and testing features and smart-starting control system.

**InPower™** – PC-based service tool available for detailed diagnostics.

**PCCNet RS485** – Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

**Control boards** – Potted for environmental protection.

**Ambient operation** – Suitable for operation in ambient temperatures from -40 ℃ to +70 ℃ and altitudes to 13,000 feet (5000 meters). Prototype tested - UL, CSA and CE compliant.

### AC protection

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

### Operator/display panel

- Manual off switch
- 128 x 128 Alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 ºC to +70 ºC

### Alternator data

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

**Control functions**

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

**Digital governing (optional)**

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

**Digital voltage regulation**

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

**Other data**

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

**Options**

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

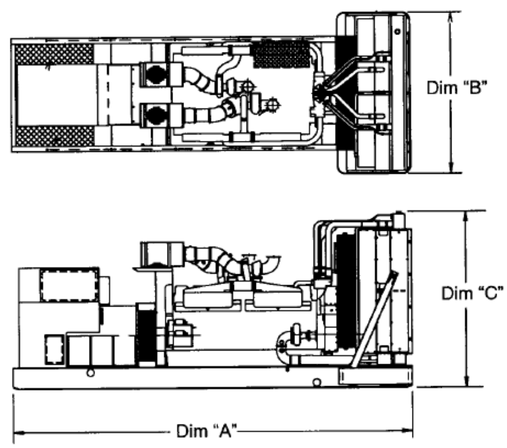
For further detail on PC 2.3 see document S-1569.
For further detail on PC 3.3 see document S-1570.

**Emergency Standby Power (ESP):**
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time running Power (LTP)**:
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP)**:
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP)**:
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




This outline drawing if for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

| Model | Dim 'A' mm (in.) | Dim 'B' mm (in.) | Dim 'C' mm (in.) | Set weight dry* kg (lbs) | Set weight wet* kg (lbs) |
|---|---|---|---|---|---|
| DFEJ | 3864 (152.1) | 1524 (60.0) | 1812 (71.3) | 4098 (9035) | 4234 (9335) |
| DFEK | 3864 (152.1) | 1524 (60.0) | 1812 (71.3) | 4325 (9535) | 4461 (9835) |

*Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | | The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment. |
| | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | **U.S EPA** | Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation. |
| | All low voltage models are CSA certified to product class 4215-01. | **International Building Code** | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012. |

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**

## Generator set data sheet

**Model:** DFEK
**Frequency:** 60
**Fuel type:** Diesel
**KW rating:** 500 standby
455 prime
**Emissions level:** EPA NSPS Stationary Emergency Tier 2

| | |
|---|---|
| **Exhaust emission data sheet:** | **EDS-173** |
| **Exhaust emission compliance sheet:** | **EPA-1005** |
| **Sound performance data sheet:** | **MSP-177** |
| **Cooling performance data sheet:** | **MCP-105** |
| **Prototype test summary data sheet:** | **PTS-145** |
| **Standard set-mounted radiator cooling outline:** | **0500-3326** |
| **Optional set-mounted radiator cooling outline:** | |
| **Optional heat exchanger cooling outline:** | |
| **Optional remote radiator cooling outline:** | |

## Fuel consumption

| | **Standby** | | | | **Prime** | | | | **Continuous** |
|---|---|---|---|---|---|---|---|---|---|
| | **kW (kVA)** | | | | **kW (kVA)** | | | | **kW (kVA)** |
| **Ratings** | 500 (625) | | | | 455 (569) | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **Full** |
| **US gph** | 11.6 | 18.8 | 25.7 | 34.4 | 10.9 | 17.6 | 23.7 | 30.4 | |
| **L/hr** | 44 | 71 | 97 | 130 | 41 | 67 | 90 | 115 | |

## Engine

| | **Standby rating** | **Prime rating** | **Continuous rating** |
|---|---|---|---|
| Engine manufacturer | Cummins Inc. | | |
| Engine model | QSX15-G9 | | |
| Configuration | Cast iron with replaceable wet cylinder liners, in-line 6 cylinder | | |
| Aspiration | Turbocharged with air-to-air charge air cooling | | |
| Gross engine power output, kWm (bhp) | 563.0 (755.0) | 507.3 (680.0) | |
| BMEP at set rated load, kPa (psi) | 2433.9 (353.0) | 2213.2 (321.0) | |
| Bore, mm (in) | 136.9 (5.39) | | |
| Stroke, mm (in) | 168.9 (6.65) | | |
| Rated speed, rpm | 1800 | | |
| Piston speed, m/s (ft/min) | 10.1 (1995.0) | | |
| Compression ratio | 17.0:1 | | |
| Lube oil capacity, L (qt) | 83.3 (88.0) | | |
| Overspeed limit, rpm | 2150 ± 50 | | |
| Regenerative power, kW | 52.00 | | |

## Fuel flow

| | | |
|---|---|---|
| Fuel flow at rated load, L/hr (US gph) | 423.9 (112.0) | |
| Maximum inlet restriction, mm Hg (in Hg) | 127.0 (5.0) | |
| Maximum return restriction, mm Hg (in Hg) | 165.1 (6.5) | |

## Air

| Air | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Combustion air, m3/min (scfm) | 41.6 (1470.0) | 38.8 (1370.0) | |
| Maximum air cleaner restriction, kPa (in H2O) | 6.2 (25.0) | | |
| Alternator cooling air, m3/min (scfm) | 62.0 (2190.0) | | |

## Exhaust

| | | | |
|---|---|---|---|
| Exhaust flow at set rated load, $m^3$/min (cfm) | 102.6 (3625.0) | 88.7 (3135.0) | |
| Exhaust temperature, ° C (° F) | 482.8 (901.0) | 466.7 (872.0) | |
| Maximum back pressure, kPa (in $H_2O$) | 10.2 (41.0) | | |

## Standard set-mounted radiator cooling

| | | | |
|---|---|---|---|
| Ambient design, ° C (° F) | 40 (104) | | |
| Fan load, $kW_m$ (HP) | 19 (25.5) | | |
| Coolant capacity (with radiator), L (US Gal) | 57.9 (15.3) | | |
| Cooling system air flow, $m^3$/min (scfm) | 707.5 (25000.0) | | |
| Total heat rejection, MJ/min (Btu/min) | 19.6 (18485.0) | 17.7 (16680.0) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |

## Optional set-mounted radiator cooling

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 19 (25.5) | | |
| Coolant capacity (with radiator), L (US gal) | 57.9 (15.3) | | |
| Cooling system air flow, $m^3$/min (scfm) | 707.5 (25000.0) | | |
| Total heat rejection, MJ/min (Btu/min) | 19.6 (18485.0) | 17.7 (16680.0) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |

## Optional heat exchanger cooling

| | | | |
|---|---|---|---|
| Set coolant capacity, L (US Gal.) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum raw water pressure, jacket water circuit, kPa (psi) | | | |
| Maximum raw water pressure, aftercooler circuit, kPa (psi) | | | |
| Maximum raw water pressure, fuel circuit, kPa (psi) | | | |
| Maximum raw water flow, jacket water circuit, L/min (US Gal/min) | | | |
| Maximum raw water flow, aftercooler circuit, L/min (US Gal/min) | | | |
| Maximum raw water flow, fuel circuit, L/min (US Gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US Gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US Gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US Gal/min) | | | |
| Raw water delta P at min flow, jacket water circuit, kPa (psi) | | | |
| Raw water delta P at min flow, aftercooler circuit, kPa (psi) | | | |
| Raw water delta P at min flow, fuel circuit, kPa (psi) | | | |
| Maximum jacket water outlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C ( °F) | | | |

## Optional remote radiator cooling[1]

| Optional remote radiator cooling[1] | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Max flow rate at max friction head, jacket water circuit, L/min (US gal/min) | | | |
| Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum friction head, jacket water circuit, kPa (psi) | | | |
| Maximum friction head, aftercooler circuit, kPa (psi) | | | |
| Maximum static head, jacket water circuit, m (ft) | | | |
| Maximum static head, aftercooler circuit, m (ft) | | | |
| Maximum jacket water outlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | | | |
| Maximum aftercooler inlet temp, °C (°F) | | | |
| Maximum fuel flow, L/hr (US gph) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | | | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 4325 (9535) |
| Unit wet weight kgs (lbs) | 4461 (9835) |

**Notes**:
[1] For non-standard remote installations contact your local Cummins Power Generation representative.
[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating factors

| | |
|---|---|
| **Standby** | Genset may be operated up to 640 m (2100 ft) and 40 °C (104 °F) without power deration. For sustained operation above these conditions up to 1150 m (3770 ft), derate by 3.8% per 305 m (1000 ft), and 6.1% per 10 °C (3.4% per 10 °F). Above 1150 m (3770 ft) up to 1680 m (5510 ft), derate 6.3% total for 1150 m (3770 ft) plus 1.6% per 305 m (1000 ft) over 1150 m (3770 ft) and 3.8% per 10 °C (2.2% per 10 °F). Above 1680 m (5510 ft), up to 3000 m (9840 ft), derate 9.0% total for 1680 m (5510 ft) plus 3.7% per 305 m (1000 ft) and 5.7% per 10 °C (3.2% per 10 °F). Above 3000 m (9840 ft), derate 24.8% total for 3000 m (9840 ft) plus 1.8% per 305 m (1000 ft) above 3000 m (9840 ft) and 10% per 10 °C (5.6% per 10 °F). |
| **Prime** | Genset may be operated up to 640 m (2100 ft) and 40 °C (104 °F) without power deration. For sustained operation above these conditions up to 1150 m (3770 ft), derate by 3.8% per 305 m (1000 ft), and 6.1% per 10 °C (3.4% per 10 °F). Above 1150 m (3770 ft) up to 1680 m (5510 ft), derate 6.3% total for 1150 m (3770 ft) plus 1.6% per 305 m (1000 ft) over 1150 m (3770 ft) and 3.8% per 10 °C (2.2% per 10 °F). Above 1680 m (5510 ft), up to 3000 m (9840 ft), derate 9.0% total for 1680 m (5510 ft) plus 3.7% per 305 m (1000 ft) and 5.7% per 10 °C (3.2% per 10 °F). Above 3000 m (9840 ft), derate 24.8% total for 3000 m (9840 ft) plus 1.8% per 305 m (1000 ft) above 3000 m (9840 ft) and 10% per 10 °C (5.6% per 10 °F). |
| **Continuous** | |

## Ratings definitions

| Emergency standby power (ESP): | Limited-time running power (LTP): | Prime power (PRP): | Base load (continuous) power (COP): |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. |

## Alternator data

| Three Phase Table[1] | | 105 °C | 105 °C | 105 °C | 125 °C | 125 °C | 125 °C | 125 °C | 125 °C | 150 °C | 150 °C | 150 °C | 150 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feature Code | | B262 | B301 | B252 | B258 | B252 | B414 | B246 | B300 | B426 | B413 | B424 | B419 |
| Alternator Data Sheet Number | | 308 | 307 | 307 | 308 | 307 | 308 | 306 | 306 | 307 | 307 | 305 | 306 |
| Voltage Ranges | | 110/190 thru 139/240 220/380 Thru 277/480 | 347/600 | 120/208 Thru 139/240 240/416 Thru 277/480 | 110/190 Thru 139/240 220/380 Thru 277/480 | 120/208 Thru 139/240 240/416 Thru 277/480 | 120/208 Thru 139/240 240/416 Thru 277/480 | 277/480 | 347/600 | 110/190 Thru 139/240 220/380 Thru 277/480 | 120/208 Thru 139/240 240/416 Thru 277/480 | 277/480 | 347/600 |
| Surge kW | | 514 | 517 | 514 | 514 | 514 | 516 | 515 | 515 | 512 | 514 | 512 | 515 |
| Motor Starting kVA (at 90% sustained voltage) | Shunt | | | | | | | | | | | | |
| | PMG | 2429 | 2208 | 2208 | 2429 | 2208 | 2429 | 1896 | 1896 | 2208 | 2208 | 1749 | 1896 |

| Full Load Current Amps at Standby Rating | 110/190 | 120/208 | 110/220 | 115/230 | 139/240 | 220/380 | 230/400 | 240/416 | 255/440 | 277/480 | 347/600 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1901 | 1737 | 1642 | 1571 | 1505 | 951 | 903 | 868 | 821 | 753 | 602 | |

**Note:**

[1] Single phase power can be taken from a three phase generator set at up to 40% of the generator set nameplate kW rating at unity power factor.

## Formulas for calculating full load currents:

**Three phase output**

$$\frac{\text{kW x 1000}}{\text{Voltage x 1.73 x 0.8}}$$

**Single phase output**

$$\frac{\text{kW x SinglePhaseFactor x 1000}}{\text{Voltage}}$$

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**

Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


D-3401d (6/15)

Power Generation

power.cummins.com

250KW GENERATOR

**Specification Sheet**

# Diesel Generator Set QSL9-G7 Series Engine

250 kW - 300 kW Standby

## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime Power applications.

## Features

**Cummins heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at the rated power level.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby rating | | Prime rating | | Continuous rating | | Data sheets | |
|---|---|---|---|---|---|---|---|---|
| **Model** | **60 Hz kW (kVA)** | **50 Hz kW (kVA)** | **60 Hz kW (kVA)** | **50 Hz kW (kVA)** | **60 Hz kW (kVA)** | **50 Hz kW (kVA)** | **60 Hz** | **50 Hz** |
| **DQDAA** | 250 (313) | | 225 (281) | | | | D-3442 | |
| **DQDAB** | 275 (344) | | 250 (313) | | | | D-3443 | |
| **DQDAC** | 300 (375) | | 270 (338) | | | | D-3444 | |

## Generator Set Specifications

| | |
|---|---|
| Governor regulation class | ISO 8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 0.5% |
| Random voltage variation | ± 0.5% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.5% |
| Radio frequency emissions compliance | IEC 801.2 through IEC 801.5; MIL-STD-461C, Part 9 |

## Engine Specifications

| | |
|---|---|
| Bore | 114.0 mm (4.49 in) |
| Stroke | 145 mm (5.69 in) |
| Displacement | 8.9 L (543 in$^3$) |
| Configuration | Cast iron, in-line 6 cylinder |
| Battery capacity | 750 amps minimum at ambient temperature of -18 °C (-0.4 °F) and above |
| Battery charging alternator | 70 amps |
| Starting voltage | 24 volt, negative ground |
| Fuel system | Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff |
| Fuel filter | Dual element with water separator |
| Air cleaner type | Normal duty |
| Lube oil filter type(s) | Single spin-on, combination full flow and bypass filters |
| Standard cooling system | High ambient radiator |

## Alternator Specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip proof revolving field |
| Stator | 2/3 pitch |
| Rotor | Single bearing, flexible discs |
| Insulation system | Class H |
| Standard temperature rise | 125 °C Standby, 105 °C Prime |
| Exciter type | Permanent Magnet Generator (PMG) |
| Phase rotation | A (U), B (V), C (W) |
| Alternator cooling | Direct drive centrifugal blower |
| AC waveform Total Harmonic Distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone Influence Factor (TIF) | < 50 per NEMA MG1-22.43 |
| Telephone Harmonic Factor (THF) | < 3 |

## Available Voltages

| **60 Hz** 3-phase | | | **50 Hz** 3-phase | |
|---|---|---|---|---|
| Reconnectable | | Non-Reconnectable | Reconnectable | Non-Reconnectable |
| • 110/90<br>• 139/240<br>• 240/416 | • 120/208<br>• 120/240<br>• 254/440 | • 277/480<br>• 347/600 | | |

Note: Consult factory for other voltages.

## Generator Set Options and Accessories

**Engine**

- 120/240 V 1500 W coolant heater
- 120/240 V 150 W lube oil heater
- Heavy duty air cleaner
- Engine oil temperature

**Control panel**

- 120/240 V 100 W control anti-condensation heater
- Exhaust pyrometer
- Ground fault indication
- Remote fault signal package
- Run relay package
- Paralleling configuration

**Alternator**

- 105 °C rise
- 125 °C rise
- 120/240 V 100 W anti-condensation heater
- PMG excitation
- Single phase

**Exhaust system**

- Genset mounted muffler
- Heavy duty exhaust elbow
- Slip on exhaust connection
- NPT exhaust connection

**Fuel system**

- 1022 L (270 gal) sub-base tank
- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 2725 L (720 gal) sub-base tank
- 5565 L (1470 gal) sub-base tank

**Generator set**

- AC entrance box
- Battery
- Battery charger
- Export box packaging
- UL 2200 Listed
- Main line circuit breaker
- PowerCommand network
- Communications Module (NCM)
- Remote annunciator panel
- Spring isolators
- Enclosure: aluminum, steel, weather protective or sound attenuated
- 2 year Standby power warranty
- 2 year Prime power warranty
- 5 year Basic power warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

## Control System PCC 2100

**PowerCommand** control is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ protective relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LonWorks® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

**Operator/display panel**

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable LED lamps (5)
- Configurable for local language

**Engine protection**

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant -start disconnect
- Cranking lockout
- Sensor failure indication

**Engine data**

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

**AmpSentry AC protection**

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

**Alternator data**

- Line-to-Line and Line-to-Neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

**Other data**

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

**Governing**

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

**Voltage regulation**

- Digital PWM electronic voltage regulation
- Three phase Line-to-Neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

**Control functions**

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

**Options**

- LED bargraph AC data display
- Thermostatically controlled space heater
- Key-type mode switch
- Ground fault module
- Auxiliary relays (3)
- Echelon LONWORKS interface
- Modlon Gateway to convert to Modbus (loose)
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- Digital input and output module(s) (loose)
- Remote annunciator (loose)

For further detail see document S-1409.

## Ratings Definitions

**Emergency Standby Power (ESP)**:

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP)**:

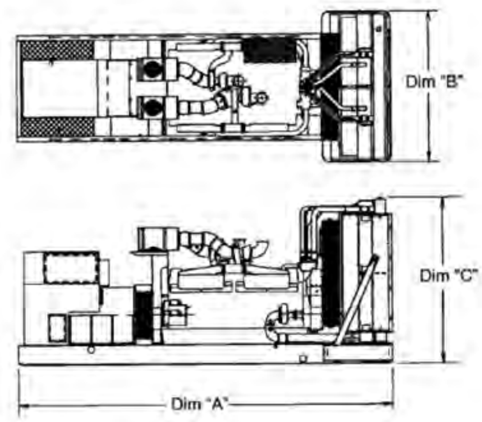
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP)**:

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP)**:

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

## Dimensions and weights with standard cooling system

| Model | Dim "A" mm (in.) | Dim "B" mm (in.) | Dim "C" mm (in.) | Estimated set weight* dry kg (lbs) | Estimated set weight* wet kg (lbs) |
|---|---|---|---|---|---|
| **DQDAA** | 3023 (119.0) | 1270 (50.0) | 1617 (64.0) | 2184 (4814) | 2234 (4926) |
| **DQDAB** | 3023 (119.0) | 1270 (50.0) | 1617 (64.0) | 2184 (4814) | 2234 (4926) |
| **DQDAC** | 3023 (119.0) | 1270 (50.0) | 1617 (64.0) | 2319 (5113) | 2370 (5225) |

## Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2

| Model | Dim "A" mm (in.) | Dim "B" mm (in.) | Dim "C" mm (in.) | Estimated set weight* dry kg (lbs) | Estimated set weight* wet kg (lbs) |
|---|---|---|---|---|---|
| **DQDAA** | 3023 (119.0) | 1270 (50.0) | 1676 (66.0) | 2184 (4814) | 2234 (4926) |
| **DQDAB** | 3023 (119.0) | 1270 (50.0) | 1676 (66.0) | 2184 (4814) | 2234 (4926) |
| **DQDAC** | 3023 (119.0) | 1270 (50.0) | 1676 (66.0) | 2319 (5113) | 2370 (5225) |

*Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Codes and Standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| ISO 9001 | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | UL | The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. |
| PTS | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | U.S. EPA | Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards,40 CFR 60 subpart IIII Tier 3 exhaust emission levels. U.S. applications must be applied per this EPA regulation. |
| CSA | All low voltage models are CSA certified to product class 4215-01. | International Building Code | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012. |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**

# Generator set data sheet

**Model:** DQDAA
**Frequency:** 60 Hz
**Fuel type:** Diesel
**kW rating:** 250 Standby
225 Prime
**Emissions level:** EPA NSPS Stationary Emergency Tier 3

| | |
|---|---|
| **Exhaust emission data sheet:** | **EDS-1073** |
| **Exhaust emission compliance sheet:** | **EPA-1101** |
| **Sound performance data sheet:** | **MSP-1026** |
| **Cooling performance data sheet:** | **MCP-163** |
| **Prototype test summary data sheet:** | **PTS-164** |
| **Standard set-mounted radiator cooling outline:** | **A048R355** |
| **Optional set-mounted radiator cooling outline with seismic feature codes L228-2 (IBC) or L225-2 (OSHPD):** | **A041F591** |

## Fuel consumption

| | Standby | | | | Prime | | | | Continuous |
|---|---|---|---|---|---|---|---|---|---|
| | kW (kVA) | | | | kW (kVA) | | | | kW (kVA) |
| **Ratings** | 250 (313) | | | | 225 (281) | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **Full** |
| **US gph** | 6.0 | 10.5 | 15.1 | 19.6 | 5.5 | 9.5 | 13.6 | 17.7 | |
| **L/hr** | 22.5 | 39.7 | 56.9 | 74.2 | 20.7 | 36.1 | 51.5 | 67.0 | |

## Engine

| Engine | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Engine manufacturer | Cummins Inc. | | |
| Engine model | QSL9-G7 | | |
| Configuration | Cast iron, in-line 6 cylinder | | |
| Aspiration | Turbocharged and after-cooled | | |
| Gross engine power output, $kW_m$ (bhp) | 346 (464) | 312 (419) | |
| BMEP at set rated load, kPa (psi) | 2606 (378) | 2351 (341) | |
| Bore, mm (in.) | 114.0 (4.49) | | |
| Stroke, mm (in.) | 145 (5.69) | | |
| Rated speed, rpm | 1800 | | |
| Piston speed, m/s (ft/min) | 8.7 (1707.0) | | |
| Compression ratio | 16.1:1 | | |
| Lube oil capacity, L (qt) | 30.0 (31.7) | | |
| Overspeed limit, rpm | 2070 ± 50 | | |
| Regenerative power, kW | 35.00 | | |

## Fuel flow

| | | |
|---|---|---|
| Maximum fuel flow, L/hr (US gph) | 138.1 (36.5) | |
| Maximum fuel inlet restriction, mm Hg (in Hg) | 152.4 (6.0) | |
| Maximum return restriction, mm Hg (in Hg) | 254.0 (10.0) | |

## Air

| Air | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Combustion air, $m^3$/min (scfm) | 22.3 (787) | 20.8 (733) | |
| Maximum air cleaner restriction, kPa (in $H_2O$) | 6.2 (25.0) | | |
| Alternator cooling air, $m^3$/min (cfm) | 59.4 (2100.0) | | |

## Exhaust

| | | | |
|---|---|---|---|
| Exhaust flow at set rated load, $m^3$/min (cfm) | 54.6 (1927) | 50.8 (1796) | |
| Exhaust temperature, °C (°F) | 525 (977) | 495 (923) | |
| Maximum back pressure, kPa (in $H_2O$) | 10.2 (41.0) | | |

## Standard set-mounted radiator cooling (non-seismic)

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 26.09 (35) | | |
| Coolant capacity (with radiator), L (US gal) | 34.29 (9.06) | | |
| Cooling system air flow, $m^3$/min (scfm) | 427.58 (15100) | | |
| Total heat rejection, MJ/min (Btu/min) | 8.93 (8467.0) | 8.55 (8104.0) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |

## Optional set-mounted radiator cooling (with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD)

| | | | |
|---|---|---|---|
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 27.8 (37.2) | | |
| Coolant capacity (with radiator), L (US gal) | 30.3 (8.0) | | |
| Cooling system air flow, $m^3$/min (scfm) | 568.1 (20075.0) | | |
| Total heat rejection, MJ/min (Btu/min) | 8.93 (8467.0) | 8.55 (8104.0) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |

## Optional heat exchanger cooling

| Optional heat exchanger cooling | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum raw water pressure, jacket water circuit, kPa (psi) | | | |
| Maximum raw water pressure, aftercooler circuit, kPa (psi) | | | |
| Maximum raw water pressure, fuel circuit, kPa (psi) | | | |
| Maximum raw water flow, jacket water circuit, L/min (US gal/min) | | | |
| Maximum raw water flow, aftercooler circuit, L/min (US gal/min) | | | |
| Maximum raw water flow, fuel circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min) | | | |
| Raw water delta P at min flow, jacket water circuit, kPa (psi) | | | |
| Raw water delta P at min flow, aftercooler circuit, kPa (psi) | | | |
| Raw water delta P at min flow, fuel circuit, kPa (psi) | | | |
| Maximum jacket water outlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | | | |

## Optional remote radiator cooling[1]

| | | | |
|---|---|---|---|
| Set coolant capacity, L (US gal) | | | |
| Max flow rate at max friction head, jacket water circuit, L/min (US gal/min) | | | |
| Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum friction head, jacket water circuit, kPa (psi) | | | |
| Maximum friction head, aftercooler circuit, kPa (psi) | | | |
| Maximum static head, jacket water circuit, m (ft) | | | |
| Maximum static head, aftercooler circuit, m (ft) | | | |
| Maximum jacket water outlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | | | |
| Maximum aftercooler inlet temp, °C (°F) | | | |
| Maximum fuel flow, L/hr (US gph) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | | | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 2184 (4814) |
| Unit wet weight kgs (lbs) | 2234 (4926) |

**Notes**:
[1] For non-standard remote installations contact your local Cummins representative.
[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating factors

| | |
|---|---|
| **Standby** | Engine power available up to 1494 m (4900 ft) at ambient temperature up to 40 °C (104 °F). Above these elevations, derate at 7% per 400m (1312 ft). Above 40 °C (104 °F) derate 5.5% per 10 °C (18 °F). Derates must be combined when both altitude of 1494 m (4900 ft) and temperature of 40 °C (104 °F) are exceeded. |
| **Prime** | Engine power available up to 1452 m (4764 ft) at ambient temperature up to 40 °C (104 °F). Above these elevations, derate at 7% per 400m (1312 ft). Above 40 °C (104 °F) derate 5.5% per 10 °C (18 °F). Derates must be combined when both altitude of 1452 m (4764 ft) and temperature of 40 °C (104 °F) are exceeded. |
| **Continuous** | |

## Ratings definitions

| **Emergency Standby Power (ESP):** | **Limited-Time Running Power (LTP):** | **Prime Power (PRP):** | **Base Load (Continuous) Power (COP):** |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. |

## Alternator data

| **Three phase table**[1] | | **80 °C** | **80 °C** | **80 °C** | **80 °C** | **105 °C** | **105 °C** | **105 °C** | **125 °C** | **125 °C** | **125 °C** | **125 °C** | **125 °C** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feature code | | B260 | B257 | B251 | B302 | B259 | B256 | B301 | B258 | B252 | B246 | B247 | B300 |
| Alternator data sheet number | | 342 | 341 | 341 | 341 | 341 | 341 | 340 | 341 | 340 | 340 | 340 | 340 |
| Voltage ranges | | 110/190 thru 139/240 220/380 thru 277/480 | 120/208 thru 139/240 240/416 thru 277/480 | 277/480 | 347/600 | 110/190 thru 139/240 220/380 thru 277/480 | 120/208 thru 139/240 240/416 thru 277/480 | 347/600 | 110/190 thru 139/240 220/380 thru 277/480 | 120/208 thru 139/240 240/416 thru 277/480 | 277/480 | 277/480 | 347/600 |
| Surge kW | | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 |
| Motor starting kVA (at 90% sustained voltage) | Shunt | | | | | | | | | | | | |
| | PMG | 1372 | 1210 | 1210 | 1210 | 1210 | 1210 | 1028 | 1210 | 1028 | 1028 | 1028 | 1028 |

| Full load current - amps at Standby rating | 120/208 | 127/220 | 139/240 | 220/380 | 240/416 | 254/440 | 277/480 | 347/600 | |
|---|---|---|---|---|---|---|---|---|---|
| | 867 | 820 | 752 | 475 | 434 | 410 | 376 | 301 | |

**Note**:
[1] Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 3 below

## Formulas for calculating full load currents:

| Three phase output | Single phase output |
| --- | --- |
| $$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$ | $$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$ |

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**


D-3442 (10/17)

Specification Sheet

# Enclosures and Tanks

250-1000 kW Gensets

## Enclosure Standard Features

- 14-gauge steel construction (panels)
- Stainless steel hardware
- Zinc phosphate pretreatment, e-coat primer and super durable powder topcoat paint minimize corrosion and color fade
- Package listed to UL 2200
- Designed to satisfy national electrical code installation requirements
- Fuel and electrical stub-up area within enclosure perimeter
- Fixed louvers
- Cambered roof prevents water accumulation
- Recessed, lockable doors in two sides
- Retainers hold doors open for easy access
- Enclosed exhaust silencer ensures safety and protects against rust
- Rain cap
- Exterior oil and coolant drains with interior valves for ease of service
- Rodent barriers on inlet
- Non-hydroscopic sound attenuating material
- Side mounted controls and circuit breakers
- Easy access lifting points for spreader bars
- Dual vibration isolation system (250-500 kW)
- Spring vibration isolation system (600-1000 kW)
- Enclosure mounts to lifting base or fuel tank (250-500 kW)
- Enclosure mounts to lifting base (600-1000 kW)
- Factory pre-assembled package
- Designed for outdoor use only
- Externally mounted emergency stop button for operator safety (optional on 250-500 kW)
- Horizontal air discharge to prevent leaf and snow accumulation (600-1000 kW)

## Options

- Three levels of sound attenuation
- Motorized louvers to protect from ice and snow accumulation (available on air inlet for all models and on air outlet on level II, 250-500 kW enclosures only)
- Horizontal air discharge, sound level 2 only (250-500 kW)
- Aluminium construction with roll-coated polymer paint
- Wind rated to 150 mph
- Neutral sandstone paint color
- Factory mounted battery charger
- External 120 VAC service outlet
- Rain hoods for air inlet (250-500 kW)
- Lifting base in lieu of a sub-base tank (250-500 kW)
  - Pre-wired AC distribution package
  - 100 amp (250-500 kW) or 150 amp (600-1000 kW) main circuit breaker; connected to 120 VAC Line-Neutral and 208 or 240 VAC Line-Line, spare breaker positions and capacity for future upgrades (600-1000 kW)
  - GFCI protected internal 120 VAC service receptacle
  - GFCI protected weather proof external 120 volt service receptacle
  - All factory installed AC powered features pre-wired into load center
- Interior lights – 120 volt (600-1000 kW)
- Rain hoods for air inlet (250-500 kW)
- Seismic isolators available (600-1000 kW)

## Fuel Tanks

**Standard sub-base tank features**

- UL 142 Listed
- ULC-S601-07 Listed
- NFPA37 compliant
- Dual walled, steel construction
- Emergency tank and rupture basin vents
- Tank mounted mechanical fuel gauge
- Fuel supply and return tubes
- Top mounted leak detection float switch
- Low and high level fuel switches
- Mounting brackets for optional pump and control (250-500 kW)
- Integral lifting points

**Sub-base tank options**

- Pre-wired fuel pump and control
- Fuel overfill alarm – internal or external
- Overflow and tank fill plugs
- Five gallon spill fill box – internal or external
- Fill pipe extender
- Local code approvals available

## 200-500 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

| Genset model (60 Hz) | Gallons /hour at full load | 270 gallon tank | 300 gallon tank | 400 gallon tank | 500 gallon tank | 600 gallon tank | 660 gallon tank | 720 gallon tank | 850 gallon tank | 1420 gallon tank | 1470 gallon tank | 1700 gallon tank | 2050 gallon tank | 2525 gallon tank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 250 DQDAA | 20 | 14 | 15 | 20 | 25 | 30 | 33 | 36 | | 72 | 74 | | 104 | |
| 275 DQDAB | 21 | 13 | 14 | 19 | 24 | 29 | 31 | 34 | | 66 | 70 | | 96 | |
| 300 DQDAC | 23 | 12 | 13 | 17 | 22 | 26 | 29 | 31 | | 61 | 64 | | 88 | |
| 300 DQHAB | 23 | 12 | 13 | 17 | 22 | 26 | 29 | | 37 | | | 74 | | |
| 450 DFEJ | 30 | 9 | 10 | 13 | 17 | 20 | 22 | | 28 | | | 57 | | 84 |
| 500 DFEK | 34 | 8 | 9 | 11 | 15 | 18 | 19 | | 25 | | | 50 | | 74 |

Operating hours are measured at 60 Hz, standby rating.

## 600-1000 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

| Genset model | Gallons /hour at full load | 200 gallon tank | 660 gallon tank | 1000 gallon tank | 1500 gallon tank | 2000 gallon tank | 2400 gallon tank |
|---|---|---|---|---|---|---|---|
| 600 DQCA | 42 | 5 | 16 | 24 | 36 | 48 | 57 |
| 600 DQPAA | 45 | 4 | 15 | 22 | 33 | 44 | 53 |
| 650 DQPAB | 50 | 4 | 13 | 20 | 30 | 40 | 48 |
| 750 DQCB | 51 | 4 | 13 | 20 | 29 | 39 | 47 |
| 750 DQFAA | 53 | 4 | 12 | 19 | 28 | 38 | 45 |
| 800 DQCC | 53 | 4 | 12 | 19 | 28 | 38 | 45 |
| 800 DQFAB | 56 | 4 | 12 | 18 | 27 | 36 | 43 |
| 900 DQFAC | 64 | 3 | 10 | 16 | 23 | 31 | 38 |
| 1000 DQFAD | 72 | 3 | 9 | 14 | 21 | 28 | 33 |

*3000 gallon tank offered as an accessory kit – refer to NAAC-5853 spec sheet.

- Operating hours are measured at 60 Hz, standby rating.
- Up to 90% fill alarm to comply with NFPA30, operating capacity is reduced by 10%.

## Enclosure Package Sound Pressure Levels @ 7 meters dB(A)

| Genset model | Weather protective enclosure (F200, F203) | QuietSite level 1 sound attenuated enclosure (F201, F204) | QuietSite level 2 sound attenuated enclosure (F202, F205) |
|---|---|---|---|
| 250 DQDAA | 90 | 88 | 72 |
| 275 DQDAB | 90 | 88 | 73 |
| 300 DQDAC | 90 | 88 | 73 |
| 300 DQHAB | 89 | 88 | 76 |
| 450 DFEJ | 88 | 85 | 74 |
| 500 DFEK | 89 | 87 | 73 |
| 600 DQCA | 90.6/86* | 79.3/78* | 74.1/73* |
| 600 DQPAA | 89.10 | 80.70 | 74.70 |
| 650 DQPAB | 89.70 | 81.40 | 75 |
| 750 DQCB | 91.1/87* | 79.9/79* | 75.3/74* |
| 750 DQFAA | 87.8 | 77.8 | 73.8 |
| 800 DQCC | 91.3/87* | 80.2/79* | 75.7/74* |
| 800 DQFAB | 88.1 | 78.3 | 74 |
| 900 DQFAC | 88.8 | 79.1 | 74.6 |
| 1000 DQFAD | 89.6 | 80.1 | 75.3 |

- All data is 60 Hz, full load standby rating, steel enclosures only.
- Data is a measured average of 8 positions.
- Sound levels for aluminium enclosures are approximately 2 dB(A) higher than listed sound levels for steel enclosures.

* Sound data with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD)

## Package Dimensions of Enclosure, Exhaust System, and UL Tank

**250-500 kW**

For 250kW & 500kW

| Tank size (gal) | Weather protective package length (in) | QuietSite level I package length (in) | QuietSite level 2 package length (in) | Width (in) | Height (in) | Weather protective package weight (lbs) | QuietSite level 1 package weight (lbs) | QuietSite level 2 package weight (lbs) |
|---|---|---|---|---|---|---|---|---|
| 270 | 188 | 188 | 222 | 82 | 106 | 4991 | 5471 | 6711 |
| 300 | 188 | 188 | 222 | 82 | 104 | 5648 | 6073 | 6991 |
| 400 | 188 | 188 | 222 | 82 | 106 | 5833 | 6258 | 7176 |
| 500 | 188 | 188 | 222 | 82 | 108 | 5956 | 6381 | 7299 |
| 600 | 188 | 188 | 222 | 82 | 111 | 6116 | 6541 | 7459 |
| 660 | 188 | 188 | 222 | 82 | 113 | 6235 | 6660 | 7578 |
| 720 | 188 | 188 | 222 | 82 | 114 | 6174 | 6599 | 7517 |
| 850 | 188 | 188 | 222 | 82 | 118 | 6529 | 6954 | 7872 |
| 1420 | 200 | 200 | 222 | 82 | 128 | 6863 | 7343 | 8583 |
| 1470 | 192 | 192 | 222 | 82 | 128 | 7253 | 7733 | 8973 |
| 1700 | 234 | 234 | 234 | 82 | 128 | 7982 | 8407 | 9325 |
| 2050 | 284 | 284 | 284 | 82 | 128 | 8383 | 8863 | 10103 |
| 2525 | 346 | 346 | 346 | 82 | 128 | 9391 | 9871 | 11111 |
| Lifting base | 188 | 188 | 222 | 82 | 100 | 4335 | 4760 | 5678 |

**600-1000 kW**

For 750kW & 1000kW

| Tank size (gal) | Weather protective package length (in) | QuietSite level I package length (in) | QuietSite level 2 package length (in) | Width (in) | Height (in) | Weather protective package weight (lbs) | QuietSite level 1 package weight (lbs) | QuietSite level 2 package weight (lbs) |
|---|---|---|---|---|---|---|---|---|
| 200 | 260 | 303 | 315 | 98 | 137 | 10194 | 13074 | 14954 |
| 660 | 260 | 303 | 315 | 98 | 137 | 9586 | 12466 | 14346 |
| 1000 | 260 | 303 | 315 | 98 | 141 | 10117 | 12997 | 14877 |
| 1500 | 260 | 303 | 315 | 98 | 146 | 10677 | 13557 | 15437 |
| 2000 | 292 | 327 | 327 | 98 | 143 | 11959 | 14839 | 16719 |
| 2400 | 338 | 338 | 338 | 98 | 143 | 12961 | 15841 | 17721 |

- This weight does not include the generator set. Consult your local Cummins distributor or the appropriate generator specification sheet.
- Width is 86” lifting eye to lifting eye (250-500 kW), 102” lifting eye to lifting eye (600-1000 kW).
- Height - Florida, Michigan, and Suffolk add 6.4” (250-500 kW) or 2” (600-1000 kW) for bottom space.
- Maximum length emergency vent removed.

| | |
|---|---|
| CSA | CSA - The generator set is CSA certified to product class 4215-01. |
| UL | UL - The generator set is available listed to UL 2200, stationary engine generator assemblies. The PowerCommand® control is listed to UL 508 - Category NITW7 for U.S. and Canadian usage. |

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**



S-1443 (11/18)

150KW GENERATOR

**Specification sheet**

# Diesel generator set

QSB7 series engine

125-200 kW @ 60 Hz

EPA Tier 3 emissions

## Description

Cummins® generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby applications.

## Features

**Heavy duty engine** - Rugged 4-cycle industrial diesel delivers reliable power and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 50 °C (122 °F) ambient temperature.

**Enclosures** - The aesthetically appealing enclosure incorporates special designs that deliver one of the quietest generators of its kind. Aluminium material plus durable powder coat paint provides the best anti-corrosion performance. The generator set enclosure has been evaluated to withstand 180 MPH wind loads in accordance with ASCE7 -10. The design has hinged doors to provide easy access for service and maintenance.

**Fuel tanks** - Dual wall sub-base fuel tanks are offered as optional features, providing economical and flexible solutions to meet extensive code requirements on diesel fuel tanks.

**NFPA** - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby 60 Hz | | Prime 60 Hz | | |
|---|---|---|---|---|---|
| **Model** | **kW** | **kVA** | **kW** | **kVA** | **Data sheets** |
| C125D6D | 125 | 156 | 113 | 141 | NAD-6371-EN |
| C150D6D | 150 | 188 | 135 | 169 | NAD-6372-EN |
| C175D6D | 175 | 219 | 158 | 197 | NAD-6373-EN |
| C200D6D | 200 | 250 | 180 | 225 | NAD-6374-EN |

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 1.0% |
| Random voltage variation | ± 1.0% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.50% |
| Radio frequency emissions compliance | FCC code title 47 part 15 class A and B |

## Engine specifications

| | |
|---|---|
| Design | Turbocharged and charge air cooled |
| Bore | 107 mm (4.21 in.) |
| Stroke | 124 mm (4.88 in.) |
| Displacement | 6.7 L (408 $in^3$) |
| Cylinder block | Cast iron, in-line 6 cylinder |
| Battery capacity | 2 x 850 amps per battery at ambient temperature of 0 °C (32 °F) |
| Battery charging alternator | 100 amps |
| Starting voltage | 2 x 12 volt in parallel, negative ground |
| Lube oil filter type(s) | Spin-on with relief valve |
| Standard cooling system | High ambient radiator |
| Rated speed | 1800 rpm |

## Alternator specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip proof, revolving field |
| Stator | 2/3 pitch |
| Rotor | Direct coupled, flexible disc |
| Insulation system | Class H per NEMA MG1-1.65 |
| Standard temperature rise | 120 ºC (248 °F) Standby |
| Exciter type | Torque match (shunt) with PMG as option |
| Alternator cooling | Direct drive centrifugal blower |
| AC waveform Total Harmonic Distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone Influence Factor (TIF) | < 50 per NEMA MG1-22.43 |
| Telephone Harmonic Factor (THF) | < 3% |

## Available voltages

| 1-phase | 3-phase | | | | |
|---|---|---|---|---|---|
| • 120/240 | • 120/208 | • 120/240 | • 277/480 | • 347/600 | • 127/220 |

## Generator set options

**Fuel system**
- Basic fuel tanks
- Regional fuel tanks

**Engine**
- Engine air cleaner – normal or heavy duty
- Shut down – low oil pressure
- Extension – oil drain
- Engine oil heater

**Alternator**
- 120 °C temperature rise alternator
- 105 °C temperature rise alternator
- PMG excitation
- Alternator heater, 120 V
- Reconnectable full 1 phase output alternator upto 175 kWe

**Control**
- AC output analog meters
- Stop switch – emergency
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)

**Electrical**
- One, two or three circuit breaker configurations
- 80% rated circuit breakers
- 80% or 100% rated LSI circuit breakers
- Battery charger

**Enclosure**
- Aluminium enclosure Sound Level 1 or Level 2, green color
- Aluminium weather protective enclosure with muffler installed, green color

**Cooling system**
- Shutdown – low coolant level
- Warning – low coolant level
- Extension – coolant drain
- Coolant heater options:
  - <4 °C (40 °F) – cold weather
  - <-18 °C (0 °F) – extreme cold

**Exhaust system**
- Exhaust connector NPT
- Exhaust muffler mounted

**Generator set application**
- Base barrier – elevated genset
- Radiator outlet duct adapter

**Warranty**
- Base warranty – 2 year/1000 hours, Standby
- Base warranty – 1 year/unlimited hours, Prime
- 3 & 5 year Standby warranty options

## Generator set accessories

- Coolant heater
- Battery heater kit
- Engine oil heater
- Remote control displays
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485
- Audible alarm
- Remote monitoring device – PowerCommand 500/550
- Battery charger – stand-alone, 12 V
- Circuit breakers
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Base barrier – elevated generator set
- Mufflers – industrial, residential or critical
- Alternator PMG excitation
- Alternator heater
- Improved PC1.1 display readability
- Top conduit entry access

## Control system PowerCommand 1.1

**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

**Operator/display panel**

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -40 °C to +70 °C
- Bargraph display (optional)

**AC protection**

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

**Engine protection**

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown

**Alternator data**

- Line-to-Line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

**Engine data**

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

**Other data**

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

**Digital governing (optional)**

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

**Digital voltage regulation**

- Integrated digital electronic voltage regulator
- 2-phase Line-to-Line sensing
- Configurable torque matching

**Control functions**

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Automatic Transfer Switch (ATS) control
- Generator set exercise, field adjustable

**Options**

- Auxiliary output relays (2)
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand 500/550 for remote monitoring and alarm notification (accessory)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- Remote operator panel
- PowerCommand 2.3 control with AmpSentry protection

## Ratings definitions

**Emergency Standby Power (ESP):**

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP):**

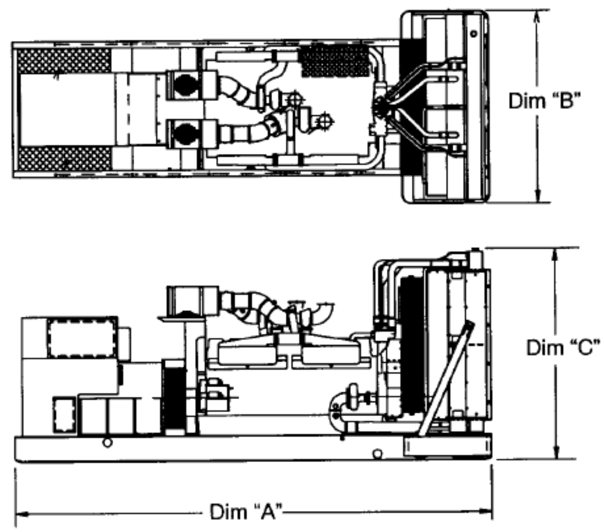
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP):**

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP):**

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

| Model | Dim "A" mm (in.) | Dim "B" mm (in.) | Dim "C" mm (in.) | Set weight*wet kg (lbs.) |
|---|---|---|---|---|
| | | **Open set** | | |
| **C125D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C150D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C175D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C200D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| | | **Weather protective enclosure** | | |
| **C125D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C150D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C175D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C200D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| | | **Sound attenuated enclosure Level 1** | | |
| **C125D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C150D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C175D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C200D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| | | **Sound attenuated enclosure Level 2** | | |
| **C125D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C150D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C175D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C200D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |

* Weights above are average. Actual weight varies with product configuration.

## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| ISO 9001 | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | UL | The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. |
| PTS | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | **U.S. EPA** | Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60. |
| CSA | All low voltage models are CSA certified to product class 4215-01. | **International Building Code** | The generator set is certified to International Building Code (IBC) 2012. |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**



NAS-6370-EN.DOCX (04/19) A061F585

# Generator Set Data Sheet

| | |
|---|---|
| Model: | C150D6D |
| Frequency: | 60 Hz |
| Fuel Type: | Diesel |
| KW Rating: | 150 Standby |
| | 135 Prime |
| Emissions level: | EPA Tier 3, Stationary Emergency |

| | |
|---|---|
| Exhaust Emission Data Sheet: | EDS-3044 |
| Exhaust Emission Compliance Sheet: | EPA-2033 |
| Sound Performance Data Sheet: | MSP-4008 |
| Cooling Performance Data Sheet: | MCP-2048 |
| Prototype Test Summary Data Sheet: | PTS-636 |

## Fuel Consumption

| | Standby | | | | Prime | | | |
|---|---|---|---|---|---|---|---|---|
| | kW (kVA) | | | | kW (kVA) | | | |
| Ratings | 150 (188) | | | | 135 (169) | | | |
| Load | 1/4 | 1/2 | 3/4 | Full | 1/4 | 1/2 | 3/4 | Full |
| US gph | 4.7 | 6.9 | 9.2 | 11.7 | 4.4 | 6.4 | 8.4 | 10.7 |
| L/hr | 17.78 | 26.11 | 34.82 | 44.28 | 16.65 | 24.22 | 31.79 | 40.49 |

## Engine

| | Standby rating | Prime rating |
|---|---|---|
| Engine Manufacturer | Cummins Inc. | |
| Engine Model | QSB7-G5 | |
| Configuration | Cast iron, in-line, 6 cylinders | |
| Aspiration | Turbocharged and charge air cooled | |
| Gross Engine Power Output, kWm (bhp) | 242 (324) | 208 (279) |
| BMEP at set rated load, kPa (psi) | 1763 (255.7) | 1601 (232) |
| Bore, mm (in) | 107 (4.21) | |
| Stroke, mm (in) | 124 (4.88) | |
| Rated Speed, rpm | 1800 | |
| Piston Speed, m/s (ft/min) | 7.44 (1464) | |
| Compression Ratio | 17.2:1 | |
| Lube Oil Capacity, L (qt) | 17.4 (18.38) | |
| Overspeed Limit, rpm | 2250 | |

## Fuel Flow

| | |
|---|---|
| Maximum Fuel Flow, L/hr (US gph) | 103 (27.0) |
| Maximum Fuel Inlet Restriction with Clean Filter, mm Hg (in Hg) | 127 (5.0) |

## Air

| Air | Standby rating | Prime rating |
|---|---|---|
| Combustion Air, m3/min (scfm) | 14.78 (522) | 14.22 (502) |
| Maximum Air Cleaner Restriction with Clean Filter, kPa (in H2O) | 3.7 (15) | |

## Exhaust

| | | |
|---|---|---|
| Exhaust Flow at set rated load, $m^3$/min (cfm) | 35.62 (1258) | 33.66 (1189) |
| Exhaust Temperature, °C (°F) | 466.67 (872) | 453.89 (849) |
| Maximum Back Pressure, kPa (in $H_2O$) | 10 (40.19) | 10 (40.19) |
| Actual Exhaust Back Pressure with CPG Sound level 2 Enclosure Muffler, kPa (in $H_2O$) | 9.5 (38.18) | 8.6 (34.36) |
| Actual Exhaust Back Pressure with CPG Weather Enclosure Muffler, kPa (in $H_2O$) | 7.2 (28.93) | 6.5 (26) |

## Standard Set-mounted Radiator Cooling

| | | |
|---|---|---|
| Ambient Design, ° C (° F) | 50 (122) | |
| Fan Load, $kW_m$ (HP) | 14.02 (18.8) | |
| Coolant Capacity (with radiator), L (US Gal) | 22 (5.9) | |
| Cooling System Air Flow, $m^3$/min (scfm) | 305.82 (10800) | |
| Total Heat Rejection, MJ/min (Btu/min) | 7.91 (7499) | 7.25 (6871) |
| Maximum Cooling Air Flow Static Restriction, kPa (in $H_2O$) | 0.12 (0.5) | |

## Weight[2]

| | |
|---|---|
| Unit Wet Weight kgs (lbs) | 1390 (3064) |

Notes:
[1] For non-standard remote installations contact your local Cummins Power Generation representative.
[2] Weights represent a set with standard features.  See outline drawing for weights of other configurations.

## Derating Factors

| | |
|---|---|
| Standby | Engine power available up to 3425 m (11237 ft.) at ambient temperatures up to 40° C (104° F) and 2298 m (7540 ft.) at 50° C (122° F). Consult your Cummins distributor for temperature and ambient requirements outside these parameters. |
| Prime | Engine power available up to 2743 m (9000 ft.) at ambient temperatures up to 40° C (104° F) and 2151 m (7057 ft.) at 50° C (122° F). Consult your Cummins distributor for temperature and ambient requirements outside these parameters. |

## Ratings Definitions

| Emergency Standby Power (ESP): | Limited-time Running Power (LTP): | Prime Power (PRP): | Base Load (continuous) Power (COP): |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours.  Limited Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. |

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

## Alternator Data

| Standard Alternators | Single phase[2] | Three Phase[1] | | | | | |
|---|---|---|---|---|---|---|---|
| Maximum Temperature Rise above 40 °C Ambient | 120 °C | 120 °C | | | | | |
| Feature Code | BB88-2 | B946-2 | B986-2 | B952-2 | B943-2 | BB86-2 | BB88-2 |
| Alternator Data Sheet Number | ADS212 | ADS-210 | ADS-210 | ADS-209 | ADS-209 | ADS-210 | ADS-212 |
| Voltage Ranges | 120/240 | 120/208 | 120/240 | 347/600 | 277/480 | 127/220 | 120/208, 127/220, 277/480 |
| Voltage Feature Code | R104 | R098-2 | R106-2 | R114-2 | R002-2 | R020-2 | R098-2, R020-2, R106-2, R002-2 |
| Surge kW | 205.9 | 210.2 | 211.4 | 211.1 | 211.4 | 210.7 | 211.6 |
| Motor Starting kVA (at 90% sustained voltage) Shunt | 770 | 563 | 563 | 516 | 516 | 563 | 770 |
| Motor Starting kVA (at 90% sustained voltage) PMG | 920 | 663 | 663 | 607 | 607 | 663 | 920 |
| Full Load Current Amps at Standby Rating | 625 | 520 | 451 | 180 | 226 | 492 | 226 to 520 |

## Alternator Data

| Standard Alternators | Single phase[2] | Three phase[1] | | | | |
|---|---|---|---|---|---|---|
| Maximum Temperature Rise above 40 °C Ambient | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C |
| Feature Code | BB87-2 | BB93-2 | BB94-2 | BB95-2 | BB92-2 | BB85-2 |
| Alternator Data Sheet Number | ADS-212 | ADS-210 | ADS-210 | ADS-209 | ADS-209 | ADS-210 |
| Voltage Ranges | 120/208, 120/240, 127/220, 277/480, 347/600 | 120/208 | 120/240 | 277/480 | 347/600 | 127/220 |
| Voltage Feature Code | R098-2, R020-2, R002-2, R104-2, R106-2, R114-2 | R098-2 | R106-2 | R002-2 | R114-2 | R020-2 |
| Surge kW | 205.9 | 210.2 | 211.4 | 211.4 | 210.7 | 211.6 |
| Motor Starting kVA (at 90% sustained voltage) Shunt | 770 | 563 | 563 | 516 | 516 | 563 |
| Motor Starting kVA (at 90% sustained voltage) PMG | 920 | 663 | 663 | 607 | 607 | 663 |
| Full Load Current Amps at Standby Rating | 625 | 520 | 451 | 226 | 180 | 492 |

Notes:
[1] Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor
[2] Full single phase output up to full set rated 3-phase kW at 1.0 power factor

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

## Formulas for Calculating Full Load Currents:

| Three phase output | Single phase output |
|---|---|
| $\dfrac{kW \times 1000}{Voltage \times 1.73 \times 0.8}$ | $\dfrac{kW \times SinglePhaseFactor \times 1000}{Voltage}$ |

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

# Sound Data
## C150D6D
## QSB7-G5 NR3 60Hz Diesel

## A-weighted Sound Pressure Level @ 7 meters, dB(A)

See notes 2, 5 and 7-11 listed below

| Configuration | Exhaust | Applied Load | Position (Note 2) | | | | | | | | 8 Position Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | 84 | 86 | 88 | 88 | 83 | 90 | 88 | 88 | 87 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | 86 | 85 | 83 | 87 | 84 | 89 | 83 | 86 | 86 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | 83 | 79 | 74 | 74 | 74 | 75 | 75 | 80 | 78 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | 72 | 72 | 71 | 72 | 73 | 72 | 71 | 73 | 72 |

## Average A-weighted Sound Pressure Level @ 1 meter, dB(A)

See notes 1, 5 and 7-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Pressure Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 46 | 68 | 81 | 89 | 91 | 91 | 90 | 88 | 86 | 90 | 98 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 42 | 67 | 83 | 90 | 89 | 90 | 87 | 84 | 80 | 81 | 96 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 45 | 62 | 74 | 80 | 80 | 81 | 79 | 76 | 77 | 73 | 88 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 45 | 63 | 72 | 77 | 76 | 77 | 76 | 73 | 71 | 65 | 84 |

## A-weighted Sound Pressure Level @ Operator Location, dB(A)

See notes 1, 3, 5 and 7-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Pressure Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 43 | 68 | 79 | 85 | 89 | 89 | 90 | 89 | 88 | 95 | 99 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 42 | 67 | 79 | 84 | 84 | 82 | 81 | 78 | 75 | 78 | 90 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 50 | 66 | 75 | 81 | 82 | 81 | 78 | 75 | 74 | 69 | 87 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 50 | 67 | 76 | 80 | 79 | 79 | 76 | 73 | 72 | 61 | 86 |

# Sound Data
## C150D6D
## QSB7-G5 NR3 60Hz Diesel

## A-weighted Sound Power Level, dB(A)

See notes 1, 3 and 6-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Power Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 63 | 86 | 98 | 106 | 108 | 109 | 107 | 106 | 103 | 107 | 116 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 60 | 85 | 101 | 108 | 107 | 107 | 105 | 102 | 97 | 99 | 114 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 63 | 80 | 92 | 99 | 99 | 99 | 97 | 94 | 95 | 91 | 106 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 64 | 81 | 91 | 95 | 94 | 95 | 94 | 91 | 90 | 84 | 102 |

## Exhaust Sound Power Level, dB(A)

See notes 4 and 6-14 listed below

| Configuration | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Power Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Open Exhaust (No Muffler) | 100% Standby | N/A | 64 | 93 | 106 | 115 | 117 | 114 | 113 | 113 | 105 | 94 | 122 |

Global Notes:

**1.** Sound pressure levels at 1 meter are measured per the requirements of ISO 3744, ISO 8528-10, and European Communities Directive 2000/14/EC as applicable. The microphone measurement locations are 1 meter from a reference parallelepiped just enclosing the generator set (enclosed or unenclosed).

**2.** Seven-meter measurement location 1 is 7 meters (23 feet) from the generator (alternator) end of the generator set, and the locations proceed counterclockwise around the generator set at 45° angles at a height of 1.2 meters (48 inches) above the ground surface.

**3.** Sound Power Levels are calculated according to ISO 3744, ISO 8528-10, and/or CE (European Union) requirements.

**4.** Exhaust Sound Levels are measured and calculated per ISO 6798, Annex A.

**5.** Reference Sound Pressure Level is 20 μPa

**6.** Reference Sound Power Level is 1 pW ($10^{-12}$ Watt)

**7.** Sound data for remote-cooled generator sets are based on rated load without cooling fan noise.

**8.** Sound data for the generator set with infinite exhaust do not include the exhaust noise contribution

**9.** Published sound levels are measured at CE certified test site and are subject to instrumentation measurement, installation, and manufacturing variability.

**10.** Unhoused/Open configuration generator sets refers to generator sets with no sound enclosures of any kind.

**11.** Housed/Enclosed/Closed/Canopy configuration generator sets refer to generator sets that have noise reduction sound enclosure installed over the generator set and usually integrally attached to the skid base/base frame/fuel container base of the generator set.

**12.** Published sound levels meet the requirements India's Central Pollution Control Board (Ministry of Environment & Forests), vide GSR 371 (E), which states the A-weighted sound level at 1 meter from any diesel generator set up to a power output rating of 1000kVA shall not exceed 75 dB(A).

**13.** For updated noise pollution information for India see website: http://www.envfor.nic.in/legis/legis.html

**14.** Sound levels must meet India's Ambient Air Noise Quality Standards detailed for Daytime/Nighttime operation in Noise Pollution (Regulation and Control) Rules, 2000

Specification sheet

# Dual wall sub-base diesel fuel tanks -

## 10-200 kW generator sets

## Description

Cummins® offers two series of fuel tanks (basic series and regional series) for the 10~125 kW diesel generator sets. The “basic” series of fuel tanks provide economical solutions for areas with no or minimal local/regional code requirements on diesel fuel tanks. The footprint of “basic” tanks matches the generator set’s footprint. The “regional” series of fuel tanks provide flexible and upgradable solutions for areas with extensive local/regional code requirements on diesel fuel tanks. The footprint of the “regional” series of fuel tanks extends beyond the generator set to allow room for installation of optional features at factory or accessories in the field for meeting local/regional code requirements or customer specification on diesel fuel tanks. All fuel tanks and optional features are compatible with factory installed enclosures.

These tanks are constructed of heavy gauge steel and include an internally reinforced baffle structure for supporting the generator set. The fuel tank design features fewer seams and welds for better corrosion resistance performance.

These tanks are pre-treated with a conversion coating and then finished with a textured powder paint. The paint has superior UV and chemical resistance with best-in-class adhesion, flexibility, and durability to resist chipping and substrate corrosion. Both interior compartments are treated with a rust preventative for extended corrosion protection.

These tanks are UL and ULC Listed as secondary containment generator base tanks. Inner and outer containments are leak checked per UL and ULC testing procedures to ensure their integrity.

These fuel tanks are offered in various sizes to satisfy different fuel capacities requirements.

## Compatible generator set model

| Engine | D1703M | V2203M | 4BT3.3-G5 | 4BTAA3.3-G7 | QSB5-G5 | QSB7-G5 |
|---|---|---|---|---|---|---|
| Generator set model names | C10D6 | C20D6 | C25D6 | C50D6 | C50D6C | C125D6D |
| | C15D6 | | C30D6 | C60D6 | C60D6C | C150D6D |
| | | | C35D6 | | C80D6C | C175D6D |
| | | | C40D6 | | C100D6C | C200D6D |
| | | | | | C125D6C | |
| | | | | | | |

## Basic fuel tanks

**Standard features:**

**UL 142 and ULC-S601 listed** - Minimum 110% secondary containment capacity.

**NFPA and IFC** - Capable of meeting NFPA 30 and NFPA 110 codes with available factory installed optional features.

**Emergency pressure relief vents** - Ensure adequate ventilation of the primary and secondary tank compartments under extreme temperature and emergency conditions.

**Normal atmospheric vent** - "Mushroom" style vent ensures adequate venting of the primary tank during fill, generator set running and temperature variations. Raised above fuel fill.

**Raised fuel fill** - includes lockable sealed fuel cap.

**Lifting eyes** - Allow lifting of fuel tank with generator set installed.

**Optional features:**

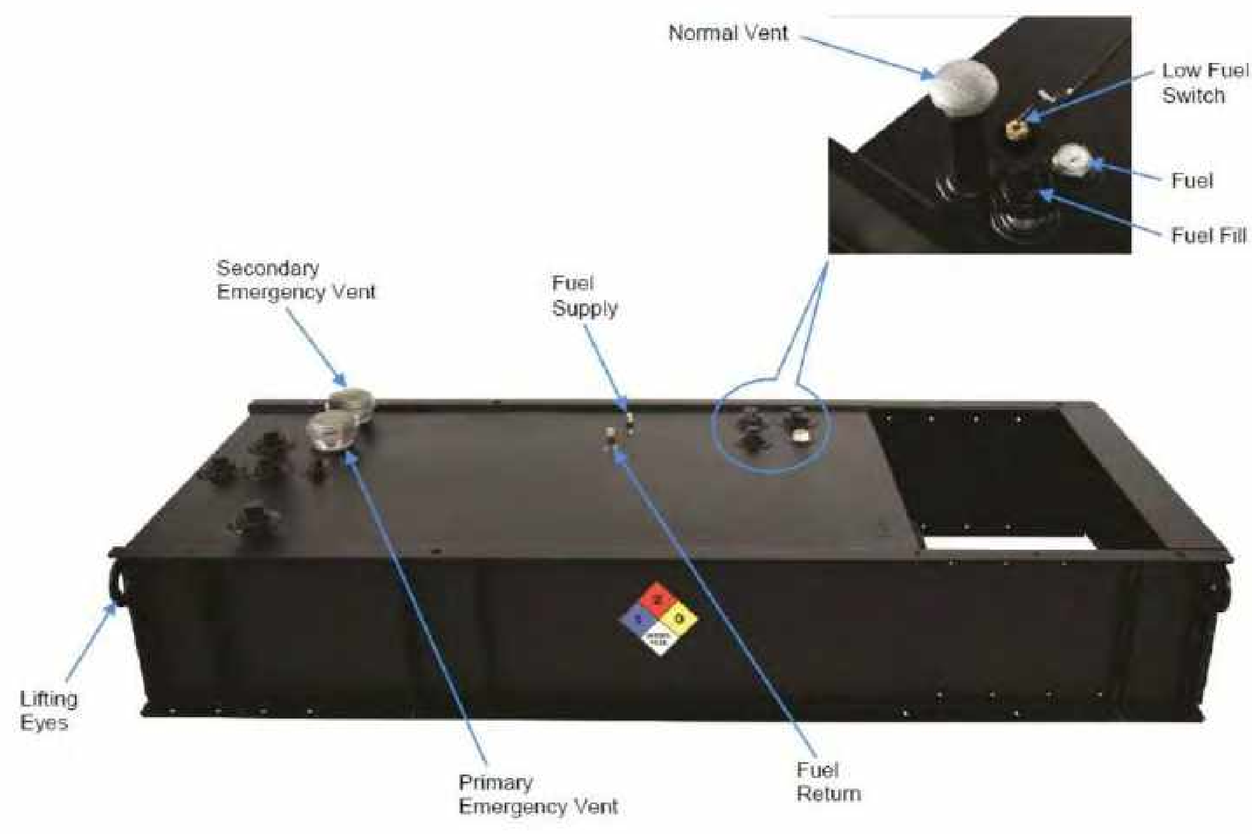
**Secondary containment basin switch (rupture switch)** - Activates a warning in the event of a primary tank leak. Side mounted.

**Low fuel level switch** - Activates a warning when 40% of the fuel is left in the tank.

**Fuel level gauge** - Provides direct reading of fuel level. Top mounted.

**Electric fuel level sender with gauge** - Allows remote electrical monitoring of fuel tank level. Flying leads for customer connection.

**Tank to foundation clearance** - 2-inch bolt-thru risers allow visual inspection under tank including rodent barrier.




*Picture is for reference only. See outline drawing for tank specific information by model.

## Basic tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time |
|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr |
| 10 | C10D6 | D1703M | 1.12 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 41 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 81 |
| 15 | C15D6 | D1703M | 1.38 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 33 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 66 |
| 20 | C20D6 | V2203M | 1.81 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 25 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 50 |
| 25 | C25D6 | 4BT3.3-G5 | 2.42 | C319-2 | 24 | 87.6 x 34 x 15 | 456 | 74 | 31 |
| | | | | C320-2 | 48 | 87.6 x 34 x 23 | 669 | 132 | 54 |
| 30 | C30D6 | 4BT3.3-G5 | 2.81 | C319-2 | 24 | 87.6 x 34 x 15 | 456 | 74 | 26 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 69 |
| 35 | C35D6 | 4BT3.3-G5 | 3.16 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 42 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 62 |
| 40 | C40D6 | 4BT3.3-G5 | 3.66 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 36 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 53 |
| 50 | C50D6 | 4BTAA3.3-G7 | 4.25 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 31 |
| | | | | C320-2 | 48 | 87.6 x 34 x 42 | 977 | 263 | 62 |
| 60 | C60D6 | 4BTAA3.3-G7 | 5.04 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 26 |
| | | | | C320-2 | 48 | 87.6 x 34 x 42 | 977 | 263 | 52 |
| 50 | C50D6C | QSB5-G5 | 5.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 49 |
| | | | | C320-2 | 48 | 117 x 40 x 25 | 809 | 260 | 49 |
| 60 | C60D6C | QSB5-G5 | 6.10 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 42 |
| | | | | C320-2 | 48 | 117 x 40 x 33 | 966 | 353 | 57 |
| 80 | C80D6C | QSB5-G5 | 7.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 35 |
| | | | | C320-2 | 48 | 117 x 40 x 33 | 966 | 353 | 48 |
| 100 | C100D6C | QSB5-G5 | 8.90 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 29 |
| | | | | C320-2 | 48 | 117 x 40 x 48 | 1471 | 526 | 59 |
| 125 | C125D6C | QSB5-G6 | 10.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 25 |
| | | | | C320-2 | 48 | 117 x 40 x 48 | 1471 | 526 | 51 |
| 125 | C125D6D | QSB7-G5 | 10.1 | C319-2 | 24 | 117x40x25 | 809 | 258 | 25 |
| | | | | C320-2 | 48 | 117x40x48 | 1471 | 520 | 51 |
| 150 | C150D6D | | 11.7 | C319-2 | 24 | 117x40x33 | 966 | 350 | 29 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 62 |
| 175 | C175D6D | | 13.3 | C319-2 | 24 | 117x40x33 | 966 | 350 | 26 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 55 |
| 200 | C200D6D | | 14.9 | C319-2 | 24 | 117x40x48 | 1471 | 520 | 34 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 49 |

Note: No OFPV is offered on basic fuel tanks.
* All weights are approximate.

## Regional fuel tanks

**Standard features:**

**UL 142 and ULC-S601 listed** - Minimum 110% secondary IBC 2012 and 2015 certified - All optional features are seismically certified with this range of tanks and generator sets. Requires factory-installed 2 ft vent extensions or higher.

**UL 142 & ULC-S601 listed** - Minimum 125% secondary containment capacity.

**NFPA & IFC** - Capable of meeting NFPA 30, NFPA 110, and IFC codes with available factory-installed optional features.

**Emergency pressure relief vents** - Ensure adequate ventilation of the primary and secondary tank compartments under extreme temperature and emergency conditions.

**Normal atmospheric vent** - “Mushroom” style vent ensures adequate venting of the primary tank during fill, generator set running, and temperature variations. Raised above fuel fill.

**Raised fuel fill** - Includes lockable sealed fuel cap.

**Lifting eyes** - Allow lifting of fuel tank with generator set installed.

**Optional features:**

**Secondary containment basin switch (rupture switch)** - Activates a warning in the event of a primary tank leak. Side Mounted.

**Low fuel level switch** - Activates a warning when 40% of the fuel is left in the tank.

**Fuel level gauge** - Provides direct reading of fuel level. Top mounted.

**Electric fuel level sender with gauge** - Allows remote electrical monitoring of fuel tank level. Flying leads for customer connection.

**Tank to foundation clearance** - 2-inch bolt-thru risers allow visual inspection under tank including rodent barrier.

**Spill containment box for fuel fill** - 5 gallon capacity with integral drain (to tank). Lockable lid.

**Overfill prevention valve** - Shuts off fuel flow during filling at approximately 95% full*. Includes fill down tube, as needed, to terminate within 6” of the bottom of the fuel tank. Uses a 2 inch type “F” cam lock adapter for filling.

**High fuel switch** - Activates at 90% of full fuel level. Flying leads for customer connection.

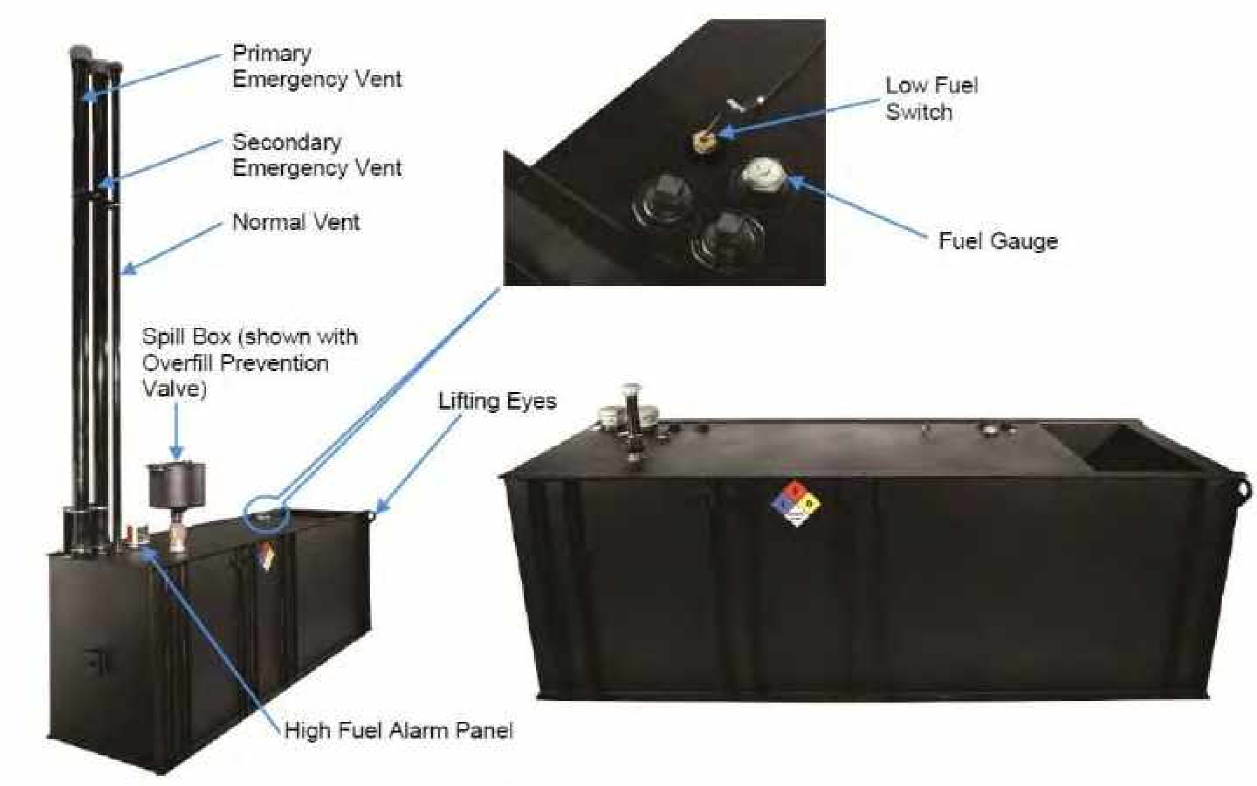
**High fuel alarm panel** - Provides audible & visual alarm when fuel level reaches 90% of full fuel level.

**Fill drop tube** - Terminates fuel fill location within 6” of the bottom of the fuel tank.

**Vent extensions** - Terminate normal and emergency vents (both primary and secondary) a minimum of 12 ft above the bottom of tank.

**Seismic vent extensions** - 2 ft normal and emergency (both primary & secondary) extensions to meet IBC/OSHPD seismic requirements.

* The OFPV inherently shuts off fuel at approximately 2” below the top of the fuel tank. Some tanks will shut off below this 95% fill level.




*Picture is for reference only. See outline drawing for tank specific information by model.

## Regional tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time w/o OFPV | Actual run time w/OFPV |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr | hr |
| 10 | C10 D6 | D1703M | 1.12 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 66 | 56 |
| | | | | C303-2 | 48 | 87.6 x 34 x 15 | 510 | 74 | 66 | 56 |
| | | | | C305-2 | 72 | 87.6 x 34 x 23 | 723 | 132 | 118 | 107 |
| | | | | C307-2 | 96 | 87.6 x 34 x 23 | 723 | 132 | 118 | 107 |
| 15 | C15 D6 | D1703M | 1.38 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 53 | 45 |
| | | | | C303-2 | 48 | 87.6 x 34 x 15 | 510 | 74 | 53 | 45 |
| | | | | C305-2 | 72 | 87.6 x 34 x 23 | 723 | 132 | 95 | 86 |
| | | | | C307-2 | 96 | 87.6 x 34 x 32 | 962 | 195 | 141 | 132 |
| 20 | C20 D6 | V2203M | 1.81 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 41 | 35 |
| | | | | C303-2 | 48 | 87.6 x 34 x 23 | 723 | 132 | 73 | 66 |
| | | | | C305-2 | 72 | 87.6 x 34 x 32 | 962 | 195 | 108 | 101 |
| | | | | C307-2 | 96 | 87.6 x 34 x 32 | 962 | 195 | 108 | 101 |
| 25 | C25 D6 | 4BT3.3-G5 | 2.42 | C301-2 | 24 | 121 x 34 x 10.5 | 514 | 74 | 31 | 25 |
| | | | | C303-2 | 48 | 121 x 34 x 16.2 | 686 | 132 | 54 | 47 |
| | | | | C305-2 | 72 | 121 x 34 x 22.1 | 879 | 195 | 80 | 73 |
| | | | | C307-2 | 96 | 121 x 34 x 29.5 | 1120 | 263 | 109 | 101 |
| 30 | C30 D6 | 4BT3.3-G5 | 2.81 | C301-2 | 24 | 121 x 34 x 10.5 | 514 | 74 | 26 | 21 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 69 | 63 |
| | | | | C305-2 | 72 | 121 x 34 x 29.5 | 1120 | 263 | 94 | 87 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 138 | 132 |
| 35 | C35 D6 | 4BT3.3-G5 | 3.16 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 42 | 36 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 62 | 56 |
| | | | | C305-2 | 72 | 121 x 34 x 29.5 | 1120 | 263 | 83 | 77 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 123 | 117 |
| 40 | C40 D6 | 4BT3.3-G5 | 3.66 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 36 | 31 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 53 | 48 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 106 | 101 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 106 | 101 |
| 50 | C50 D6 | 4BTAA3.3-G7 | 4.25 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 31 | 27 |
| | | | | C303-2 | 48 | 121 x 34 x 29.5 | 1120 | 263 | 62 | 58 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 92 | 87 |
| 60 | C60 D6 | 4BTAA3.3-G7 | 5.04 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 26 | 23 |
| | | | | C303-2 | 48 | 121 x 34 x 29.5 | 1120 | 263 | 52 | 49 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 77 | 73 |
| 50 | C50D6C | QSB5-G5 | 5.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 47 | 45 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 80 | 76 |
| | | | | C305-2 | 72 | 154 x 40 x 32 | 1657 | 425 | 80 | 76 |
| | | | | C307-2 | 96 | 154 x 40 x 46 | 2096 | 625 | 118 | 112 |
| 60 | C60D6C | QSB5-G5 | 6.10 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 41 | 39 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 70 | 66 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 102 | 97 |
| | | | | C307-2 | 96 | 154 x 40 x 46 | 2096 | 625 | 102 | 97 |
| 80 | C80D6C | QSB5-G5 | 7.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 34 | 33 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 58 | 55 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 85 | 81 |
| 100 | C100D6C | QSB5-G5 | 8.90 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 28 | 27 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 48 | 45 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 70 | 66 |
| 125 | C125D6C | QSB5-G6 | 10.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 24 | 23 |
| | | | | C303-2 | 48 | 154 x 40 x 46 | 2096 | 625 | 60 | 58 |

* All weights are approximate.

## Regional tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time w/o OFPV | Actual run time w/OFPV |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr | hr |
| 125 | C125D6D | | 10.1 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 34 | 30 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 72 | 69 |
| | | | | C305-2 | 72 | 180x40x42 | 2302 | 737 | 72 | 69 |
| | | | | C307-2 | 96 | 180x65.5x35.3 | 3552 | 1055 | 104 | 98 |
| 150 | C150D6D | | 11.7 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 30 | 26 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 63 | 59 |
| | | QSB7-G5 | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 90 | 84 |
| 175 | C175D6D | | 13.3 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 26 | 23 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 55 | 52 |
| | | | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 79 | 74 |
| 200 | C200D6D | | 14.9 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 24 | 21 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 49 | 47 |
| | | | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 72 | 66 |

## Certifications/standards/codes

**UL 142 Listed** - Cummins dual wall sub-base tanks are UL Listed and constructed in accordance with Underwriters Laboratories Standard UL 142 “steel aboveground tanks for flammable and combustible liquids,” as a “secondary containment generator base tank”

**NFPA** - Cummins tanks are built in accordance with all applicable NFPA codes:

- NFPA 30 - Flammable and Combustible Liquids code
- NFPA 37 - Standard for Installation and use of Stationary Combustible Engine and Gas Turbines
- NFPA 110 - Standard for Emergency and Standby Power Systems

**ISO9001** - This product was designed and manufactured in facilities certified to ISO9001.

**ULC** - Cummins tanks are built in accordance with all applicable ULC codes

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**


NAAC-5868-EN (02/18)

BUILDING ID: RS7

**COMMUNITY DEVELOPMENT DEPARTMENT**
**PLANNING DIVISION**
701 Laurel Street
Menlo Park, CA 94025
phone: (650) 330-6702
fax: (650) 327-1653
planning@menlopark.org
http://www.menlopark.org

## APPLICATIONS INVOLVING HAZARDOUS MATERIALS – GENERATOR SUPPLEMENT

The following information is required for hazardous materials applications that include generators.

**GENERATOR PURPOSE** (for example, whether it is an emergency generator dedicated to life safety egress lighting and other life safety devices, or a standby generator to allow continued operations in the event of a power outage)

Generator is intended to provide backup power to Emergency, Legally Required and Optional Standby loads to support continued facility operations in the event of a utility power outage.

| | |
|---|---|
| **FUEL TANK SIZE** (in gallons) **AND FUEL TYPE**<br>Fuel tank size: 270 gallons (approx)<br>Fuel type: diesel | **NOISE RATING**<br>72db(A) @ 7meters |
| **SIZE** (output in both kW (kilowatt) and hp (horsepower) measurements)<br>Power output: 150 kW (approx)<br>Engine output: 324 hp | **ENCLOSURE COLOR**<br>Green or gray |
| **ROUTE FOR FUELING HOSE ACCESS**<br>75ft max distance, direct from fueling truck to generator fuel tank | **PARKING LOCATION OF FUELING TRUCK**<br>Building exterior at drivable surface |
| **FREQUENCY OF REFUELING**<br>2 times / year | **HOURS OF SERVICE ON A FULL TANK**<br>24 hours at generator fully rated load |

**PROPOSED TESTING SCHEDULE** (including frequency, days of week, and time of day)

Monthly, Sunday, AM

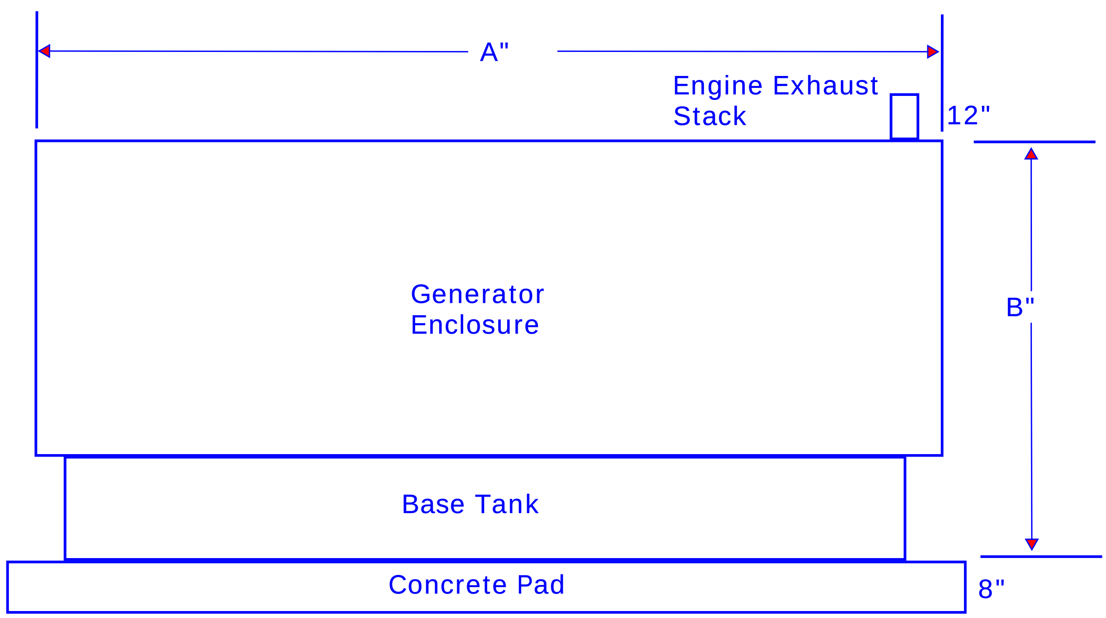
**ALARMS AND/OR AUTOMATIC SHUTOFFS** (for leaks during use and/or spills/over-filling during fueling, if applicable)

Fuel system alarms and/or shutdowns: overfill, low fuel, fuel-in-rupture basin alarm.
Engine alarms and/or shutdowns: overspeed, fail start, low oil pressure, high coolant temp, etc.

**OTHER APPLICATION SUBMITTAL REQUIREMENTS** (please attach)

- Section showing the height of the pad, the isolation base (if there is one), the height of the generator with the appropriate belly (fuel storage tank) and exhaust stack
- Status of required Bay Area Air Qualify Management District (BAAQMD) permit, including confirmation of parental notification for any proposals within 1,000 feet of a school

| GENERATOR SIZE (kW) | DIMENSION 'A' (") | DIMENSION 'B' (") |
|---|---|---|
| 1000 | 315 | 137 |
| 750 | 315 | 137 |
| 500 | 222 | 106 |
| 250 | 222 | 106 |
| 150 | 180 | 93 |




Section
(NTS)

150KW GENERATOR

**Specification sheet**

# Diesel generator set

QSB7 series engine

125-200 kW @ 60 Hz

EPA Tier 3 emissions

## Description

Cummins® generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby applications.

## Features

**Heavy duty engine** - Rugged 4-cycle industrial diesel delivers reliable power and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 50 °C (122 °F) ambient temperature.

**Enclosures** - The aesthetically appealing enclosure incorporates special designs that deliver one of the quietest generators of its kind. Aluminium material plus durable powder coat paint provides the best anti-corrosion performance. The generator set enclosure has been evaluated to withstand 180 MPH wind loads in accordance with ASCE7 -10. The design has hinged doors to provide easy access for service and maintenance.

**Fuel tanks** - Dual wall sub-base fuel tanks are offered as optional features, providing economical and flexible solutions to meet extensive code requirements on diesel fuel tanks.

**NFPA** - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

| | Standby 60 Hz | | Prime 60 Hz | | |
|---|---|---|---|---|---|
| **Model** | **kW** | **kVA** | **kW** | **kVA** | **Data sheets** |
| C125D6D | 125 | 156 | 113 | 141 | NAD-6371-EN |
| C150D6D | 150 | 188 | 135 | 169 | NAD-6372-EN |
| C175D6D | 175 | 219 | 158 | 197 | NAD-6373-EN |
| C200D6D | 200 | 250 | 180 | 225 | NAD-6374-EN |

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 1.0% |
| Random voltage variation | ± 1.0% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.50% |
| Radio frequency emissions compliance | FCC code title 47 part 15 class A and B |

## Engine specifications

| | |
|---|---|
| Design | Turbocharged and charge air cooled |
| Bore | 107 mm (4.21 in.) |
| Stroke | 124 mm (4.88 in.) |
| Displacement | 6.7 L (408 in$^3$) |
| Cylinder block | Cast iron, in-line 6 cylinder |
| Battery capacity | 2 x 850 amps per battery at ambient temperature of 0 °C (32 °F) |
| Battery charging alternator | 100 amps |
| Starting voltage | 2 x 12 volt in parallel, negative ground |
| Lube oil filter type(s) | Spin-on with relief valve |
| Standard cooling system | High ambient radiator |
| Rated speed | 1800 rpm |

## Alternator specifications

| | |
|---|---|
| Design | Brushless, 4 pole, drip proof, revolving field |
| Stator | 2/3 pitch |
| Rotor | Direct coupled, flexible disc |
| Insulation system | Class H per NEMA MG1-1.65 |
| Standard temperature rise | 120 ºC (248 °F) Standby |
| Exciter type | Torque match (shunt) with PMG as option |
| Alternator cooling | Direct drive centrifugal blower |
| AC waveform Total Harmonic Distortion (THDV) | < 5% no load to full linear load, < 3% for any single harmonic |
| Telephone Influence Factor (TIF) | < 50 per NEMA MG1-22.43 |
| Telephone Harmonic Factor (THF) | < 3% |

## Available voltages

| 1-phase | 3-phase | | | | |
|---|---|---|---|---|---|
| • 120/240 | • 120/208 | • 120/240 | • 277/480 | • 347/600 | • 127/220 |

## Generator set options

**Fuel system**
- Basic fuel tanks
- Regional fuel tanks

**Engine**
- Engine air cleaner – normal or heavy duty
- Shut down – low oil pressure
- Extension – oil drain
- Engine oil heater

**Alternator**
- 120 °C temperature rise alternator
- 105 °C temperature rise alternator
- PMG excitation
- Alternator heater, 120 V
- Reconnectable full 1 phase output alternator upto 175 kWe

**Control**
- AC output analog meters
- Stop switch – emergency
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)

**Electrical**
- One, two or three circuit breaker configurations
- 80% rated circuit breakers
- 80% or 100% rated LSI circuit breakers
- Battery charger

**Enclosure**
- Aluminium enclosure Sound Level 1 or Level 2, green color
- Aluminium weather protective enclosure with muffler installed, green color

**Cooling system**
- Shutdown – low coolant level
- Warning – low coolant level
- Extension – coolant drain
- Coolant heater options:
  - <4 °C (40 °F) – cold weather
  - <-18 °C (0 °F) – extreme cold

**Exhaust system**
- Exhaust connector NPT
- Exhaust muffler mounted

**Generator set application**
- Base barrier – elevated genset
- Radiator outlet duct adapter

**Warranty**
- Base warranty – 2 year/1000 hours, Standby
- Base warranty – 1 year/unlimited hours, Prime
- 3 & 5 year Standby warranty options

## Generator set accessories

- Coolant heater
- Battery heater kit
- Engine oil heater
- Remote control displays
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485
- Audible alarm
- Remote monitoring device – PowerCommand 500/550
- Battery charger – stand-alone, 12 V
- Circuit breakers
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Base barrier – elevated generator set
- Mufflers – industrial, residential or critical
- Alternator PMG excitation
- Alternator heater
- Improved PC1.1 display readability
- Top conduit entry access

## Control system PowerCommand 1.1

**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

**Operator/display panel**

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -40 °C to +70 °C
- Bargraph display (optional)

**AC protection**

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

**Engine protection**

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown

**Alternator data**

- Line-to-Line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

**Engine data**

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

**Other data**

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

**Digital governing (optional)**

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

**Digital voltage regulation**

- Integrated digital electronic voltage regulator
- 2-phase Line-to-Line sensing
- Configurable torque matching

**Control functions**

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Automatic Transfer Switch (ATS) control
- Generator set exercise, field adjustable

**Options**

- Auxiliary output relays (2)
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand 500/550 for remote monitoring and alarm notification (accessory)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- Remote operator panel
- PowerCommand 2.3 control with AmpSentry protection

## Ratings definitions

**Emergency Standby Power (ESP):**

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP):**

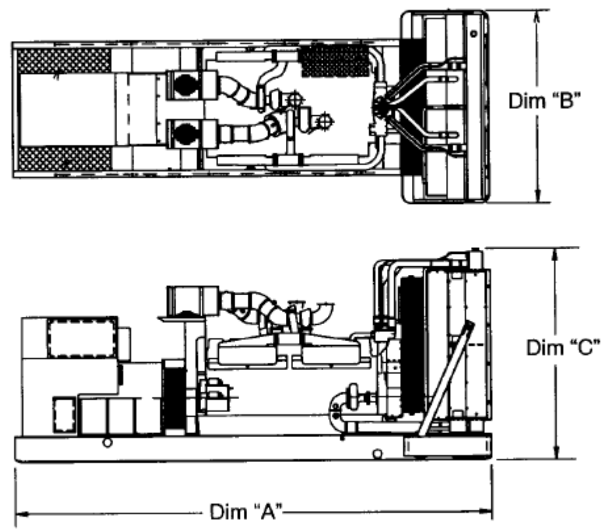
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP):**

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP):**

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.




This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

| Model | Dim “A”<br>mm (in.) | Dim “B”<br>mm (in.) | Dim “C”<br>mm (in.) | Set weight*wet<br>kg (lbs.) |
|---|---|---|---|---|
| | | **Open set** | | |
| **C125D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C150D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C175D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| **C200D6D** | 2867 (113) | 1016 (40) | 1415 (56) | 1470 (3240) |
| | | **Weather protective enclosure** | | |
| **C125D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C150D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C175D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| **C200D6D** | 2867 (113) | 1016 (40) | 1836 (72) | 1600 (3527) |
| | | **Sound attenuated enclosure Level 1** | | |
| **C125D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C150D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C175D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| **C200D6D** | 3621 (143) | 1016 (40) | 1836 (72) | 1649 (3635) |
| | | **Sound attenuated enclosure Level 2** | | |
| **C125D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C150D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C175D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |
| **C200D6D** | 4061 (160) | 1016 (40) | 1836 (72) | 1665 (3671) |

* Weights above are average. Actual weight varies with product configuration.

## Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | | | |
|---|---|---|---|
| | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. | | The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. |
| | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | **U.S. EPA** | Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60. |
| | All low voltage models are CSA certified to product class 4215-01. | **International Building Code** | The generator set is certified to International Building Code (IBC) 2012. |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**



NAS-6370-EN.DOCX (04/19) A061F585

# Generator Set Data Sheet

Model: C150D6D
Frequency: 60 Hz
Fuel Type: Diesel
KW Rating: 150 Standby
135 Prime
Emissions level: EPA Tier 3, Stationary Emergency

| | |
|---|---|
| Exhaust Emission Data Sheet: | EDS-3044 |
| Exhaust Emission Compliance Sheet: | EPA-2033 |
| Sound Performance Data Sheet: | MSP-4008 |
| Cooling Performance Data Sheet: | MCP-2048 |
| Prototype Test Summary Data Sheet: | PTS-636 |

## Fuel Consumption

| | Standby | | | | Prime | | | |
|---|---|---|---|---|---|---|---|---|
| | kW (kVA) | | | | kW (kVA) | | | |
| Ratings | 150 (188) | | | | 135 (169) | | | |
| Load | 1/4 | 1/2 | 3/4 | Full | 1/4 | 1/2 | 3/4 | Full |
| US gph | 4.7 | 6.9 | 9.2 | 11.7 | 4.4 | 6.4 | 8.4 | 10.7 |
| L/hr | 17.78 | 26.11 | 34.82 | 44.28 | 16.65 | 24.22 | 31.79 | 40.49 |

## Engine

| | Standby rating | Prime rating |
|---|---|---|
| Engine Manufacturer | Cummins Inc. | |
| Engine Model | QSB7-G5 | |
| Configuration | Cast iron, in-line, 6 cylinders | |
| Aspiration | Turbocharged and charge air cooled | |
| Gross Engine Power Output, kWm (bhp) | 242 (324) | 208 (279) |
| BMEP at set rated load, kPa (psi) | 1763 (255.7) | 1601 (232) |
| Bore, mm (in) | 107 (4.21) | |
| Stroke, mm (in) | 124 (4.88) | |
| Rated Speed, rpm | 1800 | |
| Piston Speed, m/s (ft/min) | 7.44 (1464) | |
| Compression Ratio | 17.2:1 | |
| Lube Oil Capacity, L (qt) | 17.4 (18.38) | |
| Overspeed Limit, rpm | 2250 | |

## Fuel Flow

| | |
|---|---|
| Maximum Fuel Flow, L/hr (US gph) | 103 (27.0) |
| Maximum Fuel Inlet Restriction with Clean Filter, mm Hg (in Hg) | 127 (5.0) |

## Air

| Air | Standby rating | Prime rating |
|---|---|---|
| Combustion Air, m3/min (scfm) | 14.78 (522) | 14.22 (502) |
| Maximum Air Cleaner Restriction with Clean Filter, kPa (in H2O) | 3.7 (15) | |

## Exhaust

| | | |
|---|---|---|
| Exhaust Flow at set rated load, $m^3$/min (cfm) | 35.62 (1258) | 33.66 (1189) |
| Exhaust Temperature, °C (°F) | 466.67 (872) | 453.89 (849) |
| Maximum Back Pressure, kPa (in $H_2O$) | 10 (40.19) | 10 (40.19) |
| Actual Exhaust Back Pressure with CPG Sound level 2 Enclosure Muffler, kPa (in $H_2O$) | 9.5 (38.18) | 8.6 (34.36) |
| Actual Exhaust Back Pressure with CPG Weather Enclosure Muffler, kPa (in $H_2O$) | 7.2 (28.93) | 6.5 (26) |

## Standard Set-mounted Radiator Cooling

| | | |
|---|---|---|
| Ambient Design, ° C (° F) | 50 (122) | |
| Fan Load, $kW_m$ (HP) | 14.02 (18.8) | |
| Coolant Capacity (with radiator), L (US Gal) | 22 (5.9) | |
| Cooling System Air Flow, $m^3$/min (scfm) | 305.82 (10800) | |
| Total Heat Rejection, MJ/min (Btu/min) | 7.91 (7499) | 7.25 (6871) |
| Maximum Cooling Air Flow Static Restriction, kPa (in $H_2O$) | 0.12 (0.5) | |

## Weight[2]

| | |
|---|---|
| Unit Wet Weight kgs (lbs) | 1390 (3064) |

Notes:
[1] For non-standard remote installations contact your local Cummins Power Generation representative.
[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating Factors

| | |
|---|---|
| Standby | Engine power available up to 3425 m (11237 ft.) at ambient temperatures up to 40° C (104° F) and 2298 m (7540 ft.) at 50° C (122° F). Consult your Cummins distributor for temperature and ambient requirements outside these parameters. |
| Prime | Engine power available up to 2743 m (9000 ft.) at ambient temperatures up to 40° C (104° F) and 2151 m (7057 ft.) at 50° C (122° F). Consult your Cummins distributor for temperature and ambient requirements outside these parameters. |

## Ratings Definitions

| Emergency Standby Power (ESP): | Limited-time Running Power (LTP): | Prime Power (PRP): | Base Load (continuous) Power (COP): |
|---|---|---|---|
| Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528. | Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. |

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

## Alternator Data

| Standard Alternators | Single phase[2] | Three Phase[1] | | | | | |
|---|---|---|---|---|---|---|---|
| Maximum Temperature Rise above 40 °C Ambient | 120 °C | 120 °C | | | | | |
| Feature Code | BB88-2 | B946-2 | B986-2 | B952-2 | B943-2 | BB86-2 | BB88-2 |
| Alternator Data Sheet Number | ADS212 | ADS-210 | ADS-210 | ADS-209 | ADS-209 | ADS-210 | ADS-212 |
| Voltage Ranges | 120/240 | 120/208 | 120/240 | 347/600 | 277/480 | 127/220 | 120/208, 127/220, 277/480 |
| Voltage Feature Code | R104 | R098-2 | R106-2 | R114-2 | R002-2 | R020-2 | R098-2, R020-2, R106-2, R002-2 |
| Surge kW | 205.9 | 210.2 | 211.4 | 211.1 | 211.4 | 210.7 | 211.6 |
| Motor Starting kVA (at 90% sustained voltage) Shunt | 770 | 563 | 563 | 516 | 516 | 563 | 770 |
| Motor Starting kVA (at 90% sustained voltage) PMG | 920 | 663 | 663 | 607 | 607 | 663 | 920 |
| Full Load Current Amps at Standby Rating | 625 | 520 | 451 | 180 | 226 | 492 | 226 to 520 |

## Alternator Data

| Standard Alternators | Single phase[2] | Three phase[1] | | | | |
|---|---|---|---|---|---|---|
| Maximum Temperature Rise above 40 °C Ambient | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C |
| Feature Code | BB87-2 | BB93-2 | BB94-2 | BB95-2 | BB92-2 | BB85-2 |
| Alternator Data Sheet Number | ADS-212 | ADS-210 | ADS-210 | ADS-209 | ADS-209 | ADS-210 |
| Voltage Ranges | 120/208, 120/240, 127/220, 277/480, 347/600 | 120/208 | 120/240 | 277/480 | 347/600 | 127/220 |
| Voltage Feature Code | R098-2, R020-2, R002-2, R104-2, R106-2, R114-2 | R098-2 | R106-2 | R002-2 | R114-2 | R020-2 |
| Surge kW | 205.9 | 210.2 | 211.4 | 211.4 | 210.7 | 211.6 |
| Motor Starting kVA (at 90% sustained voltage) Shunt | 770 | 563 | 563 | 516 | 516 | 563 |
| Motor Starting kVA (at 90% sustained voltage) PMG | 920 | 663 | 663 | 607 | 607 | 663 |
| Full Load Current Amps at Standby Rating | 625 | 520 | 451 | 226 | 180 | 492 |

Notes:
[1] Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor
[2] Full single phase output up to full set rated 3-phase kW at 1.0 power factor

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

## Formulas for Calculating Full Load Currents:

| Three phase output | Single phase output |
|---|---|
| $\dfrac{kW \times 1000}{Voltage \times 1.73 \times 0.8}$ | $\dfrac{kW \times SinglePhaseFactor \times 1000}{Voltage}$ |

**Warning**: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

**North America**
**1400 73rd Avenue N.E.**
**Minneapolis, MN 55432**
**USA**
Phone 763 574 5000
Fax 763 574 5298

**Our energy working for you.™**


NAD-6372-EN (08/20) A061F587

# Sound Data
## C150D6D
## QSB7-G5 NR3 60Hz Diesel

## A-weighted Sound Pressure Level @ 7 meters, dB(A)

See notes 2, 5 and 7-11 listed below

| Configuration | Exhaust | Applied Load | Position (Note 2) | | | | | | | | 8 Position Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | 84 | 86 | 88 | 88 | 83 | 90 | 88 | 88 | 87 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | 86 | 85 | 83 | 87 | 84 | 89 | 83 | 86 | 86 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | 83 | 79 | 74 | 74 | 74 | 75 | 75 | 80 | 78 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | 72 | 72 | 71 | 72 | 73 | 72 | 71 | 73 | 72 |

## Average A-weighted Sound Pressure Level @ 1 meter, dB(A)

See notes 1, 5 and 7-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Pressure Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 46 | 68 | 81 | 89 | 91 | 91 | 90 | 88 | 86 | 90 | 98 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 42 | 67 | 83 | 90 | 89 | 90 | 87 | 84 | 80 | 81 | 96 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 45 | 62 | 74 | 80 | 80 | 81 | 79 | 76 | 77 | 73 | 88 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 45 | 63 | 72 | 77 | 76 | 77 | 76 | 73 | 71 | 65 | 84 |

## A-weighted Sound Pressure Level @ Operator Location, dB(A)

See notes 1, 3, 5 and 7-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Pressure Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 43 | 68 | 79 | 85 | 89 | 89 | 90 | 89 | 88 | 95 | 99 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 42 | 67 | 79 | 84 | 84 | 82 | 81 | 78 | 75 | 78 | 90 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 50 | 66 | 75 | 81 | 82 | 81 | 78 | 75 | 74 | 69 | 87 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 50 | 67 | 76 | 80 | 79 | 79 | 76 | 73 | 72 | 61 | 86 |

# Sound Data
## C150D6D
## QSB7-G5 NR3 60Hz Diesel

## A-weighted Sound Power Level, dB(A)

See notes 1, 3 and 6-14 listed below

| Configuration | Exhaust | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Power Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard – Unhoused | Infinite Exhaust | 100% Standby | N/A | 63 | 86 | 98 | 106 | 108 | 109 | 107 | 106 | 103 | 107 | 116 |
| F216-2 Weather Aluminum | Mounted | 100% Standby | N/A | 60 | 85 | 101 | 108 | 107 | 107 | 105 | 102 | 97 | 99 | 114 |
| F231-2 Sound Attenuated Level 1, Aluminum | Mounted | 100% Standby | N/A | 63 | 80 | 92 | 99 | 99 | 99 | 97 | 94 | 95 | 91 | 106 |
| F217-2 Sound Attenuated Level 2, Aluminum | Mounted | 100% Standby | N/A | 64 | 81 | 91 | 95 | 94 | 95 | 94 | 91 | 90 | 84 | 102 |

## Exhaust Sound Power Level, dB(A)

See notes 4 and 6-14 listed below

| Configuration | Applied Load | Octave Band Center Frequency (Hz) | | | | | | | | | | | Overall Sound Power Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Open Exhaust (No Muffler) | 100% Standby | N/A | 64 | 93 | 106 | 115 | 117 | 114 | 113 | 113 | 105 | 94 | 122 |

Global Notes:

**1.** Sound pressure levels at 1 meter are measured per the requirements of ISO 3744, ISO 8528-10, and European Communities Directive 2000/14/EC as applicable. The microphone measurement locations are 1 meter from a reference parallelepiped just enclosing the generator set (enclosed or unenclosed).

**2.** Seven-meter measurement location 1 is 7 meters (23 feet) from the generator (alternator) end of the generator set, and the locations proceed counterclockwise around the generator set at 45° angles at a height of 1.2 meters (48 inches) above the ground surface.

**3.** Sound Power Levels are calculated according to ISO 3744, ISO 8528-10, and/or CE (European Union) requirements.

**4.** Exhaust Sound Levels are measured and calculated per ISO 6798, Annex A.

**5.** Reference Sound Pressure Level is 20 μPa

**6.** Reference Sound Power Level is 1 pW ($10^{-12}$ Watt)

**7.** Sound data for remote-cooled generator sets are based on rated load without cooling fan noise.

**8.** Sound data for the generator set with infinite exhaust do not include the exhaust noise contribution

**9.** Published sound levels are measured at CE certified test site and are subject to instrumentation measurement, installation, and manufacturing variability.

**10.** Unhoused/Open configuration generator sets refers to generator sets with no sound enclosures of any kind.

**11.** Housed/Enclosed/Closed/Canopy configuration generator sets refer to generator sets that have noise reduction sound enclosure installed over the generator set and usually integrally attached to the skid base/base frame/fuel container base of the generator set.

**12.** Published sound levels meet the requirements India's Central Pollution Control Board (Ministry of Environment & Forests), vide GSR 371 (E), which states the A-weighted sound level at 1 meter from any diesel generator set up to a power output rating of 1000kVA shall not exceed 75 dB(A).

**13.** For updated noise pollution information for India see website: http://www.envfor.nic.in/legis/legis.html

**14.** Sound levels must meet India's Ambient Air Noise Quality Standards detailed for Daytime/Nighttime operation in Noise Pollution (Regulation and Control) Rules, 2000

Specification sheet

# Dual wall sub-base diesel fuel tanks -

10-200 kW generator sets

## Description

Cummins® offers two series of fuel tanks (basic series and regional series) for the 10~125 kW diesel generator sets. The "basic" series of fuel tanks provide economical solutions for areas with no or minimal local/regional code requirements on diesel fuel tanks. The footprint of "basic" tanks matches the generator set's footprint. The "regional" series of fuel tanks provide flexible and upgradable solutions for areas with extensive local/regional code requirements on diesel fuel tanks. The footprint of the "regional" series of fuel tanks extends beyond the generator set to allow room for installation of optional features at factory or accessories in the field for meeting local/regional code requirements or customer specification on diesel fuel tanks. All fuel tanks and optional features are compatible with factory installed enclosures.

These tanks are constructed of heavy gauge steel and include an internally reinforced baffle structure for supporting the generator set. The fuel tank design features fewer seams and welds for better corrosion resistance performance.

These tanks are pre-treated with a conversion coating and then finished with a textured powder paint. The paint has superior UV and chemical resistance with best-in-class adhesion, flexibility, and durability to resist chipping and substrate corrosion. Both interior compartments are treated with a rust preventative for extended corrosion protection.

These tanks are UL and ULC Listed as secondary containment generator base tanks. Inner and outer containments are leak checked per UL and ULC testing procedures to ensure their integrity.

These fuel tanks are offered in various sizes to satisfy different fuel capacities requirements.

## Compatible generator set model

| Engine | D1703M | V2203M | 4BT3.3-G5 | 4BTAA3.3-G7 | QSB5-G5 | QSB7-G5 |
|---|---|---|---|---|---|---|
| Generator set model names | C10D6 | C20D6 | C25D6 | C50D6 | C50D6C | C125D6D |
| | C15D6 | | C30D6 | C60D6 | C60D6C | C150D6D |
| | | | C35D6 | | C80D6C | C175D6D |
| | | | C40D6 | | C100D6C | C200D6D |
| | | | | | C125D6C | |
| | | | | | | |

## Basic fuel tanks

**Standard features:**

**UL 142 and ULC-S601 listed** - Minimum 110% secondary containment capacity.

**NFPA and IFC** - Capable of meeting NFPA 30 and NFPA 110 codes with available factory installed optional features.

**Emergency pressure relief vents** - Ensure adequate ventilation of the primary and secondary tank compartments under extreme temperature and emergency conditions.

**Normal atmospheric vent** - "Mushroom" style vent ensures adequate venting of the primary tank during fill, generator set running and temperature variations. Raised above fuel fill.

**Raised fuel fill** - includes lockable sealed fuel cap.

**Lifting eyes** - Allow lifting of fuel tank with generator set installed.

**Optional features:**

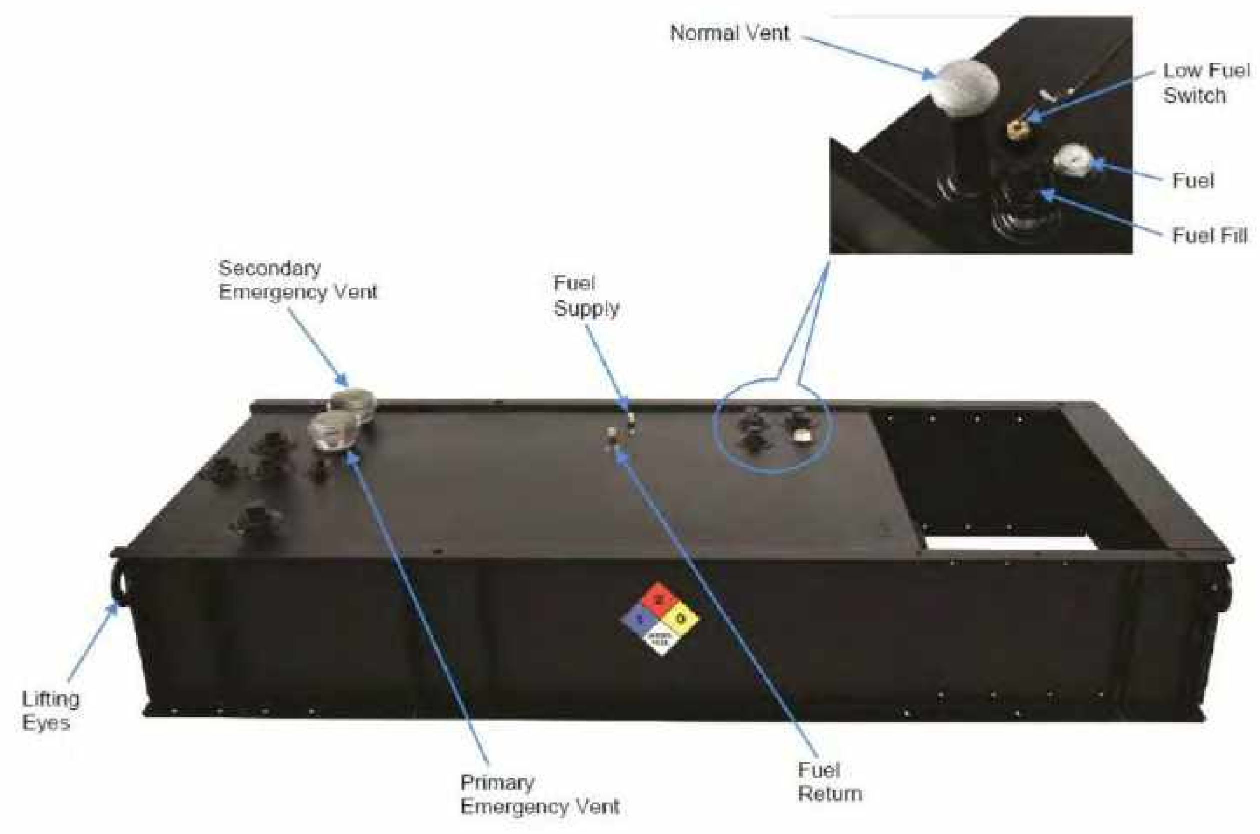
**Secondary containment basin switch (rupture switch)** - Activates a warning in the event of a primary tank leak. Side mounted.

**Low fuel level switch** - Activates a warning when 40% of the fuel is left in the tank.

**Fuel level gauge** - Provides direct reading of fuel level. Top mounted.

**Electric fuel level sender with gauge** - Allows remote electrical monitoring of fuel tank level. Flying leads for customer connection.

**Tank to foundation clearance** - 2-inch bolt-thru risers allow visual inspection under tank including rodent barrier.




*Picture is for reference only. See outline drawing for tank specific information by model.

## Basic tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time |
|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr |
| 10 | C10D6 | D1703M | 1.12 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 41 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 81 |
| 15 | C15D6 | D1703M | 1.38 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 33 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 66 |
| 20 | C20D6 | V2203M | 1.81 | C319-2 | 24 | 65.7 x 34 x 13 | 310 | 46 | 25 |
| | | | | C320-2 | 48 | 65.7 x 34 x 23 | 583 | 91 | 50 |
| 25 | C25D6 | 4BT3.3-G5 | 2.42 | C319-2 | 24 | 87.6 x 34 x 15 | 456 | 74 | 31 |
| | | | | C320-2 | 48 | 87.6 x 34 x 23 | 669 | 132 | 54 |
| 30 | C30D6 | 4BT3.3-G5 | 2.81 | C319-2 | 24 | 87.6 x 34 x 15 | 456 | 74 | 26 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 69 |
| 35 | C35D6 | 4BT3.3-G5 | 3.16 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 42 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 62 |
| 40 | C40D6 | 4BT3.3-G5 | 3.66 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 36 |
| | | | | C320-2 | 48 | 87.6 x 34 x 32 | 908 | 195 | 53 |
| 50 | C50D6 | 4BTAA3.3-G7 | 4.25 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 31 |
| | | | | C320-2 | 48 | 87.6 x 34 x 42 | 977 | 263 | 62 |
| 60 | C60D6 | 4BTAA3.3-G7 | 5.04 | C319-2 | 24 | 87.6 x 34 x 23 | 669 | 132 | 26 |
| | | | | C320-2 | 48 | 87.6 x 34 x 42 | 977 | 263 | 52 |
| 50 | C50D6C | QSB5-G5 | 5.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 49 |
| | | | | C320-2 | 48 | 117 x 40 x 25 | 809 | 260 | 49 |
| 60 | C60D6C | QSB5-G5 | 6.10 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 42 |
| | | | | C320-2 | 48 | 117 x 40 x 33 | 966 | 353 | 57 |
| 80 | C80D6C | QSB5-G5 | 7.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 35 |
| | | | | C320-2 | 48 | 117 x 40 x 33 | 966 | 353 | 48 |
| 100 | C100D6C | QSB5-G5 | 8.90 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 29 |
| | | | | C320-2 | 48 | 117 x 40 x 48 | 1471 | 526 | 59 |
| 125 | C125D6C | QSB5-G6 | 10.30 | C319-2 | 24 | 117 x 40 x 25 | 809 | 260 | 25 |
| | | | | C320-2 | 48 | 117 x 40 x 48 | 1471 | 526 | 51 |
| 125 | C125D6D | QSB7-G5 | 10.1 | C319-2 | 24 | 117x40x25 | 809 | 258 | 25 |
| | | | | C320-2 | 48 | 117x40x48 | 1471 | 520 | 51 |
| 150 | C150D6D | | 11.7 | C319-2 | 24 | 117x40x33 | 966 | 350 | 29 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 62 |
| 175 | C175D6D | | 13.3 | C319-2 | 24 | 117x40x33 | 966 | 350 | 26 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 55 |
| 200 | C200D6D | | 14.9 | C319-2 | 24 | 117x40x48 | 1471 | 520 | 34 |
| | | | | C320-2 | 48 | 180x40x42 | 2302 | 737 | 49 |

Note: No OFPV is offered on basic fuel tanks.

* All weights are approximate.

## Regional fuel tanks

**Standard features:**

**UL 142 and ULC-S601 listed** - Minimum 110% secondary IBC 2012 and 2015 certified - All optional features are seismically certified with this range of tanks and generator sets. Requires factory-installed 2 ft vent extensions or higher.

**UL 142 & ULC-S601 listed** - Minimum 125% secondary containment capacity.

**NFPA & IFC** - Capable of meeting NFPA 30, NFPA 110, and IFC codes with available factory-installed optional features.

**Emergency pressure relief vents** - Ensure adequate ventilation of the primary and secondary tank compartments under extreme temperature and emergency conditions.

**Normal atmospheric vent** - "Mushroom" style vent ensures adequate venting of the primary tank during fill, generator set running, and temperature variations. Raised above fuel fill.

**Raised fuel fill** - Includes lockable sealed fuel cap.

**Lifting eyes** - Allow lifting of fuel tank with generator set installed.

**Optional features:**

**Secondary containment basin switch (rupture switch)** - Activates a warning in the event of a primary tank leak. Side Mounted.

**Low fuel level switch** - Activates a warning when 40% of the fuel is left in the tank.

**Fuel level gauge** - Provides direct reading of fuel level. Top mounted.

**Electric fuel level sender with gauge** - Allows remote electrical monitoring of fuel tank level. Flying leads for customer connection.

**Tank to foundation clearance** - 2-inch bolt-thru risers allow visual inspection under tank including rodent barrier.

**Spill containment box for fuel fill** - 5 gallon capacity with integral drain (to tank). Lockable lid.

**Overfill prevention valve** - Shuts off fuel flow during filling at approximately 95% full*. Includes fill down tube, as needed, to terminate within 6" of the bottom of the fuel tank. Uses a 2 inch type "F" cam lock adapter for filling.

**High fuel switch** - Activates at 90% of full fuel level. Flying leads for customer connection.

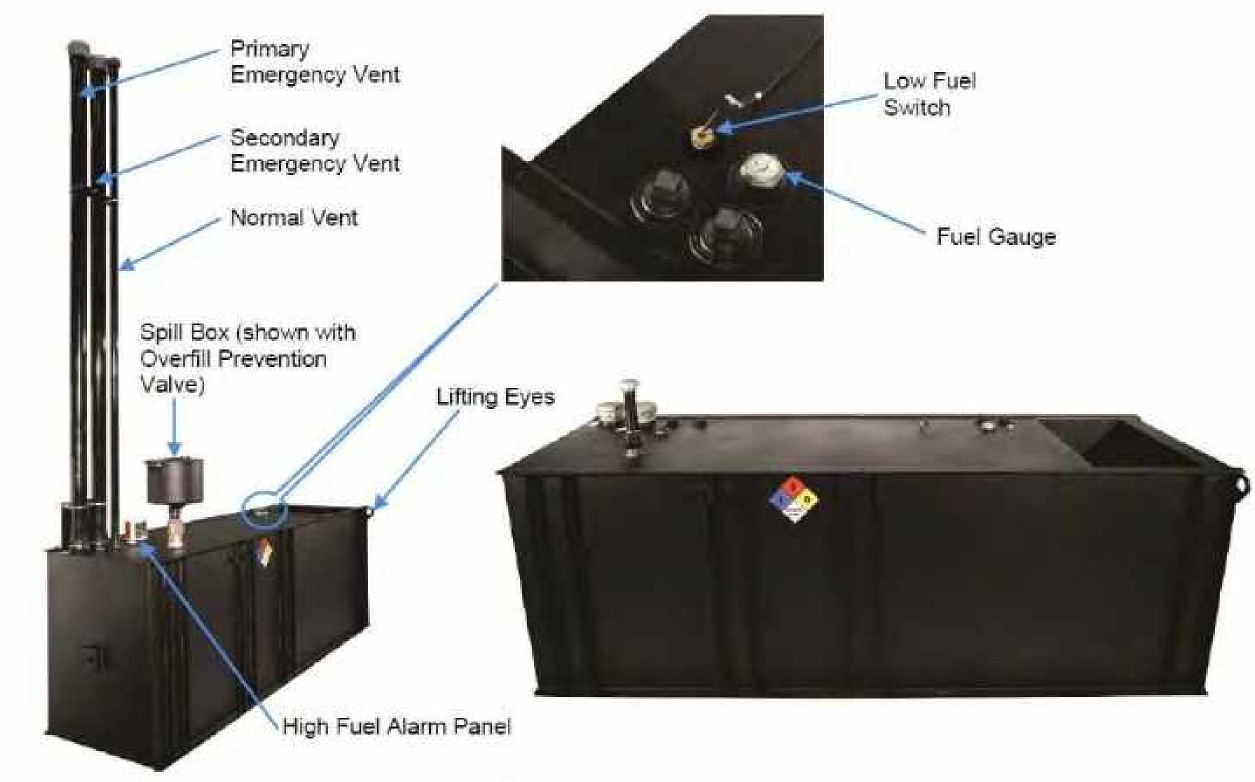
**High fuel alarm panel** - Provides audible & visual alarm when fuel level reaches 90% of full fuel level.

**Fill drop tube** - Terminates fuel fill location within 6" of the bottom of the fuel tank.

**Vent extensions** - Terminate normal and emergency vents (both primary and secondary) a minimum of 12 ft above the bottom of tank.

**Seismic vent extensions** - 2 ft normal and emergency (both primary & secondary) extensions to meet IBC/OSHPD seismic requirements.

* The OFPV inherently shuts off fuel at approximately 2" below the top of the fuel tank. Some tanks will shut off below this 95% fill level.




*Picture is for reference only. See outline drawing for tank specific information by model.

## Regional tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time w/o OFPV | Actual run time w/OFPV |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr | hr |
| 10 | C10 D6 | D1703M | 1.12 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 66 | 56 |
| | | | | C303-2 | 48 | 87.6 x 34 x 15 | 510 | 74 | 66 | 56 |
| | | | | C305-2 | 72 | 87.6 x 34 x 23 | 723 | 132 | 118 | 107 |
| | | | | C307-2 | 96 | 87.6 x 34 x 23 | 723 | 132 | 118 | 107 |
| 15 | C15 D6 | D1703M | 1.38 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 53 | 45 |
| | | | | C303-2 | 48 | 87.6 x 34 x 15 | 510 | 74 | 53 | 45 |
| | | | | C305-2 | 72 | 87.6 x 34 x 23 | 723 | 132 | 95 | 86 |
| | | | | C307-2 | 96 | 87.6 x 34 x 32 | 962 | 195 | 141 | 132 |
| 20 | C20 D6 | V2203M | 1.81 | C301-2 | 24 | 87.6 x 34 x 15 | 510 | 74 | 41 | 35 |
| | | | | C303-2 | 48 | 87.6 x 34 x 23 | 723 | 132 | 73 | 66 |
| | | | | C305-2 | 72 | 87.6 x 34 x 32 | 962 | 195 | 108 | 101 |
| | | | | C307-2 | 96 | 87.6 x 34 x 32 | 962 | 195 | 108 | 101 |
| 25 | C25 D6 | 4BT3.3-G5 | 2.42 | C301-2 | 24 | 121 x 34 x 10.5 | 514 | 74 | 31 | 25 |
| | | | | C303-2 | 48 | 121 x 34 x 16.2 | 686 | 132 | 54 | 47 |
| | | | | C305-2 | 72 | 121 x 34 x 22.1 | 879 | 195 | 80 | 73 |
| | | | | C307-2 | 96 | 121 x 34 x 29.5 | 1120 | 263 | 109 | 101 |
| 30 | C30 D6 | 4BT3.3-G5 | 2.81 | C301-2 | 24 | 121 x 34 x 10.5 | 514 | 74 | 26 | 21 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 69 | 63 |
| | | | | C305-2 | 72 | 121 x 34 x 29.5 | 1120 | 263 | 94 | 87 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 138 | 132 |
| 35 | C35 D6 | 4BT3.3-G5 | 3.16 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 42 | 36 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 62 | 56 |
| | | | | C305-2 | 72 | 121 x 34 x 29.5 | 1120 | 263 | 83 | 77 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 123 | 117 |
| 40 | C40 D6 | 4BT3.3-G5 | 3.66 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 36 | 31 |
| | | | | C303-2 | 48 | 121 x 34 x 22.1 | 879 | 195 | 53 | 48 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 106 | 101 |
| | | | | C307-2 | 96 | 121 x 34 x 42.0 | 1461 | 389 | 106 | 101 |
| 50 | C50 D6 | 4BTAA3.3-G7 | 4.25 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 31 | 27 |
| | | | | C303-2 | 48 | 121 x 34 x 29.5 | 1120 | 263 | 62 | 58 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 92 | 87 |
| 60 | C60 D6 | 4BTAA3.3-G7 | 5.04 | C301-2 | 24 | 121 x 34 x 16.2 | 686 | 132 | 26 | 23 |
| | | | | C303-2 | 48 | 121 x 34 x 29.5 | 1120 | 263 | 52 | 49 |
| | | | | C305-2 | 72 | 121 x 34 x 42.0 | 1461 | 389 | 77 | 73 |
| 50 | C50D6C | QSB5-G5 | 5.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 47 | 45 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 80 | 76 |
| | | | | C305-2 | 72 | 154 x 40 x 32 | 1657 | 425 | 80 | 76 |
| | | | | C307-2 | 96 | 154 x 40 x 46 | 2096 | 625 | 118 | 112 |
| 60 | C60D6C | QSB5-G5 | 6.10 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 41 | 39 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 70 | 66 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 102 | 97 |
| | | | | C307-2 | 96 | 154 x 40 x 46 | 2096 | 625 | 102 | 97 |
| 80 | C80D6C | QSB5-G5 | 7.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 34 | 33 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 58 | 55 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 85 | 81 |
| 100 | C100D6C | QSB5-G5 | 8.90 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 28 | 27 |
| | | | | C303-2 | 48 | 154 x 40 x 32 | 1657 | 425 | 48 | 45 |
| | | | | C305-2 | 72 | 154 x 40 x 46 | 2096 | 625 | 70 | 66 |
| 125 | C125D6C | QSB5-G6 | 10.30 | C301-2 | 24 | 154 x 40 x 22 | 1388 | 250 | 24 | 23 |
| | | | | C303-2 | 48 | 154 x 40 x 46 | 2096 | 625 | 60 | 58 |

* All weights are approximate.

## Regional tanks

| Generator set Standby power output | Generator set model | Engine model | Fuel consumption (100% load, Standby) | Tank feature code | Minimum run time feature | Tank dimensions (L x W x H) | Nominal dry weight* | Tank usable volume | Actual run time w/o OFPV | Actual run time w/OFPV |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | | | gal/hr | | hr | inch | lbs | gal | hr | hr |
| 125 | C125D6D | QSB7-G5 | 10.1 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 34 | 30 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 72 | 69 |
| | | | | C305-2 | 72 | 180x40x42 | 2302 | 737 | 72 | 69 |
| | | | | C307-2 | 96 | 180x65.5x35.3 | 3552 | 1055 | 104 | 98 |
| 150 | C150D6D | | 11.7 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 30 | 26 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 63 | 59 |
| | | | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 90 | 84 |
| 175 | C175D6D | | 13.3 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 26 | 23 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 55 | 52 |
| | | | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 79 | 74 |
| 200 | C200D6D | | 14.9 | C301-2 | 24 | 180x40x21 | 1477 | 351 | 24 | 21 |
| | | | | C303-2 | 48 | 180x40x42 | 2302 | 737 | 49 | 47 |
| | | | | C305-2 | 72 | 180x65.5x35.3 | 3552 | 1055 | 72 | 66 |

## Certifications/standards/codes

**UL 142 Listed** - Cummins dual wall sub-base tanks are UL Listed and constructed in accordance with Underwriters Laboratories Standard UL 142 “steel aboveground tanks for flammable and combustible liquids,” as a “secondary containment generator base tank”

**NFPA** - Cummins tanks are built in accordance with all applicable NFPA codes:

- NFPA 30 - Flammable and Combustible Liquids code
- NFPA 37 - Standard for Installation and use of Stationary Combustible Engine and Gas Turbines
- NFPA 110 - Standard for Emergency and Standby Power Systems

**ISO9001** - This product was designed and manufactured in facilities certified to ISO9001.

**ULC** - Cummins tanks are built in accordance with all applicable ULC codes

**For more information contact your local Cummins distributor or visit power.cummins.com**

**Our energy working for you.™**


NAAC-5868-EN (02/18)


| REVISIONS | | | |
|---|---|---|---|
| NO. | DATE | DR. | NATURE |
| | | | |

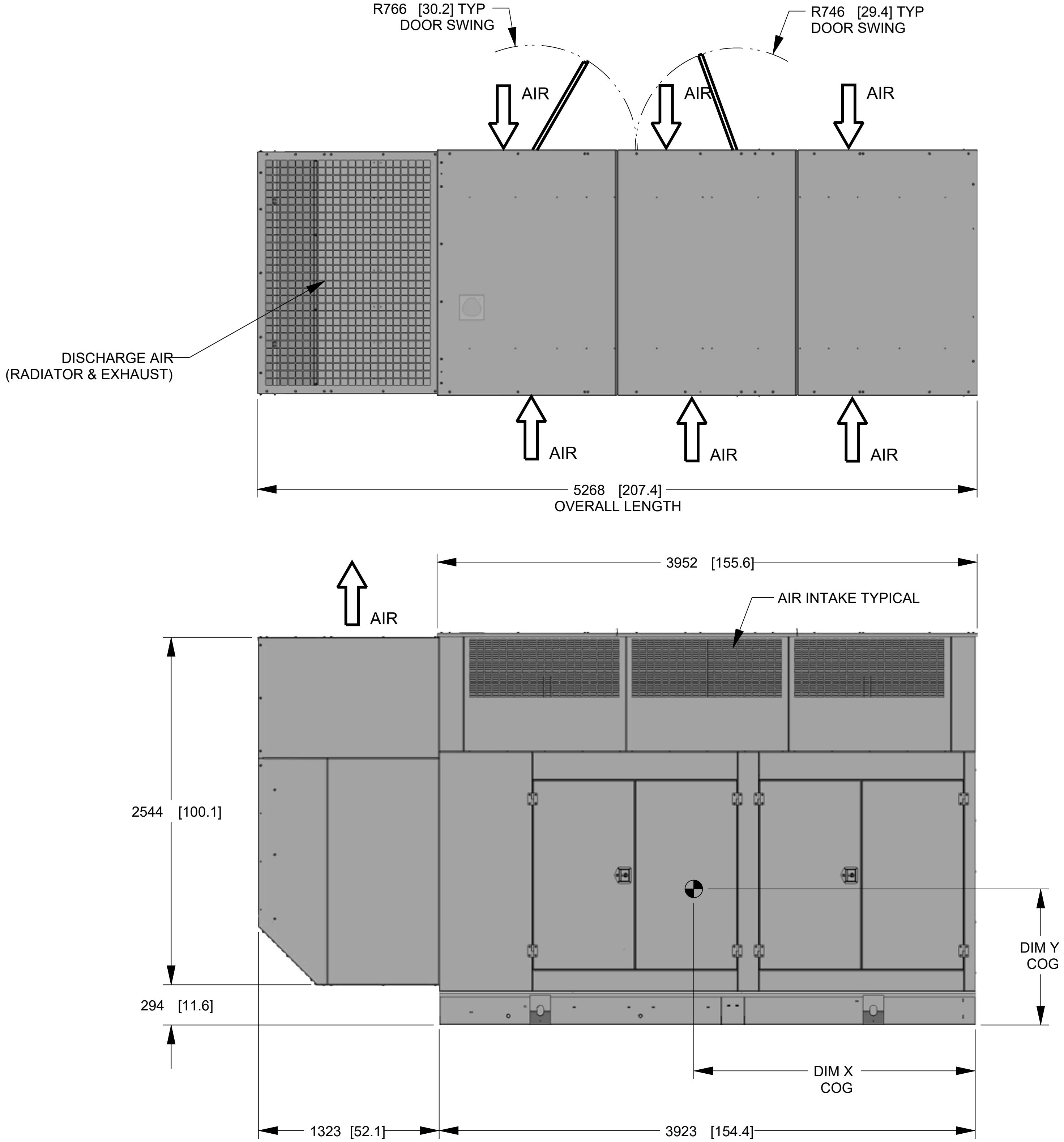
SITE PLAN

SERVICE STATION #207718
1399 WILLOW ROAD
MENLO PARK, CA 94025

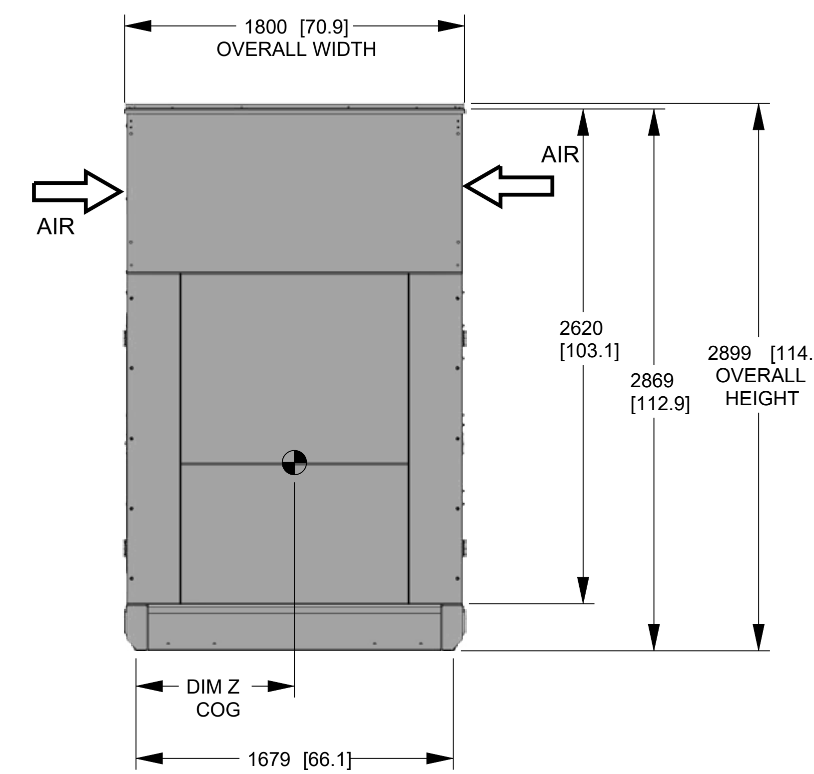
Chevron

DATE: 08/26/20
DRAWN BY: GRH
SCALE: 1"=10'-0"
FILENAME: 207718RCIP6

| SH | 1/1 | REV | D | WINDCHILL VERSION | D.1 |
|---|---|---|---|---|---|




FOR ALL STUB-UP, WEIGHT, AND COG DETAILS, SEE CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.




DIMENSIONS ARE IN MILLIMETERS [INCHES]

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

# INSTALLATION DRAWING



ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE

L2A ENCLOSURE
D15.2L SD/MD 500 & SB/MB 500
PD/WD 450 & PB/WB 450

| ISSUE DATE: | 03/21/14 | | |
|---|---|---|---|
| SIZE B | CAGE NO N/A | DWG NO 0K1606C | REV D |
| SCALE 0.025 | WT-KG | SHEET 1 of 1 | |

# SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC® | INDUSTRIAL POWER

**Standby Power Rating**

500 kW, 625 kVA, 60 Hz

**Prime Power Rating***

450 kW, 563 kVA, 60 Hz

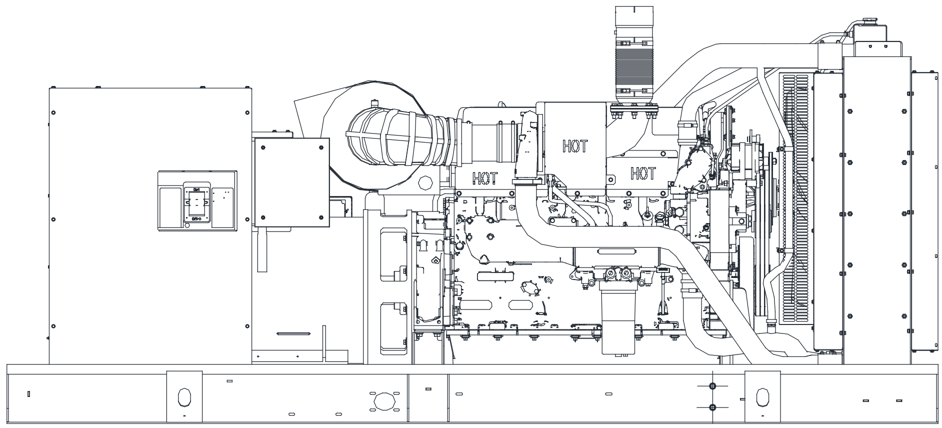



Image used for illustration purposes only

ISO 9001:2008

USA ENGINEERED & BUILT*

*Assembled in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories

## Codes and Standards

**Not all codes and standards apply to all configurations. Contact factory for details.**

UL2200, UL6200, UL1236, UL142

CSA C22.2

BS5514 and DIN 6271

SAE J1349

NFPA 37, 70, 99, 110

NEC700, 701, 702, 708

ISO 3046, 7637, 8528, 9001

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

## Powering Ahead

For over 50 years, Generac has provided innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial applications under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

# SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

## STANDARD FEATURES

### ENGINE SYSTEM

- Oil Drain Extension
- Heavy Duty Air Cleaner
- Fan Guard
- Stainless Steel Flexible Exhaust Connection
- Critical Silencer (Enclosed Units Only)
- Factory Filled Oil and Coolant
- Radiator Duct Adapter (Open Set Only)

### Fuel System

- Primary Fuel Filter

### Cooling System

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension

### Electrical System

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

### ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Class H Insulation Material
- Vented Rotor
- 2/3 Pitch
- Skewed Stator
- Amortisseur Winding
- Permanent Magnet Excitation
- Sealed Bearing
- Full Load Capacity Alternator
- Protective Thermal Switch

### GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping (Enclosed Units Only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby Rated Units)
- 1 Year Limited Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Units Only)

### ENCLOSURE (If Selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Stamped Air-Intake Louvers
- Upward Facing Discharge Hoods (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

### FUEL TANKS (If Selected)

- UL 142/ULC S-601
- Double Wall
- Vents
- Sloped Top
- Sloped Bottom
- Factory Pressure Tested (2 psi)
- Rupture Basin Alarm
- Fuel Level
- Check Valve in Supply and Return Lines
- RhinoCoat™ - Textured Polyester Powder Coat Paint
- Stainless Hardware

### CONTROL SYSTEM


### Digital H Control Panel- Dual 4x20 Display

### Program Functions

- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable Logic Controller
- RS-232/485 Communications
- All Phase Sensing Digital Voltage Regulator
- 2-Wire Start Capability
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus® protocol
- Predictive Maintenance Algorithm
- Sealed Boards
- Password Parameter Adjustment Protection
- Single Point Ground
- 16 Channel Remote Trending
- 0.2 msec High Speed Remote Trending
- Alarm Information Automatically Annunciated on the Display

### Full System Status Display

- Power Output (kW)
- Power Factor
- kW Hours, Total and Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency

### Alarms and Warnings

- Oil Pressure
- Coolant Temperature
- Coolant Level
- Low Fuel Pressure
- Engine Overspeed
- Battery Voltage
- Alarms and Warnings Time and Date Stamped
- Snap Shots of Key Operation Parameters During Alarms and Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

## CONFIGURABLE OPTIONS

### ENGINE SYSTEM

- Engine Coolant Heater
- Oil Heater
- Level 1 Fan and Belt Guards (Open Set Only)
- Radiator Stone Guard (Open Set Only)

### FUEL SYSTEM

- NPT Flexible Fuel Line

### ELECTRICAL SYSTEM

- 10A UL Listed Battery Charger
- Battery Warmer

### ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater

### CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

### GENERATOR SET

- 12 Position Load Center
- Extended Factory Testing

### ENCLOSURE

- Weather Protected Enclosure
- Level 1 Sound Attenuated
- Level 2 Sound Attenuated
- Level 2 Sound Attenuated with Motorized Dampers
- Steel Enclosure
- Aluminum Enclosure
- IBC Seismic Certification/OSHPD Preapproval
- Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- AC/DC Enclosure Lighting Kit
- Enclosure Heater

### FUEL TANKS (Size On Last Page)

- 8 in Fill Extension
- 13 in Fill Extension
- 19 in Fill Extension

### CONTROL SYSTEM

- NFPA 110 Compliant 21-Light Remote Annunciator
- Remote Relay Assembly (8 or 16)
- Oil Temperature Indication and Alarm
- Ground Fault Annunciator
- 10A Engine Run Relay
- 120V GFCI and 240V Outlets
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- Damper Alarm Contacts (Motorized Dampers Only)
- 100dB Alarm Horn

### WARRANTY (Standby Gensets Only)

- 2 Year Extended Limited Warranty
- 5 Year Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

## ENGINEERED OPTIONS

### ENGINE SYSTEM

- Fluid Containment Pan
- Coolant Heater Ball Valves

### ALTERNATOR SYSTEM

- 3rd Breaker Systems

### CONTROL SYSTEM

- Spare Inputs (x4) / Outputs (x4)
- Battery Disconnect Switch

### GENERATOR SET

- Special Testing
- Battery Box

### ENCLOSURE

- Door Open Alarm Switch

### TANKS

- Overfill Protection Valve
- UL 2085 Tank
- Stainless Steel Tank
- Special Fuel Tanks
- Vent Extensions
- 5 Gallon Spill Containment Box
- Dealer Supplied AHJ Requirements

GENERAC INDUSTRIAL POWER

## APPLICATION AND ENGINEERING DATA

### ENGINE SPECIFICATIONS

#### General

| | |
|---|---|
| Make | Perkins |
| EPA Emissions Compliance | Stationary Emergency |
| EPA Emission Reference | See Emission Data Sheet |
| Cylinder # | 6 |
| Type | In-Line |
| Displacement - $in^3$ (L) | 927.56 (15.2) |
| Bore - in (mm) | 5.39 (137) |
| Stroke - in (mm) | 6.73 (171) |
| Compression Ratio | 16.0:1 |
| Intake Air Method | Turbocharged/Aftercooled |
| Cylinder Head Type | 4-Valve |
| Piston Type | Aluminum |
| Crankshaft Type | I-Beam Section |

#### Engine Governing

| | |
|---|---|
| Governor | Electronic Isochronous |
| Frequency Regulation (Steady State) | ±0.25% |

#### Lubrication System

| | |
|---|---|
| Oil Pump Type | Gear |
| Oil Filter Type | Full-Flow |
| Crankcase Capacity - qt (L) | 47.55 (45) |

#### Cooling System

| | |
|---|---|
| Cooling System Type | Closed Recovery |
| Water Pump Type | Centrifugal Type, Belt-Driven |
| Fan Type | Pusher |
| Fan Speed - RPM | 1,658 |
| Fan Diameter - in (mm) | 36.5 (927) |

#### Fuel System

| | |
|---|---|
| Fuel Type | Ultra Low Sulfur Diesel #2 |
| Carburetor | ASTM |
| Fuel Filtering (Microns) | Primary 10 - Secondary 2 |
| Fuel Inject Pump Make | Electronic |
| Injector Type | MEUI |
| Engine Type | Pre-Combustion |
| Fuel Supply Line - in (mm) | 0.5 (12.7) NPT |
| Fuel Return Line - in (mm) | 0.5 (12.7) NPT |

#### Engine Electrical System

| | |
|---|---|
| System Voltage | 24 VDC |
| Battery Charger Alternator | Standard |
| Battery Size | See Battery Index 0161970SBY |
| Battery Voltage | (2)-12 VDC |
| Ground Polarity | Negative |

### ALTERNATOR SPECIFICATIONS

| | |
|---|---|
| Standard Model | K0500124Y23 |
| Poles | 4 |
| Field Type | Revolving |
| Insulation Class - Rotor | H |
| Insulation Class - Stator | H |
| Total Harmonic Distortion | <3% (3-Phase) |
| Telephone Interference Factor (TIF) | <50 |

| | |
|---|---|
| Standard Excitation | Permanent Magnet |
| Bearings | Single Sealed Cartridge |
| Coupling | Direct via Flexible Disc |
| Prototype Short Circuit Test | Yes |
| Voltage Regulator Type | Digital |
| Number of Sensed Phases | All |
| Regulation Accuracy (Steady State) | ±0.25% |

# SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

## OPERATING DATA

### POWER RATINGS - DIESEL

| | | Standby |
|---|---|---|
| Three-Phase 120/208 VAC @0.8pf | 500 kW | Amps: 1,735 |
| Three-Phase 120/240 VAC @0.8pf | 500 kW | Amps: 1,504 |
| Three-Phase 277/480 VAC @0.8pf | 500 kW | Amps: 752 |
| Three-Phase 346/600 VAC @0.8pf | 500 kW | Amps: 601 |

### MOTOR STARTING CAPABILITIES (skVA)

skVA vs. Voltage Dip

| 277/480 VAC | 30% | 208/240 VAC | 30% |
|---|---|---|---|
| K0500124Y23 | 1,050 | K0600124Y23 | 1,120 |
| K0600124Y23 | 1,560 | K0792124Y23 | 2,130 |
| K0832124Y23 | 2,800 | K0832124Y23 | 2,090 |

### FUEL CONSUMPTION RATES*

| Fuel Pump Lift - ft (m) |
|---|
| 12 (3.7) |

| Total Fuel Pump Flow (Combustion + Return) gph (Lph) |
|---|
| 121 (457) |

Diesel - gph (Lph)

| Percent Load | Standby |
|---|---|
| 25% | 11.2 (42.3) |
| 50% | 17.5 (66.3) |
| 75% | 24.2 (91.4) |
| 100% | 32.0 (121.1) |

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

### COOLING

| | | Standby |
|---|---|---|
| Coolant Flow | gpm (Lpm) | 114.1 (432) |
| Coolant System Capacity | gal (L) | 15.5 (586) |
| Heat Rejection to Coolant | BTU/hr (kW) | 648,307 (190) |
| Inlet Air | scfm ($m^3$/min) | 30,582 (866) |
| Maximum Radiator Backpressure | in $H_2O$ (kPa) | 0.5 (0.12) |

### COMBUSTION AIR REQUIREMENTS

| | Standby |
|---|---|
| Flow at Rated Power scfm ($m^3$/min) | 1,483 (42) |

### ENGINE

| | | Standby |
|---|---|---|
| Rated Engine Speed | RPM | 1,800 |
| Horsepower at Rated kW** | hp | 755 |
| Piston Speed | ft/min (m/min) | 2,020 (616) |
| BMEP | psi (kPa) | 358 (2,468) |

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

### EXHAUST

| | | Standby |
|---|---|---|
| Exhaust Flow (Rated Output) | scfm ($m^3$/min) | 3,955 (112) |
| Maximum Exhaust Backpressure | inHg (kPa) | 2.01 (6.8) |
| Exhaust Temp (Rated Output - Post Silencer) | °F (°C) | 1,022 (550) |

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, and DIN6271 standards.

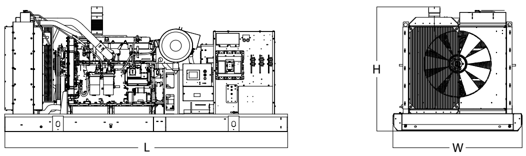
# SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

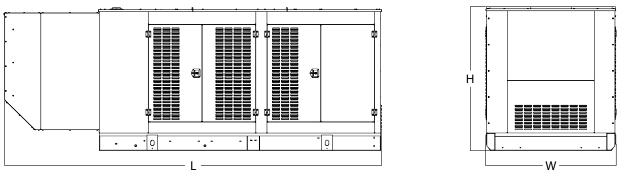


## DIMENSIONS AND WEIGHTS*



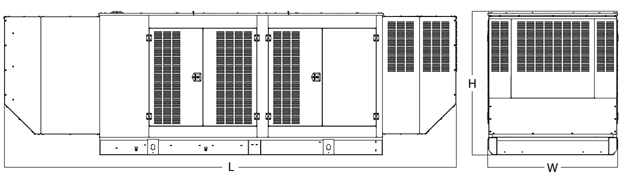

### OPEN SET (Includes Exhaust Flex)

| Run Time Hours | Usable Capacity Gal (L) | L x W x H - in (mm) | Weight - lbs (kg) |
|---|---|---|---|
| No Tank | - | 154.4 (3,923) x 71.0 (1,803) x 67.3 (1,709) | 10,435 (4,733) |
| 9 | 334 | 158.5 (4,025) x 71.0 (1,803) x 81.3 (2,065) | 12,110 (5,493) |
| 28 | 1,001 | 158.5 (4,025) x 71.0 (1,803) x 103.3 (2,623) | 15,272 (6,927) |
| 28 | 1,001 | 228.0 (5,791) x 71.0 (1,803) x 92.3 (2,344) | 13,585 (6,162) |
| 57 | 2,002 | 290.0 (7,366) x 71.0 (1,803) x 103.3 (2,623) | 15,285 (6,933) |



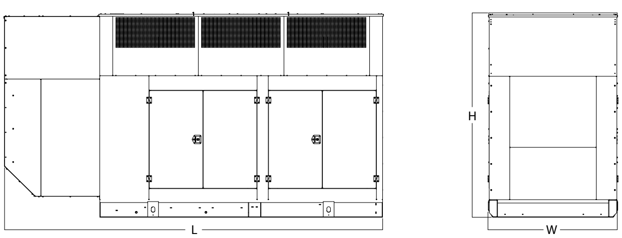

### WEATHER PROTECTED ENCLOSURE

| Run Time Hours | Usable Capacity Gal (L) | L x W x H - in (mm) | Weight - lbs (kg) | |
|---|---|---|---|---|
| | | | Steel | Aluminum |
| No Tank | - | 207.4 (5,268) x 70.9 (1,800) x 79.9 (2,031) | 12,672 (5,748) | 12,017 (5,451) |
| 9 | 334 | 207.4 (5,268) x 70.9 (1,800) x 93.9 (2,387) | 14,347 (6,508) | 13,692 (6,211) |
| 28 | 1,001 | 207.4 (5,268) x 70.9 (1,800) x 115.9 (2,945) | 15,272 (6,927) | 14,617 (6,630) |
| 28 | 1,001 | 228.0 (5,791) x 70.9 (1,800) x 104.9 (2,666) | 15,822 (7,177) | 15,167 (6,880) |
| 57 | 2,002 | 290.0 (7,366) x 70.9 (1,803) x 115.9 (2,945) | 17,522 (7,948) | 16,867 (7,651) |




### LEVEL 1 SOUND ATTENUATED ENCLOSURE

| Run Time Hours | Usable Capacity Gal (L) | L x W x H - in (mm) | Weight - lbs (kg) | |
|---|---|---|---|---|
| | | | Steel | Aluminum |
| No Tank | - | 247.5 (6,285) x 70.9 (1,800) x 80.0 (2,032) | 13,677 (6,204) | 12,017 (5,451) |
| 9 | 334 | 247.5 (6,285) x 70.9 (1,800) x 94.0 (2,388) | 15,352 (6,964) | 13,692 (6,211) |
| 28 | 1,001 | 247.5 (6,285) x 70.9 (1,800) x 116.0 (2,946) | 16,277 (7,383) | 14,617 (6,630) |
| 28 | 1,001 | 247.5 (6,285) x 70.9 (1,800) x 105.0 (2,667) | 16,827 (7,633) | 15,167 (6,880) |
| 57 | 2,002 | 290.0 (7,366) x 70.9 (1,800) x 116.0 (2,946) | 18,527 (8,404) | 16,867 (7,651) |




### LEVEL 2 SOUND ATTENUATED ENCLOSURE

| Run Time Hours | Usable Capacity Gal (L) | L x W x H - in (mm) | Weight - lbs (kg) | |
|---|---|---|---|---|
| | | | Steel | Aluminum |
| No Tank | - | 207.4 (5,268) x 70.9 (1,800) x 114.1 (2,899) | 14,016 (6,357) | 12,161 (5,516) |
| 9 | 334 | 207.4 (5,268) x 70.9 (1,800) x 128.1 (3,255) | 15,691 (7,117) | 13,836 (6,276) |
| 28 | 1,001 | 207.4 (5,268) x 70.9 (1,800) x 150.1 (3,813) | 16,616 (7,536) | 14,761 (6,695) |
| 28 | 1,001 | 228.0 (5,791) x 70.9 (1,800) x 139.1 (3,534) | 17,166 (7,786) | 15,311 (6,945) |
| 57 | 2,002 | 290.0 (7,366) x 70.9 (1,800) x 150.1 (3,813) | 18,866 (8,557) | 17,011 (7,716) |

* All measurements are approximate and for estimation purposes only.

| YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER |
|---|
| |

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

## Sarah Manzano

**From:** Faye Brandin <fbrandin@signaturedevelopment.com>
**Sent:** Tuesday, October 26, 2021 10:34 PM
**To:** Sarah Manzano
**Cc:** Eric Harrison
**Subject:** RE: Backup Generator for Pump Station

Hi Sarah,

Here is a crude map of where the pump station generator is located. It is at the southwestern corner of the public park. Do you need something more formal?


**Faye Brandin**
Direct 510.251.9284 | Cell 510.862.5629

---

**From:** Sarah Manzano <smanzano@ramboll.com>
**Sent:** Tuesday, October 26, 2021 4:11 PM
**To:** Faye Brandin <fbrandin@signaturedevelopment.com>
**Cc:** Eric Harrison <eharrison@signaturedevelopment.com>
**Subject:** RE: Backup Generator for Pump Station

Hi Faye,

Thank you for sending along the information. Can you provide a map of where the generator would be? All we need is a dot on the site plan.

Thanks!

## Electricity, Data Analysis and Trends

**Jan 2019 - Dec 2019**

**Usage(kWh)**

| Site Name | Site Code | Jan 2019 | Feb 2019 | Mar 2019 | Apr 2019 | May 2019 | Jun 2019 | Jul 2019 | Aug 2019 | Sep 2019 | Oct 2019 | Nov 2019 | Dec 2019 | Total | ENERGY STAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1050 HAMILTON CT | MPK 40 | 145,953 | 145,263 | 162,013 | 156,527 | 162,933 | 175,343 | 178,721 | 187,565 | 179,652 | 135,045 | 107,455 | 107,514 | 1,843,983 | 87 |
| 1100 HAMILTON CT | MPK 41 | 50,950 | 46,370 | 49,638 | 46,095 | 45,923 | 50,824 | 53,887 | 54,247 | 49,813 | 42,988 | 39,645 | 41,132 | 571,511 | 98 |
| 1200 HAMILTON CT | MPK 42 | 23,512 | 23,448 | 28,449 | 27,082 | 28,417 | 29,779 | 30,041 | 30,721 | 28,957 | 28,102 | 27,168 | 28,547 | 334,223 | 100 |
| 1010 HAMILTON CT | MPK 43 | 50,250 | 46,498 | 53,941 | 55,193 | 56,699 | 59,805 | 63,222 | 61,207 | 55,127 | 56,244 | 49,385 | 50,766 | 658,339 | 55 |
| 1205 HAMILTON CT | MPK 44 | 49,721 | 45,058 | 40,020 | 32,497 | 30,693 | 32,089 | 35,474 | 36,586 | 35,386 | 34,089 | 32,930 | 37,316 | 441,861 | 88 |
| 1105 HAMILTON CT | MPK 45 | 61,723 | 57,876 | 58,759 | 55,056 | 57,157 | 61,179 | 63,880 | 67,915 | 67,461 | 64,228 | 60,035 | 64,794 | 740,064 | 54 |
| 1005 HAMILTON CT | MPK 46 | 87,803 | 80,066 | 92,308 | 89,897 | 76,744 | 88,837 | 87,501 | 92,777 | 89,462 | 87,672 | 68,530 | 68,144 | 1,009,741 | 99 |
| 959-967 HAMILTON AV | MPK 47 | 19,152 | 20,803 | 20,239 | 19,620 | 23,368 | 23,990 | 23,890 | 26,746 | 25,471 | 24,240 | 23,985 | 22,970 | 274,475 | 5 |
| 927 HAMILTON AVE | MPK 48 | 25,025 | 23,807 | 26,911 | 26,542 | 27,515 | 30,947 | 31,945 | 32,896 | 31,616 | 32,054 | 28,709 | 28,156 | 346,123 | 57 |
| 923-925 HAMILTON AV | MPK 49 | 44,952 | 45,281 | 51,081 | 49,454 | 47,717 | 48,510 | 50,052 | 51,565 | 47,896 | 44,900 | 40,546 | 40,344 | 562,298 | 1 |
| 1390 WILLOW RD | MPK 50 | 10,763 | 9,749 | 11,591 | 11,433 | 12,161 | 10,679 | 8,127 | 7,921 | 7,090 | 7,277 | 8,041 | 9,123 | 113,956 | 91 |
| 1394 HAMILTON CT | MPK 51 | 1,504 | 1,296 | 1,007 | 970 | 1,146 | 1,416 | 1,446 | 1,022 | 898 | 2,540 | 3,967 | 4,422 | 21,633 | 100 |
| 1380 WILLOW ROAD # | MPK 52 | 40,830 | 38,180 | 43,811 | 43,022 | 43,499 | 45,486 | 44,014 | 47,182 | 44,070 | 42,519 | 35,516 | 35,888 | 504,017 | 100 |
| | MPK 53 | | | | | | | | | | 22,560 | 64,640 | 88,640 | 175,840 | |
| 1370-1380 WILLOW RD | MPK 54 | 15,738 | 21,766 | 24,498 | 23,787 | 24,551 | 29,974 | 29,697 | 31,022 | 29,810 | 25,061 | 20,117 | 20,806 | 296,826 | 57 |
| 1374 WILLOW ROAD | MPK 55 | 9,684 | 8,828 | 9,787 | 9,431 | 9,675 | 9,306 | 9,363 | 9,078 | 9,170 | 9,101 | 8,472 | 8,655 | 110,550 | 100 |
| 980 HAMILTON AVE | MPK 56 | 110,472 | 105,821 | 125,000 | 115,740 | 110,782 | 121,348 | 126,895 | 126,359 | 118,548 | 125,756 | 107,663 | 115,299 | 1,409,683 | |
| 1350 WILLOW RD | MPK 57 | 76,444 | 78,905 | 86,172 | 78,428 | 89,544 | 95,149 | 102,594 | 111,826 | 109,011 | 105,362 | 97,645 | 94,947 | 1,126,027 | 99 |
| 1360 WILLOW RD | MPK 58 | 60,443 | 55,346 | 61,902 | 60,953 | 60,442 | 60,565 | 65,172 | 68,043 | 66,940 | 82,510 | 69,082 | 70,329 | 781,726 | 100 |
| 990-998 HAMILTON AV | MPK 59 | 73,800 | 66,883 | 73,712 | 71,491 | 74,473 | 78,242 | 82,210 | 85,704 | 80,398 | 78,601 | 68,707 | 68,701 | 902,924 | 88 |
| **Total** | | 958,719 | 921,244 | 1,020,840 | 973,219 | 983,439 | 1,053,469 | 1,088,132 | 1,130,382 | 1,076,777 | 1,028,290 | 897,598 | 917,852 | 12,049,961 | 73 |

## Natural Gas, Data Analysis and Trends
**Jan 2019 - Dec 2019**

**Usage(therms)**

| Site Code | Site Name | Jan 2019 | Feb 2019 | Mar 2019 | Apr 2019 | May 2019 | Jun 2019 | Jul 2019 | Aug 2019 | Sep 2019 | Oct 2019 | Nov 2019 | Dec 2019 | Total | ENERGY STAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1050 HAMILTON CT | MPK 40 | 6,877 | 7,864 | 7,752 | 6,228 | 6,187 | 5,279 | 5,572 | 5,485 | 5,270 | 3,268 | 3,017 | 3,526 | 66,326 | 87 |
| 1100 HAMILTON CT | MPK 41 | 3,132 | 2,852 | 2,079 | 818 | 214 | 23 | 4 | 4 | 51 | 298 | 571 | 782 | 10,829 | 98 |
| 1200 HAMILTON CT | MPK 42 | 379 | 379 | 268 | 115 | 1 | 0 | 0 | 0 | 7 | 39 | 242 | 197 | 1,629 | 100 |
| 1010 HAMILTON CT | MPK 43 | 2,983 | 2,865 | 2,310 | 1,541 | 1,500 | 781 | 654 | 462 | 436 | 1,123 | 1,721 | 2,253 | 18,628 | 55 |
| 1205 HAMILTON CT | MPK 44 | 1,198 | 902 | 1,183 | 513 | 142 | 33 | 29 | 15 | 21 | 98 | 1,319 | 1,267 | 6,722 | 88 |
| 1105 HAMILTON CT | MPK 45 | 2,846 | 2,817 | 2,053 | 1,245 | 473 | 123 | 11 | 0 | 0 | 25 | 381 | 1,016 | 10,990 | 54 |
| 1005 HAMILTON CT | MPK 46 | 6,047 | 5,407 | 5,697 | 3,983 | 2,093 | 1,633 | 1,297 | 1,169 | 1,552 | 3,647 | 4,969 | 6,001 | 43,495 | 99 |
| 959-967 HAMILTON A\ | MPK 47 | 1,661 | 1,525 | 1,637 | 1,546 | 1,342 | 482 | 11 | 11 | 11 | 13 | 13 | 13 | 8,265 | 5 |
| 927 HAMILTON AVE | MPK 48 | 1,530 | 1,375 | 1,111 | 565 | 277 | 121 | 112 | 97 | 165 | 341 | 511 | 640 | 6,846 | 57 |
| 923-925 HAMILTON A\ | MPK 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1390 WILLOW RD | MPK 50 | 74 | 345 | 379 | 128 | 62 | 2 | 0 | 1 | 12 | 96 | 158 | 11 | 1,267 | 91 |
| | MPK 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1380 WILLOW ROAD # | MPK 52 | 3,158 | 2,738 | 2,820 | 1,920 | 1,685 | 1,195 | 694 | 623 | 676 | 1,072 | 1,151 | 1,316 | 19,047 | 100 |
| | MPK 53 | 1,466 | 1,473 | 1,565 | 1,481 | 1,560 | 161 | 10 | 10 | 10 | 12 | 10 | 17 | 7,775 | |
| 1370-1380 WILLOW R | MPK 54 | 493 | 425 | 290 | 89 | 13 | 12 | 13 | 13 | 13 | 22 | 217 | 374 | 1,972 | 57 |
| 1374 WILLOW ROAD | MPK 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| 980 HAMILTON AVE | MPK 56 | 4,379 | 3,504 | 3,654 | 3,027 | 2,533 | 2,312 | 2,529 | 2,424 | 2,192 | 2,508 | 2,377 | 2,514 | 33,953 | |
| 1350 WILLOW RD | MPK 57 | 2,531 | 3,029 | 2,638 | 1,843 | 1,397 | 908 | 927 | 881 | 972 | 1,207 | 2,929 | 2,932 | 22,194 | 99 |
| 1360 WILLOW RD | MPK 58 | 4,138 | 3,458 | 3,553 | 2,653 | 2,025 | 1,700 | 1,576 | 1,820 | 2,423 | 2,775 | 2,707 | 2,916 | 31,744 | 100 |
| 990-998 HAMILTON A\ | MPK 59 | 2,341 | 2,563 | 2,533 | 1,787 | 1,025 | 492 | 365 | 703 | 794 | 1,128 | 1,299 | 1,457 | 16,487 | 88 |
| | **Total** | 43,767 | 42,049 | 39,958 | 28,002 | 20,970 | 15,095 | 13,795 | 13,708 | 14,596 | 17,659 | 23,581 | 27,214 | 300,393 | 73 |

| Site Code | Site Name |
|---|---|
| 1 FACEBOOK WAY - MPK 20 | MPK0020 |
| 1 HACKER BLDG 10 | MPK0010 |
| 1 HACKER BLDG 11 | MPK0011 |
| 1 HACKER BLDG 12 | MPK0012 |
| 1 HACKER BLDG 14 | MPK0014 |
| 1 HACKER BLDG 15 | MPK0015 |
| 1 HACKER BLDG 16 | MPK0016 |
| 1 HACKER BLDG 17 | MPK0017 |
| 1 HACKER BLDG 18 | MPK0018 |
| 1 HACKER BLDG 19 | MPK0019 |
| 100 INDEPENDENCE DR | MPK0061 |
| 1005 HAMILTON CT | MPK 46 |
| 1010 HAMILTON CT | MPK 43 |
| 1010 O BRIEN | 84 1010 O BRIEN |
| 1010 OBRIEN DR | MPK0400 |
| 105 CONSTITUTION PARKING STRUC | MPK00P1 |
| 1050 HAMILTON CT | MPK 40 |
| 1100 HAMILTON CT | MPK 41 |
| 1105 HAMILTON CT | MPK 45 |
| 1180 DISCOVERY WAY STE A | SUN0102 |
| 1190 DISCOVERY WAY | SUN0102 |
| 1200 HAMILTON CT | MPK 42 |
| 1200 MISSISSIPPI ST | SAF1200 |
| 1205 HAMILTON CT | MPK 44 |
| 125 CONSTITUTION DR A | MPK0062 |
| 135 COMMONWEALTH DR | MPK0064 |
| 135 CONSTITUTION DR B | MPK0063 |
| 1350 WILLOW RD | MPK 57 |
| 1360 WILLOW RD | MPK 58 |
| 1370-1380 WILLOW RD | MPK 54 |
| 1374 WILLOW ROAD | MPK 55 |
| 1380 WILLOW ROAD #1 | MPK 52 |
| 1390 WILLOW RD | MPK 50 |
| 1394 HAMILTON CT | MPK 51 |
| 150 INDEPENDENCE DR | MPK0060 |
| 155 CONSTITUTION PARKING GARAG | MPK00P2 |
| 162 JEFFERSON DR | MPK0027 |
| 164 JEFFERSON DR | MPK0028 |
| 171 JEFFERSON DR - BU 37 | MPK0280 |
| 173 JEFFERSON DR - BU 37 | 37 BOH 173 |
| 175 JEFFERSON DR - BU 02 | 02 BOH 175 |
| 177 JEFFERSON DR - BU 02 | 02 BOH 177 |
| 179 JEFFERSON DR - BU 37 | MPK0280 |
| 180 JEFFERSON DR | MPK0026 |
| 1831 E BAYSHORE ROAD - BU 83 | RWC0860 |
| 190 JEFFERSON DR | MPK0025 |

| | |
|---|---|
| 191 JEFFERSON DR - BU77 | MPK0281 |
| 193 JEFFERSON DR - BU77 | MPK0281 |
| 195 JEFFERSON DR - BU77 | MPK0281 |
| 199 JEFFERSON DR - BU77 | MPK0281 |
| 200 JEFFERSON DR | MPK0024 |
| 205 CONSTITUTION DR - BU 02 | 02 BOH 205 |
| 209 CONSTITUTION DR - BU 37 | MPK0284 |
| 220 JEFFERSON DR | MPK0029 |
| 250 BRYANT ST | 32 250 BRYANT |
| 300 CONSTITUTION DR | MPK0023 |
| 322 AIRPORT BLVD | BUR0102 |
| 333 AIRPORT BLVD | BUR0101 |
| 34700 CAMPUS DR | FRE0113 |
| 34750 CAMPUS DR | FRE0112 |
| 34800 CAMPUS DR | FRE0111 |
| 42700 BOYCE RD | NEW8130 |
| 6422 COMMERCE DR | FRE6422 |
| 6503 DUMBARTON CIR | FRE0124 |
| 6504 KAISER DR # H | FRE0120 |
| 6511 DUMBARTON CIR | FRE0124 |
| 6512 KAISER DR | FRE0120 |
| 6519 DUMBARTON CIR # A | FRE0123 |
| 6520 KAISER DR | FRE0119 |
| 6524 KAISER DR | FRE0119 |
| 6530 PASEO PADRE PKWY | FRE6530 |
| 6536 KAISER DR | 35 FRE 115 |
| 6539 DUMBARTON CIR | FRE0122 |
| 6540 KAISER DR | FRE0115 |
| 6552 KAISER DR | FRE0114 |
| 6591 DUMBARTON CIR | FRE0118 |
| 6607 DUMBARTON CIR | FRE0117 |
| 6700 DUMBARTON CIR | 36 FRE 125 |
| 6700 DUMBARTON CIR # 200 | FRE0125 |
| 6700 DUMBARTON CIR #100 | FRE0125 |
| 6750 DUMBARTON CIR | FRE0125 |
| 6800 DUMBARTON CIR | FRE0125 |
| 6900 DUMBARTON CIR | FRE0125 |
| 7380 MORTON AVE | NEW0100 |
| 7601 DUMBARTON CIR | FRE0110 |
| 8130 ENTERPRISE DR | NEW8130 |
| 860 CHARTER ST - BU 83 | RWC0860 |
| 879 HAMILTION AVE. - BU 01 | 01 BELLE HAVEN |
| 900 VILLA ST | 31 900 VILLA |
| 923-925 HAMILTON AVE | MPK 49 |
| 927 HAMILTON AVE | MPK 48 |
| 950 5TH AVE PARKING STRUCTUREC | SUN0102 |
| 950 5TH AVE PARKINGSTRUCTUREC | SUN0102 |

| | |
|---|---|
| 959-967 HAMILTON AVE | MPK 47 |
| 980 HAMILTON AVE | MPK 56 |
| 990-998 HAMILTON AVE | MPK 59 |
| BURLINGAME | BUR1846 |
| SAF 250 | SAF250 |

# Memo

| | |
|---|---|
| **Date:** | December 1, 2021 |
| **Project:** | Willow Village Mixed-Use Development |
| **Project Number:** | 18-1489 |
| **To:** | Faye Brandin (Signature Development Group) |
| **From:** | Ian Seagren, PE<br>Forest Tanier-Gesner, PE |
| **Subject:** | Concept Level Energy Use and Production Summary |
| **Distribution:** | Eric Harrison (SDG), PAE Team |

The purpose of this memo is to summarize a preliminary estimate of energy consumption by programming and fuel type, to summarize a preliminary estimate of photovoltaic (PV) energy production and to summarize the key assumptions of the preliminary analysis for the Willow Village Mixed-Use Development.

**ENERGY CONSUMPTION SUMMARY BY PROGRAM AND FUEL**

The preliminary energy use estimates by land-use category and fuel type for the mixed-use portion of Willow Village are summarized below.

**Table 1| Concept Level Consumption Estimates**

| Land Use | Estimated Annual Electricity Usage (kWh/yr) | Estimated Annual Natural Gas Usage (Therms/yr) |
|---|---|---|
| Residential | 16,855,000 | 0 |
| Supermarket | 1,562,000 | 3,000 |
| Retail | 269,000 | 0 |
| Dining | 1,150,000 | 18,500 |
| Parking Infrastructure | 1,280,000 | 0 |
| Total | 21,116,000 | 21,500 |

**ENERGY PRODUCTION OPPORTUNITY SUMMARY BY BUILDING**

The preliminary production for the on-site solar photovoltaic (PV) has been estimated by building as summarized below. PV systems are sized to comply with the Solar PV requirements described under Title 24 and Menlo Park Municipal code ordinances.

**Table 2| Concept Level Production Estimates**

| BUILDING ID | SOLAR PV SYSTEM (kW) | ESTIMATED ENERGY PRODUCTION[i] (kWh/yr) |
|---|---|---|
| RS2 | 62 | 100,000 |
| RS3 | 57 | 92,000 |
| RS4 | 64 | 103,000 |
| RS5 | 34 | 55,000 |
| RS6 | 35 | 56,000 |
| RS7 | 13 | 21,000 |
| Total | | 427,000 |

## SUMMARY OF ANALYSIS AND KEY ASSUMPTIONS

### Land Use

Land use gross area estimates are based on the programming estimates provided on Jan 5, 2021, as summarized in Table 3 below.

**Table 3| Land Use Gross Area Estimates**

| Land Use | Proposed Area (GSF) | Note |
|---|---|---|
| Residential | 1,695,976 | 1730 Units Total |
| Supermarket | 40,000 | |
| Retail | 30,000 | 60,000 GSF Retail allocation assumed to be 50% Dining |
| Dining | 30,000 | |
| Parking Infrastructure | 617,715 | 1,883 residential spaces and 502 commercial spaces @ 259 SF/Space (308 EV Charging Stations) |

### Energy Data Sources

The estimates provided in Tables 1 utilize prototypical energy models for ASHRAE 90.1[ii] and Title 24[iii] along with supplemental existing building stock data[iv] and Title 24 exterior lighting power[v] allowances. Key characteristics of these data sources are:

- The prototype models utilize regional climate data (SFO or Oakland).
- Averaged estimates were taken from both ASHRAE 90.1-2016 prototypes and T-24 – 2016 prototypes when available. (Midrise Apartment; Restaurant; Retail)
- The Supermarket reference is an average of the DOE reference model and regional existing building stock data, due to a lack of cooking/baking energy in the reference model.
- The exterior lighting calculations only account for the General Hardscape allowance of 0.04 W/SF and does not include any "Special Security Lighting for Retail Parking and Pedestrian Hardscape" allowance.
- Electrification impacts are based on conservative heat pump space heating (2.5 COP) and electric tank water heating (0.93 EF). No efficiency credit estimated for conversion from gas cooking appliances to electric.
- Gas use in Supermarket and Dining is for commercial cooking equipment only. Smaller supermarkets may include minimal or no in-house food prep.
- Residential prototype includes in-unit air conditioning.

---

[i] Energy production based on PV Watt calculations for the specified system capacity.
[ii] AHRAE 90.1-2016 Commercial Prototype Building Models and 90.1-2004 DOE reference Model (supermarket) https://www.energycodes.gov/development/commercial/prototype_models; https://www.energy.gov/eere/buildings/new-construction-commercial-reference-buildings
[iii] Title-24-2016 Prototype Models http://bees.archenergy.com/resources.html
[iv] Existing building data: Building Performance Database https://bpd.lbl.gov/#explore
[v] Title-24-2016 exterior lighting allowance https://energycodeace.com/site/custom/public/reference-ace-2016/index.html#!Documents/section1407requirementsforoutdoorlighting.htm

**End of memo.**

## Sarah Manzano

**From:** Jeff Bean <jtbean@fb.com>
**Sent:** Monday, November 8, 2021 1:07 PM
**To:** Sarah Manzano
**Cc:** Eric Harrison; Faye Brandin
**Subject:** Willow Village - Consolidated Data Request

Hi Sarah,

There have been a number of data requests related to Willow Village recently, and I wanted to consolidate a summary of our projected energy use and solar capabilities here in one place.

First, here are the estimates provided by our electrical engineering team. This is predominantly going off the 100% SD set – some of it based off modeled information, some off educated guesses and EV charging is still an evolving field:

| | **Estimated KWH/YR*** |
|---|---|
| Office Buildings (6) | 23,828,000 |
| North Garage | 397,120 |
| NG EV Charging | 17,100,000 |
| South Garage | 268,098 |
| SG EV Charging | 10,885,500 |
| Town Square Garage | 268,181 |
| TS EV Charging | 1,984,500 |
| Retail | 1,450,000 |
| Hotel (w/no garage) | 2,528,400 |
| Town Square Plaza | 38,000 |

**note that the office buildings, N&S garages and hotel will have solar PV installed. The hotel will also have solar hot water generation. This onsite renewable energy generation will have an impact on the KWH numbers listed above.*

EV – connected loads and consumption based on the following assumptions:

- North Garage: 30% of the parking stalls (had 20% in the SD set but increased to 30% in case more are desired)
- South Garage: 30% of the parking stalls (had 20% in the SD set but increased to 30% in case more are desired)
- TS Garage: 20% of the parking stalls (remains as per SD set)

Second, assuming usage of 21,500 therms/year for both the Mixed-Use (including the supermarket) and public-facing retail on the office campus (the owner-occupied campus will be all-electric), the question was asked if "all natural gas usage in the commercial cooking areas be offset by on-site solar capabilities to be in compliance with the Municipal Code?" The answer is below:

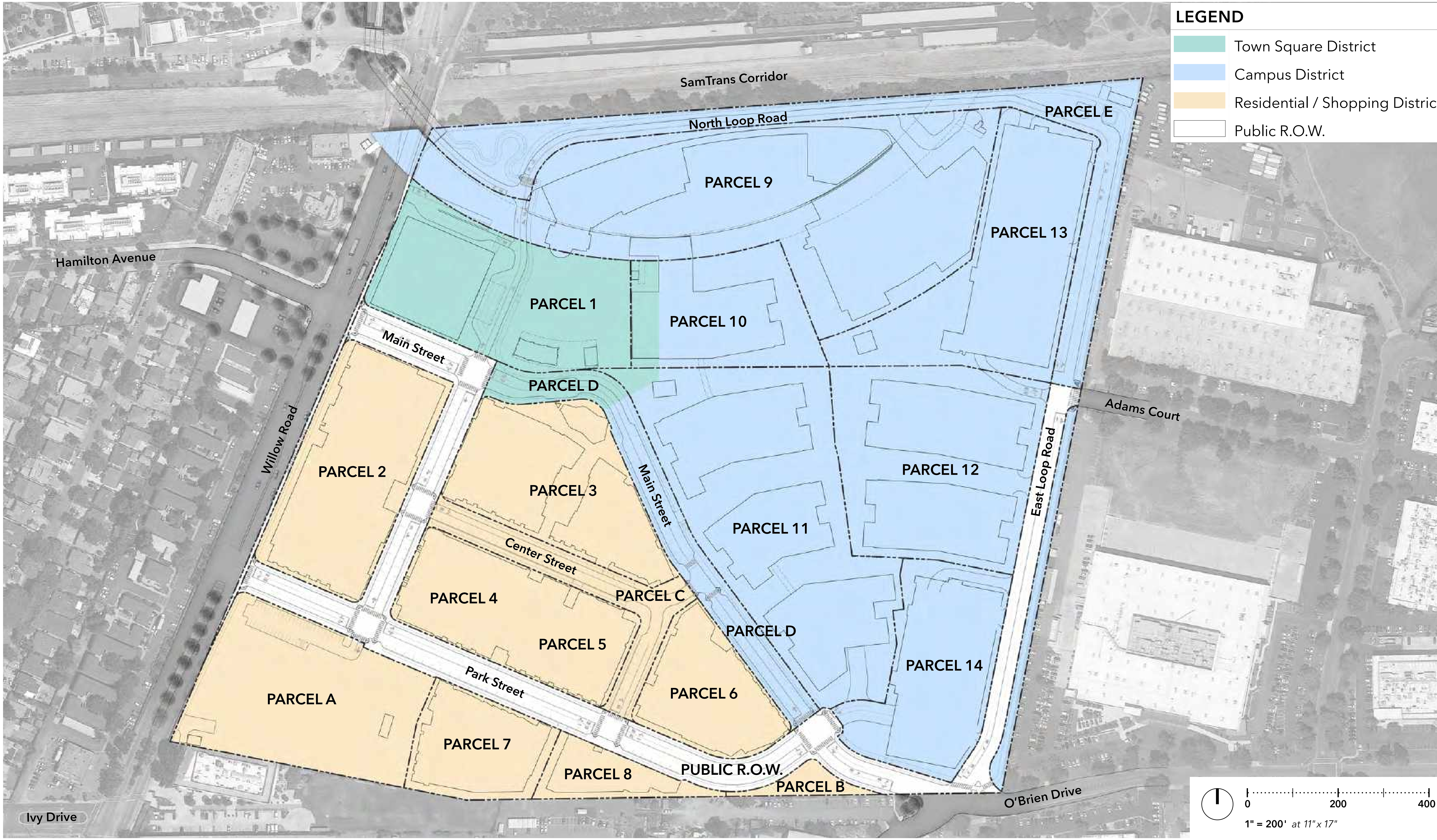
Yes, currently the office campus (6 offices + 2 garages) is on track to have enough solar PV to offset this gas usage. We are estimating producing approx. 3.5M kWh/year from solar PV.

Please let me know if there is anything else you need.

Regards,

Jeff

Jeff Bean
(308) 530-9538 | jtbean@fb.com




# Water Demand by Parcel | Plan

## PARCEL BY PARCEL

| Land Use | Parcel | Demand (MGY) | | | | |
|---|---|---|---|---|---|---|
| | | Indoor Water Use | | Irrigation | Cooling | Total |
| | | Potable | NP | | | |
| Retail | Parcel 1 | 5.77 | 1.13 | 3.00 | 0.00 | 9.90 |
| Park + Open Space | Parcel A | 0.00 | 0.00 | 4.86 | 0.00 | 4.86 |
| Park + Open Space | Parcel B | 0.00 | 0.00 | 0.40 | 0.00 | 0.40 |
| Roads | Parcel C | 0.00 | 0.00 | 0.14 | 0.00 | 0.14 |
| Retail + Residential | Parcel 2 | 11.50 | 2.24 | 1.54 | 0.00 | 15.27 |
| Retail + Residential | Parcel 3 | 16.28 | 3.77 | 1.38 | 0.00 | 21.43 |
| Residential | Parcel 4 | 5.70 | 0.97 | 0.64 | 0.00 | 7.31 |
| Residential | Parcel 5 | 5.54 | 0.94 | 0.64 | 0.00 | 7.12 |
| Retail + Residential | Parcel 6 | 7.93 | 1.48 | 0.78 | 0.00 | 10.19 |
| Residential | Parcel 7 | 4.55 | 0.78 | 0.72 | 0.00 | 6.04 |
| Residential | Parcel 8 | 2.74 | 0.47 | 0.36 | 0.00 | 3.57 |
| Roads | Public ROW | 0.00 | 0.00 | 0.23 | 0.00 | 0.23 |
| Meeting and Conference Facilities | Parcel 9 | 1.25 | 0.35 | 4.99 | 2.04 | 8.63 |
| Office Campus | Parcel 10 | 3.08 | 0.85 | 0.27 | 0.77 | 4.97 |
| Office Campus | Parcel 11 | 7.69 | 2.11 | 1.48 | 1.93 | 13.21 |
| Office Campus | Parcel 12 | 5.78 | 1.59 | 0.51 | 1.45 | 9.34 |
| Office Campus | Parcel 13 | 4.20 | 1.15 | 0.37 | 1.06 | 6.78 |
| Office Campus | Parcel 14 | 3.02 | 0.83 | 0.58 | 0.76 | 5.19 |
| Roads | Parcel D | 0.00 | 0.00 | 0.37 | 0.00 | 0.37 |
| Roads | Parcel E | 0.00 | 0.00 | 0.56 | 0.00 | 0.56 |
| **Sub-Total** | | 85.04 | 18.65 | 23.80 | 8.00 | 135.49 |
| Plus Leakage Factor | | 10% | 10% | 10% | 10% | 10% |
| **TOTAL** | | **93.54** | **20.52** | **26.18** | **8.80** | **149.03** |

# APPENDIX D
# CALEEMOD INPUTS FOR LANDSCAPING EMISSIONS ESTIMATION

# Facebook Willow Village - CEQA

**San Mateo County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 251.53 | 1000sqft | 5.77 | 251,530.00 | 0 |
| Research & Development | 123.87 | 1000sqft | 2.84 | 123,870.00 | 0 |
| General Light Industry | 80.10 | 1000sqft | 1.84 | 80,100.00 | 0 |
| Manufacturing | 23.57 | 1000sqft | 0.54 | 23,570.00 | 0 |
| Unrefrigerated Warehouse-No Rail | 500.78 | 1000sqft | 11.50 | 500,780.00 | 0 |
| Enclosed Parking with Elevator | 2,300.00 | Space | 20.70 | 920,000.00 | 0 |
| Health Club | 24.06 | 1000sqft | 0.55 | 24,060.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 70 |
| **Climate Zone** | 5 | | | **Operational Year** | 2019 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 243 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor changed to reflect Renewable Portfolio Standard (RPS) adjustments.

Land Use - Assumes 400 sqft/parking space, 2300 spaces total.

Energy Use -

Land Use Change -

Sequestration -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblProjectCharacteristics | CO2IntensityFactor | 641.35 | 243 |
| tblSequestration | NumberOfNewTrees | 0.00 | 7.00 |

# FB Willow Village Full Buildout
**San Mateo County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 1,730.00 | Dwelling Unit | 45.53 | 1,730,000.00 | 4948 |
| Regional Shopping Center | 200.00 | 1000sqft | 4.59 | 200,000.00 | 0 |
| Office Park | 1,600.00 | 1000sqft | 36.73 | 1,600,000.00 | 0 |
| Hotel | 119.00 | Room | 3.97 | 172,788.00 | 0 |
| Enclosed Parking with Elevator | 1,855.64 | 1000sqft | 42.60 | 1,855,640.00 | 0 |
| City Park | 11.59 | Acre | 11.59 | 504,702.00 | 0 |
| Parking Lot | 13.60 | 1000sqft | 0.31 | 13,600.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 70 |
| **Climate Zone** | 5 | | | **Operational Year** | 2026 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 49 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - PCE intensity factors used.

Land Use -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblLandUse | LandUseSquareFeet | 504,703.58 | 504,702.00 |
| tblProjectCharacteristics | CO2IntensityFactor | 641.35 | 49 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

# APPENDIX E
# REFINEMENT OF ONSITE HEALTH IMPACTS FOR THE WILLOW VILLAGE PROJECT

ENVIRONMENT
& HEALTH

# DRAFT MEMORANDUM

Date: May 17, 2022

To: Eric Harrison, Signature Development Group

From: Sarah Manzano
Michael Keinath

Subject: **Refinement of Onsite Health Impacts for the Willow Village Project**

## 1. PURPOSE OF MEMORANDUM

Ramboll
2200 Powell Street
Suite 700
Emeryville, CA 94608
USA

T +1 510 655 7400
F +1 510 655 9517
www.ramboll.com

Ramboll refined the health risk assessment for onsite residents of the proposed mixed-use development at Willow Village in Menlo Park, California (referred to hereafter as "the Project"). The analysis presented in the Draft Environmental Impact Report (DEIR) for the Project overestimated health impacts for onsite residents for the Project, Variants and Alternatives in two ways:

1. The analysis in the DEIR conservatively assumed all residential buildings became operational at the time the first residential building became operational, meaning all receptors were exposed to all construction starting in 2025, including construction from parcels that would already been completed by the time a specific residential parcel became operational, which is very conservative hypothetical condition.
2. The analysis in the DEIR did not take into account the effects of the filtration required by California Building Code on the heating, ventilation and air conditioning system (HVAC).

Ramboll refined the analysis of the onsite resident to take these factors into account, as discussed below for the Proposed Project and the Increased Housing Density Variant (which was the only variant and alternative with a quantitative assessment of health impacts). These refinements would not affect the analysis or impact conclusions as related to the maximally impacted offsite resident. If offsite residents have filtration installed consistent with the most recent building code, the reductions associated with filtration could be applied to those offsite residents as well and health risks would be less than shown in the DEIR.

As discussed in detail below, cancer risks are greatly reduced with the refinements to the HRA methodology and the incorporation of filtration. A summary of impacts at the onsite maximally exposed individual receptor (MEIR) reported in the DEIR is compared to the refined cancer risk and thresholds of significance used in the DEIR in **Table A** below. Further details on the refinements are discussed below.

**Table A Comparison of Refined Cancer Risks to Cancer Risks Reported in the DEIR**

| | Project Cancer Risk (in a million) | Variant Cancer Risk (in a million) |
|---|---|---|
| Onsite MEIR from DEIR | 9.8 | 10.6 |
| With HRA Refinement and Effects of Filtration | 5.1 | 5.5 |
| Threshold of Significance | 10 | |

## 2. REFINEMENT OF EXPOSURE

Onsite residents occupy six parcels of the Project, each of which becomes operational at different times throughout the proposed construction schedule. As a conservative measure, the analysis in the DEIR for the onsite residents evaluated a conservative hypothetical condition where all residents moved in when the first residential parcel was completed, as opposed to the expected condition where residents move in over the course of the construction as subsequent residential parcels are completed. The DEIR analysis assumed residents were exposed to construction starting in 2025 and were exposed to all construction in 2025, even if the construction of a certain building would have been completed before the residential building became operational. As such, the results presented in the DEIR conservatively overestimated impacts for onsite residents.

To refine the health risk assessment, phased operations were accounted for in the analysis. For each parcel with onsite residents, construction impacts from parcels whose construction had ended and had transitioned to operations were removed, consistent with the construction schedule shown in Figure 9 in Appendix 3.4-1 of the DEIR. For example, according to the construction schedule analyzed in the DEIR, construction of Parcel 7 is scheduled to be completed in month 48 of construction. Office Building 3 is scheduled to be completed in month 40. Because construction of Office Building 3 is complete before Parcel 7 becomes operational, Parcel 7 residents would not be exposed to construction of Office Building 3. Therefore, impacts from Office Building 3 were removed from the assessment of impacts to residents in buildings on Parcel 7. To be conservative, if a building was still under construction as another residential building becomes operational, all impacts from that building were included in the assessment. As a result, the refined estimates continue to be more conservative (i.e., higher) than expected.

This refinement results in construction impacts for many onsite residents being reduced and, in some cases, new MEIRs identified. **Table B** shows a summary of these impacts for the Project. After the refinements to the construction analysis were performed, the maximum cancer risk experienced from an onsite resident shifted from a combined construction and operational scenario, to an operational-only scenario, where the resident would be exposed to operations during the periods of highest exposure parameters. Therefore, **Table B** shows the impacts at this new MEIR and at the receptor with highest refined construction cancer risk (the impacts of both the construction plus operation and operational-only scenario are roughly equivalent at 7.11 and 7.14 in a million, respectively).

**Table C** shows a summary of these impacts for the Increased Housing Density Variant. Traffic impacts for the new Variant MEIRs were updated using the same methods as discussed in the Memorandum titled, “Air Quality, Greenhouse Gas, and Energy Analysis of the Willow Village Project Variants,” which is Appendix 5 of the DEIR.  Note, the MEIR did not shift for the Variant and the construction plus operational scenario remained the scenario with the highest health risks.

An explicit refinement of chronic hazard index and $PM_{2.5}$ concentration was not performed since impacts were well below thresholds in the DEIR.

**Table B: Updated Project Cancer Risk for Construction + Operations (in a million)**

| Source Category | On-Site MEIR from DEIR[1] | Maximum Construction plus Operational Impact On-Site Receptor, Refined[2] | | On-Site MEIR, Refined[2] |
|---|---|---|---|---|
| | Mitigated | Unmitigated[3] | Mitigated[4] | Mitigated[5] |
| Construction | 7.2 | 83 | 3.7 | 0 |
| Operational Generators | 1.4 | 1.7 | 1.3 | 6.9 |
| Operational Traffic | 1.1 | 1.1 | 2.1 | 0.19 |
| **Total Project Contribution** | **9.8** | **86** | **7.11** | **7.14** |
| Threshold of Significance | 10 | | | |

Notes:

1 The mitigated cancer risk for the on-site MEIR from the analysis in the DEIR was included for comparison. This MEIR is located at UTMx 575,245, UTMy 4,148,135, with a receptor height of 4.8, which is located on Parcel 4. Parcel 4 is the last building to come online, meaning no construction impacts would be expected, if phased operations were accounted for in the analysis

2 After the refinements to the construction analysis were performed, impacts from operational sources became drivers for the overall cancer risk at the MEIR. To show the maximum impacts from construction with the refinement, the receptor with the highest impact from construction is also shown.

3 Both the unmitigated maximum construction impact receptor and the MEIR are located at UTMx 575,215, UTMy 4,148,075, with a receptor height of 4.8 m

4 The mitigated maximum construction impact receptor is located at UTMx 575,255, UTMy 4,148,075, with a receptor height of 1.8 m

5 The mitigated MEIR is located at UTMx 575,275, UTMy 4,148,145, with a receptor height of 22.8 m

**Table C: Updated Variant Cancer Risk for Construction + Operations**

| Source Category | On-Site MEIR from DEIR Variants[1] | On-Site MEIR and Maximum Construction Impact Receptor, Refined | |
|---|---|---|---|
| | Mitigated | Unmitigated[2] | Mitigated[3] |
| Construction | 8.06 | 86 | 4.1 |
| Operational Generators | 1.40 | 1.7 | 1.3 |
| Operational Traffic | 1.16 | 1.9 | 2.2 |
| **Total Project Contribution** | **10.6** | **90** | **7.6** |
| Threshold of Significance | 10 | | |

Notes:

| |
|---|
| 1 The mitigated cancer risk for the on-site MEIR from the analysis in Appendix 5 of the DEIR was included for comparison. This MEIR is located at UTMx 575,245, UTMy 4,148,135, with a receptor height of 4.8.<br>2 The unmitigated maximum construction impact receptor and the MEIR are located at UTMx 575,225, UTMy 4,148,095, with a receptor height of 1.8 m<br>3 The mitigated maximum construction impact and the MEIR are located at UTMx 575,255, UTMy 4,148,085, with a receptor height of 1.8 m |

## 3. EFFECTS OF FILTRATION

Since January 1, 2020, California Title 24 has required all residential heating/cooling and ventilation systems to have Minimum Efficiency Reporting Value (MERV)-13 filters.[1,2] As Project construction would begin after January 1, 2020, residential units will have filtration installed. MERV-13 filters have a dust spot efficiency percent of 80-90%.[3] For this assessment, the lower end of that rating, 80%, was used to be conservative. These filters remove particulates from the air that are brought into the building for ventilation and remove particulates from the indoor air when the heating or cooling is recirculating air in the building.

In older buildings, air would enter the building through infiltration in cracks and crevices. The building code requires new buildings to be sealed from the outdoors to a point where not enough fresh outdoor air naturally enters the buildings with the windows closed. Therefore, the code requires the ventilation system to always bring in air from the outdoors, so residents have fresh air to breathe. The ventilation system is required to be equipped with MERV-13 filters; therefore, there is a constant supply of filtered air to the residences.

Furthermore, when the heating, cooling or fan modes are turned on, indoor air is pulled through a filter again and recirculated into the building, providing another reduction in particulates for air already in the building.

The health impacts reported in the DEIR are primarily from exposure to diesel particulate matter (DPM). The filters would remove DPM and thus reduce the health impacts experienced by residents who spend most of their time inside. However, health impacts would not be reduced proportionally to the rate the filters remove particulates because unfiltered air can also enter the residence through windows, doors and infiltration.

Therefore, to estimate the health impacts experienced by onsite residents that considers the effects of the filtration, a simple averaging calculation was performed that only considers the effects of the natural unfiltered air flow through windows and the filtered forced ventilation of outdoor air. As discussed above, the air would be further filtered through recirculation of indoor air when heating and cooling is on. However, this filtration mechanism is not considered in this analysis and would serve to increase the efficacy and reduce impacts. The amount of time recirculation is on is dependent on residents' preferences, which are not speculated in this

[1] California Energy Commission. 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Title 24, Part 6, and Associated Administrative Regulations in Part 1. Available online at: https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

[2] This requirement is carried forward in the adopted 2022 Building Energy Efficiency Standards that take effect January 1, 2023.

[3] USEPA. 2009. Residential Air Cleaners, A Summary of Available Information. EPA 402-F-09-002. August. Available online at: https://19january2017snapshot.epa.gov/indoor-air-quality-iaq/residential-air-cleaners-second-edition-summary-available-information_.html. Accessed May 11, 2022.

analysis. Excluding recirculation underestimates the reduction associated with the filtration system and provide a conservative estimate of indoor concentrations.

Flow rates into the building for the forced ventilation and the windows were estimated and combined with filtration percentages. The United States Environmental Protection Agency (USEPA) Exposure Factor Handbook provides a summary of air exchange rates by area for residential buildings by region of the United States. The 50th percentile air exchange rate for buildings in the western region of the United States is 0.43 air changes per hour (ACH).[4,5] ACH is defined as the ratio of the airflow to the volume. The mechanical engineer designing the residential buildings provided the air exchange rate for the forced air ventilation as a ratio of 0.41 to 0.47 air exchanges per hour.[6]

A percent reduction in exposure to DPM can be calculated through a simple weighted average of filtration percentage with air exchange rates. This simple average would assume windows are open all day, every day, which is conservative. It also does not include any additional reduction from recirculation.

The equation below shows the calculation for the average reduction of DPM indoors compared to outdoors based on the assumptions discussed above. **Table D** shows the parameters used to estimate this reduction.

$$R_{Avg} = \frac{ACH_W\ (1 - F_W) + ACH_V\ (1 - F_V)}{ACH_W + ACH_V}$$

Where:

| | |
|---|---|
| $R_{avg}$: | Ratio of indoor concentration of outdoor sources to outdoor concentration |
| $ACH_W$: | Air exchange rate through open windows |
| $ACH_V$: | Air exchange rate through forced ventilation of outdoor air |
| $F_W$: | Fraction of particulates removed through windows |
| $F_V$: | Fraction of particulates removed through forced ventilation of outdoor air |

**Table D. Building Parameters for Calculating Ratio of Indoor Concentration[1]**

| | Air Exchange Rate (ACH) | Filtration Percentage |
|---|---|---|
| **Windows** | 0.43 [$ACH_W$] | 0% [$F_W$] |
| **Forced Ventilation of Outdoor Air** | 0.41 [$ACH_V$] | 80% [$F_V$] |

Using the equation above and the parameters in **Table D**, the indoor concentration of DPM from outdoor sources is reduced to **61%** [$R_{avg}$]. As discussed above, this is a conservative estimate of the ratio of indoor concentration to outdoor concentration, which would result in a conservative

4 USEPA. 2018. Exposure Factors Handbook. Chapter 19: Building Characteristics. EPA/600/R-18/121F. July. Available at: https://www.epa.gov/expobox/exposure-factors-handbook-chapter-19. Accessed May 9, 2022.

5 This is the air exchange rate for air flows within the building, including natural ventilation (e.g., windows and doors), forced ventilation in the HVAC system, and infiltration. This study was conducted before modern code requirements for additional forced air ventilation. Assuming this air exchange rate applies only to windows would be a conservative estimate.

6 Communication between Greg Bucher, PAE, and Sarah Manzano, Ramboll, on April 19, 2022.

estimate of indoor concentrations, due to the exclusion of any reduction from recirculation and the assumption that windows would be open at all times.

**Tables E** and **F** show the cancer risk reported in the DEIR for the Project and Increased Housing Density Variant, respectively, and the reduction in risks taking into account filtration reduction. These risks do not incorporate the refinements to the risk assessment discussed in **Section 2**. Health impacts from traffic are based on DPM and other toxic air contaminants in the form of organic gases. The filters discussed in **Section 2** would filter the DPM from traffic and would likely filter some fraction of the organic gases. However, because the amount of filtration for organic gases is not known, filtration was not considered for traffic sources to be conservative.

**Table E. Cancer Risk Refined with Effects of Filtration (in a million)**

| **Source Category** | **Onsite MEIR from DEIR[1]** | | **With Effects of Filtration[2]** | |
|---|---|---|---|---|
| | **Construction + Operations** | **Operations Only** | **Construction + Operations** | **Operations Only** |
| Construction | 7.2 | -- | 4.4 | -- |
| Operational Generators | 1.4 | 1.4 | 0.9 | 0.9 |
| Operational Traffic | 1.1 | 2.0 | 1.1 | 2.0 |
| **Total Project Contribution** | **9.8** | **3.3** | **6.3** | **2.9** |
| Threshold of Significance | 10 | | | |

Notes:

1 Onsite MEIR from DEIR as reported in Table 59 of Appendix 3.4-1 of the DEIR.

2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

**Table F. Increased Housing Density Variant Cancer Risk Refined with Effects of Filtration (in a million)**

| **Source Category** | **Onsite MEIR from DEIR[1]** | | **With Effects of Filtration[2]** | |
|---|---|---|---|---|
| | **Construction + Operations** | **Operations Only** | **Construction + Operations** | **Operations Only** |
| Construction | 8.06 | -- | 4.9 | -- |
| Operational Generators | 1.4 | 1.4 | 0.9 | 0.9 |
| Operational Traffic | 1.16 | 2.0 | 1.2 | 2.0 |
| **Total Project Contribution** | **10.6** | **3.4** | **6.9** | **2.9** |
| Threshold of Significance | 10 | | | |

| Notes: |
|---|
| 1 Onsite MEIR from DEIR as reported in Table 59V of Appendix 5 of the DEIR. |
| 2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative. |

## 4. COMBINED ANALYSIS

The ratio of indoor concentration of outdoor sources to outdoor concentration discussed in **Section 3** can be applied to the revised health impacts discussed in **Section 2**. **Table G** shows the mitigated cancer risk at the maximum onsite receptors for the Project and the Variant incorporating the refined health impacts from **Section 2** and the filtration discussed in **Section 3** and compares to the impacts reported in the DEIR.

As shown in the table, the revised health impacts are much lower than reported in the DEIR while still considering conservative assumptions discussed above.

**Table G. Onsite Mitigated Cancer Risk for Project and Variant considering HRA Refinements and Filtration**

| Source Category | Onsite MEIR from DEIR | | With HRA Refinement and Effects of Filtration | |
|---|---|---|---|---|
| | Project | Variant | Project | Variant |
| Construction | 7.2 | 8.06 | 2.3 | 2.5 |
| Operational Generators | 1.4 | 1.4 | 0.8 | 0.8 |
| Operational Traffic | 1.1 | 1.16 | 2.1 | 2.2 |
| **Total Project Contribution** | **9.8** | **10.6** | **5.1** | **5.5** |
| Threshold of Significance | 10 | | | |

Notes:

1 Onsite MEIR from DEIR as reported in Table 59 of Appendix 3.4-1 and Table 59V of Appendix 5 of the DEIR.

2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

# APPENDIX F
# ANALYSIS OF THE RELOCATION OF THE PUMP STATION GENERATOR FOR THE WILLOW VILLAGE PROJECT

ENVIRONMENT
& HEALTH

# DRAFT MEMORANDUM

Date: June 9, 2022

To: Eric Harrison, Signature Development Group

From: Sarah Manzano
Michael Keinath, P.E.

Subject: **Analysis of the Relocation of the Pump Station Generator for the Willow Village Project**

## 1. PURPOSE OF MEMORANDUM

We understand the pump station associated with the Willow Village Project in Menlo Park will be relocated from the southwest corner of the site to one of two possible locations: 1) in the dog park (referred to as Location 1) or 2) in the parking lot of the park in the southwest portion of the site (referred to as Location 2). The pump station has an associated generator that was analyzed in our previous analyses discussed in our report titled "CEQA Air Quality, Greenhouse Gas and Health Risk Assessment Technical Report for Willow Village", which is Appendix 3.4-1 of the Draft Environmental Impact Report (DEIR) for Willow Village. This analysis was further refined in our memo "Refinement of Onsite Health Impacts for the Willow Village Project" dated May 17, 2022, herein referred to as the "Onsite Refinements Memo."

The relocation of the pump station would not affect the calculation of mass emissions as reported in the DEIR, since the same generator would be used and the total quantity of emissions would remain the same. The relocation also would not affect the analysis of odors or mitigation as discussed in the DEIR. However, the relocation would affect the health risk assessment because the location of the generator's emissions would change. Therefore, Ramboll refined the health risk assessment performed for Willow Village to assess the health risk impacts of the pump station generator at both proposed new locations. This memorandum discusses the methods used and the results of the health risk assessment at the two proposed new locations.

As discussed in detail below, impacts of the generators in the newly proposed locations are similar to those reported in the DEIR and the Onsite Refinements Memo. A summary of impacts at the onsite maximally exposed individual receptor (MEIR) for both proposed generator locations with and without filtration is shown in **Table A** below. Further details on the analysis are discussed below.


Ramboll
2200 Powell Street
Suite 700
Emeryville, CA 94608
USA

T +1 510 655 7400
F +1 510 655 9517
www.ramboll.com

**Table A Summary of Refined Cancer Risks to Cancer Risks Reported in the DEIR**

| | | Cancer Risk at Location 1 (in a million) | Cancer Risk at Location 2 (in a million) |
|---|---|---|---|
| Project | Onsite MEIR | 7.5 | 7.2 |
| | With Effects of Filtration | 4.7 | 5.2 |
| Variant | Onsite MEIR | 7.6 | 7.7 |
| | With Effects of Filtration | 5.5 | 5.5 |
| Threshold of Significance | | 10 | |

## 2. ANALYSIS OF GENERATOR RELOCATION

As discussed above, the relocation of the pumping station will impact the health risk assessment by changing the location of the generator's emissions, thereby impacting the estimated air concentrations of the toxic air contaminants (TACs) analyzed in the health risk assessment. Consistent with the methodology used in the DEIR, the most recent version of the American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD Version 21112) was used to recalculate the air concentrations of DPM and $PM_{2.5}$ from the pumping station generator at both potential locations. For both locations, the generator was modeled using the same source parameters used in the DEIR, with the stack height at one foot above the height of the utility building at 3.78 meters. Consistent with the DEIR, the latest version of the Building Profile Input Program, PRIME (BPIP PRIME, version 04274) was used to estimate the building downwash caused by the utility building that houses the pumping station generator, as well as the surrounding buildings present at both potential locations.

As detailed in the DEIR, emissions were modeled using the x/Q ("chi over q") method. Since the generator specifications would not change as a result of the relocation, the same actual emission rates from the DEIR were multiplied by the updated dispersion factors for both proposed locations to obtain updated concentrations. Exposure assumptions and receptor details from the DEIR were used in the updated health risk assessment as well.

Results from the updated health risk assessments conducted for both proposed locations can be found in the attached tables. **Table 1**, **Table 2**, and **Table 3** show the excess lifetime cancer risk, chronic health impact, and $PM_{2.5}$ concentration from the Project construction and operation at the MEIR for Location 1 (located in the dog park). **Table 4**, **Table 5**, and **Table 6** show the excess lifetime cancer risk, chronic health impact, and $PM_{2.5}$ concentration from the Project construction and operation at the MEIR for Location 2 (located in the parking lot of the park located at the southwest portion of the site). The excess lifetime cancer risk results in Table 1 and Table 4 incorporate the onsite refinements to exposure discussed in Section 2 of our Onsite Refinements Memo. Similar to the Onsite Refinements Memo, the chronic health impact and $PM_{2.5}$ concentration were not refined because results were well below thresholds without refinements. Therefore, these metrics are overestimated.

As the tables show, all impacts are below thresholds.

As discussed in our Onsite Refinements Memo, the filtration required to be installed in new residential buildings by California Building Code would reduce concentrations of outdoor sources indoors to about 61%. Therefore, the health impacts to onsite residents were further refined to account for the reduction in concentration associated with filtration, as shown in **Table B** for Location 1 and **Table C** for Location 2. Chronic HI and $PM_{2.5}$ concentration would be similarly reduced. However, since impacts for these categories are well below thresholds, the analysis was not explicitly performed.

**Table B. Cancer Risk at Location 1, Refined with Effects of Filtration (in a million)**

| Source Category | Onsite MEIR[1] | | With Effects of Filtration[2] | |
|---|---|---|---|---|
| | **Construction + Operations** | **Operations Only** | **Construction + Operations** | **Operations Only** |
| Construction | 0 | -- | 0 | -- |
| Operational Generators | 7.3 | 7.3 | 4.5 | 4.5 |
| Operational Traffic | 0.19 | 0.19 | 0.19 | 0.19 |
| **Total Project Contribution** | **7.5** | **7.5** | **4.7** | **4.7** |
| Threshold of Significance | 10 | | | |

Notes:
1 Onsite MEIR as reported in Table 1.
2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

**Table C. Cancer Risk at Location 2, Refined with Effects of Filtration (in a million)**

| Source Category | Onsite MEIR[1] | | With Effects of Filtration[2] | |
|---|---|---|---|---|
| | **Construction + Operations** | **Operations Only** | **Construction + Operations** | **Operations Only** |
| Construction | 3.7 | -- | 2.2 | -- |
| Operational Generators | 1.4 | 7.0 | 0.85 | 4.2 |
| Operational Traffic | 2.1 | 0.19 | 2.1 | 0.19 |
| **Total Project Contribution** | **7.2** | **7.1** | **5.2** | **4.4** |
| Threshold of Significance | 10 | | | |

Notes:
1 Onsite MEIR as reported in Table 4.
2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

RAMBOLL

## 3. ANALYSIS OF GENERATOR RELOCATION FOR THE INCREASED HOUSING DENSITY VARIANT

The same analysis discussed in Section 2 was performed for the Increased Housing Density Variant. **Table 7**, **Table 8**, and **Table 9** show the excess lifetime cancer risk, chronic health impact, and $PM_{2.5}$ concentration from the Project construction and operation at the MEIR for Location 1 (located in the dog park) for the Increased Housing Density Variant. **Table 10**, **Table 11**, and **Table 12** show the excess lifetime cancer risk, chronic health impact, and $PM_{2.5}$ concentration from the Project construction and operation at the MEIR for Location 2 (located in the parking lot of the park located at the southwest portion of the site) for the Increased Housing Density Variant.

As the tables show, all impacts are below thresholds.

Similar to the Project, the health impacts to onsite residents for the Variant were further refined to account for the reduction in concentration associated with filtration, as shown in **Table D** for Location 1 and **Table E** for Location 2.

**Table D. Cancer Risk at Location 1, Refined with Effects of Filtration for Variant (in a million)**

| Source Category | Onsite MEIR[1] | | With Effects of Filtration[2] | |
|---|---|---|---|---|
| | Construction + Operations | Operations Only | Construction + Operations | Operations Only |
| Construction | 4.1 | -- | 2.5 | -- |
| Operational Generators | 1.3 | 7.3 | 0.81 | 4.5 |
| Operational Traffic | 2.2 | 0.20 | 2.2 | 0.20 |
| **Total Variant Contribution** | **7.6** | **7.5** | **5.5** | **4.7** |
| Threshold of Significance | 10 | | | |

Notes:
1 Onsite MEIR as reported in Table 7.
2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

**Table E. Cancer Risk at Location 2, Refined with Effects of Filtration for Variant (in a million)**

| Source Category | Onsite MEIR[1] | | With Effects of Filtration[2] | |
|---|---|---|---|---|
| | Construction + Operations | Operations Only | Construction + Operations | Operations Only |
| Construction | 4.1 | -- | 2.5 | -- |
| Operational Generators | 1.4 | 7.0 | 0.85 | 4.2 |
| Operational Traffic | 2.2 | 0.20 | 2.2 | 0.20 |

RAMBOLL

| | | | | |
|---|---|---|---|---|
| **Total Variant Contribution** | **7.7** | **7.2** | **5.5** | **4.4** |
| Threshold of Significance | 10 | | | |

Notes:
1 Onsite MEIR as reported in Table 10.
2 Impacts at the MEIR are refined to incorporate the effects of filtration by assuming indoor concentrations of outdoor sources is 61% of the outdoor concentration for construction and generators. As discussed above, impacts from traffic were not refined to be conservative.

**TABLE**

**Table 1**
**Project Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5] Scenario 3** | **Off-Site MEIR[4,5] Scenario 2** | **On-Site MEIR[3,5] Scenario 3** | **Off-Site MEIR[4,5] Scenario 2** | **On-Site MEIR[3,5] Scenario 3** | **Off-Site MEIR[4,5] Scenario 4** |
| Construction | 83 | 57 | 0 | 7.6 | -- | -- |
| Operational Generators | 1.6 | 0.99 | 7.3 | 0.99 | 7.3 | 1.8 |
| Operational Traffic | 1.1 | 0.89 | 0.19 | 0.89 | 0.19 | 1.6 |
| **Total Project Contribution** | **86** | **59** | **7.5** | **9.5** | **7.5** | **3.4** |

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (µg/m3)
   CF = Conversion Factor (mg/µg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:



RAMBOLL

## Table 1
## Project Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1
## Willow Village
## Menlo Park, California

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,215 | 575,500 | 575,275 | 575,500 | 575,275 | 575,500 |
| UTMy (m) | 4,148,075 | 4,147,960 | 4,148,145 | 4,147,960 | 4,148,145 | 4,147,960 |
| Receptor Height (m) | 4.8 | 1.8 | 22.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 2**
**Project Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** |
| Construction | 0.23 | 0.11 | 8.8E-03 | 0.011 | -- | -- |
| Operational Generators | 4.0E-04 | 5.8E-04 | 3.9E-04 | 7.0E-04 | 8.8E-04 | 8.1E-04 |
| Operational Traffic | 2.1E-03 | 1.4E-03 | 2.3E-03 | 3.3E-03 | 6.0E-03 | 3.9E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.011** | **0.015** | **6.9E-03** | **4.7E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i / cREL$

   Where:

   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)

   $C_i$ = Annual Average Air Concentration for Chemical "i" ($\mu g/m^3$)

   cREL = Chronic Reference Exposure Level ($\mu g/m^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 2**
**Project Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,245 | 575,400 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year l | Year l |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 3**
**Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | $PM_{2.5}$ Concentration[1] ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 1.1 | 0.52 | 0.038 | 0.063 | -- | -- |
| Operational Generators | 2.0E-03 | 2.9E-03 | 2.2E-03 | 4.1E-03 | 4.4E-03 | 4.1E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.13** | **0.18** | **0.11** | **0.12** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

$C_i = E \times D_i$

Where:

C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)

$D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($(\mu g/m^3)/(g/s)$)

E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. On-site and off-site MEIR locations are documented below:

**Table 3**
**Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

## Table 4
## Project Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2
## Willow Village
## Menlo Park, California

<table>
<tr><th rowspan="4">Source Category</th><th colspan="6">Lifetime Excess Cancer Risk[1]</th></tr>
<tr><th colspan="6">(in a million)</th></tr>
<tr><th colspan="4">Construction + Operations</th><th colspan="2" rowspan="2">Operations Only</th></tr>
<tr><th colspan="2">Unmitigated[2]</th><th colspan="2">Mitigated[2]</th></tr>
<tr><th rowspan="2">Project Contribution</th><th>On-Site MEIR[3,5]</th><th>Off-Site MEIR[4,5]</th><th>On-Site MEIR[3,5]</th><th>Off-Site MEIR[4,5]</th><th>On-Site MEIR[3,5]</th><th>Off-Site MEIR[4,5]</th></tr>
<tr><th>Scenario 3</th><th>Scenario 2</th><th>Scenario 3</th><th>Scenario 2</th><th>Scenario 3</th><th>Scenario 4</th></tr>
<tr><td>Construction</td><td>83</td><td>57</td><td>3.7</td><td>7.6</td><td>--</td><td>--</td></tr>
<tr><td>Operational Generators</td><td>1.8</td><td>0.66</td><td>1.4</td><td>0.66</td><td>7.0</td><td>0.17</td></tr>
<tr><td>Operational Traffic</td><td>1.1</td><td>0.89</td><td>2.1</td><td>0.89</td><td>0.19</td><td>3.2</td></tr>
<tr><td>Total Project Contribution</td><td>86</td><td>58</td><td>7.2</td><td>9.2</td><td>7.1</td><td>3.4</td></tr>
</table>

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (µg/m3)
   CF = Conversion Factor (mg/µg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 4**
**Project Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,215 | 575,500 | 575,255 | 575,500 | 575,275 | 574,720 |
| UTMy (m) | 4,148,075 | 4,147,960 | 4,148,085 | 4,147,960 | 4,148,145 | 4,147,360 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 5**
**Project Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 0.23 | 0.11 | 8.9E-03 | 0.011 | -- | -- |
| Operational Generators | 4.2E-04 | 6.9E-04 | 4.2E-04 | 2.2E-04 | 4.6E-03 | 2.7E-04 |
| Operational Traffic | 2.1E-03 | 1.4E-03 | 2.1E-03 | 3.3E-03 | 2.3E-03 | 3.9E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.011** | **0.014** | **6.9E-03** | **4.1E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i$ / cREL

   Where:

   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)

   $C_i$ = Annual Average Air Concentration for Chemical "i" ($\mu g/m^3$)

   cREL = Chronic Reference Exposure Level ($\mu g/m^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. On-site and off-site MEIR locations are documented below:

## Table 5
## Project Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2
## Willow Village
## Menlo Park, California

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,235 | 575,400 | 575,015 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,175 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year I | Year I |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 6**
**Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| Source Category | $PM_{2.5}$ Concentration[1] ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 |
| Construction | 1.1 | 0.52 | 0.038 | 0.063 | -- | -- |
| Operational Generators | 2.1E-03 | 3.5E-03 | 1.8E-03 | 1.3E-03 | 1.7E-03 | 1.3E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.13** | **0.18** | **0.11** | **0.12** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

$C_i = E \times D_i$
Where:
C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)
$D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($(\mu g/m^3)/(g/s)$)
E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. On-site and off-site MEIR locations are documented below:

**Table 6**
**Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 7**
**Project Variant Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 2** | **Scenario 3** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Construction | 86 | 57 | 4.1 | 7.6 | -- | -- |
| Operational Generators | 1.4 | 0.99 | 1.3 | 0.99 | 7.3 | 1.8 |
| Operational Traffic | 1.9 | 0.92 | 2.2 | 0.92 | 0.20 | 1.7 |
| **Total Project Contribution** | **90** | **59** | **7.6** | **9.5** | **7.5** | **3.5** |

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (μg/m3)
   CF = Conversion Factor (mg/μg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 7**
**Project Variant Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,225 | 575,500 | 575,255 | 575,500 | 575,275 | 575,500 |
| UTMy (m) | 4,148,095 | 4,147,960 | 4,148,085 | 4,147,960 | 4,148,145 | 4,147,960 |
| Receptor Height (m) | 1.8 | 1.8 | 1.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 8**
**Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 0.23 | 0.11 | 8.9E-03 | 0.011 | -- | -- |
| Operational Generators | 4.0E-04 | 5.8E-04 | 3.9E-04 | 7.0E-04 | 8.8E-04 | 8.1E-04 |
| Operational Traffic | 2.1E-03 | 1.4E-03 | 2.3E-03 | 3.3E-03 | 6.0E-03 | 3.9E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.012** | **0.015** | **6.9E-03** | **4.7E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i / cREL$

   Where:

   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)

   $C_i$ = Annual Average Air Concentration for Chemical "i" (μg/m$^3$)

   cREL = Chronic Reference Exposure Level (μg/m$^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

## Table 8
## Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1
## Willow Village
## Menlo Park, California

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,245 | 575,400 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year I | Year I |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 9**
**Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**
**Willow Village**
**Menlo Park, California**

| Source Category | $PM_{2.5}$ Concentration[1] ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** |
| Construction | 1.1 | 0.52 | 0.040 | 0.063 | -- | -- |
| Operational Generators | 2.0E-03 | 2.9E-03 | 2.2E-03 | 4.1E-03 | 4.4E-03 | 4.1E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.13** | **0.18** | **0.11** | **0.12** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

   The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

   $C_i = E \times D_i$
   Where:
   C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)
   $D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($\mu g/m^3$)/(g/s)
   E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:


RAMBOLL

**Table 9**

**Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 1**

**Willow Village**

**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram

kg - kilogram

m - meter

MEIR - maximally exposed individual receptor

TRU - Transportation Refrigeration Unit

UTMx - Universal Transverse Mercator x-coordinate

UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 10**
**Project Variant Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| Construction | 86 | 57 | 4.1 | 7.6 | -- | -- |
| Operational Generators | 1.5 | 0.66 | 1.4 | 0.66 | 7.0 | 0.17 |
| Operational Traffic | 1.9 | 0.92 | 2.2 | 0.92 | 0.20 | 3.4 |
| **Total Project Contribution** | **90** | **58** | **7.7** | **9.2** | **7.2** | **3.6** |

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (μg/m3)
   CF = Conversion Factor (mg/μg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

## Table 10
## Project Variant Cancer Risk at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2
## Willow Village
## Menlo Park, California

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,225 | 575,500 | 575,255 | 575,500 | 575,275 | 574,720 |
| UTMy (m) | 4,148,095 | 4,147,960 | 4,148,085 | 4,147,960 | 4,148,145 | 4,147,360 |
| Receptor Height (m) | 1.8 | 1.8 | 1.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 11**
**Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 0.23 | 0.11 | 8.9E-03 | 0.011 | -- | -- |
| Operational Generators | 4.2E-04 | 6.9E-04 | 4.0E-04 | 2.2E-04 | 4.6E-03 | 2.7E-04 |
| Operational Traffic | 2.1E-03 | 1.4E-03 | 2.3E-03 | 3.3E-03 | 2.3E-03 | 3.9E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.012** | **0.014** | **6.9E-03** | **4.1E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i$ / cREL
   Where:
   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)
   $C_i$ = Annual Average Air Concentration for Chemical "i" ($\mu g/m^3$)
   cREL = Chronic Reference Exposure Level ($\mu g/m^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:

**Table 11**
**Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,245 | 575,400 | 575,015 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,175 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year I | Year I |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 12**
**Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| Source Category | $PM_{2.5}$ Concentration[1] ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 | On-Site MEIR[3,5] Scenario 3 | Off-Site MEIR[4,5] Scenario 1 |
| Construction | 1.1 | 0.52 | 0.040 | 0.063 | -- | -- |
| Operational Generators | 2.1E-03 | 3.5E-03 | 1.8E-03 | 1.3E-03 | 1.7E-03 | 1.3E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.13** | **0.18** | **0.11** | **0.12** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

   The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

   $C_i = E \times D_i$
   Where:
   C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)
   $D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($\mu g/m^3$)/(g/s)
   E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.
3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.
5. On-site and off-site MEIR locations are documented below:



RAMBOLL

**Table 12**
**Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR for Pumping Station Relocation at Location 2**
**Willow Village**
**Menlo Park, California**

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

# Appendix 5.2
# Additional Information Regarding Potential Health Effects or Criteria Air Pollutant Emission Impacts

RAMBOLL

ENVIRONMENT
& HEALTH

# MEMORANDUM

Date: June 24, 2022

To: Eric Harrison, Signature Development Group

From: Michael Keinath, PE
Sarah Manzano

Subject: **Air Quality, Greenhouse Gas, and Energy Analysis of the Willow Village Project Variants**

## 1. PURPOSE OF MEMORANDUM

As a supplemental analysis to the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report prepared for the construction and operation of the proposed mixed-use development at Willow Village in Menlo Park, California (referred to hereafter as "the Project"), Ramboll evaluated potential criteria air pollutant (CAP) emissions, greenhouse gas (GHG) emissions, and health impacts associated with the Project variants at the maximally exposed individual receptor (MEIR) as described below. Variants are elements that may or may not be proposed as part of the Project for particular reasons.

Ramboll
2200 Powell Street
Suite 700
Emeryville, CA 94608
USA

T +1 510 655 7400
F +1 510 655 9517
www.ramboll.com

## 2. PROJECT VARIANTS

### 2.1 Increased Residential Density Variant

The Increased Residential Density Variant would increase the number of residential dwelling units by approximately 200 units, to a total of up to 1,930 residential units. These additional dwelling units would be included in Parcel 4, which is one of the last buildings to be built. No other changes to the Project would occur under this Variant. Updates to the land use summary can be found in **Table 1V**.

An analysis consistent with the Project analysis was performed to evaluate the potential impacts associated with the increase in dwelling units. Table references included herein correspond to the similar tables in the Technical Report that would be replaced by the changes associated with the Increased Residential Density Variant.

#### 2.1.1 *Construction Emissions and Health Risk Assessment*

This Variant results in additional construction activity to build the additional 200 dwelling units. The Project Applicant indicated that there would be no change to the foundations or excavation necessary to accommodate the additional dwelling units. However, the core and shell phase for Parcel 4 would be increased by one month and tenant improvements would increase by three months. Both phases would use the same equipment information for the extended construction period. This increased activity

RAMBOLL

would result in additional emissions, which are shown in **Table 12V**[1] for construction architectural coating off-gassing emissions, **Table 13V** for unmitigated criteria air pollutant emissions, **Table 14V** for mitigated criteria air pollutant emissions and **Table 15V** for GHG emissions. As shown in these tables, emissions would increase slightly, but conclusions would not change.

The increase in emissions would also affect health impacts. A health risk assessment was performed using the same methodology as was used in the Technical Report with these additional emissions. Results are shown in **Tables 59V**, **60V** and **61V**. Additional discussion on findings is in **Section 2.1.3.**

### 2.1.2 *Operational Emissions and Health Risk Assessment*

Increasing the density of the residential area by 200 units, or roughly 12% compared to the original 1,730 units, would be expected to increase the residential emissions associated with consumer products, architectural coatings, water use, and energy use by approximately the same margin. Landscaping and generator emissions are not expected to change because the additional units would be installed by increasing the height of existing apartment buildings, leaving landscaping and generator requirements the same. The impacted building operational capacity can be found in **Table 16V**.

The Transportation Engineer provided increased traffic associated with this Variant, which increases the daily average residential trip rate and VMT from 7,359 trips and 69,910 miles to 8,210 trips and 77,992 miles, respectively.

The emissions due to increased traffic and operational emissions associated with this Variant can be found in **Tables 17V**, **18V**, **21aV**, **21bV**, **22V**, **23V**, **24aV**, **24bV**, **25aV**, **25bV**, **28V**, **30V-36V**, **38V**, and **39V**. A summary of increased emissions can be found in **Tables 40V**, **41V**, and **42V**.

The total construction and operations emissions increase from this Variant can be found in **Tables 43V** and **44V**. As shown in **Table 44V**, an additional 200 DU is not expected to change significance findings compared to the Project.

The increase in dwelling units would also increase the traffic volumes on certain roadways. Analysis comparing volumes by roadways at the MEIR from the Technical Report was performed to determine the impact of the additional traffic. **Table 47V** shows how traffic volumes scale by segment. As shown in **Table 59V**, operational emissions due to this Variant would increase the operational only lifetime excess cancer risk from 3.3 in a million to 3.4 in a million for the On-Site MEIR and from 3.4 to 3.6 in a million for the Off-Site MEIR. Based on these results, the increase in cancer risk associated with this Variant is minor and remains below the Bay Area Air Quality Management District cancer risk threshold of 10 in a million.

The potential for exposure to the increased traffic volumes to result in adverse chronic noncancer effects and excess $PM_{2.5}$ concentrations were evaluated by conservatively scaling the Project operations chronic noncancer hazard index and excess $PM_{2.5}$ concentrations by the maximum change in traffic volumes for any segment. The impact from the Increased Residential Density Variant remains below threshold.

[1] Table numbers referenced herein correspond to the similar table in the Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report.

### 2.1.3 *Combined Construction and Operational Health Impacts*

Similar to the analysis for the Project, health impacts from Increased Residential Variant construction and operations were added together to estimate the combined health impacts of construction activities and operation. A breakdown of excess lifetime cancer risk from construction, operational generators, and operational traffic at the Project MEIR is shown in **Table 59V**. The table also shows the Scenario for which the maximum was identified. Similar breakdowns for chronic HI and $PM_{2.5}$ concentration are shown in **Table 60V** and **Table 61V**, respectively. These tables also show the Scenario for which the maximums were identified, as well as the year for which the maximum occurred since chronic HI and $PM_{2.5}$ concentrations are annual impacts.

All health impacts remain below thresholds. Similar to the Project, the health impacts at onsite residents would be reduced due to the required filtration on the new residential units. However, these impacts were conservatively not taken into account. Appendix E and Appendix F of the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report contain more information on the effects of filtration for informational purposes.

### 2.1.4 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.1.5 *Energy*

This Variant would increase energy use associated with construction and operations. However, increases in energy use would be minor, similar to the increase in emissions, and significance findings would not change.

## 2.2 No Hamilton Avenue Realignment Variant

The No Hamilton Avenue Realignment Variant assumes that no changes would occur to the existing land uses on the Hamilton Avenue Parcels and that the intersection of Willow Road and Hamilton Avenue would remain in the existing location. This would alter the circulation network east of Willow Road to accommodate retaining the Willow Road and Hamilton Avenue intersection in its current alignment. This Variant would result from forces outside of the Project's control, such as not receiving approval from Caltrans or affected property owners.

### 2.2.1 *Construction Emissions and Health Risk Assessment*

This Variant results in less construction activity due to the lack of construction of the Hamilton Avenue Realignment and lack of increase in retail and relocation of the service station at the Hamilton Avenue Parcels North and South. Therefore, construction emissions would be reduced. However, emissions would not be reduced to a level that would change significance findings of construction criteria air pollutant emissions since construction associated with these parcels were relatively minor.

As a result of the emissions reduction due to the reduction in equipment activity, health impacts would also be reduced. However, the reduction in emissions is far from the MEIR reported in our Technical Report. Therefore, the reduction in construction activity would not have a substantial change in health impacts reported in the Technical Report due to the dispersion of the emissions at the MEIR. The reduction also would not substantially reduce required mitigation of construction equipment.

### 2.2.2 *Operational Emissions and Health Risk Assessment*

Operational emissions would be reduced as a result of the reduction in additional retail associated with the Hamilton Avenue Parcels North and South. Emissions from architectural coatings, consumer products, landscaping, mobile, energy use, water, waste and emergency generators would be reduced as a result of the reduction in additional retail with this Variant. For context, the Hamilton Avenue Parcels North and South account for only 0.7% of daily trips and 0.4% of daily vehicle miles traveled of the Project at Full Buildout. This Variant would decrease Project traffic emissions by a similarly insubstantial margin. Therefore, the change in emissions associated with this Variant would be minimal and would not change significance findings.

The overall effect on the operational health impacts of the Project is expected to be negligible. Considering both the relatively small decrease in emissions and the Hamilton Avenue Parcels being approximately 0.25 miles to the onsite MEIR and 0.5 miles to offsite MEIR, it is unlikely that this Variant would produce a meaningful reduction to the health impacts associated with the Project.

### 2.2.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.2.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. As mentioned above, construction activity would be reduced with this Variant due to the reduction in activity at the Hamilton Avenue Parcels North and South. Therefore, construction fuel use would be minorly reduced. However, the reduction in fuel use would not change any significance findings due to the minor reduction.

Project building related energy use would also be minorly reduced due to the reduction in new retail space. The minor change in traffic patterns associated with this Variant would have a negligible impact on energy use associated with vehicle travel. These changes would not change any significance findings due to the minor changes.

## 2.3 No Willow Road Tunnel Variant

The No Willow Road Tunnel Variant assumes the tunnel from the northwest corner of the Project site to the southeast corner of the Bayfront campus would not be constructed, resulting from forces outside of the Project's control. With this Variant, the trams would continue to operate, but would use Willow Road instead of the tunnel. Pedestrians and bicyclists would use the sidewalk and on-street bike lanes to move along the Willow Road corridor.

### 2.3.1 *Construction Emissions and Health Risk Assessment*

This Variant results in less construction activity due to the lack of construction of the Willow Road Tunnel. Therefore, construction emissions will be reduced. However, emissions would not be reduced to a level that would change significance findings of construction criteria air pollutant emissions.

As a result of the emissions reduction due to the reduction in equipment activity, health impacts would also be reduced. However, the reduction in emissions is far from the MEIR reported in our Technical Report. Therefore, the reduction in construction activity would not have a substantial change in health impacts reported in the Technical Report due to the dispersion of the emissions at the MEIR. The reduction also would not substantially reduce required mitigation of construction equipment.

### 2.3.2 *Operational Emissions and Health Risk Assessment*

Emissions from architectural coatings, consumer products, energy use, and emergency generators would not be affected by this Variant. Landscaping emissions may change slightly due to the change in landscape in this area. However, the parameters used to estimate emissions from landscaping, as prescribed in CalEEMod, would not change. Therefore, any change in landscaping emissions would be small.

This Variant would move trams, pedestrians and bicyclists from the tunnel to Willow Road. Pedestrians and bicyclists do not release emissions. The tram and shuttle schedule would not be affected by the lack of tunnel under Willow Road. The slight change in distance traveled by the trams and shuttles would be negligible and would not change emissions associated with their travel.

The change in travel patterns for the trams and shuttles also would not affect the health impacts from traffic reported in the Technical Report. The onsite and offsite MEIR is far from where this change in location of emissions would occur and the change in location of emissions is small. Therefore, this Variant would have a negligible change on reported health impacts. Furthermore, without the Project, the trams and shuttles would travel on this segment of Willow Road. Therefore, the change in health impacts to sensitive receptors near the tunnel with this Variant would be negligible.

### 2.3.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.3.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. As mentioned above, construction activity would be reduced with this Variant. Therefore, construction fuel use would be minorly reduced. However, the reduction in fuel use would not change any significance findings due to the minor reduction. Building related energy use would not be affected by this Variant. The minor change in traffic patterns associated with this Variant would have a negligible impact on energy use associated with vehicle travel.

## 2.4 On-site Recycled Water Variant

The On-Site Recycled Water Variant would provide recycled water to Willow Village through the on-site treatment of wastewater. The on-site treatment and production of recycled water would capture wastewater supplies, including blackwater, from all Willow Village buildings by providing four water reuse facilities. The recycled water would be utilized for irrigation, toilet flushing and cooling. This Variant would be included in the Project if the West Bay Sanitary District does not construct its proposed Bayfront Recycled Water Plant and associated improvements to convey recycled water to the Project Site.

### 2.4.1 *Construction Emissions and Health Risk Assessment*

This Variant results in very little change in construction activity. Any equipment to be used to install the water treatment facility would already be on-site for the other components of construction and any activity associated with the installation would be encompassed in the existing schedule. Therefore, construction emissions would not be expected to change as a result of the On-site Recycled Water Variant.

Since emissions are not expected to change, health impacts are also not expected to change as a result of the On-site Recycled Water Variant.

### 2.4.2 *Operational Emissions and Health Risk Assessment*

Emissions from architectural coatings, consumer products, landscaping, mobile, waste and emergency generators would not be affected by this Variant. Any increase in on-site energy use associated with the on-site treatment would be offset by the reduction in energy to pump the water to a central treatment facility and energy the central treatment facility would use to treat the water. As a result, this Variant would not alter emissions as compared to the Project.

Similarly, health impacts of operations would not change as a result of this Variant.

### 2.4.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. Recycled water systems that employ biological treatment are capable of removing odor causing organic compounds and sulfides. These odorous compounds are oxidized to carbon dioxide, sulfates and water by microorganisms in the biological reactor in the presence of dissolved oxygen. Any remaining compounds that might volatilize are quickly diluted by the surrounding air. Therefore, this Variant would not change odor impacts. This Variant would not change traffic volumes, so the carbon monoxide assessment would not change. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.4.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. Any increase in on-site energy use due to the water treatment would be offset by the reduction in energy use at a central treatment plant and the energy to pump the water to the treatment plant.

# TABLES

**Table 1V**
**Land Use Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use[1] | CalEEMod® Land Use | Size | Units[2] | Square Footage |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 252 | ksf | 251,530 |
| R&D | Research and Development | 124 | ksf | 123,870 |
| Warehouse | Unrefrigerated Warehouse-No Rail | 501 | ksf | 500,780 |
| Lab & Manufacture | Manufacturing | 24 | ksf | 23,570 |
| Health Center | Health Club | 24 | ksf | 24,060 |
| Former Fire Department Building | General Light Industry | 80 | ksf | 80,100 |
| Parking | Enclosed Parking with Elevator | 2,300 | Spaces | 920,000 |
| **Partial Buildout by Year[3]** | | | | |
| **Land Use Type[4]** | | **Percent Operational by Year** | | |
| | | **Year 4** | **Year 5** | **Year 6** |
| Office | | 3.1% | 58% | 95% |
| Retail | | 10% | 59% | 98% |
| Residential | | 0% | 16% | 64% |
| Hotel | | 0% | 41% | 100% |
| Parking | | 53% | 75% | 96% |
| Park | | 89% | 95% | 100% |
| **Full Buildout** | | | | |
| **Land Use Type[4]** | | **Size** | **Units[2]** | **Square Footage** |
| Office | | 1,600 | ksf | 1,600,000 |
| Retail | | 208 | ksf | 207,690 |
| Residential | | 1,930 | DU | 1,892,043 |
| Hotel | | 193 | Rooms | 172,000 |
| Parking | | 1,869 | ksf | 1,869,240 |
| Park | | 404 | ksf | 403,837 |

**Notes:**

1. Land uses analyzed based on information provided by the Project Applicant, as found in the Project Description. "Office" land use mapped to General Office Building and Research and Development; "Office/Lab" mapped to General Office Building, Research and Development, Health Club, and Manufacturing; "Warehouse" mapped to Unrefrigerated Warehouse-No Rail and General Light Industry, and "Warehouse/Office" mapped to Unrefrigerated Warehouse-No Rail and Research and Development CalEEMod land use types on a building-by-building basis.
2. The Project Applicant provided Project land uses in units of square footage, hotel rooms, and dwelling units. For the existing parking land use, each parking space is assumed to be 400 sqft. This assumption is based on CalEEMod defaults.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area for each land use type that becomes operational each year, based on the construction schedule, as shown in Table 2.
4. For Hamilton Avenue Parcels North and South, only net new square footage was included in the analysis. This is under the conservative assumption that the existing retail area and the retail land use that will replace it have similar operational emissions.

**Abbreviations:**

DU - dwelling unit　　sqft - square foot

ksf - 1,000 square feet　　CalEEMod® - California Emissions Estimator Model

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 12V**
**Project Construction Architectural Coating Off-Gassing Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

| Coating Category | Unmitigated Interior | Mitigated Interior | Exterior |
|---|---|---|---|
| **VOC Content (g/L)[1,2]** | 100 | 10 | 150 |
| **Emission Factor (lb/ft²)[3]** | 0.0046 | 0.00046 | 0.0070 |
| **Land Use** | **Fraction of Surface Area Painted[3] (%)** | | **Painted Area Multiplier[3]** |
| | **Interior** | **Exterior** | |
| Residential | 75% | 25% | 2.7 |
| Non-Residential | 75% | 25% | 2 |
| Parking | 0% | 6% | -- |

| Building or Parcel | Land Use[4] | Start Year | End Year | Building Square Footage[5] | | | Painted Surface Area | | Unmitigated ROG Emissions | Mitigated ROG Emissions |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Area | Non-Residential Area | Parking Area | Interior | Exterior | | |
| | | | | ft² | ft² | ft² | ft² | ft² | tons | tons |
| Parcel 2 | Residential | Year 4 | Year 5 | 320,569 | -- | -- | 649,152 | 216,384 | 2.3 | 0.90 |
| | Non-Residential | | | -- | 40,000 | -- | 60,000 | 20,000 | 0.21 | 0.083 |
| | Parking | | | -- | -- | 216,862 | -- | 13,012 | 0.045 | 0.045 |
| Parcel 3 | Residential | Year 4 | Year 5 | 410,760 | -- | -- | 831,788 | 277,263 | 2.9 | 1.2 |
| | Non-Residential | | | -- | 55,000 | -- | 82,500 | 27,500 | 0.29 | 0.11 |
| | Parking | | | -- | -- | 233,000 | -- | 13,980 | 0.049 | 0.049 |
| North Garage | Parking | Year 2 | Year 3 | -- | -- | 840,056 | -- | 50,403 | 0.18 | 0.18 |
| Office Building 4 | Non-Residential | Year 4 | | -- | 269,934 | -- | 404,902 | 134,967 | 1.4 | 0.56 |
| Meeting, Collaboration, Park | Non-Residential | Year 5 | Year 6 | -- | 454,563 | -- | 681,844 | 227,281 | 2.4 | 0.95 |
| Hotel | Non-Residential | Year 5 | | -- | 172,000 | -- | 258,000 | 86,000 | 0.90 | 0.36 |
| Other | Non-Residential | Year 4 | | -- | 6,085 | -- | 9,127 | 3,042 | 0.032 | 0.013 |
| | Parking | | | -- | -- | 13,600 | -- | 816 | 2.8E-03 | 2.8E-03 |
| Parcel 7 | Residential | Year 4 | Year 5 | 117,640 | -- | -- | 238,221 | 79,407 | 0.83 | 0.33 |
| | Parking | | | -- | -- | 9,547 | -- | 573 | 2.0E-03 | 2.0E-03 |
| Parcel 6 | Residential | Year 5 | | 174,499 | -- | -- | 353,361 | 117,787 | 1.2 | 0.49 |
| | Parking | | | -- | -- | 26,809 | -- | 1,609 | 5.6E-03 | 5.6E-03 |
| South Garage | Parking | Year 3 | Year 4 | -- | -- | 446,830 | -- | 26,810 | 0.093 | 0.093 |
| Office Building 3 | Non-Residential | Year 4 | Year 5 | -- | 212,805 | -- | 319,207 | 106,402 | 1.1 | 0.44 |
| Office Building 1 | Non-Residential | Year 4 | | -- | 134,237 | -- | 201,355 | 67,118 | 0.70 | 0.28 |
| Office Building 2 | Non-Residential | Year 4 | Year 5 | -- | 164,078 | -- | 246,118 | 82,039 | 0.86 | 0.34 |
| Office Building 5 | Non-Residential | Year 4 | Year 5 | -- | 236,320 | -- | 354,481 | 118,160 | 1.2 | 0.49 |
| Office Building 6 | Non-Residential | Year 4 | Year 5 | -- | 221,978 | -- | 332,967 | 110,989 | 1.2 | 0.46 |
| Parcels 4 + 5 | Residential | Year 5 | Year 6 | 868,575 | -- | -- | 1,758,864 | 586,288 | 6.1 | 2.4 |
| | Non-Residential | | | -- | 5,000 | -- | 7,500 | 2,500 | 0.026 | 0.010 |
| | Parking | | | -- | -- | 82,536 | -- | 4,952 | 0.017 | 0.017 |
| Hamilton Avenues Parcels North and South | Non-Residential | Year 5 | | -- | 7,690 | -- | 11,535 | 3,845 | 0.040 | 0.016 |
| | | | | | | | | **Total Year 2[6]** | **0.025** | **0.025** |
| | | | | | | | | **Total Year 3[6]** | **0.20** | **0.20** |
| | | | | | | | | **Total Year 4[6]** | **7.5** | **3.1** |
| | | | | | | | | **Total Year 5[6]** | **9.9** | **4.0** |
| | | | | | | | | **Total Year 6[6]** | **6.4** | **2.6** |

**Table 12V**
**Project Construction Architectural Coating Off-Gassing Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**Notes:**

1. VOC content of paint is assumed to be consistent with BAAQMD Regulation 8, Rule 3 for flat and nonflat coatings. VOC is assumed to be equivalent to ROG for these purposes.
2. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions are estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumes use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC is assumed to be equivalent to ROG for these purposes.
3. The emission factor is calculated using CalEEMod default architectural coating emissions parameters. The default assumptions account for the painting surface area relative to the floor square footage assuming 1 gallon of paint covers 180 sqft of surface area.
4. Consistent with CalEEMod Appendix A, recreational areas were excluded from the floor square footage in calculating VOC emissions due to architectural coatings.
5. Project square footage by land use was provided by the Project Applicant.
6. ROG emissions are allocated to each year based on the construction schedule for each building or parcel.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator MODel
CEQA - California Environmental Quality Act
$ft^2$ - square feet
g - gram
gal - gallons
L - liters
lb - pounds
ROG - reactive organic gas
sqft - square feet
VOC - volatile organic compound

**References:**


BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). 2016. Appendix A. Available at: http://www.caleemod.com

**Table 13V**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**Off-Road Emissions[1,2]**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 34 | 376 | 15 | 14 |
| | | Year 2 | 196 | 2,133 | 82 | 76 |
| | Grading and Utilities | Year 2 | 436 | 4,632 | 159 | 146 |
| Parcel 2 Foundations | | Year 3 | 285 | 2,758 | 163 | 150 |
| Parcel 2 Core and Shell | | Year 3 | 31 | 296 | 16 | 15 |
| | | Year 4 | 57 | 451 | 25 | 23 |
| Parcel 2 Tenant Improvements | | Year 4 | 52 | 371 | 24 | 22 |
| | | Year 5 | 32 | 302 | 18 | 16 |
| Parcel 2 Landscaping | | Year 5 | 134 | 896 | 70 | 65 |
| Parcel 3 Foundations | | Year 3 | 373 | 3,494 | 219 | 202 |
| | | Year 4 | 2.4 | 21 | 1.3 | 1.2 |
| Parcel 3 Core and Shell | | Year 4 | 128 | 938 | 54 | 50 |
| Parcel 3 Tenant Improvements | | Year 4 | 30 | 235 | 13 | 12.2 |
| | | Year 5 | 52 | 531 | 28 | 25 |
| Parcel 3 Landscaping | | Year 5 | 160 | 1,093 | 87 | 80 |
| North Garage | | Year 2 | 62 | 644 | 20 | 19 |
| | | Year 3 | 152 | 1,615 | 62 | 57 |
| Office Building 4 | | Year 3 | 132 | 1,355 | 54 | 50 |
| | | Year 4 | 17 | 227 | 7.3 | 6.8 |
| Meeting, Collaboration, Park | | Year 2 | 102 | 992 | 31 | 29 |
| | | Year 3 | 433 | 4,090 | 159 | 147 |
| | | Year 4 | 96 | 1,075 | 24 | 22 |
| | | Year 5 | 81 | 842 | 18 | 17 |
| | | Year 6 | 26 | 229 | 8.0 | 7.4 |
| Hotel Excavation | | Year 2 | 99 | 995 | 34 | 31 |
| | | Year 3 | 421 | 4,048 | 173 | 160 |
| Hotel Construction | | Year 4 | 94 | 1,011 | 27 | 25 |
| | | Year 5 | 71 | 845 | 18 | 16 |
| Town Square | | Year 3 | 608 | 5,208 | 301 | 277 |
| | | Year 4 | 256 | 2,207 | 120 | 111 |
| | | Year 5 | 26 | 218 | 3.7 | 3.4 |
| Area 2 | Demolition | Year 2 | 112 | 1,219 | 47 | 43 |
| | Grading and Utilities | Year 2 | 198 | 2,106 | 72 | 67 |
| | | Year 3 | 289 | 2,620 | 132 | 122 |
| Parcel 7 Foundations | | Year 4 | 200 | 1,666 | 113 | 104 |
| Parcel 7 Core and Shell | | Year 4 | 63 | 482 | 28 | 26 |
| Parcel 7 Tenant Improvements | | Year 4 | 6.0 | 41 | 2.7 | 2.5 |
| | | Year 5 | 48 | 438 | 26 | 24 |
| Parcel 7 Landscaping | | Year 5 | 110 | 704 | 55 | 51 |
| Parcel 6 Foundations | | Year 4 | 202 | 1,728 | 113 | 104 |
| Parcel 6 Core and Shell | | Year 4 | 58 | 410 | 24 | 22 |
| | | Year 5 | 27 | 256 | 14 | 13 |
| Parcel 6 Tenant Improvements | | Year 5 | 54 | 538 | 29 | 27 |
| Parcel 6 Landscaping | | Year 5 | 64 | 426 | 34 | 32 |
| | | Year 6 | 74 | 488 | 40 | 37 |
| South Garage | | Year 3 | 188 | 1,854 | 77 | 71 |
| | | Year 4 | 83 | 889 | 32 | 29 |
| Office Building 3 | | Year 3 | 168 | 1,611 | 72 | 66 |
| | | Year 4 | 35 | 442 | 13 | 12 |
| | | Year 5 | 3.9 | 58 | 1.6 | 1.5 |
| Office Building 1 | | Year 3 | 147 | 1,427 | 62 | 57 |
| | | Year 4 | 33 | 411 | 13 | 12 |
| Office Building 2 | | Year 3 | 142 | 1,366 | 60 | 56 |
| | | Year 4 | 36 | 448 | 14 | 13 |
| | | Year 5 | 0.44 | 6.4 | 0.18 | 0.17 |
| Office Building 5 | | Year 3 | 197 | 1,875 | 84 | 78 |
| | | Year 4 | 33 | 418 | 13 | 12 |
| | | Year 5 | 3.6 | 52 | 1.5 | 1.4 |

**Table 13V**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 189 | 1,775 | 82 | 75 |
| | | Year 4 | 39 | 476 | 14 | 13 |
| | | Year 5 | 7.6 | 112 | 3.2 | 3.0 |
| Area 3 | Grading and Utilities | Year 3 | 49 | 443 | 22 | 21 |
| | Tunnel Construction | Year 3 | 145 | 1,476 | 68 | 63 |
| | | Year 4 | 71 | 710 | 33 | 31 |
| | Foundations | Year 4 | 86 | 725 | 47 | 43 |
| | | Year 5 | 333 | 2,939 | 190 | 174 |
| | Core and Shell | Year 5 | 174 | 1,563 | 82 | 75 |
| | Tenant Improvements | Year 5 | 17 | 157 | 7.5 | 6.9 |
| | | Year 6 | 113 | 1,065 | 50 | 46 |
| | Landscaping | Year 6 | 210 | 1,522 | 119 | 110 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 42 | 428 | 23 | 21 |
| | Grading and Utilities | Year 4 | 2.1 | 20 | 1.2 | 1.1 |
| | | Year 5 | 45 | 441 | 25 | 23 |
| | Foundations | Year 5 | 35 | 309 | 20 | 18 |
| | Core and Shell | Year 5 | 18 | 189 | 7.9 | 7.3 |
| | Tenant Improvements | Year 5 | 14 | 141 | 7.1 | 6.5 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 223 | 1,749 | 142 | 131 |
| Feeder Line | PG&E Offsite Work | Year 3 | 180 | 1,438 | 99 | 91 |
| | Surface Improvements | Year 3 | 20 | 186 | 11 | 10 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 8.4 | 66 | 5.3 | 4.9 |
| | Adams and O'Brien | Year 3 | 5.6 | 44 | 3.6 | 3.3 |
| | Willow Road and Ivy Drive | Year 3 | 5.6 | 44 | 3.6 | 3.3 |

**On-Road and Paving[1]**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 0.0064 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

**Table 13V**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.32 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 556 | 716 | 11 | 10 |
| | Tenant Improvements | Year 5 | 115 | 148 | 2.3 | 2.1 |
| | | Year 6 | 758 | 960 | 15 | 14 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 1.0 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

**Summary of Project Construction Unmitigated Annual CAP Emissions by Year**

| Year | Emissions[4] | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | ton/year | | | |
| Year 1 | 0.022 | 0.44 | 0.010 | 9.0E-03 |
| Year 2 | 0.82 | 12 | 0.26 | 0.24 |
| Year 3 | 3.5 | 23 | 1.06 | 0.98 |
| Year 4 | 9.5 | 9.8 | 0.41 | 0.38 |
| Year 5 | 12 | 8.3 | 0.40 | 0.37 |
| Year 6 | 7.0 | 2.2 | 0.12 | 0.11 |
| **Total** | 33 | 55 | 2.3 | 2.1 |

**Summary of Project Construction Unmitigated Daily CAP Emissions by Year**

| Year | Emissions | | | |
|---|---|---|---|---|
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | lb/day | | | |
| Year 1 | 2.8 | **56** | 1.2 | 1.1 |
| Year 2 | 4.5 | **64** | 1.4 | 1.3 |
| Year 3 | 19 | **124** | 5.8 | 5.4 |
| Year 4 | 52 | 53 | 2.3 | 2.1 |
| Year 5 | **64** | 46 | 2.2 | 2.0 |
| Year 6 | 43 | 14 | 0.72 | 0.67 |
| **Threshold[5]** | 54 | 54 | 82 | 54 |

**Notes:**

1. Construction emissions were estimated with methodology equivalent to CalEEMod 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD2017. Onroad trips and offroad construction equipment use were provided by the Project Applicant.

2. Unmitigated construction emissions from offroad equipment are calculated using fleet-average emission factors.

**Table 13V**
**Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

3. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.

4. The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.

5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Bolded values indicate threshold exceedances. Fugitive emissions sources are excluded from comparison to this threshold.

**Abbreviations:**

CAP - criteria air pollutant

CalEEMod - California Emissions Estimate Model

ROG - reactive organic gases

$NO_X$ - nitrous oxide

**Table 14V**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**Off-Road Emissions[1,2]**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 13 | 168 | 2.4 | 2.4 |
| | | Year 2 | 79 | 1,045 | 15 | 15 |
| | Grading and Utilities | Year 2 | 189 | 2,033 | 36 | 35 |
| Parcel 2 Foundations | | Year 3 | 48 | 933 | 8.4 | 8.4 |
| Parcel 2 Core and Shell | | Year 3 | 7.3 | 81 | 1.4 | 1.4 |
| | | Year 4 | 13 | 143 | 2.5 | 2.4 |
| Parcel 2 Tenant Improvements | | Year 4 | 9.3 | 133 | 1.8 | 1.7 |
| | | Year 5 | 6.8 | 95 | 1.1 | 1.0 |
| Parcel 2 Landscaping | | Year 5 | 10 | 165 | 1.3 | 1.3 |
| Parcel 3 Foundations | | Year 3 | 53 | 1,008 | 9.5 | 9.4 |
| | | Year 4 | 0.33 | 6.2 | 0.059 | 0.058 |
| Parcel 3 Core and Shell | | Year 4 | 24 | 333 | 4.3 | 4.2 |
| Parcel 3 Tenant Improvements | | Year 4 | 6.1 | 102 | 1.11 | 1.09 |
| | | Year 5 | 13 | 207 | 1.9 | 1.9 |
| Parcel 3 Landscaping | | Year 5 | 11 | 215 | 1.3 | 1.3 |
| North Garage | | Year 2 | 31 | 310 | 5.7 | 5.7 |
| | | Year 3 | 57 | 568 | 11 | 11.0 |
| Office Building 4 | | Year 3 | 46 | 562 | 8.4 | 8.4 |
| | | Year 4 | 7.0 | 138 | 1.2 | 1.2 |
| Meeting, Collaboration, Park | | Year 2 | 50 | 453 | 9.3 | 9.3 |
| | | Year 3 | 172 | 1,532 | 32 | 32 |
| | | Year 4 | 55 | 818 | 10 | 10 |
| | | Year 5 | 50 | 561 | 7.2 | 7.2 |
| | | Year 6 | 12 | 69 | 1.8 | 1.8 |
| Hotel Excavation | | Year 2 | 50 | 441 | 10 | 9 |
| | | Year 3 | 160 | 1,462 | 32 | 32 |
| Hotel Construction | | Year 4 | 63 | 814 | 13 | 13 |
| | | Year 5 | 42 | 643 | 6.1 | 6.1 |
| Town Square | | Year 3 | 141 | 1,493 | 27 | 27 |
| | | Year 4 | 67 | 676 | 13 | 13 |
| | | Year 5 | 21 | 147 | 3.4 | 3.4 |
| Area 2 | Demolition | Year 2 | 45 | 597 | 8.7 | 8.6 |
| | Grading and Utilities | Year 2 | 86 | 924 | 16 | 16 |
| | | Year 3 | 83 | 886 | 16 | 16 |
| Parcel 7 Foundations | | Year 4 | 25 | 412 | 4.4 | 4.4 |
| Parcel 7 Core and Shell | | Year 4 | 14 | 139 | 2.7 | 2.7 |
| Parcel 7 Tenant Improvements | | Year 4 | 1.1 | 14 | 0.21 | 0.20 |
| | | Year 5 | 10 | 126 | 1.6 | 1.6 |
| Parcel 7 Landscaping | | Year 5 | 8.6 | 153 | 1.1 | 1.1 |
| Parcel 6 Foundations | | Year 4 | 27 | 474 | 4.7 | 4.6 |
| Parcel 6 Core and Shell | | Year 4 | 11 | 138 | 1.9 | 1.9 |
| | | Year 5 | 6.1 | 75 | 0.91 | 0.89 |
| Parcel 6 Tenant Improvements | | Year 5 | 13 | 198 | 2.0 | 2.0 |
| Parcel 6 Landscaping | | Year 5 | 4.6 | 96 | 0.54 | 0.54 |
| | | Year 6 | 5.4 | 112 | 0.63 | 0.63 |
| South Garage | | Year 3 | 68 | 674 | 13 | 13 |
| | | Year 4 | 34 | 372 | 6.5 | 6.5 |
| Office Building 3 | | Year 3 | 55 | 532 | 10 | 10 |
| | | Year 4 | 14 | 289 | 2.4 | 2.4 |
| | | Year 5 | 1.8 | 35 | 0.25 | 0.25 |
| Office Building 1 | | Year 3 | 48 | 492 | 9.2 | 9.1 |
| | | Year 4 | 13 | 269 | 2.2 | 2.2 |
| Office Building 2 | | Year 3 | 46 | 454 | 8.8 | 8.8 |
| | | Year 4 | 14 | 293 | 2.5 | 2.4 |
| | | Year 5 | 0.20 | 3.8 | 0.029 | 0.028 |
| Office Building 5 | | Year 3 | 63 | 617 | 12 | 12 |
| | | Year 4 | 13 | 271 | 2.3 | 2.3 |
| | | Year 5 | 1.7 | 31 | 0.23 | 0.23 |

**Table 14V**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 60 | 540 | 11 | 11 |
| | | Year 4 | 16 | 316 | 2.7 | 2.7 |
| | | Year 5 | 3.6 | 67 | 0.50 | 0.49 |
| Area 3 | Grading and Utilities | Year 3 | 14 | 150 | 2.7 | 2.7 |
| | Tunnel Construction | Year 3 | 43 | 557 | 7.6 | 7.5 |
| | | Year 4 | 21 | 275 | 3.7 | 3.7 |
| | Foundations | Year 4 | 12 | 208 | 2.2 | 2.1 |
| | | Year 5 | 49 | 796 | 6.5 | 6.5 |
| | Core and Shell | Year 5 | 47 | 512 | 6.8 | 6.7 |
| | Tenant Improvements | Year 5 | 5.6 | 70 | 0.81 | 0.79 |
| | | Year 6 | 38 | 479 | 5.5 | 5.4 |
| | Landscaping | Year 6 | 18 | 336 | 2.2 | 2.2 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 9.0 | 200 | 1.5 | 1.5 |
| | Grading and Utilities | Year 4 | 0.34 | 6.8 | 0.062 | 0.061 |
| | | Year 5 | 7.2 | 138 | 1.1 | 1.1 |
| | Foundations | Year 5 | 5.4 | 97 | 0.78 | 0.78 |
| | Core and Shell | Year 5 | 8.1 | 117 | 1.4 | 1.4 |
| | Tenant Improvements | Year 5 | 3.6 | 54 | 0.51 | 0.50 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 10 | 68 | 2.4 | 2.4 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 207 | 6.5 | 6.5 |
| | Surface Improvements | Year 3 | 3.3 | 22 | 0.66 | 0.65 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 0.36 | 2.6 | 0.091 | 0.091 |
| | Adams and O'Brien | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |
| | Willow Road and Ivy Drive | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |

**On-Road and Paving[1]**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 6.4E-03 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Area 1 Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

**Table 14V**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions ROG (lb/year) | $NO_X$ (lb/year) | $PM_{10}$ (lb/year) | $PM_{2.5}$ (lb/year) |
|---|---|---|---|---|---|---|
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.3 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 556 | 716 | 11 | 10 |
| | Tenant Improvements | Year 5 | 115 | 148 | 2.3 | 2.1 |
| | | Year 6 | 758 | 960 | 15 | 14 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 0.98 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

**Summary of Project Construction Mitigated Annual CAP Emissions by Year**

| Year | Emissions[4] ROG (ton/year) | $NO_X$ (ton/year) | $PM_{10}$ (ton/year) | $PM_{2.5}$ (ton/year) |
|---|---|---|---|---|
| Year 1 | 0.012 | 0.34 | 3.5E-03 | 3.4E-03 |
| Year 2 | 0.48 | 8.2 | 0.089 | 0.087 |
| Year 3 | 1.9 | 8.6 | 0.142 | 0.140 |
| Year 4 | 4.4 | 5.3 | 0.069 | 0.067 |
| Year 5 | 5.2 | 4.1 | 0.049 | 0.047 |
| Year 6 | 3.0 | 1.06 | 0.014 | 0.013 |
| **Total** | 15 | 28 | 0.37 | 0.36 |

**Summary of Project Construction Mitigated Daily CAP Emissions by Year**

| Year | Emissions ROG (lb/day) | $NO_X$ (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) |
|---|---|---|---|---|
| Year 1 | 1.5 | 43 | 0.44 | 0.42 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 |
| Year 3 | 10 | 47 | 0.78 | 0.77 |
| Year 4 | 24 | 29 | 0.38 | 0.37 |
| Year 5 | 29 | 22 | 0.27 | 0.26 |
| Year 6 | 19 | 6.5 | 0.084 | 0.080 |
| **Threshold[5]** | 54 | 54 | 82 | 54 |

**Notes:**

1. Construction emissions were estimated with methodology equivalent to CalEEMod® 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Mitigated construction emissions from offroad equipment are calculated using Tier 4 Final emission factors for 95 percent of the equipment before residents move on-site in Year 5 and 98 percent of the equipment after residents move on-site in Year 5. The other 5 percent and 2 percent (before and after on-site residents, repspectively) of non-Tier 4 equipment are assumed to be Tier 2.
3. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
4. The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold.

**Abbreviations:**

**Table 14V**
**Summary of Mitigated Project Construction Criteria Air Pollutant Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

CAP - criteria air pollutant
CalEEMod® - California Emissions Estimate Model

ROG - reactive organic gases
$NO_X$ - nitrous oxide

**Table 15V**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**Off-Road Emissions[1]**

| Construction Area[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 45 | 8.0E-03 | 2.3E-03 | 46 |
| | | Year 2 | 287 | 5.2E-02 | 1.5E-02 | 292 |
| | Grading and Utilities | Year 2 | 705 | 1.5E-01 | 2.5E-02 | 716 |
| Parcel 2 Foundations | | Year 3 | 179 | 2.3E-02 | 1.3E-02 | 184 |
| Parcel 2 Core and Shell | | Year 3 | 24 | 4.7E-03 | 1.0E-03 | 24 |
| | | Year 4 | 43 | 8.5E-03 | 1.8E-03 | 44 |
| Parcel 2 Tenant Improvements | | Year 4 | 29 | 4.5E-03 | 1.9E-03 | 30 |
| | | Year 5 | 22 | 3.5E-03 | 1.5E-03 | 23 |
| Parcel 2 Landscaping | | Year 5 | 32 | 6.0E-03 | 1.6E-03 | 32 |
| Parcel 3 Foundations | | Year 3 | 200 | 2.7E-02 | 1.4E-02 | 205 |
| | | Year 4 | 1.2 | 1.7E-04 | 8.5E-05 | 1.3 |
| Parcel 3 Core and Shell | | Year 4 | 83 | 1.5E-02 | 4.2E-03 | 84 |
| Parcel 3 Tenant Improvements | | Year 4 | 21 | 2.6E-03 | 1.8E-03 | 22 |
| | | Year 5 | 45 | 5.5E-03 | 3.7E-03 | 46 |
| Parcel 3 Landscaping | | Year 5 | 32 | 6.1E-03 | 1.6E-03 | 32 |
| North Garage | | Year 2 | 118 | 2.9E-02 | 2.6E-03 | 119 |
| | | Year 3 | 206 | 4.9E-02 | 3.9E-03 | 208 |
| Office Building 4 | | Year 3 | 162 | 3.8E-02 | 4.0E-03 | 164 |
| | | Year 4 | 29 | 3.7E-03 | 2.3E-03 | 29.7 |
| Meeting, Collaboration, Park | | Year 2 | 192 | 4.9E-02 | 2.9E-03 | 194 |
| | | Year 3 | 640 | 1.7E-01 | 8.6E-03 | 647 |
| | | Year 4 | 190 | 4.3E-02 | 5.8E-03 | 193 |
| | | Year 5 | 185 | 4.3E-02 | 5.0E-03 | 187 |
| | | Year 6 | 45 | 1.2E-02 | 3.4E-04 | 45 |
| Hotel Excavation | | Year 2 | 185 | 4.8E-02 | 2.6E-03 | 187 |
| | | Year 3 | 529 | 1.2E-01 | 8.1E-03 | 535 |
| Hotel Construction | | Year 4 | 193 | 3.5E-02 | 4.2E-03 | 195 |
| | | Year 5 | 156 | 2.9E-02 | 6.4E-03 | 158 |
| Town Square | | Year 3 | 545 | 1.3E-01 | 1.4E-02 | 553 |
| | | Year 4 | 261 | 6.3E-02 | 6.0E-03 | 264 |
| | | Year 5 | 83 | 2.2E-02 | 1.2E-03 | 84 |
| Area 2 | Demolition | Year 2 | 164 | 3.0E-02 | 8.4E-03 | 167 |
| | Grading and Utilities | Year 2 | 320 | 7.0E-02 | 1.1E-02 | 326 |
| | | Year 3 | 319 | 7.0E-02 | 1.1E-02 | 324 |
| Parcel 7 Foundations | | Year 4 | 87 | 1.6E-02 | 4.4E-03 | 88 |
| Parcel 7 Core and Shell | | Year 4 | 48 | 9.5E-03 | 2.0E-03 | 48 |
| Parcel 7 Tenant Improvements | | Year 4 | 3.3 | 5.2E-04 | 2.2E-04 | 3.4 |
| | | Year 5 | 33 | 5.3E-03 | 2.2E-03 | 34 |
| Parcel 7 Landscaping | | Year 5 | 28 | 5.0E-03 | 1.6E-03 | 28 |
| Parcel 6 Foundations | | Year 4 | 97 | 1.6E-02 | 5.7E-03 | 99 |
| Parcel 6 Core and Shell | | Year 4 | 36 | 6.5E-03 | 1.9E-03 | 37 |
| | | Year 5 | 21 | 3.9E-03 | 1.1E-03 | 22 |
| Parcel 6 Tenant Improvements | | Year 5 | 47 | 5.8E-03 | 3.9E-03 | 48 |
| Parcel 6 Landscaping | | Year 5 | 13 | 2.4E-03 | 7.2E-04 | 13 |
| | | Year 6 | 15 | 2.8E-03 | 8.4E-04 | 16 |
| South Garage | | Year 3 | 255 | 6.2E-02 | 5.3E-03 | 258 |
| | | Year 4 | 120 | 2.7E-02 | 2.5E-03 | 122 |
| Office Building 3 | | Year 3 | 201 | 5.1E-02 | 3.5E-03 | 204 |
| | | Year 4 | 49 | 7.7E-03 | 3.0E-03 | 50 |
| | | Year 5 | 8.4 | 9.4E-04 | 7.4E-04 | 8.6 |
| Office Building 1 | | Year 3 | 178 | 4.4E-02 | 3.4E-03 | 180 |
| | | Year 4 | 45 | 7.2E-03 | 2.8E-03 | 46 |
| Office Building 2 | | Year 3 | 171 | 4.3E-02 | 3.1E-03 | 173 |
| | | Year 4 | 49 | 8.0E-03 | 3.0E-03 | 50 |
| | | Year 5 | 0.94 | 1.1E-04 | 8.3E-05 | 0.97 |
| Office Building 5 | | Year 3 | 234 | 5.9E-02 | 4.0E-03 | 237 |
| | | Year 4 | 47 | 7.4E-03 | 3.0E-03 | 48 |
| | | Year 5 | 7.7 | 8.6E-04 | 6.8E-04 | 7.9 |

**Table 15V**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**Off-Road Emissions[1]**

| Phase | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Office Building 6 | | Year 3 | 224 | 5.8E-02 | 3.2E-03 | 226 |
| | | Year 4 | 52 | 8.5E-03 | 2.9E-03 | 53 |
| | | Year 5 | 16 | 1.8E-03 | 1.5E-03 | 17 |
| Area 3 | Grading and Utilities | Year 3 | 56 | 1.2E-02 | 2.1E-03 | 57 |
| | Tunnel Construction | Year 3 | 156 | 2.6E-02 | 9.4E-03 | 159 |
| | | Year 4 | 77 | 1.3E-02 | 4.6E-03 | 79 |
| | Foundations | Year 4 | 40 | 7.0E-03 | 2.1E-03 | 41 |
| | | Year 5 | 163 | 2.9E-02 | 8.4E-03 | 167 |
| | Core and Shell | Year 5 | 139 | 2.7E-02 | 6.1E-03 | 142 |
| | Tenant Improvements | Year 5 | 16 | 2.2E-03 | 1.1E-03 | 16 |
| | | Year 6 | 107 | 1.5E-02 | 7.6E-03 | 110 |
| | Landscaping | Year 6 | 54 | 9.6E-03 | 3.1E-03 | 55 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 35 | 3.8E-03 | 2.9E-03 | 36 |
| | Grading and Utilities | Year 4 | 1.6 | 2.0E-04 | 1.3E-04 | 1.7 |
| | | Year 5 | 35 | 4.4E-03 | 2.9E-03 | 36 |
| | Foundations | Year 5 | 17 | 2.1E-03 | 1.1E-03 | 18 |
| | Core and Shell | Year 5 | 24 | 2.2E-03 | 1.4E-03 | 24 |
| | Tenant Improvements | Year 5 | 12 | 2.0E-03 | 6.6E-04 | 12 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 34 | 9.8E-03 | 0 | 34 |
| Feeder Line | PG&E Offsite Work | Year 3 | 108 | 3.1E-02 | 0 | 109 |
| | Surface Improvements | Year 3 | 12 | 2.3E-03 | 0 | 12 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.3 | 3.7E-04 | 0 | 1.3 |
| | Adams and O'Brien | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |
| | Willow Road and Ivy Drive | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |

**On-Road Emissions[1]**

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 112 | 2.5E-04 | 1.7E-02 | 117 |
| | | Year 2 | 717 | 1.4E-03 | 1.1E-01 | 750 |
| | Grading and Utilities | Year 2 | 585 | 3.1E-03 | 8.5E-02 | 610 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 27 | 3.3E-05 | 4.3E-03 | 28 |
| | | Year 4 | 0.12 | 1.4E-07 | 1.9E-05 | 0.13 |
| | Core and Shell | Year 3 | 7.7 | 9.5E-06 | 1.2E-03 | 8.1 |
| | | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Tenant Improvements | Year 4 | 18 | 2.0E-05 | 2.8E-03 | 18 |
| | | Year 5 | 21 | 2.2E-05 | 3.3E-03 | 22 |
| | Landscaping | Year 5 | 15 | 1.5E-05 | 2.3E-03 | 15 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 340 | 1.1E-02 | 9.6E-03 | 344 |
| | | Year 4 | 391 | 1.2E-02 | 1.0E-02 | 395 |
| | | Year 5 | 261 | 7.7E-03 | 6.7E-03 | 263 |
| | Landscaping Worker Mobile Trips | Year 5 | 48 | 1.4E-03 | 1.2E-03 | 49 |
| Campus District | Foundations + Core and Shell | Year 2 | 28 | 4.8E-05 | 4.5E-03 | 30 |
| | | Year 3 | 173 | 2.1E-04 | 2.7E-02 | 181 |
| | | Year 4 | 172 | 2.0E-04 | 2.7E-02 | 180 |
| | | Year 5 | 170 | 1.8E-04 | 2.7E-02 | 177 |
| | Tenant Improvements | Year 4 | 70 | 7.9E-05 | 1.1E-02 | 73 |
| | | Year 5 | 92 | 9.7E-05 | 1.5E-02 | 97 |
| | | Year 6 | 16 | 1.6E-05 | 2.5E-03 | 17 |
| | O4 and NG Worker Mobile Trips | Year 2 | 58 | 2.1E-03 | 1.7E-03 | 58 |
| | | Year 3 | 351 | 1.2E-02 | 9.9E-03 | 355 |
| | | Year 4 | 275 | 8.6E-03 | 7.3E-03 | 277 |
| | MCS Worker Mobile Trips | Year 2 | 43 | 1.6E-03 | 1.3E-03 | 44 |
| | | Year 3 | 263 | 8.9E-03 | 7.4E-03 | 266 |
| | | Year 4 | 261 | 8.2E-03 | 7.0E-03 | 263 |
| | | Year 5 | 255 | 7.5E-03 | 6.5E-03 | 257 |
| | | Year 6 | 44 | 1.2E-03 | 1.1E-03 | 45 |

RAMBOLL

**Table 15V**
**Summary of Project Construction Greenhouse Gas Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**On-Road Emissions[1]**

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 2 | Demolition | Year 2 | 821 | 1.3E-03 | 1.3E-01 | 859 |
| | Grading and Utilities | Year 2 | 290 | 1.5E-03 | 4.2E-02 | 302 |
| | | Year 3 | 286 | 1.3E-03 | 4.2E-02 | 298 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Core and Shell | Year 4 | 26 | 3.0E-05 | 4.1E-03 | 27 |
| | | Year 5 | 8.5 | 8.9E-06 | 1.3E-03 | 8.9 |
| | Tenant Improvements | Year 4 | 3.1 | 3.5E-06 | 4.8E-04 | 3.2 |
| | | Year 5 | 42 | 4.4E-05 | 6.6E-03 | 44 |
| | Landscaping | Year 5 | 11 | 1.1E-05 | 1.7E-03 | 11 |
| | | Year 6 | 3.7 | 3.6E-06 | 5.9E-04 | 3.9 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 388 | 1.2E-02 | 1.0E-02 | 392 |
| | | Year 5 | 345 | 1.0E-02 | 8.8E-03 | 348 |
| | Landscaping Worker Mobile Trips | Year 5 | 36 | 1.0E-03 | 9.1E-04 | 36 |
| | | Year 6 | 12 | 3.4E-04 | 3.0E-04 | 12 |
| Campus District | Foundations + Core and Shell | Year 3 | 134 | 1.7E-04 | 2.1E-02 | 141 |
| | | Year 4 | 153 | 1.7E-04 | 2.4E-02 | 160 |
| | Tenant Improvements | Year 4 | 129 | 1.5E-04 | 2.0E-02 | 135 |
| | | Year 5 | 101 | 1.1E-04 | 1.6E-02 | 106 |
| | Worker Mobile Trips | Year 3 | 587 | 2.0E-02 | 1.6E-02 | 592 |
| | | Year 4 | 748 | 2.4E-02 | 2.0E-02 | 754 |
| | | Year 5 | 342 | 1.0E-02 | 8.8E-03 | 345 |
| Area 3 | Grading and Utilities | Year 3 | 83 | 1.5E-03 | 7.4E-03 | 85 |
| | Tunnel Construction | Year 3 | 859 | 2.6E-02 | 3.5E-02 | 870 |
| | | Year 4 | 420 | 1.2E-02 | 1.7E-02 | 425 |
| | Foundations | Year 4 | 119 | 3.3E-03 | 5.1E-03 | 120 |
| | | Year 5 | 481 | 1.3E-02 | 2.0E-02 | 487 |
| | Core and Shell | Year 5 | 797 | 2.0E-02 | 3.5E-02 | 808 |
| | Tenant Improvements | Year 5 | 165 | 4.2E-03 | 7.3E-03 | 167 |
| | | Year 6 | 1130 | 2.7E-02 | 4.9E-02 | 1145 |
| | Landscaping | Year 6 | 34 | 3.4E-04 | 3.8E-03 | 35 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 19 | 6.4E-05 | 2.9E-03 | 20 |
| | Grading and Utilities | Year 4 | 0.36 | 2.5E-06 | 4.7E-05 | 0.37 |
| | | Year 5 | 7.7 | 5.2E-05 | 1.0E-03 | 8.0 |
| | Foundations | Year 5 | 16 | 1.7E-05 | 2.5E-03 | 17 |
| | Core and Shell | Year 5 | 14 | 1.5E-05 | 2.3E-03 | 15 |
| | Tenant Improvements | Year 5 | 18 | 1.9E-05 | 2.8E-03 | 19 |
| | Worker Mobile Trips | Year 5 | 89 | 2.6E-03 | 2.3E-03 | 90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 12 | 2.1E-04 | 1.1E-03 | 12 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 5.6E-04 | 2.6E-03 | 31 |
| | Surface Improvements | Year 3 | 2.9 | 5.4E-05 | 2.5E-04 | 3.0 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 3.6 | 2.4E-05 | 4.9E-04 | 3.8 |
| | Adams and O'Brien | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |
| | Willow Road and Ivy Drive | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |

**Summary of Project Construction Annual GHG Emissions by Year**

| Year | Emissions[4,5] | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | MT/year | | | |
| Year 1 | 157 | 0.0083 | 0.020 | 163 |
| Year 2 | 4,514 | 0.44 | 0.44 | 4,657 |
| Year 3 | 7,605 | 1.1 | 0.30 | 7,722 |
| Year 4 | 4,871 | 0.40 | 0.25 | 4,954 |
| Year 5 | 4,471 | 0.29 | 0.23 | 4,548 |
| Year 6 | 1,462 | 0.069 | 0.070 | 1,484 |
| | | | **Total** | **23,528** |

**Notes:**

1. Emissions were estimated using onroad emissions factors from EMFAC2021 and offroad construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
3. Carbon dioxide equivalent emissions were determined using IPCC 5th Assessment Report Global Warming Potentials for $CH_4$ and $N_2O$.
4. The Summary of Project Construction Annual GHG Emissions by Year is the sum of the values represented above as well as Construction Water Use Emissions, shown in Table 10.
5. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions.

**Abbreviations:**

CalEEMod® - California Emissions Estimate Model
GHG - greenhouse gases
$CH_4$ - methane
$CO_2$ - carbon dioxide
$N_2O$ - nitrous oxide
$CO_2e$ - carbon dioxide equivalent
MT - metric ton
IPCC - Intergovernmental Panel on Climate Change

**Table 16V**
**Building Operational Capacity For Emissions Scaling**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Building or Parcel[1] | | Percent Breakdown of Land Use Type by Building | | | | | | Percent of Year Building is Operational[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Office | Retail | Residential | Hotel | Parking | Park | Year 4 | Year 5 | Year 6 |
| North Garage | | -- | -- | -- | -- | 45% | -- | 100% | 100% | 100% |
| Office Building 4 | | 11% | 48% | -- | -- | -- | -- | 21% | 100% | 100% |
| Meeting, Collaboration, Park | | 28% | -- | -- | -- | -- | -- | 0% | 0% | 82% |
| Hotel Construction | | -- | -- | -- | 100% | -- | -- | 0% | 41% | 100% |
| Town Square | | -- | -- | -- | -- | -- | 14% | 0% | 58% | 100% |
| Parcel 2 | | -- | 19% | 17% | -- | 12% | -- | 0% | 34% | 100% |
| Parcel 3 | | -- | 26% | 22% | -- | 12% | -- | 0% | 10% | 100% |
| Other | | 0.38% | -- | -- | -- | 0.73% | 86% | 100% | 100% | 100% |
| South Garage | | -- | -- | -- | -- | 23.9% | -- | 29% | 100% | 100% |
| Office Building 3 | | 13% | -- | -- | -- | -- | -- | 0% | 76% | 100% |
| Office Building 1 | | 8.4% | -- | -- | -- | -- | -- | 5% | 100% | 100% |
| Office Building 2 | | 10% | -- | -- | -- | -- | -- | 0% | 98% | 100% |
| Office Building 5 | | 15% | -- | -- | -- | -- | -- | 0% | 78% | 100% |
| Office Building 6 | | 14% | -- | -- | -- | -- | -- | 0% | 53% | 100% |
| Parcel 6 | | -- | -- | 9% | -- | 1.4% | -- | 0% | 0% | 88% |
| Parcel 7 | | -- | -- | 6.2% | -- | 0.5% | -- | 0% | 99% | 100% |
| Parcels 4 + 5 | | -- | 2.4% | 46% | -- | 4.4% | -- | 0% | 0% | 11% |
| Hamilton Avenue Parcels North and South | | -- | 3.7% | -- | -- | -- | -- | 0% | 54% | 100% |
| **Partial Buildout by Year and Land Use Type[3]** | **Year 4** | 3.1% | 10% | 0% | 0% | 53% | 86% | | | |
| | **Year 5** | 58% | 59% | 14% | 41% | 75% | 94% | | | |
| | **Year 6** | 95% | 98% | 58% | 100% | 96% | 100% | | | |

**Notes:**

1. Construction area/subphasing information and full buildout square footage by building provided by Project Applicant.
2. The percentage of year that each building is operational is calculated using the last day of construction for each building. For each partial year of construction, the building is assumed to be operational during the fraction of the year between the last day of construction and the end of that year. The building is assumed to be 0% operational for each full year of construction and 100% operational for each year full year after the end of construction.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area that becomes operational each year over the total building area for each land use type.

**Abbreviations:**

% - percent

**Table 17V**
**Traffic Data Provided by the Transportation Engineer**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Daily Trips Rates and VMT**

| Land Use | Fleet Type / Land Use | Trip Rate Units[1] | Weekday Trips per Day per Unit[1] | Weekday daily VMT[2] |
|---|---|---|---|---|
| | | | TOTAL | TOTAL |
| Main Project Site - Existing Conditions | Cars | per 1,000 s.f. | 9.19 | 110,860 |
| | Trucks | per 1,000 s.f. | 0.22 | 2,640 |
| | Shuttles | per 1,000 s.f. | 0.66 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.66 | 7,919 |
| Campus District - Full Buildout | Cars | per 1,000 s.f. | 10.05 | 178,766 |
| | Trucks | per 1,000 s.f. | 0.23 | 4,056 |
| | Shuttles | per 1,000 s.f. | 0.44 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.68 | 12,168 |
| Town Square and the Residential/Shopping District - Full Buildout | Residential | per d.u. | 4.35 | 79,792 |
| | Retail[3] | per 1,000 s.f. | 25.07 | 33,594 |
| | Hamilton Avenue Parcels North and South[3] | per 1,000 s.f. | 28.31 | 1,461 |
| | Park | per acre | 42.80 | 1,147 |
| | Hotel | per room | 6.69 | 14,814 |

**Notes:**

1. Daily project trip rates were provided by the Transportation Engineer in terms of trip rates per land use amount.
2. Daily Project VMT provided by the Transportation Engineer include reductions for pass-by and diverted trips. Daily VMT is given in VMT per day. For the increased residential variant, the residential trips and VMT are based on an increasing the residential dwelling units by 200, to a total of 1930 residential dwelling units.
3. The trip rates and VMT for Hamilton Avenue Parcels North and South were provided separately and added to retail totals in calculations.

**Abbreviations:**

VMT - Vehicle miles traveled
s.f. - Square feet
d.u. - Dwelling unit

**Table 18V**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Project Area[1] | Land Use | Fleet Type[2] | Total Weekday Daily VMT[3] | Total Weekday Daily Trips[3] | Total Average Daily VMT[4] | Total Average Daily Trips[4] | Total Annual VMT[5] | Total Annual Trips[5] |
|---|---|---|---|---|---|---|---|---|
| | | | VMT/day | trips/day | VMT/day | trips/day | VMT/year | trips/year |
| Existing Conditions | Campus District | Cars | 110,860 | 9,221 | 84,225 | 7,006 | 30,742,244 | 2,557,040 |
| | | Trucks | 2,640 | 220 | 2,005 | 167 | 731,958 | 60,882 |
| | | Shuttles | 21,088 | 659 | 15,063 | 470 | 3,916,358 | 122,319 |
| | | On-Demand | 7,919 | 659 | 5,656 | 470 | 1,470,590 | 122,319 |
| Year 4 | Campus District | Cars | 5,480 | 493 | 4,079 | 367 | 1,488,677 | 133,874 |
| | | Trucks | 124 | 11 | 93 | 8.3 | 33,776 | 3,037 |
| | | Shuttles | 646 | 22 | 462 | 15 | 120,048 | 3,996 |
| | | On-Demand | 373 | 34 | 266 | 24 | 69,267 | 6,229 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 3,563 | 510 | 3,442 | 492 | 1,256,238 | 179,684 |
| | Park | San Mateo | 987 | 147 | 3,652 | 545 | 1,332,917 | 198,943 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| Year 5 | Campus District | Cars | 104,523 | 9,400 | 77,797 | 6,996 | 28,395,923 | 2,553,590 |
| | | Trucks | 2,371 | 213 | 1,765 | 159 | 644,259 | 57,937 |
| | | Shuttles | 12,330 | 410 | 8,807 | 293 | 2,289,859 | 76,227 |
| | | On-Demand | 7,114 | 640 | 5,082 | 457 | 1,321,238 | 118,816 |
| | Residential | San Mateo | 11,209 | 1,180 | 10,956 | 1,153 | 3,999,096 | 420,957 |
| | Retail | San Mateo | 20,794 | 2,974 | 20,085 | 2,873 | 7,331,178 | 1,048,602 |
| | Park | San Mateo | 1,080 | 161 | 3,993 | 596 | 1,457,557 | 217,546 |
| | Hotel | San Mateo | 6,049 | 527 | 5,816 | 507 | 2,122,939 | 184,925 |
| Year 6 | Campus District | Cars | 169,737 | 15,264 | 126,336 | 11,361 | 46,112,784 | 4,146,833 |
| | | Trucks | 3,851 | 346 | 2,866 | 258 | 1,046,226 | 94,085 |
| | | Shuttles | 20,023 | 667 | 14,302 | 476 | 3,718,554 | 123,787 |
| | | On-Demand | 11,553 | 1,039 | 8,252 | 742 | 2,145,589 | 192,949 |
| | Residential | San Mateo | 46,475 | 4,892 | 45,427 | 4,782 | 16,580,889 | 1,745,357 |
| | Retail | San Mateo | 34,307 | 4,907 | 33,137 | 4,740 | 12,095,154 | 1,730,009 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |
| Full Buildout | Campus District | Cars | 178,766 | 16,076 | 133,057 | 11,966 | 48,565,689 | 4,367,418 |
| | | Trucks | 4,056 | 365 | 3,019 | 271 | 1,101,879 | 99,090 |
| | | Shuttles | 21,088 | 702 | 15,063 | 501 | 3,916,358 | 130,371 |
| | | On-Demand | 12,168 | 1,094 | 8,691 | 782 | 2,259,721 | 203,212 |
| | Residential | San Mateo | 79,792 | 8,399 | 77,992 | 8,210 | 28,467,226 | 2,996,550 |
| | Retail | San Mateo | 35,055 | 5,014 | 33,860 | 4,843 | 12,358,799 | 1,767,718 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |

**Table 18V**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Notes:**

1. Partial years are scaled from the full buildout based on the portion of each land use that becomes operational for each year of construction. See VariantTable 16 for more details.
2. The fleet type for each land use was provided by the Transportation Engineer. The Campus District will have various fleets for specific uses. Town Square and the Residential/Shopping District land uses (Residential, Retail, Park, and Hotel) are analyzed assuming a default San Mateo fleet. Hamilton Avenue Parcels North and South are combined with retail land uses. See AQTR Table 19 for more information.
3. Daily VMT and trip rates were provided by the Transportation Engineer on October 5, 2021. Total trip rates are calculated using land uses in AQTR Table 1.
4. Weekday VMT and trip rates provided by the Transportation Engineer were scaled to average trip rates using the ratio between CalEEMod® weekday and weekend one-way trip rates.
5. Annual trips and VMT are calculated by multiplying daily values by 365 for all fleets with the exception of shuttles and on-demand, which are multiplied by 260 days/year.

**Abbreviations:**

VMT - vehicle miles traveled

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 21aV**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | CAP Emissions[3,4] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ |
| | | | trips/year | VMT/year | tons/year | | | | lb/day | | | |
| **Existing Conditions** | Campus District | Cars | 2,557,040 | 30,742,244 | 4.9 | 4.1 | 3.1 | 0.59 | 27 | 22 | 17 | 3.3 |
| | | Trucks | 60,882 | 731,958 | 0.18 | 2.0 | 0.17 | 0.068 | 1.0 | 11 | 0.92 | 0.37 |
| | | Shuttles | 122,319 | 3,916,358 | 0.027 | 1.8 | 0.59 | 0.15 | 0.15 | 10 | 3.3 | 0.80 |
| | | On-Demand | 122,319 | 1,470,590 | 0.19 | 0.15 | 0.15 | 0.028 | 1.1 | 0.85 | 0.81 | 0.15 |
| | | | **2,862,559** | **36,861,150** | **5.3** | **8.0** | **4.0** | **0.84** | **29** | **44** | **22** | **4.6** |
| **Partial Buildout - Year 4** | Campus District | Cars | 133,874 | 1,488,677 | 0.19 | 0.12 | 0.15 | 0.028 | 1.1 | 0.65 | 0.82 | 0.15 |
| | | Trucks | 3,037 | 33,776 | 0.0041 | 0.035 | 0.0065 | 0.0020 | 0.023 | 0.19 | 0.036 | 0.011 |
| | | Shuttles | 3,996 | 120,048 | 0.0011 | 0.071 | 0.018 | 0.0046 | 0.0058 | 0.39 | 0.10 | 0.025 |
| | | On-Demand | 6,229 | 69,267 | 0.0077 | 0.0046 | 0.0069 | 0.0013 | 0.042 | 0.025 | 0.038 | 0.0071 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 179,684 | 1,256,238 | 0.19 | 0.21 | 0.13 | 0.027 | 1.1 | 1.2 | 0.74 | 0.15 |
| | Park | San Mateo | 198,943 | 1,332,917 | 0.21 | 0.23 | 0.14 | 0.029 | 1.2 | 1.2 | 0.78 | 0.16 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | **525,763** | **4,300,922** | **0.61** | **0.67** | **0.46** | **0.092** | **3.4** | **3.7** | **2.5** | **0.50** |
| **Partial Buildout - Year 5** | Campus District | Cars | 2,553,590 | 28,395,923 | 3.6 | 2.1 | 2.9 | 0.53 | 20 | 11 | 16 | 2.9 |
| | | Trucks | 57,937 | 644,259 | 0.073 | 0.60 | 0.12 | 0.037 | 0.40 | 3.3 | 0.68 | 0.20 |
| | | Shuttles | 76,227 | 2,289,859 | 0.021 | 1.4 | 0.35 | 0.089 | 0.11 | 7.4 | 1.9 | 0.49 |
| | | On-Demand | 118,816 | 1,321,238 | 0.14 | 0.081 | 0.13 | 0.025 | 0.78 | 0.45 | 0.72 | 0.13 |
| | Residential | San Mateo | 420,957 | 3,999,096 | 0.49 | 0.57 | 0.43 | 0.085 | 2.7 | 3.1 | 2.3 | 0.47 |
| | Retail | San Mateo | 1,048,602 | 7,331,178 | 1.1 | 1.1 | 0.78 | 0.16 | 5.9 | 6.3 | 4.3 | 0.86 |
| | Park | San Mateo | 217,546 | 1,457,557 | 0.22 | 0.23 | 0.16 | 0.031 | 1.2 | 1.3 | 0.85 | 0.17 |
| | Hotel | San Mateo | 184,925 | 2,122,939 | 0.23 | 0.29 | 0.23 | 0.045 | 1.3 | 1.6 | 1.2 | 0.25 |
| | | | **4,678,601** | **47,562,050** | **5.8** | **6.3** | **5.1** | **1.0** | **32** | **35** | **28** | **5.5** |
| **Partial Buildout - Year 6** | Campus District | Cars | 4,146,833 | 46,112,784 | 5.6 | 3.1 | 4.6 | 0.86 | 31 | 17 | 25 | 4.7 |
| | | Trucks | 94,085 | 1,046,226 | 0.11 | 0.89 | 0.20 | 0.059 | 0.62 | 4.9 | 1.1 | 0.33 |
| | | Shuttles | 123,787 | 3,718,554 | 0.034 | 2.2 | 0.57 | 0.15 | 0.19 | 12 | 3.1 | 0.80 |
| | | On-Demand | 192,949 | 2,145,589 | 0.22 | 0.12 | 0.21 | 0.040 | 1.2 | 0.68 | 1.2 | 0.22 |
| | Residential | San Mateo | 1,745,357 | 16,580,889 | 1.9 | 2.2 | 1.8 | 0.35 | 11 | 12 | 9.7 | 1.9 |
| | Retail | San Mateo | 1,730,009 | 12,095,154 | 1.7 | 1.8 | 1.3 | 0.26 | 9.3 | 10 | 7.1 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **8,717,037** | **88,446,872** | **10** | **11** | **9.4** | **1.9** | **57** | **61** | **52** | **10** |
| **Full Buildout** | Campus District | Cars | 4,367,418 | 48,565,689 | 5.9 | 3.3 | 4.9 | 0.91 | 32 | 18 | 27 | 5.0 |
| | | Trucks | 99,090 | 1,101,879 | 0.12 | 0.94 | 0.21 | 0.062 | 0.65 | 5.2 | 1.2 | 0.34 |
| | | Shuttles | 130,371 | 3,916,358 | 0.036 | 2.3 | 0.61 | 0.15 | 0.20 | 13 | 3.3 | 0.84 |
| | | On-Demand | 203,212 | 2,259,721 | 0.23 | 0.13 | 0.23 | 0.042 | 1.3 | 0.71 | 1.2 | 0.23 |
| | Residential | San Mateo | 2,996,550 | 28,467,226 | 3.3 | 3.7 | 3.0 | 0.60 | 18 | 21 | 17 | 3.3 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 1.7 | 1.8 | 1.3 | 0.26 | 9.5 | 10 | 7.2 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **10,248,378** | **103,417,346** | **12** | **13** | **11** | **2.2** | **66** | **72** | **60** | **12** |

**Table 21aV**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Notes:**

1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. Trip counts and VMTs by land use type were broken out by year using a scaling factor representing the percent of each fleet that is operational in a given year leading up to full buildout. This percent was determined based on the square footage of the land use associated with each fleet that is operational in a given year relative to that land use's full buildout square footage. See Table 16 for more details on scaling. See Table 18 for Project Trip Rates and VMT.
3. Criteria air pollutants are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in AQTR Table 20a.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

| | |
|---|---|
| EV - electric vehicle | $PM_{10}$ - particulate matter less than 10 microns in diameter |
| lb - pound | $PM_{2.5}$ - particulate matter less than 2.5 microns in diameter |
| $NO_x$ - nitrogen oxides | ROG - reactive organic gases |
| VMT- vehicle miles traveled | |

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 21bV**
**Summary of Mobile GHG Emissions Before EV Reductions**
**Willow Village**
**Menlo Park, California - Increased Residential Variant Analysis**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | GHGs Emissions[3,4] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | trips/year | VMT/year | MT/year | | | |
| Existing Conditions | Campus District | Cars | 2,557,040 | 30,742,244 | 9,997 | 0.41 | 0.32 | 10,104 |
| | | Trucks | 60,882 | 731,958 | 834 | 0.043 | 0.082 | 859 |
| | | Shuttles | 122,319 | 3,916,358 | 4,965 | 0.019 | 0.78 | 5,199 |
| | | On-Demand | 122,319 | 1,470,590 | 444 | 0.017 | 0.014 | 448 |
| | | | **2,862,559** | **36,861,150** | **16,240** | **0.48** | **1.2** | **16,610** |
| Full Buildout | Campus District | Cars | 4,367,418 | 48,565,689 | 14,353 | 0.41 | 0.34 | 14,465 |
| | | Trucks | 99,090 | 1,101,879 | 1,086 | 0.040 | 0.11 | 1,119 |
| | | Shuttles | 130,371 | 3,916,358 | 4,772 | 0.0037 | 0.75 | 4,996 |
| | | On-Demand | 203,212 | 2,259,721 | 611 | 0.016 | 0.015 | 616 |
| | Residential | San Mateo | 2,996,550 | 28,467,226 | 9,942 | 0.33 | 0.40 | 10,069 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 4,351 | 0.17 | 0.19 | 4,411 |
| | Park | San Mateo | 231,140 | 1,548,641 | 546 | 0.022 | 0.024 | 554 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 1,809 | 0.055 | 0.070 | 1,831 |
| | | | **10,248,378** | **103,417,346** | **37,469** | **1.0** | **1.9** | **38,060** |

**Notes:**

1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. VMT and trip rates for the increased residential variant were provided by the Transportation Engineer on February 9, 2022, and are summarized in Table 1
3. Greenhouse Gases are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in AQTR Table 20b.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
EV - electric vehicle
MT - Metric Ton
VMT- vehicle miles traveled

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 22V**
**EV Assumptions for Campus District**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Campus District EV Parameters**

| Description | Units | Value |
|---|---|---|
| Electricity required per mile charged[1] | kWh/mi | 0.30 |
| Total Charging Energy of Meta Campuses[2] | kWh/year | 3,791,856 |
| Total Area of Meta Campuses[2] | sqf | 4,753,594 |
| Total Meta Campus Energy per Area[2] | kWh/sqf | 0.80 |
| Existing Conditions Fleet eVMT per Total VMT[3] | Percent | 5.5% |
| Full Buildout Fleet MSS eVMT per Total VMT[4] | Percent | 14% |
| Electricity Loss Factor[5] | Percent | 10% |
| Existing Conditions Charging Energy Usage[6] | kWh/year | 534,955 |
| Full Buildout Charging Energy Usage[7] | kWh/year | 2,925,608 |

**eVMTs from Project Chargers at the proposed Campus District**

| Year | Land Use Category[8] | Project Increase in Annual eVMTs[9] |
|---|---|---|
| | | eVMT/year |
| **Existing Conditions** | Campus District | 1,783,182 |
| **Partial Buildout - Year 4** | | 298,927 |
| **Partial Buildout - Year 5** | | 5,701,922 |
| **Partial Buildout - Year 6** | | 9,259,481 |
| **Full Buildout** | | 9,752,026 |

**Notes:**

1. An average EV fuel economy of 0.30 kWh per mile was used. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. Meta provided energy usage and areas for EV charging at their existing campuses: Classic, Bayfront, Chilco, Willow, Gateway. The provided data was used to evaluate an average ratio of EV charging energy usage per campus area.
3. The percent eVMT for existing conditions is calculated by dividing the eVMT in existing conditions by the annual VMT from the 'Car' and 'On-Demand' vehicle types in existing conditions. For existing conditions VMT, see Variant Table 18.
4. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1) estimating future fleet characteristics. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The increase in annual eVMTs charged by the Campus District is scaled from the increase in fleet eVMT from existing conditions to full buildout.
5. A 10% Loss Factor was applied to the annual project energy uses to account for expected losses. Source available at: https://www.fueleconomy.gov/
6. The EV charging energy consumption for existing conditions was based on existing charger energy usage data for Willow Village for 2019 provided by the Project applicant. The total energy usage was reduced assuming a 10% loss factor.

**Table 22V**

**EV Assumptions for Campus District**

**Willow Village - Increased Residential Variant Analysis**

**Menlo Park, California**

7. The EV charging energy consumption for the Project at full buildout was determined using an average ratio of existing charging sites kWh/sqf and multiplying it by the Campus District land use area at full buildout (1.6 million sqf). This number was scaled by the increase in fleet eVMT from existing conditions to full buildout based on the MSS scenario of the VISION model. A 10% loss factor was applied to the total energy usage per year. All relevant data sources were provided by the Project applicant.

8. Meta offers an EV charging program to its workers. Charging on campus is free and valets move cars into chargers to maximize charging time. Therefore, the EV charging annual electricity for the Campus District was provided based on studies from Meta's existing campuses in the area. The electricity for EV charging at the Project would be supplied with 100% renewable energy.

9. For years where the Campus District is only operational a proportion of the year, the annual kWh is multiplied by a scaling fraction for the Campus District land use, found in Table 16.

**Abbreviations:**

EV - Electric vehicle (includes battery electric or plug-in hybrid technology)
eVMT- Electric vehicle miles traveled
kWh - Kilowatt hour
sqf- Square foot
MSS - Mobile Source Strategy

**References:**

City of Menlo Park Nonresidential EV Charging Requirements. Published July 17, 2019. Available at: https://www.menlopark.org/DocumentCenter/View/22382/Nonresidential-EV-Charging-Requirements

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

CalEEMod Appendix D. Available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=12

**Table 23V**
**EV Assumptions for Town Square and the Residential/Shopping District**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**EV Assumptions**

| Description | Units | Input |
|---|---|---|
| Miles Charged per Hour Charged[1] | (miles/hr) | 21 |
| Scenario1[2] | - | Reference |
| Scenario 2[2] | - | MSS |
| Number of Chargers[3] | Total # | 249 |
| Average Daily Hours for Charging per Charger[4] | hr | 10 |
| Annual Days of Charger Activity[4] | days/yr | 365 |

**eVMTs from Project Chargers - Reference Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **4.7%** | 17,714 | 121,137 | 131 | 477,218 | 10,021,583 | Under Capacity | **121,137** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **5.2%** | 97,457 | 776,244 | 187 | 683,944 | 14,362,828 | Under Capacity | **776,244** |
| **Partial Buildout - Year 6** | 4,159,383 | 35,423,719 | **5.6%** | 231,865 | 1,974,696 | 239 | 871,770 | 18,307,160 | Under Capacity | **1,974,696** |
| **Full Buildout** | 5,448,287 | 47,573,700 | **5.9%** | 322,805 | 2,818,688 | 249 | 908,850 | 19,085,850 | Under Capacity | **2,818,688** |

**eVMTs from Project Chargers - Mobile Source Strategy (MSS) Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **8.3%** | 31,482 | 215,280 | 131 | 477,218 | 10,021,583 | Under Capacity | **215,280** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **10.6%** | 198,125 | 1,578,074 | 187 | 683,944 | 14,362,828 | Under Capacity | **1,578,074** |
| **Partial Buildout - Year 6** | 4,159,383 | 35,423,719 | **13.1%** | 543,454 | 4,628,372 | 239 | 871,770 | 18,307,160 | Under Capacity | **4,628,372** |
| **Full Buildout** | 5,448,287 | 47,573,700 | **15.8%** | 860,576 | 7,514,434 | 249 | 908850 | 19,085,850 | Under Capacity | **7,514,434** |

**Notes:**

1. The miles charged per hour charged is representative of a typical charge rate for an EV of 6.25 kWh per hour and a fuel economy of 0.30 kWh per mile. The charge rate is based on capability of existing battery-electric vehicles and Level 2 charging stations. Reference: Chargepoint. 2017. Level Up Your EV Charging Knowledge. Available at: https://www.chargepoint.com/blog/level-your-ev-charging-knowledge/. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. The two scenarios analyzed are the Reference and the Mobile Source Strategy scenarios. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1). The 2020 MSS uses "scenario planning to take an integrated approach to identifying the technology trajectories and programmatic concepts" to model projected years of electric vehicle miles for assessed scenarios. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The 2020 update only considers passenger vehicles (LDA, LDT1, LDT2, and MDV). To determine the eVMT percent of the passenger vehicle fleets, the 2020 MSS update was downloaded in July 13, 2021. The increase in annual eVMTs charged by the Project from the Reference Scenario to the MSS Scenario is used to determine the eVMTs the Project can take credit for based on providing additional charging infrastructure for the state to reach aspirational EV fleet penetration.
3. The number of chargers in the Town Square and the Residential/Shopping District was provided by the Project Applicant in the Willow Village Mixed Use Development Concept Level Energy Use Summary, dated June 14, 2021, detailing chargers available for all mixed-use traffic. 249 EV Charging Stations are available to serve the 1,694 residential spaces and 500 commercial spaces.
4. Meta offers a valet service to charge EVs from 7am to 7pm, average daily hours of availability for charging per charger is conservatively assumed to be 10 hours per day. When demand is met, the full 10 hours will be used for charging, with each vehicle cycling out of the charging spot before or as the car reaches full charge. The number of chargers are available for all Town Square and the Residential/Shopping District land uses, and it is expected that there will be 10 hours a day of active charging taking place due to the frequency of turnover associated with retail, restaurant, hotel, and park land uses. Town Square and the Residential/Shopping District land uses are assumed to operate 365 days per year. Any charging inefficiencies associated with cars remaining plugged in after reaching full charge is assumed to balance out due the likelihood of more than 10 hours of activity a day associated with Town Square and the Residential/Shopping District activity.
5. Town Square and the Residential/Shopping District Total VMT and trips includes all proposed Project residential, retail, park, and hotel land uses, consistent with Table 18. Retail land uses include Hamilton Parcels North and South and are added to total VMT and trips.
6. EV Annual Trips and EV Annual VMT are determined based on Project trips and VMTs and the VISION Reference Scenario percent of Electric Fleet. These eVMTs (electric vehicle miles traveled) represents the number of project VMTs that are driven by electric vehicles.
7. 249 EV Charging Stations are proposed for the full buildout. To reflect the EV charging stations that will come online during construction in the partial years leading up to full buildout, a scaling factor was applied based on the ratio of square feet of the parking land use that is built out in a given year to the total square feet that will be built. The scaling factor for a given year was applied to the 249 chargers at full buildout. To see scaling factors used, refer to the parking land use from Table 16.
8. Total annual charge hours available from the project are determined by multiplying the average daily hours of charging per charger (10 hours) by the annual days of charger activity (365 days). The annual charge hours available from the project are then multiplied by 25 miles charged per charge hour to determine the number of eVMT available from the project.
9. The Project EV chargers for Town Square and the Residential/Shopping District land uses are determined to be at capacity, meaning used fully for all available charge hours per day, when the electric vehicle miles associated with the Project are in excess of the maximum electric vehicle miles the Project chargers can charge. If there is a surplus of chargers relative to EVs coming to the site, then the Project chargers are under-capacity, and only a fraction of chargers will be used as the number of EVs coming to the site are fewer than the total number of charger capacity. If there is a surplus of EVs coming to the site relative to the chargers at the site, all chargers will be used and the site will be at capacity. In the scenario when the chargers are at capacity, the full capacity of VMTs the site can charge are assumed to be charged.

**Abbreviations:**

EV - electric vehicle (includes battery electric or plug-in hybrid technology)
Hr - hour
TDM - Transportation Demand Management
VMT - vehicle miles travelled
eVMT - electric vehicle mile traveled

**References:**

U.S. Census. 2019. Factfinder. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/
California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/
California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 24aV**
**EV CAP Emissions Reductions Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Town Square and the Residential / Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT CAP Emissions Reduction (lb / year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT / year | trips / year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | Reference | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MSS | 0 | 0 | | | | | | |
| Year 4 | Reference | 121,137 | 17,714 | 94,143 | 13,767 | -33 | -18 | -0.34 | -0.31 |
| | MSS | 215,280 | 31,482 | | | | | | |
| Year 5 | Reference | 776,244 | 97,457 | 801,830 | 100,669 | -246 | -133 | -2.7 | -2.5 |
| | MSS | 1,578,074 | 198,125 | | | | | | |
| Year 6 | Reference | 1,974,696 | 231,865 | 2,653,676 | 311,589 | -752 | -400 | -8.4 | -7.7 |
| | MSS | 4,628,372 | 543,454 | | | | | | |
| Full Buildout | Reference | 2,818,688 | 322,805 | 4,695,746 | 537,771 | -1,311 | -700 | -15 | -14 |
| | MSS | 7,514,434 | 860,576 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[5] | Trip Counts from additional Project Chargers[5,6] | Electric VMT CAP Emissions Reduction (lb / year)[3,4] | | | |
|---|---|---|---|---|---|---|
| | eVMT / year | trips / year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | 1,783,182 | 148,319 | -564 | -472 | -7.6 | -7.0 |
| Year 4 | 298,927 | 26,882 | -78 | -47 | -1.0 | -0.91 |
| Year 5 | 5,701,922 | 512,763 | -1,432 | -833 | -18 | -17 |
| Year 6 | 9,259,481 | 832,687 | -2,249 | -1,262 | -28 | -26 |
| Full Buildout | 9,752,026 | 876,981 | -2,369 | -1,329 | -30 | -27 |

| Year | Electric VMT CAP Emissions Reduction (lb / year) | | | |
|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | -564 | -472 | -7.6 | -7.0 |
| Partial Buildout- Year 4 | -111 | -65 | -1.3 | -1.2 |
| Partial Buildout- Year 5 | -1,677 | -966 | -21 | -19 |
| Partial Buildout- Year 6 | -3,002 | -1,662 | -37 | -34 |
| Full Buildout | -3,680 | -2,030 | -45 | -41 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.
2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.
3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).
4. EVs emit particulate matter brake wear and tire wear, therefore those emissions are not considered in the reductions.
5. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Variant Table 22.
6. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

eVMT - electric vehicle miles traveled
lb - pound
EV - electric vehicle
ROG - reactive organic gases
NOx - nitrogen oxides
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 24bV**
**EV GHG Emissions Reductions Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Town Square and the Residential/Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT GHG Emissions Reduction (MT/year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Full Buildout | Reference | 2,818,688 | 322,805 | 4,695,746 | 537,771 | -1,396 | -0.047 | -0.037 | -1,408 |
| | MSS | 7,514,434 | 860,576 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[4] | Trip Counts from additional Project Chargers[4,5] | Electric VMT GHG Emissions Reduction (MT/year)[3] | | | |
|---|---|---|---|---|---|---|
| | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | 1,783,182 | 148,319 | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | 9,752,026 | 876,981 | -2,882 | -0.082 | -0.069 | -2,905 |

| Year | Electric VMT GHG Emissions Reduction (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | -4,278 | -0.13 | -0.11 | -4,313 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.
2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.
3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).
4. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Table 22.
5. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
eVMT - electric vehicle miles traveled
MT - metric ton
EV - electric vehicle

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

## Table 25aV
## Summary of Mobile CAP Emissions
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

**Total Emissions Before Reductions:**[1]

| Year | CAP Emissions without Reductions (ton/year) | | | |
|---|---|---|---|---|
| | ROG | $NO_x$ | $PM_{10}$[2] | $PM_{2.5}$[2] |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.61 | 0.67 | 0.46 | 0.092 |
| Year 5 | 5.8 | 6.3 | 5.1 | 1.0 |
| Year 6 | 10 | 11 | 9.4 | 1.9 |
| **Full Buildout** | 12 | 13 | 11 | 2.2 |
| **Net Emissions by Year** | | | | |
| **Full Buildout** | **7.1** | **5.1** | **7.0** | **1.3** |

**Total Emissions with Reductions:**[4]

| Year | CAP Emissions with Reductions (ton/year) | | | |
|---|---|---|---|---|
| | ROG | $NO_x$ | $PM_{10}$[2] | $PM_{2.5}$[2] |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.56 | 0.64 | 0.46 | 0.091 |
| Year 5 | 5.0 | 5.9 | 5.1 | 1.0 |
| Year 6 | 8.9 | 10 | 9.4 | 1.8 |
| **Full Buildout** | **10** | **12** | **11** | **2.2** |
| **Net Emissions by Year** | | | | |
| **Full Buildout** | **5.3** | **4.1** | **7.0** | **1.3** |

**Notes:**

1. Calculations of CAP emissions before reductions are shown in detail in Table 21a. Net emissions subtract the emissions from the existing conditions in 2019.
2. PM10 and PM2.5 emissions include exhaust, tire wear, brake wear, and fugitive dust. Fugitive dust emissions factors are calculated in AQTR Table 8.
3. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
4. CAP Emissions after reductions account for the reductions associated with EVs as shown in Table 24a. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

lb - pound
MT - metric ton
EV - electric vehicle
ROG - reactive organic gases
NOx - nitrogen oxides
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**References:**


California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 25bV**
**Summary of Mobile GHG Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Total Emissions Before Reductions:**[1]

| Year | GHG Emissions without Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 37,469 | 1.0 | 1.9 | 38,060 |
| **Net Emissions** | | | | |
| **Full Buildout** | **21,809** | **0.58** | **0.71** | **22,035** |

**Total Emissions with Reductions:**[3]

| Year | GHG Emissions with Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 33,191 | 0.92 | 1.8 | 33,747 |
| **Net Emissions** | | | | |
| **Full Buildout** | **17,531** | **0.45** | **0.61** | **17,723** |

**Notes:**

1. Calculations of GHG emissions before reductions are shown in detail in AQTR Table 21b. Net emissions subtract the emissions from the existing conditions in 2019.
2. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
3. GHG Emissions after reductions account for the reductions associated with EVs as shown in Table 24b. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
MT - metric ton
EV - electric vehicle

**References:**

California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf
California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 28V**
**Energy Usage for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Floor Area | Annual Electricity Use | Annual Natural Gas Use |
|---|---|---|---|
| | (sqft) (DU - Residential) | (MWh/yr) | (MMBtu/yr) |
| **Existing Conditions (2019)[1]** | | | |
| All | 1,923,910 | 12,050 | 30,039 |
| **Total Existing Energy Usage** | | **12,050** | **30,039** |
| **Full Buildout[2,3]** | | | |
| Office | 1,600,000 | 23,828 | 0 |
| Retail | 207,690 | 4,517 | 2,195 |
| Residential | 1,930 | 18,804 | 0 |
| Hotel | 172,000 | 2,528 | 0 |
| Parking | 1,869,240 | 32,183 | 0 |
| Park | 403,837 | 38 | 0 |
| **Total Full Buildout Energy Usage** | | **81,898** | **2,195** |

**Notes:**
1. Energy use rates for existing conditions were provided for 2019 by the Project Applicant via email on August 10, 2021.
2. Electricity and natural gas usage rates for the retail, residential, and parking land uses were provided by PAE in the June 14, 2021 memorandum. Electricity usage rates for Office, Hotel, and Park were provided by Hines on June 21, 2021. The hotel and office do not use natural gas. The electricity usage includes 27,986 MWh/year of electricity use associated with the Campus District EV charging stations, which is summarized in the parking land use category. Electricity and energy use rates for the Willow Road Retail were calculated based on the CalEEMod defaults the retail land use type in Climate Zone 5.
3. Natural gas for the project is only used for Hamilton Avenue Parcels North and South and the supermarket and restaurant land uses, which are summarized in the retail category.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
DU - dwelling unit
kBTU - thousand British Thermal Units
kWh - kilowatt-hour
MMBTU - million British Thermal Units
MWh - Megawatt-hour
sqft - square feet
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

RAMBOLL

**Table 30V**
**Energy Usage Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Location | Natural Gas Emissions[1,2] | | | | | Electricity Emissions[1,2] |
|---|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ | |
| | (tons/yr) | | | | (MT/yr) | |
| **Existing Conditions (2019)** | | | | | | |
| All | 0.16 | 1.5 | 0.11 | 0.11 | 1,613 | 0 |
| **Total Existing Emissions** | **0.16** | **1.5** | **0.11** | **0.11** | **1,613** | **0** |
| **Full Buildout** | | | | | | |
| Retail | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 118 | 0 |
| **Total Full Buildout Emissions** | **0.012** | **0.11** | **8.2E-03** | **8.2E-03** | **118** | **0** |
| **Partial Buildout[3]** | | | | | | |
| Total Year 4 Emissions | 0.0012 | 0.011 | 8.3E-04 | 8.3E-04 | 12 | 0 |
| Total Year 5 Emissions | 0.0070 | 0.064 | 4.9E-03 | 4.9E-03 | 70 | 0 |
| Total Year 6 Emissions | 0.012 | 0.11 | 8.0E-03 | 8.0E-03 | 115 | 0 |

**Notes:**

1. CAP emissions result from the combustion of natural gas. As a result, CAP emissions were only calculated for natural gas usage. In compliance with the City of Menlo Park Municipal Code, natural gas usage for the Project will be offset; however, since the carbon intensity of the offset production is not known at this time, GHG emissions from natural gas were conservatively included alongside electricity GHG emissions.
2. Emissions were calculated based on energy use, shown in Table 28, and energy emission factors, shown in AQTR Table 29. Existing electricity is sourced from PCE. Project electricity will be sourced from 100% renewable sources; as such, emissions from Project electricity use are expected to be zero. Project natural gas will only be used in retail land uses for commercial cooking equipment.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CAP - Criteria Air Pollutants
$CO_2e$ - carbon dioxide equivalents
GHG - Greenhouse Gas
MT - metric ton(s)
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 31V**
**Water Usage for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Water Usage**

| Land Use | CalEEMod® Land Use Subtype | Size | Size Metric | Indoor Water (million gal/year) | Outdoor Water (million gal/year) |
|---|---|---|---|---|---|
| **Existing Conditions (2019)[1]** | | | | | |
| Office | General Office Building | 251,530 | sqft | 45 | 27 |
| Commercial | Research and Development | 123,870 | sqft | 61 | 0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 500,780 | sqft | 116 | 0 |
| Industrial - Manufacturing | Manufacturing | 23,570 | sqft | 5.5 | 0 |
| Recreational | Health Club | 24,060 | sqft | 1.4 | 0.87 |
| Light Industrial | General Light Industry | 80,100 | sqft | 19 | 0 |
| Parking | Enclosed Parking with Elevator | 920,000 | sqft | 0 | 0 |
| **Full Buildout[2]** | | | | | |
| Office | | 1,600,000 | sqft | 35 | 10 |
| Retail | | 207,690 | sqft | 4.2 | 0.36 |
| Residential | | 1,892,043 | sqft | 75 | 7.0 |
| Hotel | | 172,000 | sqft | 7.6 | 2.5 |
| Parking | | 1,869,240 | sqft | 0 | 1.4 |
| Park | | 403,837 | sqft | 0 | 14 |
| **Partial Buildout[3]** | | | | | |
| | | | Total Year 4 Usage[3] | 1.5 | 13 |
| | | | Total Year 5 Usage[3] | 37 | 23 |
| | | | Total Year 6 Usage[3] | 89 | 32 |

**Notes:**
1. Existing water use was calculated using the CalEEMod default water consumption profile for each land use.
2. Project indoor water use rates and outdoor water use for all parcels except Willow Road Retail were provided by the Project Applicant on June 14, 2021. Indoor and outdoor water use rates for Willow Road Retail were calculated using the CalEEMod default water consumption profile for the retail land use type.
3. Partial buildout usage rates were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**
CalEEMod - California Emissions Estimator Model
gal - gallon
kWh - kilowatt-hours
ksf - thousand square feet
sqft - square feet

**References:**
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 32V**
**Water Usage and Wastewater Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Electricity Indirect Emissions[1,2] (MT $CO_2e$ / yr) | Septic Tank Direct Emissions[1,2] (MT $CO_2e$ / yr) | Aerobic Direct Emissions[1,2] (MT $CO_2e$ / yr) | Facultative Lagoon Direct Emissions[1,2] (MT $CO_2e$ / yr) | Total Emissions (MT CO2e / yr) |
|---|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | | |
| Office | 37 | 27 | 24 | 10 | 98 |
| Commercial | 36 | 37 | 33 | 13.1 | 119 |
| Industrial - Warehouse | 68 | 71 | 62 | 25 | 226 |
| Industrial - Manufacturing | 3.2 | 3.3 | 2.9 | 1.2 | 10.6 |
| Recreational | 1.2 | 0.87 | 0.76 | 0.30 | 3.1 |
| Light Industrial | 11 | 11.3 | 9.9 | 4.0 | 36 |
| Parking | 0 | 0 | 0 | 0 | 0 |
| **Total Existing Emissions** | **156** | **151** | **132** | **53** | **492** |
| **Full Buildout** | | | | | |
| Office | 19 | 21 | 19 | 7.5 | 67 |
| Retail | 2.0 | 2.6 | 2.3 | 0.91 | 7.8 |
| Residential | 36 | 46 | 40 | 16 | 138 |
| Hotel | 4.1 | 4.6 | 4.1 | 1.6 | 14 |
| Parking | 0.42 | 0 | 0 | 0 | 0.42 |
| Park | 4.2 | 0 | 0 | 0 | 4.2 |
| **Total Full Buildout Emissions** | **65** | **74** | **65** | **26** | **231** |
| **Partial Buildout[3]** | | | | | |
| Total Year 4 Emissions[3] | 5.0 | 0.92 | 0.81 | 0.32 | 7.1 |
| Total Year 5 Emissions[3] | 24 | 22 | 20 | 7.9 | 74 |
| Total Year 6 Emissions[3] | 49 | 54 | 48 | 19 | 170 |

**Notes:**

1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. The Water Electricity Intensity, Water Treatment Types, and Wastewater Treatment Direct Emission Factors used in the calculation can be found in Tables 9.2, 9.3 and 9.4 of Appendix D of the CalEEMod user guide, respectively. These calculations were performed using water use rates, shown in Table 31, and energy emission factors, shown in AQTR Table 29.
2. Consistent with CalEEMod, indoor water use was assumed to be processed as wastewater and outdoor water use was assumed to not be processed as wastewater.
3. Partial buildout direct emissions from Septic Tank, Aerobic, and Facultative Lagoon wastewater treatment were calculated from full buildout using scaling factors by land use type and year, as shown in Table 1. For partial buildout indirect electricity emissions from water usage and wastewater treatment, usage rates rather than emission were scaled to account for year specific energy emission factors from PG&E, as shown in AQTR Table 29

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

## Table 33V
## Solid Waste Generation for Existing Conditions and Project Operations
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

**Solid Waste Generation**[1]

| Land Use | Size | Units | Solid Waste Disposal Rate (ton/year) |
|---|---|---|---|
| **Existing Conditions (2019)** | | | |
| Office | 251,530 | sqft | 42 |
| Commercial | 123,870 | sqft | 10 |
| Industrial - Warehouse | 500,780 | sqft | 471 |
| Industrial - Manufacturing | 23,570 | sqft | 29 |
| Recreational | 24,060 | sqft | 137 |
| Light Industrial | 80,100 | sqft | 99 |
| Parking | 920,000 | sqft | 0 |
| **Full Buildout Conditions** | | | |
| Office | 1,600,000 | sqft | 268 |
| Retail | 207,690 | sqft | 218 |
| Residential | 1,930 | DU | 888 |
| Hotel | 193 | Rooms | 106 |
| Parking | 1,869,240 | sqft | 0 |
| Park | 403,837 | sqft | 0.83 |

**Notes:**

1. Solid Waste Generation Rates are from Table 10.1 of Appendix D of the CalEEMod User's Guide. An 82% diversion rate, provided by the Project Applicant via email communication dated August 2, 2021, is applied to default solid waste generation rates for the existing and project office land use to account for recycling and composting. The diversion rate is generated using data from Recology with the assumption that all bins are at 100% capacity and 0% contamination.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model

DU - dwelling unit

sqft - square feet

**References**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 34V**
**Solid Waste Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Solid Waste Emissions[1]**

| Location | CalEEMod® Land Use Subtype | $CO_2$ (MT/year) | $CH_4$ (MT/year) | $CO_2e$ (MT/year) |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 8.5 | 0.51 | 21 |
| Commercial | Research and Development | 2.0 | 0.12 | 5.0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 96 | 5.6 | 237 |
| Industrial - Manufacturing | Manufacturing | 5.9 | 0.35 | 15 |
| Recreational | Health Club | 28 | 1.6 | 69 |
| Light Industrial | General Light Industry | 20 | 1.2 | 50 |
| Parking | Enclosed Parking with Elevator | 0 | 0 | 0 |
| **Total Existing Emissions** | | **160** | **9.5** | **397** |
| **Full Buildout Conditions** | | | | |
| Office | | 54 | 3.2 | 135 |
| Retail | | 44 | 2.6 | 110 |
| Residential | | 180 | 10.7 | 446 |
| Hotel | | 22 | 1.3 | 53 |
| Parking | | 0 | 0 | 0 |
| Park | | 0.17 | 0.010 | 0.42 |
| **Total Full Buildout Emissions** | | **301** | **18** | **745** |
| **Partial Buildout[2]** | | | | |
| Total Year 4 Emissions[2] | | 6.3 | 0.37 | 16 |
| Total Year 5 Emissions[2] | | 92 | 5.5 | 229 |
| Total Year 6 Emissions[2] | | 222 | 13 | 549 |

**Notes:**
1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. These calculations were performed using default waste use rates by land use type and an 82% diversion rate for office land use types provided by the Project Applicant, shown in Table 33, and default solid waste landfill gas emission factors from Table 10.2 of CalEEMod User's Guide Appendix D.
2. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**
CalEEMod - California Emissions Estimator Model
$CH_4$ - methane
$CO_2$ - carbon dioxide
$CO_2e$ - carbon dioxide equivalents
LFG - Landfill Gas
MT - metric ton

**References:**
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 35V**
**Unmitigated Architectural Coating Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Existing Conditions (2019)** | | | | | | |
| Office | 251,530 | 503,060 | 10% | 100 | 150 | 262 |
| Commercial | 123,870 | 247,740 | 10% | 100 | 150 | 129 |
| Industrial - Warehouse | 500,780 | 1,001,560 | 10% | 100 | 150 | 522 |
| Industrial - Manufacturing | 23,570 | 47,140 | 10% | 100 | 150 | 25 |
| Recreational | 24,060 | 48,120 | 10% | 100 | 150 | 25 |
| Light Industrial | 80,100 | 160,200 | 10% | 100 | 150 | 84 |
| Parking | 920,000 | 55,200 | 10% | 0 | 150 | 9.6 |
| **Total Existing Conditions Emissions** | | | | | | **1,057** |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 100 | 150 | 1,669 |
| Retail | 207,690 | 415,380 | 10% | 100 | 150 | 217 |
| Residential | 1,892,043 | 5,108,515 | 10% | 100 | 150 | 2,664 |
| Hotel | 172,000 | 344,000 | 10% | 100 | 150 | 179 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| **Total Full Buildout Emissions** | | | | | | **4,749** |
| **Partial Buildout[5]** | | | | | | |
| Total Year 4 Emissions[5] | | | | | | 83 |
| Total Year 5 Emissions[5] | | | | | | 1,567 |
| Total Year 6 Emissions[5] | | | | | | 3,547 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Consistent with CalEEMod Appendix D Table 6.1, which is based on BAAQMD Regulation 8 Rule 3 paint VOC regulations, use VOC EF of 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**


BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/


RAMBOLL

**Table 36V**
**Mitigated Architectural Coating Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 10 | 150 | 668 |
| Retail | 207,690 | 415,380 | 10% | 10 | 150 | 87 |
| Residential | 1,892,043 | 5,108,515 | 10% | 10 | 150 | 1,066 |
| Hotel | 172,000 | 344,000 | 10% | 10 | 150 | 72 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| | | | | | **Total Full Buildout Emissions** | **1,911** |
| **Partial Buildout[5]** | | | | | | |
| | | | | | Total Year 4 Emissions[5] | 40 |
| | | | | | Total Year 5 Emissions[5] | 635 |
| | | | | | Total Year 6 Emissions[5] | 1,430 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions were estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumed use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC was assumed to be equivalent to ROG for these purposes.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**


BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

South Coast Air Quality Management District. Super Compliant Architectural Coatings per Rule 1113. Accessed July 2021. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings&parent=other-low-voc-products.

**Table 38V**
**Consumer Product Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Building Area | Consumer Products VOC EF[1,2] | Days per Year | Consumer Products VOC emissions |
|---|---|---|---|---|
| | (sqft) | (lb/sqft/day) | | (lb/yr) |
| **Existing Conditions (2019)** | | | | |
| Office | 251,530 | 1.8E-05 | 365 | 1,670 |
| Commercial | 123,870 | 1.8E-05 | 365 | 822 |
| Industrial - Warehouse | 500,780 | 1.8E-05 | 365 | 3,324 |
| Industrial - Manufacturing | 23,570 | 1.8E-05 | 365 | 156 |
| Recreational | 24,060 | 1.8E-05 | 365 | 160 |
| Light Industrial | 80,100 | 1.8E-05 | 365 | 532 |
| Parking | 920,000 | 3.5E-07 | 365 | 119 |
| | | | **Existing Conditions Emissions** | **6,783** |
| **Full Buildout** | | | | |
| Office | 1,600,000 | 1.8E-05 | 365 | 10,621 |
| Retail | 207,690 | 1.8E-05 | 365 | 1,379 |
| Residential | 1,892,043 | 1.8E-05 | 365 | 12,560 |
| Hotel | 172,000 | 1.8E-05 | 365 | 1,142 |
| Parking | 1,869,240 | 3.5E-07 | 365 | 242 |
| Park | 403,837 | 5.2E-08 | 365 | 7.6 |
| | | | **Total Full Buildout Emissions** | **25,950** |
| **Partial Buildout[3]** | | | | |
| | | | Total Year 4 Emissions[3] | 599 |
| | | | Total Year 5 Emissions[3] | 9,447 |
| | | | Total Year 6 Emissions[3] | 20,130 |

**Notes:**

1. The consumer products VOC EF for office, retail, and residential land uses was derived using methodology consistent with CalEEMod with adjusted parameters for San Mateo County, as described in AQTR Table 37. The default emissions factor assumes 2020 consumer products VOC inventory for San Mateo County. The default building square footage used is from 2010, which was updated to 2020 using population growth of San Mateo County, as shown in AQTR Table 37.
2. Consumer product VOC EFs for parking and open space were taken from CalEEMod 2020.4.0. These defaults take into account pesticide and fertilizer use in city parks and degreaser use in parking areas.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

ARB - Air Resources Board
CalEEMod - California Emissions Estimator Model
EF - emission factor
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 39V**
**Landscaping Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year[2] | Emissions from Landscaping Equipment[1] | | | | |
|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
| | (tons/yr) | | | | (MT/yr) |
| Existing Conditions | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.063 |
| Year 4 | 0.37 | 0.14 | 0.068 | 0.068 | 21 |
| Year 5 | 0.41 | 0.16 | 0.075 | 0.075 | 23 |
| Year 6 | 0.43 | 0.17 | 0.079 | 0.079 | 24 |
| Full Buildout | **0.43** | **0.17** | **0.079** | **0.079** | **24** |

**Notes:**

1. Landscape emissions calculated using CalEEMod 2020.4.0 based on information regarding building square footage and acreage, shown in Appendix D.
2. Emissions in partial years were calculated by scaling full buildout emissions by the maximum percentage of land uses operational during that year.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton(s)
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 40V**
**Summary of Unmitigated Operational CAP Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| **Existing Conditions (2019)[3]** | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| **Total Emissions** | **9.1** | **10** | **4.1** | **0.95** | **50** | **52** | **23** | **5.2** |
| **Full Buildout Conditions[4]** | | | | | | | | |
| Architectural Coating | 2.4 | -- | -- | -- | 13 | -- | -- | -- |
| Consumer Products | 13 | -- | -- | -- | 71 | -- | -- | -- |
| Landscaping | 0.43 | 0.17 | 0.079 | 0.079 | 2.4 | 0.90 | 0.44 | 0.44 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.2 | 56 | 66 | 60 | 12 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| **Total Emissions** | **26** | **14** | **11** | **2.3** | **144** | **75** | **61** | **13** |
| **Partial Buildout Emissions[6]** | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.54 | 0.17 | 7.2 | 6.0 | 2.9 | 0.94 |
| Total Year 5 Emissions | 11 | 6.7 | 5.2 | 1.1 | 60 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 21 | 12 | 9.5 | 2.0 | 117 | 63 | 52 | 11 |
| **Net Emissions[7]** | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.4 | -3.6 | -0.78 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.9 | -2.8 | 1.0 | 0.15 | 11 | -15 | 5.6 | 0.81 |
| Net Year 6 Emissions | 12 | 2.0 | 5.4 | 1.0 | 67 | 11 | 29 | 5.6 |
| **Net Full Buildout Emissions** | **17** | **4.1** | **7.0** | **1.3** | **94** | **23** | **38** | **7.4** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions. Net emissions were calculated as the difference between full buildout emissions and existing condition emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 41V**
**Summary of Mitigated Operational CAP Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| **Existing Conditions (2019)[3]** | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| **Total Emissions** | **9.1** | **9.5** | **4.1** | **0.95** | **50** | **52** | **23** | **5.2** |
| **Full Buildout Conditions[4]** | | | | | | | | |
| Architectural Coating | 0.96 | -- | -- | -- | 5.2 | -- | -- | -- |
| Consumer Products | 13 | -- | -- | -- | 71 | -- | -- | -- |
| Landscaping | 0.43 | 0.17 | 0.079 | 0.079 | 2.4 | 0.90 | 0.44 | 0.44 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.2 | 56 | 66 | 60 | 12 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| **Total Emissions** | **25** | **14** | **11** | **2.3** | **136** | **75** | **61** | **13** |
| **Partial Buildout Emissions[6]** | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.54 | 0.17 | 7.1 | 6.0 | 2.9 | 0.94 |
| Total Year 5 Emissions | 10.5 | 6.7 | 5.2 | 1.1 | 58 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 20 | 11.6 | 9.5 | 2.0 | 111 | 63 | 52 | 11 |
| **Net Emissions[7]** | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.4 | -3.6 | -0.78 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.5 | -2.8 | 1.0 | 0.15 | 8.0 | -15 | 5.6 | 0.81 |
| Net Year 6 Emissions | 11.1 | 2.0 | 5.4 | 1.0 | 61 | 11.1 | 29 | 5.6 |
| **Net Full Buildout Emissions** | **16** | **4.1** | **7.0** | **1.3** | **86** | **23** | **38** | **7.4** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0. The mitigated scenario for the Project is equivalent to the unmitigated scenario for all sources except Architectural Coating, as shown in Table 36.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

RAMBOLL

**Table 42V**
**Summary of Operational GHG Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Emissions Source | GHG Emissions[1] (MT/yr) $CO_2e$ | |
|---|---|---|
| | Existing Conditions (2019)[2] | Full Buildout Conditions[3] |
| Landscaping | 0.063 | 24 |
| Electricity Use | 0 | 0 |
| Natural Gas Use[4] | 1,613 | 118 |
| Water Use | 492 | 231 |
| Waste Disposed | 397 | 745 |
| Emergency Generators | 8.5 | 399 |
| **Total Emissions** | **2,509** | **1,516** |
| | **Net Emissions[5]** | **-993** |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
3. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
4. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
5. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

**Abbreviations:**

CalEEMod® - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
MT - metric ton
yr - year

**References:**

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 43V**
**Unmitigated Construction and Net New Operational CAP Emissions by Year**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only | | | | Net Operational Emissions[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.12 | 2.4 | 0.053 | 0.050 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 4.5 | 64 | 1.4 | 1.3 | -50 | -52 | -23 | -5.2 | -45 | 11 | -21 | -3.9 |
| Year 3 | 19 | 124 | 5.8 | 5.4 | -50 | -52 | -23 | -5.2 | -31 | 72 | -17 | 0.15 |
| Year 4 | 52 | 53 | 2.3 | 2.1 | -43 | -46 | -20 | -4.3 | 9.5 | 7.2 | -17 | -2.2 |
| Year 5 | 64 | 46 | 2.2 | 2.0 | 11 | -15 | 5.6 | 0.81 | 75 | 30 | 7.8 | 2.8 |
| Year 6 | 43 | 14 | 0.72 | 0.67 | 67 | 11 | 29 | 5.6 | 110 | 25 | 30 | 6.3 |
| Full Buildout | -- | -- | -- | -- | 94 | 23 | 38 | 7.4 | 94 | 23 | 38 | 7.4 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Unmitigated construction emissions can be found in Table 13. Net unmitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 42.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 44V**
**Mitigated Construction and Net New Operational CAP Emissions by Year**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only[3] | | | | Net Operational Emissions Only[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.064 | 1.9 | 0.019 | 0.019 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 | -50 | -52 | -23 | -5.2 | -47 | -7.6 | -22 | -4.7 |
| Year 3 | 10 | 47 | 0.78 | 0.77 | -50 | -52 | -23 | -5.2 | -40 | -5.1 | -22 | -4.4 |
| Year 4 | 24 | 29 | 0.38 | 0.37 | -43 | -46 | -20 | -4.3 | -19 | -17 | -19 | -3.9 |
| Year 5 | 29 | 22 | 0.27 | 0.26 | 8 | -15 | 5.6 | 0.81 | 37 | 7.0 | 5.8 | 1.1 |
| Year 6 | 19 | 6.5 | 0.084 | 0.080 | 61 | 11.1 | 29 | 5.6 | 80 | 18 | 30 | 5.7 |
| Full Buildout | -- | -- | -- | -- | 86 | 22.6 | 38 | 7.4 | 86 | 23 | 38 | 7.4 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

**Notes:**

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Mitigated construction emissions can be found in Table 14. Net mitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 43.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

**Table 47V**
**Summary of Full Buildout Traffic Volumes by Roadway Segment**
**Willow Village**
**Menlo Park, CA**

**Offsite Roadways[1]**

| Source Group Name | Distance (m) | Facebook Campus District | | | | | | Project + Variant Town Square and Residential/Shopping District[2] | | Total Project + Variant Volume and VMT[2] | | Total Project Volume and VMT[2] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cars | | On-Demand | | Trucks | | San Mateo Default Fleet | | San Mateo Default Fleet | | San Mateo Default Fleet | |
| | | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) |
| ADAMS_CT | 223 | 62 | 8.6 | 4.2 | 0.58 | 1.4 | 0.19 | 88 | 12 | 156 | 22 | 155 | 21 |
| ADAMSD01 | 57 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 2.9 | 81 | 2.9 | 80 | 2.9 |
| ADAMSD02 | 160 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 8.1 | 81 | 8.1 | 80 | 8.0 |
| ADAMSD03 | 76 | 66 | 3.1 | 4.5 | 0.21 | 1.5 | 0.071 | 7.9 | 0.37 | 80 | 3.8 | 80 | 3.8 |
| ADAMSD04 | 83 | 66 | 3.4 | 4.5 | 0.23 | 1.5 | 0.077 | 7.9 | 0.40 | 80 | 4.1 | 80 | 4.1 |
| ADAMSD05 | 147 | 66 | 6.0 | 4.5 | 0.41 | 1.5 | 0.14 | 7.9 | 0.71 | 80 | 7.3 | 80 | 7.3 |
| ADAMSD06 | 81 | 66 | 3.3 | 4.5 | 0.23 | 1.5 | 0.076 | 7.9 | 0.40 | 80 | 4.1 | 80 | 4.0 |
| BAY_EAST | 1,185 | 657 | 484 | 45 | 33 | 15 | 11 | 1,598 | 1,177 | 2,315 | 1,705 | 2,252 | 1,658 |
| BAY_EFB | 718 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 762 | 1,709 | 762 | 1,566 | 698 |
| BAY_M01 | 110 | 525 | 36 | 36 | 2.4 | 12 | 0.81 | 1,650 | 113 | 2,223 | 152 | 2,130 | 146 |
| BAY_M02 | 135 | 525 | 44 | 36 | 3.0 | 12 | 1.0 | 1,650 | 138 | 2,223 | 186 | 2,130 | 179 |
| BAY_M03 | 117 | 525 | 38 | 36 | 2.6 | 12 | 0.86 | 1,650 | 119 | 2,223 | 161 | 2,130 | 154 |
| BAY_M04 | 143 | 525 | 47 | 36 | 3.2 | 12 | 1.1 | 1,650 | 146 | 2,223 | 197 | 2,130 | 189 |
| BAY_M05 | 350 | 525 | 114 | 36 | 7.8 | 12 | 2.6 | 1,650 | 358 | 2,223 | 483 | 2,130 | 463 |
| BAY_WFB1 | 419 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 365 | 1,401 | 365 | 1,284 | 334 |
| BAY_WFB2 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 183 | 1,401 | 183 | 1,284 | 168 |
| BAY_WFB3 | 124 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 108 | 1,401 | 108 | 1,284 | 99 |
| BAY_WFB4 | 328 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 286 | 1,401 | 286 | 1,284 | 262 |
| BAY_WFB5 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 120 | 1,709 | 120 | 1,566 | 110 |
| BAY_WFB6 | 542 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 576 | 1,709 | 576 | 1,566 | 527 |
| BAY_WFB7 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 144 | 1,709 | 144 | 1,566 | 132 |
| OBRIEN01 | 320 | 1,480 | 294 | 101 | 20 | 34 | 6.7 | 1,032 | 205 | 2,646 | 526 | 2,605 | 518 |
| OBRIEN02 | 138 | 1,480 | 127 | 101 | 8.7 | 34 | 2.9 | 1,032 | 89 | 2,646 | 227 | 2,605 | 224 |
| OBRIEN03 | 35 | 1,480 | 33 | 101 | 2.2 | 34 | 0.74 | 1,032 | 23 | 2,646 | 58 | 2,605 | 57 |
| OBRIEN04 | 29 | 1,480 | 27 | 101 | 1.8 | 34 | 0.61 | 1,032 | 19 | 2,646 | 48 | 2,605 | 47 |
| OBRIEN05 | 28 | 1,480 | 26 | 101 | 1.8 | 34 | 0.59 | 1,032 | 18 | 2,646 | 46 | 2,605 | 46 |
| OBRIEN06 | 52 | 1,480 | 48 | 101 | 3.3 | 34 | 1.1 | 1,032 | 33 | 2,646 | 85 | 2,605 | 84 |
| OBRIEN07 | 43 | 3,842 | 103 | 262 | 7.0 | 87 | 2.3 | 2,568 | 69 | 6,759 | 181 | 6,589 | 176 |
| OBRIEN08 | 20 | 3,842 | 49 | 262 | 3.3 | 87 | 1.1 | 2,568 | 32 | 6,759 | 85 | 6,589 | 83 |
| OBRIEN09 | 20 | 3,842 | 47 | 262 | 3.2 | 87 | 1.1 | 2,568 | 32 | 6,759 | 83 | 6,589 | 81 |
| OBRIEN10 | 21 | 3,842 | 50 | 262 | 3.4 | 87 | 1.1 | 2,568 | 33 | 6,759 | 87 | 6,589 | 85 |
| OBRIEN11 | 44 | 3,842 | 105 | 262 | 7.2 | 87 | 2.4 | 2,568 | 70 | 6,759 | 185 | 6,589 | 180 |
| OBRIEN12 | 102 | 3,842 | 243 | 262 | 17 | 87 | 5.5 | 2,568 | 162 | 6,759 | 427 | 6,589 | 416 |
| OBRIEN13 | 32 | 3,842 | 76 | 262 | 5.2 | 87 | 1.7 | 2,568 | 51 | 6,759 | 133 | 6,589 | 130 |
| OBRIEN14 | 112 | 3,842 | 268 | 262 | 18 | 87 | 6.1 | 2,568 | 179 | 6,759 | 471 | 6,589 | 459 |
| OBRIEN15 | 242 | 3,870 | 581 | 263 | 40 | 88 | 13 | 2,494 | 374 | 6,715 | 1,008 | 6,546 | 983 |
| OBRIEN16 | 48 | 3,870 | 115 | 263 | 7.8 | 88 | 2.6 | 2,494 | 74 | 6,715 | 200 | 6,546 | 195 |
| OBRIEN17 | 54 | 3,870 | 130 | 263 | 8.8 | 88 | 2.9 | 2,494 | 84 | 6,715 | 225 | 6,546 | 219 |
| UNIV_01 | 110 | 339 | 23 | 23 | 1.6 | 7.7 | 0.53 | 355 | 24 | 725 | 50 | 679 | 46 |
| UNIV_02 | 91 | 339 | 19 | 23 | 1.3 | 7.7 | 0.43 | 355 | 20 | 725 | 41 | 679 | 38 |
| UNIV_03 | 222 | 339 | 47 | 23 | 3.2 | 7.7 | 1.1 | 355 | 49 | 725 | 100 | 679 | 94 |
| UNIV_04 | 121 | 339 | 26 | 23 | 1.7 | 7.7 | 0.58 | 355 | 27 | 725 | 55 | 679 | 51 |
| UNIV_05 | 80 | 339 | 17 | 23 | 1.2 | 7.7 | 0.38 | 355 | 18 | 725 | 36 | 679 | 34 |
| UNIV_06 | 69 | 339 | 15 | 23 | 1.0 | 7.7 | 0.33 | 355 | 15 | 725 | 31 | 679 | 29 |
| UNIV_07 | 258 | 339 | 54 | 23 | 3.7 | 7.7 | 1.2 | 355 | 57 | 725 | 116 | 679 | 109 |
| UNIV_08 | 185 | 410 | 47 | 28 | 3.2 | 9.3 | 1.1 | 560 | 64 | 1,007 | 116 | 963 | 110 |
| UNIV_09 | 142 | 3,255 | 287 | 222 | 20 | 74 | 6.5 | 1,826 | 161 | 5,377 | 473 | 5,258 | 463 |
| UNIV_10 | 310 | 3,243 | 624 | 221 | 42 | 74 | 14 | 1,845 | 355 | 5,382 | 1,036 | 5,275 | 1,015 |
| UNIV_11 | 115 | 3,243 | 232 | 221 | 16 | 74 | 5.3 | 1,845 | 132 | 5,382 | 384 | 5,275 | 377 |
| UNIV_12 | 63 | 3,243 | 128 | 221 | 8.7 | 74 | 2.9 | 1,845 | 73 | 5,382 | 212 | 5,275 | 208 |
| UNIV_13 | 128 | 3,243 | 258 | 221 | 18 | 74 | 5.8 | 1,845 | 147 | 5,382 | 427 | 5,275 | 419 |
| UNIV_14 | 201 | 3,243 | 405 | 221 | 28 | 74 | 9.2 | 1,845 | 230 | 5,382 | 672 | 5,275 | 659 |
| UNIV_15 | 647 | 3,243 | 1,304 | 221 | 89 | 74 | 30 | 1,845 | 742 | 5,382 | 2,164 | 5,275 | 2,121 |
| WILLOW01 | 97 | 89 | 5.3 | 6.0 | 0.36 | 2.0 | 0.12 | 3,143 | 189 | 3,240 | 194 | 3,073 | 184 |
| WILLOW02 | 174 | 89 | 10 | 6.0 | 0.65 | 2.0 | 0.22 | 3,143 | 339 | 3,240 | 350 | 3,073 | 332 |
| WILLOW03 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW04 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW05 | 201 | 0 | 0 | 0 | 0 | 0 | 0 | 6,780 | 848 | 6,780 | 848 | 6,362 | 796 |
| WILLOW06 | 110 | 0 | 0 | 0 | 0 | 0 | 0 | 6,780 | 465 | 6,780 | 465 | 6,362 | 436 |
| WILLOW07 | 281 | 580 | 101 | 39 | 6.9 | 13 | 2.3 | 7,304 | 1,276 | 7,937 | 1,387 | 7,508 | 1,312 |
| WILLOW08 | 93 | 580 | 33 | 39 | 2.3 | 13 | 0.76 | 7,304 | 422 | 7,937 | 459 | 7,508 | 434 |
| WILLOW09 | 39 | 580 | 14 | 39 | 0.95 | 13 | 0.32 | 7,304 | 176 | 7,937 | 191 | 7,508 | 181 |
| WILLOW10 | 31 | 580 | 11 | 39 | 0.76 | 13 | 0.25 | 7,304 | 141 | 7,937 | 153 | 7,508 | 145 |
| WILLOW11 | 180 | 580 | 65 | 39 | 4.4 | 13 | 1.5 | 7,304 | 818 | 7,937 | 889 | 7,508 | 841 |
| WILLOW12 | 256 | 580 | 92 | 39 | 6.3 | 13 | 2.1 | 7,304 | 1,162 | 7,937 | 1,262 | 7,508 | 1,194 |
| WILLOW13 | 216 | 580 | 78 | 39 | 5.3 | 13 | 1.8 | 7,304 | 980 | 7,937 | 1,065 | 7,508 | 1,007 |

**Onsite Roadways[3]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| ONSITE - Project | 2570 | 10,782 | 17,217 |
| ONSITE - Project + Variant | 2570 | 11,219 | 17,915 |

**Intercampus Shuttles[4]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| SHUTTLES | 7278 | 361 | 1,633 |

**Notes:**

1. Net new offsite traffic volumes for both the Campus District and the Town Square were provided by Hexagon in the data request received in February 2022. Offsite traffic for the Campus District was modeled using a percent breakdown of the fleet (88% cars, 6% on-demand, 2% trucks), provided by Hexagon. Offsite traffic for the Town Square and Residential/Shopping District was modeled as the default San Mateo fleet. A summary of fleet mix categories can be found in AQTR Table 19. Modeled offsite roadway segments can be found in AQTR Figure 8.

2. The increased residential variant increases the traffic for the Town Square and Residential/Shopping District. Total traffic volumes and VMT are calculated by summing the Facebook Campus District fleets with the Town Square and Residential/Shopping District fleet. The total Project volume and VMT without contributions from the variant are shown for comparison purposes.

3. Net new onsite traffic volumes were provided by Hexagon in the data request received in February 2022 which include the increased traffic volumes due to the residential variant. Onsite traffic volumes were taken as the sum of all net new onsite traffic volumes divided by two to account for round trips. Onsite traffic was modeled exclusively as the cars fleet type. A summary of the cars fleet mix can be found in Table 19. Modeled onsite roadway segments can be found in AQTR Figure 7.

4. Shuttle traffic volumes, which account for the remaining 4% of the offsite fleet mix, were conservatively modeled as the sum of all inbound and outbound vehicle trips across all regions and routes, divided by two to account for round trips. Inbound and outbound vehicle trips were provided by the Project Applicant in June 2021. A summary of the shuttles fleet mix can be found in AQTR Table 19. Modeled shuttle roadway segments can be found in AQTR Figure 9.

**Abbreviations:**

VMT - Vehicle Miles Traveled    m - meter    mi - mile

RAMBOLL

**Table 59V**
**Project Variant Cancer Risk at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, CA**

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| Construction | 86 | 57 | 4.1 | 7.6 | -- | -- |
| Operational Generators | 1.5 | 0.99 | 1.4 | 0.99 | 7.3 | 0.17 |
| Operational Traffic | 1.9 | 0.92 | 2.2 | 0.92 | 0.20 | 3.4 |
| **Total Project Contribution** | **90** | **59** | **7.7** | **9.5** | **7.5** | **3.6** |

**Notes:**

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (μg/m3)
   CF = Conversion Factor (mg/μg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1
   ASF = Age Sensitivity Factor (unitless)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project. The maximum total cancer risk was identified across both proposed locations for the pumping station generator. The maximum unmitigated and mitigated on-site MEIR for Construction + Operations occurs when the pumping station generator is located at Location 2. The maximum on-site MEIR for Operations Only occurs when the pumping station generator is located at Location 1.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project. The maximum total cancer risk was identified across both proposed locations for the pumping station generator. The maximum unmitigated and mitigated off-site MEIR for Construction + Operations occurs when the pumping station generator is located at Location 1. The maximum off-site MEIR for Operations Only occurs when the pumping station generator is located at Location 2.

# Table 59V
## Project Variant Cancer Risk at Off-Site and On-Site MEIR
## Willow Village
## Menlo Park, CA

5. On-site and off-site MEIR locations are documented below:

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,225 | 575,500 | 575,255 | 575,500 | 575,275 | 574,720 |
| UTMy (m) | 4,148,095 | 4,147,960 | 4,148,085 | 4,147,960 | 4,148,145 | 4,147,360 |
| Receptor Height (m) | 1.8 | 1.8 | 1.8 | 1.8 | 22.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

**Abbreviations:**

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

RAMBOLL

**Table 60V**
**Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| Source Category | Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| **Project Contribution** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** | **On-Site MEIR[3,5]** | **Off-Site MEIR[4,5]** |
| | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** | **Scenario 3** | **Scenario 1** |
| Construction | 0.23 | 0.11 | 8.9E-03 | 0.011 | -- | -- |
| Operational Generators | 4.2E-04 | 6.9E-04 | 4.0E-04 | 7.0E-04 | 4.6E-03 | 8.1E-04 |
| Operational Traffic | 2.4E-03 | 1.6E-03 | 2.6E-03 | 3.8E-03 | 2.6E-03 | 4.5E-03 |
| **Total Project Contribution** | **0.23** | **0.11** | **0.012** | **0.015** | **7.3E-03** | **5.3E-03** |

**Notes:**

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   $HI_{inh} = C_i \ / \ cREL$

   Where:

   $HI_{inh}$ = Chronic HI for the Inhalation Pathway (unitless)

   $C_i$ = Annual Average Air Concentration for Chemical "i" ($\mu g/m^3$)

   cREL = Chronic Reference Exposure Level ($\mu g/m^3$)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project. The maximum total chronic HI was identified across both proposed locations for the pumping station generator. The maximum unmitigated and mitigated on-site MEIR for Construction + Operations and the maximum on-site MEIR for Operations Only occurs when the pumping station generator is located at Location 2.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project. The maximum total chronic HI was identified across both proposed locations for the pumping station generator. The maximum unmitigated off-site MEIR for Construction + Operations occurs when the pumping station generator is located at Location 2. The maximum mitigated off-site MEIR for Construction + Operations and the maximum off-site MEIR for Operations Only occurs when the pumping station generator is located at Location 1.

## Table 60V
## Project Variant Chronic Hazard Index at Off-Site and On-Site MEIR
## Willow Village
## Menlo Park, California

5. On-site and off-site MEIR locations are documented below:

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,245 | 575,400 | 575,015 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,175 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | Daycare Child (18 months +) |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year I | Year I |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

**Table 61V**
**Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR**
**Willow Village**
**Menlo Park, California**

| Source Category | $PM_{2.5}$ Concentration[1] ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 1.1 | 0.52 | 0.040 | 0.063 | -- | -- |
| Operational Generators | 2.1E-03 | 3.5E-03 | 2.2E-03 | 4.1E-03 | 4.4E-03 | 4.1E-03 |
| Operational Traffic | 0.046 | 0.034 | 0.106 | 0.14 | 0.12 | 0.14 |
| **Total Project Contribution** | **1.1** | **0.56** | **0.15** | **0.20** | **0.13** | **0.14** |

**Notes:**

1. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. $PM_{2.5}$ concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

 The $PM_{2.5}$ concentration at each receptor was estimated using the following equation:

 $C_i = E \times D_i$
 Where:
 C = Concentration of $PM_{2.5}$ at receptor "i" ($\mu g/m^3$)
 $D_i$ = Dispersion factor associated with unit emissions at receptor "i" ($\mu g/m^3$)/(g/s)
 E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total PM2.5 concentration attributed to the emissions associated with the Project. The maximum total $PM_{2.5}$ concentration was identified across both proposed locations for the pumping station generator. The maximum unmitigated on-site MEIR for Construction + Operations occurs when the pumping station generator is located at Location 2. The mitigated maximum on-site MEIR for Construction + Operations and the maximimum on-site MEIR for Operations Only occurs when the pumping station generator is located at Location 1.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total PM2.5 concentration attributed to the emissions associated with the Project. The maximum total $PM_{2.5}$ concentration was identified across both proposed locations for the pumping station generator. The maximum unmitigated off-site MEIR for Construction + Operations occurs when the pumping station generator is located at Location 2. The maximum mitigated off-site MEIR for Construction + Operations and the maximum off-site MEIR for Operations Only occurs when the pumping station generator is located at Location 1.

## Table 61V
## Project Variant $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR
## Willow Village
## Menlo Park, California

5. On-site and off-site MEIR locations are documented below:

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

**Abbreviations:**

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

**References:**

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

Appendix 5.3

# Air Quality, Greenhouse Gas, and Energy Analysis of the Willow Village Project Variants

Prepared for
**Peninsula Innovation Partners, LLC**

Prepared by
**Ramboll US Corporation**
**San Francisco, California**

Project Number
**1690010687**

Date
**July 2022**

# ADDITIONAL INFORMATION REGARDING POTENTIAL HEALTH EFFECTS OF CRITERIA AIR POLLUTANT EMISSION IMPACTS

## WILLOW VILLAGE
## MENLO PARK, CALIFORNIA

RAMBOLL

# CONTENTS



## ATTACHMENTS

# 1. INTRODUCTION

This report presents an estimate of the potential health effects of the emissions of criteria pollutants that may result from the operation of Meta's mixed use development at Willow Village in Menlo Park, California (referred to hereafter as "the Proposed Project" or "Project").

## 1.1 Friant Ranch Decision

As background for this evaluation, Environmental Impact Reports (EIRs) prepared pursuant to the California Environmental Quality Act (CEQA) have long evaluated project-related health effects of toxic air contaminants, such as diesel particulate matter (PM), through quantitative and/or qualitative means relative to air district-issued thresholds of significance. However, EIRs historically have not evaluated the specific health effects of project-related increases in criteria pollutants,[1] other than to note and summarize scientific literature regarding the general effect of those pollutants on health. Instead, in accordance with air district-issued thresholds of significance and industry standard practice at the time, CEQA analysis historically and traditionally focused on estimating project-related mass emissions totals for criteria pollutants and, in certain cases, conducting dispersion modeling to assess impacts on local ambient air quality concentrations.

In this report, Ramboll presents one method that correlates project-related mass emissions totals for criteria pollutants to estimated health-based consequences. More specifically, in order to estimate the health effects of the increases of criteria pollutants for the proposed Project, Ramboll applied a photochemical grid model (PGM) and Comprehensive Air Quality Model with extensions (CAMx) to estimate the increases in concentrations of ozone and $PM_{2.5}$ in the region as a result of the emissions of criteria and precursor pollutants from the Project. We then applied a U.S. Environmental Protection Agency (USEPA)-authored program, the Benefits Mapping and Analysis Program Community Edition (BenMAP-CE, herein referred to as "BenMAP"),[2] to estimate the resulting health effects from the small increases in concentration. Only the health effects of ozone and $PM_{2.5}$ are estimated, as those are the pollutants that USEPA uses in BenMAP to estimate the health effects of emissions of NOx, VOCs, CO, $SO_2$, and $PM_{2.5}$. Ozone and $PM_{2.5}$ have the most critical health effects and thus are the emissions evaluated to determine the Project's health effects.

## 1.2 Additional Evaluation

This analysis estimates the health effects of criteria pollutants and their precursors, specifically those that are evaluated by the USEPA in rulemaking setting the national ambient air quality standards: NOx, VOC [also known as reactive organic gases, or ROG, which are virtually the same as VOC with some slight differences],[3] CO, ozone, $SO_2$, and $PM_{2.5}$. Consistent with USEPA's assessment of health effects of PM, our health effects evaluation

---

[1] Criteria pollutants are those pollutants with an air pollution standard or pollutants which are precursors to those with a standard. Pollutants with an air pollution standard include nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide, particulate matter smaller than 2.5 microns in diameter and 10 microns in diameter ($PM_{2.5}$ and $PM_{10}$), and ozone. Precursor pollutants to criteria pollutants include oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), and volatile organic compounds (VOCs).

[2] https://www.epa.gov/benmap/benmap-ce-manual-and-appendices.

[3] Reactive organic gas (ROG) emissions are quantified and modeled as VOCs in this assessment. ROG means total organic gases minus ARB's "exempt" compounds (e.g., methane, ethane, CFCs, etc.). ROG is similar, but not identical, to USEPA's term "VOC", which is based on USEPA's exempt list, which is slightly different from ARB's list.

focuses on $PM_{2.5}$ and not $PM_{10}$[4] as $PM_{2.5}$ has a much larger body of evidence that this size fraction is associated with health effects due to the sources, composition, chemical properties and lifetime in the atmosphere (USEPA, 2009). $PM_{2.5}$ is capable of penetrating deeper into the lungs because of their size compared to larger particles and this is believed to contribute to greater health effects. Consistent with USEPA health effects evaluations, the health effect functions in BenMAP for PM use fine particulate ($PM_{2.5}$) as the causal PM agent. VOCs are not a criteria air pollutant but, together with NOx and in the presence of sunlight, they form ozone and contribute to the formation of secondary $PM_{2.5}$ and thus are analyzed here. $SO_2$ and CO are not evaluated due to their small contribution to the formation of secondary $PM_{2.5}$ and ozone. The health effects from ozone and $PM_{2.5}$ are examined for this Project because the USEPA has determined that these criteria pollutants would have the greatest effect on human health. The emissions of other criteria pollutants and precursors, including VOC and NOx, are analyzed in their contribution in the formation of ozone and secondary $PM_{2.5}$.

The evaluation presented herein serves to describe the potential health effects of the criteria pollutant emissions associated with the Project. This evaluation does not make a new significance determination.

[4] $PM_{10}$ is defined as particulate matter with a nominal mean aerodynamic diameter less than or equal to 10 µm.

# 2. TECHNICAL APPROACH

The USEPA's air quality modeling guidelines (Appendix W[5]) and ozone and $PM_{2.5}$ modeling guidance[6] recommend using a PGM to estimate ozone and secondary $PM_{2.5}$ concentrations. The USEPA's modeling guidance does not recommend specific PGMs but provides procedures for determining an appropriate PGM on a case-by-case basis. Both the modeling guidelines and guidance note that the CAMx[7] and the Community Multiscale Air Quality (CMAQ[8]) PGMs have been used extensively in the past and would be acceptable PGMs. As such, the USEPA has prepared a memorandum[9] documenting the suitability for using CAMx and CMAQ for ozone and secondary $PM_{2.5}$ modeling of single-sources or group of sources.

The first step in the process is to run the PGM with appropriate information to assess the increases in ambient air concentrations that the Project emissions may cause. PGMs require a database of information, including the spatial allocation of emissions, in the area to be modeled. This includes both base (background/existing) emissions and Project emissions. The latest publicly available PGM database for Northern California was developed by the Bay Area Air Quality Management District (BAAQMD) in support of the 2000 Central California Ozone Study (CCOS),[10] and was adapted for this analysis. The model domain used is discussed further in Attachment B and encompasses an area of 740 kilometers (km) by 740 km centered around the Central Valley of California. The computational domain roughly extends from Shasta and Trinity counties at the north, to the northern portion of Los Angeles County to the south. The domain includes regions of the Pacific Ocean on its western portion and parts of Nevada on its eastern portion. This PGM database is tailored for Northern California using California-specific input tools (e.g., the EMission FACtors (EMFAC)[11] mobile source emissions model) and uses a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California. Project emissions included $NO_X$, respirable ($PM_{10}$) and fine ($PM_{2.5}$) primary PM, and VOCs. As discussed above, $NO_X$ and VOC are precursors to ozone and are also precursors to secondarily formed $PM_{2.5}$.

To estimate the potential outcome of the proposed Project's emissions on ambient air concentrations, the Project's annual emissions were added to the CAMx 4-km annual PGM modeling database.[12] Operational emissions from the Project were estimated as described in the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report.[13] Incremental operational emissions for full buildout were modeled.

---

5 https://www3.epa.gov/ttn/scram/appendix_w/2016/AppendixW_2017.pdf.

6 https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

7 http://www.camx.com/.

8 https://www.epa.gov/cmaq.

9 https://www3.epa.gov/ttn/scram/guidance/clarification/20170804-Photochemical_Grid_Model_Clarification_Memo.pdf.

10 http://www.baaqmd.gov/about-air-quality/research-and-data/research-and-modeling.

11 https://www.arb.ca.gov/emfac/.

12 BAAQMD performed WRF meteorological modeling for the CCOS 4-km domain and 2012 calendar year that has been processed by WRFCAMx to generate CAMx 2012 4-km meteorological inputs for the CCOS domain. The CMAQ 2012 emissions have been converted to the format used by CAMx using the CMAQ2CAMx processor.

13 To the extent that conservative inputs were used to estimate Project-related criteria pollutants and precursors, the analysis provided herein also is conservatively influenced by those inputs.

For use in PGMs, each Project emissions source must be spatially distributed across the modeling grid cells so that they can be incorporated into the gridded emission inventory. The mitigated incremental emission inventory for the Project at full buildout was used in the analysis. This includes architectural coatings, VOCs in consumer products, limited natural gas combustion for commercial culinary, landscaping equipment, emergency generators, and emissions associated with motor vehicle use. The emissions from architectural coatings, consumer products, limited natural gas combustion, landscaping equipment, and emergency generators are located onsite, and were therefore allocated to the grid cell representing the Project site. The mobile source category includes various fleets which are spatially distributed in both the Project site's grid cells, as well as offsite grid cells along nearby travel routes. Annual emission estimates from the Project were spatially gridded, temporally allocated, and chemically speciated to be used for photochemical grid modelling using the Sparse Matrix Operator Kerner Emissions (SMOKE) emissions modelling system supported by the USEPA. The emissions inventory, spatial allocation, and SMOKE inputs and outputs are shown in **Attachment A.**

As discussed above, the Northern California 2000 CCOS modeling database was used for this Project. The Northern California 4-km PGM modeling database is based on a 2012 base meteorological year. The 2035 future year projections were used for this analysis, as described in Attachment B. The Project's emissions were isolated by the source apportionment tools in CAMx to obtain the incremental ozone and $PM_{2.5}$ concentration changes due to the Project's emissions. More details and inputs for the PGM modeling are included in **Attachment B.**

Following completion of the CAMx source apportionment modeling, Ramboll used the USEPA's BenMAP program (USEPA 2022a, USEPA 2022b) to estimate the potential health effects of the Project's contribution to ozone and $PM_{2.5}$ concentrations. BenMAP uses the concentration estimates produced by CAMx, along with population and health effect concentration-response (C-R) functions, to estimate various health effects of the concentration increases. BenMAP has a wide history of applications by the USEPA and others, including for local-scale analysis[14] as needed for assessing the health effects of a project's emissions. We used the BenMAP health effects C-R functions that have been used in national rulemaking, such as the health effects assessments for $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) (USEPA 2010, USEPA 2022b). The health endpoints used for $PM_{2.5}$ include mortality (all causes), hospital admissions (respiratory, asthma, cardiovascular), emergency room visits (asthma, cardiovascular), and acute myocardial infarction (non-fatal). For ozone, the endpoints are mortality (respiratory), emergency room visits (respiratory), and hospital admissions (respiratory). Details on the BenMAP inputs and outputs and definitions for the health effects are shown in **Attachment C.**

[14] https://www.epa.gov/benmap/benmap-ce-applications-articles-and-presentations#local.

# 3. RESULTS

This section presents the results of the health effects analysis for the incremental increases in $PM_{2.5}$ and ozone resulting from primary and precursor emissions for these constituents. The results presented here describe the potential health effects of the criteria pollutant emissions associated with the Project, and the results themselves do not constitute a new significance determination.

There are a number of conservative assumptions built into this evaluation, beginning with the quantification of emissions themselves. These conservative assumptions include, but are not limited to, the following:

- Mitigated incremental emissions without inclusion of reductions from EV charging were conservatively modeled. Incorporation of reductions due to EV charging would result in lower health effect estimates;
- Emissions reductions associated with reduced natural gas usage with the Project compared to existing conditions have conservatively not been included in this analysis (discussed further in Appendix A);
- Emissions reductions associated with various subcategories of mobile emissions (e.g., reductions in NOx emissions from trucks during running mode) have conservatively not been included in this analysis (discussed further in Appendix A);
- Assumption that health effects occur at any concentration, including small incremental concentrations (discussed further in Attachment C); and
- Assumption that all $PM_{2.5}$ is of equal toxicity (discussed further in Attachment C).

As such, results presented below are meant to represent an upper bound of potential health effects, and actual effects may be zero. For example, should health effects in fact only occur above a certain threshold, and the increment from the Project not cause an exceedance of that threshold, actual health effects could be zero.

## 3.1 Potential Health Effects Associated with the Project

Overall, the estimated change in health effects from ozone and $PM_{2.5}$ associated with the Project's additional emissions are minimal relative to background incidences. **Tables 3-1 and 3-2** below show the annual percent of background health incidence for $PM_{2.5}$ and ozone health effects associated with the Project. The "background health incidence" is an estimate of the average number of people that suffer from some adverse health effect in a given population over a given period of time, in the absence of additional emissions from the Project. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. Background health incident rates presented in this report are over the full model domain, as defined in Attachment B, which has a projected population of 22,502,033 in 2035. Project-related health incidences occur both in closer proximity to Project emissions, particularly for $PM_{2.5}$ health effects (see Attachment B for maps of modeled concentration changes), or over a large area due to the regional nature of emission dispersion and photochemical reactions that occur, particularly for ozone health effects (concentration changes also shown in Attachment B). When taken into context, the small increase in incidences and the small percent of the number of background incidences indicate that these health effects are minimal in a developed environment.

**Table 3-1. BenMAP-Estimated Annual Mean $PM_{2.5}$ Health Effects of the Project Emissions Across the Northern California Model Domain [1]**

| Health Endpoint[2] | Project Mean as Percent of Background Health Incidence (%) (Annual) | Background Health Incidence (Annual) |
|---|---|---|
| Emergency Room Visits, Asthma [0-99] | 0.000080% | 115,302 |
| Emergency Room Visits, Cardiovascular [0-99] | 0.0000093% | 441,046 |
| Mortality, All Cause [30-99] | 0.000086% | 256,043 |
| Hospital Admissions, Asthma [0-64] | 0.000049% | 13,394 |
| Hospital Admissions, All Cardiovascular [65-99] (Bell et al., 2015) | 0.000011% | 220,836 |
| Hospital Admissions, Respiratory [65-99] (Bell et al., 2015) | 0.0000034% | 82,964 |
| Acute Myocardial Infarction, Nonfatal [18-24] | 0.000040% | 27 |
| Acute Myocardial Infarction, Nonfatal [25-44] | 0.000036% | 1,583 |
| Acute Myocardial Infarction, Nonfatal [45-54] | 0.000033% | 4,025 |
| Acute Myocardial Infarction, Nonfatal [55-64] | 0.000037% | 6,762 |
| Acute Myocardial Infarction, Nonfatal [65-99] | 0.000035% | 28,174 |

[1] Health effects are shown terms of incidences of each health endpoint and how it compares to the base values (2035 base year health effect incidences or "background health incidence"). Health effects and background health incidences are across the Northern California model domain.
[2] Affected age ranges are shown in square brackets.

Annual mean $PM_{2.5}$-related health effects attributed to Project-related increases in ambient air concentrations include asthma-related emergency room visits (0.092 incidences per year), cardiovascular-related emergency room visits (0.041 incidences per year), asthma-related hospital admissions (0.0066 incidences per year), all cardiovascular-related hospital admissions (0.023 incidences per year), all respiratory-related hospital admissions (0.0028 incidences per year), mortality (0.22 incidences per year), and nonfatal acute myocardial infarction (0.014 incidences per year across all age groups).

**Table 3-2. BenMAP-Estimated Annual Mean Ozone Health Effects of the Project Emissions Across the Northern California Model Domain[1]**

| Health Endpoint[2] | Project Mean as Percent of Background Health Incidence (%) (Annual) | Background Health Incidence (Annual) |
|---|---|---|
| Hospital Admissions, All Respiratory [65-99] | 0.000025% | 63,783 |
| Mortality, Respiratory [30-99] | 0.00035% | 19,099 |
| Emergency Room Visits, Asthma [0-17] | 0.00048% | 39,464 |
| Emergency Room Visits, Asthma [18-99] | 0.00029% | 38,023 |

1 Health effects are shown terms of incidences of each health endpoint and how it compares to the base values (2035 base year health effect incidences, or "background health incidence"). Health effects and background health incidences are across the Northern California model domain.
2 Affected age ranges are shown in square brackets.

Annual mean ozone-related health effects attributed to Project-related increases in ambient air concentrations include respiratory-related hospital admissions (0.016 incidences per year), respiratory-related mortality (0.067 incidences per year), and asthma-related emergency room visits (0.19 incidences for ages 0-17 and 0.11 incidences for ages 18-99).

The health effects from ozone and $PM_{2.5}$ are minimal in light of background incidences. We did not quantify the potential health effects from other criteria air pollutants, consistent with how USEPA quantifies the health impacts and economic costs for criteria air pollutants (other than ozone and $PM_{2.5}$). Specifically, USEPA relies on studies that evaluate the health effects of $PM_{2.5}$ as a surrogate for general PM effects (including $PM_{10}$) in health effect assessments (e.g., USEPA 2022c). In addition, for $NO_2$, USEPA has noted that uncertainty remains regarding the independent effects of $NO_2$ from other air pollutants, including ozone and $PM_{2.5}$ (USEPA, 2016). Additionally, in 2017, USEPA concluded that a quantitative risk assessment was not supported for $NO_2$, stating that there were significant limitations in the available epidemiological studies including "the potential for co-pollutant confounding of the $NO_2$ association, potential bias due to exposure measurement error, and the shape of the concentration-response function." (USEPA, 2017)

<ins>Project Variants and Alternatives</ins>

Ramboll's analysis of potential health effects due to Project emissions evaluated the proposed Project mitigated incremental emissions upon full Project build-out. Potential health effects due to Project variants or alternatives would be similar to or less than those modeled in Ramboll's analysis as incremental operational criteria pollutant emissions, specifically ROG, NOx, and $PM_{2.5}$ would be similar to or less than those emissions modeled in the above referenced analysis.

Further, any differences in source types and spatial allocation of emissions in the Project Variants and Alternatives is expected to be minimal. In cases such as this, where overall emissions changes are small, and where there are minimal changes to the sources of emissions and spatial allocations, it is appropriate to use a linear model, based on the refined modeling already completed, to estimate the corresponding changes in health effects due to different Project scenarios. As such, it can be concluded that potential health effects due to the operational emissions generated from a Project Variant or Alternative would be similar to or less than those presented above.

## 3.2 Uncertainty

Analyses that evaluate the changes in concentrations resulting from individual sources and the health impacts of increases or decreases in pollutants as a result of regulation on a localized basis are routinely done. This analysis does not tie the changes in concentration to a specific health effect in an individual; however, it does use scientific correlations of certain types of health effects from pollution to estimate effects on the population at large.

There is a degree of uncertainty in these results from a combination of the uncertainty in the emissions themselves, the change in concentration resulting from the PGM, and the uncertainty of the application of the C-R functions. All simulations of physical processes, whether ambient air concentrations or health effects from air pollution, have a level of uncertainty associated with them due to simplifying assumptions. The overall uncertainty is a combination of the uncertainty associated with each piece of the modeling study, in this case, the emissions quantification, the emissions model, the PGM, and BenMAP. While these results reflect a level of uncertainty, regulatory agencies, including the USEPA have judged that, even with the uncertainty, they provide sufficient information to the public to allow them to understand the potential health effects of increases or decreases in air pollution.

### 3.2.1 PGM Uncertainty

PGMs generally represent the state-of-the-science when the treatment of photochemically formed air pollution is required over multiple spatial scales (e.g., from single-source to continental). PGMs are part of a modeling system in which there are several other major components that determine model performance, including meteorology, emissions inventories (including background), and chemical mechanisms, all of which have associated uncertainties, as discussed further in Attachment B.

Despite these complexities and associated uncertainties, the USEPA recommends using PGMs for a variety of applications including State Implementation Plans and Regional Haze Planning, and CAMx or CMAQ specifically for single-source modeling of ozone and secondary $PM_{2.5}$. The USEPA believes that the relative change in the PGM-predicted concentrations (e.g., the incremental changes due to the emissions from a single-source) is more accurate and reliable than the total predicted concentrations (USEPA, 2020a).

### 3.2.2 C-R Function Uncertainty

The approach and methodology of this analysis ensures that the uncertainty is of a conservative nature. In addition to the conservative assumptions built into the emissions noted above, there are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. In the Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter prepared by the EPA (USEPA, 2022c), the EPA acknowledges the many factors of uncertainty in selected C-R functions and resulting risk estimates, including the shape of the exposure-response function and statistical uncertainty (especially at low concentrations), temporal mismatch between ambient air data and the health effect, exposure measurement error in the epidemiological studies that produced the C-R function, potential confounding of the effect of PM2.5 or ozone on mortality, and compositional and source differences of PM, all of which similarly apply to the results presented above.

Another uncertainty highlighted by the USEPA (2012, 2022c) which applies to potential health effects from both $PM_{2.5}$ and ozone, is the assumption of a log-linear response between exposure and health effects, without consideration for a threshold concentration below which effects may not be measurable. In the latest USEPA Policy Assessment for PM (USEPA, 2022c), while it is noted that some studies show evidence supporting a linear, no-threshold relationship, the USEPA continues to acknowledge that interpreting the shapes of concentration-response relationships is a recognized uncertainty, particularly at lower $PM_{2.5}$ concentrations, where lower data density, possible influence of measurement error, and variability among individuals with response to air pollution health effects can obscure the existence of a threshold or nonlinear relationship. Without consideration of a threshold concentration, any changes in air pollution are assumed to adversely affect health, which is a conservative assumption.

For $PM_{2.5}$ health effects, the USEPA has also stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health effects of PM (USEPA, 2009). Further, the USEPA (2009) found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality, consistent with the findings by Rohr and Wyzga (2012) and others. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brakewear, tirewear, and entrained roadway dust (see Attachment A), and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative.

For both the $PM_{2.5}$ and ozone health effects calculated, each of the pollutants may be a confounder of the other. That is, in studies that only evaluate health effects from $PM_{2.5}$ exposures, the observed health effects could actually be partly due to ozone, but are attributed fully to $PM_{2.5}$, yielding a higher effect estimate for $PM_{2.5}$. Thus, while C-R functions are from studies that evaluated the effects for each pollutant individually, while sometimes adjusting for the other as a co-pollutant, both air pollutants could contribute to the health effect outcomes evaluated, and thus the overall health effects from a single pollutant may be overstated.

In summary, and with consideration of the uncertainty discussed above, health effects presented in this report are conservatively estimated, and the actual effects may be zero.

Additional discussion of the uncertainty associated with C-R functions and health effect estimates is included in Attachment C.

# REFERENCES

Kelly, F.J., J.C. Fussell, 2007. Particulate Toxicity Ranking Report. Report Number 2/07. Environmental Research Group, Kings College, London.

Lippmann, M., L.C. Chen, 2009. Health effects of concentrated ambient air particulate matter (CAPs) and its components. *Crit. Rev. Toxicol*., 39, 865e913.

Rohr A.C., R.E. Wyzga, 2012. Attributing Health Effects to Individual Particulate Matter Constituents. *Atmos Environ*., 62, 130-152. doi:10.1016/j.atmosenv.07.036.

USEPA, 2009. Integrated Science Assessment (ISA) For Particulate Matter (Final Report, Dec 2009). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=216546

USEPA, 2010. Quantitative Health Risk Assessment for Particulate Matter. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. EPA-452/R-10-005. June 2010. Available: https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf.

USEPA, 2012. Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-12-005. https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-pm_ria_final_2012-12.pdf.

USEPA, 2016. Integrated Science Assessment (ISA) For Oxides of Nitrogen – Health Criteria U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879

USEPA, 2017. Policy Assessment for the Review of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-17-003. https://www.epa.gov/sites/production/files/2017-04/documents/policy_assessment_for_the_review_of_the_no2_naaqs_-_final_report.pdf

USEPA. 2018. Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Assessment Division. Research Triangle Park, NC. EPA 454/R-18-009. November 29. https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

USEPA, 2022a. BenMAP Community Edition, v1.5.8.17. Available at: https://www.epa.gov/benmap/benmap-community-edition.

USEPA. 2022b. Environmental Benefits Mapping and Analysis Program – Community Edition, User's Manual. January. https://www.epa.gov/sites/default/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf

USEPA. 2022c. Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impacts Division. Research Triangle Park, NC. EPA 452/R-22-004. May. https://www.epa.gov/system/files/documents/2022-05/Final%20Policy%20Assessment%20for%20the%20Reconsideration%20of%20the%20PM%20NAAQS_May2022_0.pdf.

# ATTACHMENT A
# EMISSIONS INVENTORY, SPATIAL ALLOCATION, AND SMOKE SETUP

# 1. INTRODUCTION

Operational emissions from the Project were estimated using methodologies consistent with the California Emissions Estimator Model (CalEEMod®) and Project-specific data, where available, and CalEEMod defaults. The model employs widely accepted calculation methodologies for emission estimates combined with appropriate default data if site-specific information is not available.

Annual emission estimates from the Project need to be spatially gridded, temporally allocated, and chemically speciated to be used for photochemical grid modeling. The Sparse Matrix Operator Kerner Emissions (SMOKE) emissions modeling system (Coats, 1996; Coats and Houyoux, 1996)[15] is used for this process.

# 2. PROJECT EMISSIONS AND SPATIAL ALLOCATION

Emissions were estimated for the Project to support the photochemical grid model (PGM) and were allocated into 4 km x 4 km grid cells. This section describes those emissions and how they were spatially allocated.

## 2.1 Project Emissions and Spatial Allocation

For use in PGMs, emissions must be spatially allocated over the area so that they can be incorporated into the baseline gridded emission inventory, as developed by the Bay Area Air Quality Management District (BAAQMD), and adapted for this analysis as discussed in Attachment B. The average daily incremental emission inventory modeled for the Project is shown below in **Table 2-1**.[16] Incremental emissions were calculated as the difference between the full Project buildout mitigated emissions and the 2019 baseline emissions. For any emission categories which showed a reduction from 2019 to full buildout, the reduction in emissions were conservatively zeroed out and the reduction was not included in the analysis.[17] For example, emission reductions due to a decrease in natural gas usage were conservatively not modeled here. Similarly, this approach was applied to increments calculated for mobile subcategories, and resulted in some mobile emission reductions being conservatively removed from the analysis, e.g., running NOx emissions from truck activity. As such, this analysis is conservative and the emissions presented in **Table 2-1** below are higher than those presented in the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report. Project emissions modeled in the PGM include oxides of nitrogen (NOx), reactive organic gases (ROG), and fine primary particulate matter ($PM_{2.5}$). Since some of these pollutants incorporate a wide range of chemical species (e.g., ROG and PM), the Project emissions were further speciated into detailed chemical species or groups of species to be used as inputs for the PGM's robust chemistry solver. $NO_X$ and ROG are precursors to ozone and are also precursors to secondarily formed $PM_{2.5}$. Mobile source emissions were split into categories based on the EMFAC2021 emission rates. The following fleets were evaluated: Cars, Trucks, Shuttles, On-Demand Vehicles, and San Mateo County Mix (representing vehicle activity in the Town Square District and Residential/Shopping

[15] https://www.cmascenter.org/smoke/

[16] Average daily emissions are modeled here as the Project's operations are generally consistent throughout the year.

[17] To be conservative and to limit model complexities, we do not model negative emissions and instead set to zero. Overall, this causes the total emissions modeled to be higher than what is presented in the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report.

District). Fleets at full buildout conservatively use 2026 emission factors; refer to the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report for additional detail. For PM, less than 2.5 microns in diameter ($PM_{2.5}$) emissions are used in the modeling; less than 10 microns in diameter ($PM_{10}$) emissions are presented for information below.

**Table 2-1. Average Daily Incremental Emissions**

| Emission Category | ROG/VOC lbs/day | NOx lbs/day | $PM_{10}$ lbs/day | $PM_{2.5}$ lbs/day |
|---|---|---|---|---|
| Mobile | 38 | 38 | 37 | 7.3 |
| Diurnal | 11 | -- | -- | -- |
| Hotsoak | 3.0 | -- | -- | -- |
| Idling Exhaust | 0.15 | 0.30 | 7.4E-04 | 5.4E-04 |
| Brakewear | -- | -- | 3.9 | 1.4 |
| Tirewear | -- | -- | 3.7 | 1.0 |
| Road Dust | -- | -- | 29 | 4.3 |
| Running Exhaust | 3.3 | 18 | 0.50 | 0.45 |
| Running Loss | 8.4 | -- | -- | -- |
| Starting Exhaust | 12 | 19 | 0.12 | 0.12 |
| Architectural Coatings | 2.0 | -- | -- | -- |
| Consumer Products | 48.9 | -- | -- | -- |
| Landscaping | 2.1 | 0.8 | 0.4 | 0.4 |
| Energy | -- | -- | -- | -- |
| Emergency Generators | 0.8 | 6.7 | 0.2 | 0.2 |
| **Total** | **92** | **45** | **38** | **7.9** |

**Table 2-2** below shows the breakdown of incremental mobile emissions by fleet, after removing any subcategories that resulted in a negative increment.

**Table 2-2. Daily Incremental Emissions by Fleet**

| Emission Process | CAP Emissions (lb/day) | | | |
|---|---|---|---|---|
| | ROG/VOC | NOx | PM10 | PM2.5 |
| **On-Road Mobile - San Mateo County Mix** | | | | |
| Diurnal | 7.9 | 0 | 0 | 0 |
| Hotsoak | 2.3 | 0 | 0 | 0 |
| Idling Exhaust | 0.11 | 0.015 | 1.1E-04 | 8.3E-05 |
| Brakewear | 0 | 0 | 2.7 | 1.0 |
| Tirewear | 0 | 0 | 2.7 | 0.71 |
| Resting Loss | 0 | 0 | 0 | 0 |
| Road Dust | 0 | 0 | 20 | 3.0 |
| Running Exhaust | 3.2 | 17 | 0.44 | 0.40 |
| Running Loss | 6.4 | 0 | 0 | 0 |
| Starting Exhaust | 10 | 16 | 0.10 | 0.091 |
| **Subtotal** | **30** | **33** | **26** | **5.2** |
| **On-Road Mobile - Cars** | | | | |
| Diurnal | 2.8 | 0 | 0 | 0 |
| Hotsoak | 0.63 | 0 | 0 | 0 |
| Idling Exhaust | 0 | 0 | 0 | 0 |
| Brakewear | 0 | 0 | 0.79 | 0.27 |
| Tirewear | 0 | 0 | 0.85 | 0.21 |
| Resting Loss | 0 | 0 | 0 | 0 |
| Road Dust | 0 | 0 | 8.0 | 1.2 |
| Running Exhaust | 0.013 | 0.0077 | 0.057 | 0.051 |
| Running Loss | 1.9 | 0 | 0 | 0 |
| Starting Exhaust | 2.3 | 1.6 | 0.026 | 0.023 |
| **Subtotal** | **7.7** | **1.6** | **10** | **1.8** |
| **On-Road Mobile - On-Demand Vehicles** | | | | |
| Diurnal | 0.12 | 0 | 0 | 0 |
| Hotsoak | 0.028 | 0 | 0 | 0 |
| Idling Exhaust | 0 | 0 | 0 | 0 |
| Brakewear | 0 | 0 | 0.031 | 0.011 |
| Tirewear | 0 | 0 | 0.038 | 0.0093 |
| Resting Loss | 0 | 0 | 0 | 0 |
| Road Dust | 0 | 0 | 0.36 | 0.053 |
| Running Exhaust | 0 | 0 | 0.0018 | 0.0016 |
| Running Loss | 0.086 | 0 | 0 | 0 |
| Starting Exhaust | 0.022 | 0.055 | 0.0013 | 0.0012 |
| **Subtotal** | **0.26** | **0.055** | **0.43** | **0.076** |

**Table 2-2. Daily Incremental Emissions by Fleet**

| Emission Process | CAP Emissions (lb/day) | | | |
|---|---|---|---|---|
| | ROG/VOC | NOx | PM10 | PM2.5 |
| **On-Road Mobile - Trucks** | | | | |
| Diurnal | 0 | 0 | 0 | 0 |
| Hotsoak | 0 | 0 | 0 | 0 |
| Idling Exhaust | 0.018 | 0.019 | 6.3E-04 | 4.6E-04 |
| Brakewear | 0 | 0 | 0.13 | 0.031 |
| Tirewear | 0 | 0 | 0.023 | 0.0045 |
| Resting Loss | 0 | 0 | 0 | 0 |
| Road Dust | 0 | 0 | 0.17 | 0.025 |
| Running Exhaust | 0 | 0 | 1.4E-05 | 3.4E-06 |
| Running Loss | 0 | 0 | 0 | 0 |
| Starting Exhaust | 5.3E-06 | 0.10 | 0 | 0 |
| **Subtotal** | **0.018** | **0.12** | **0.32** | **0.061** |
| **On-Road Mobile - Shuttles** | | | | |
| Diurnal | 0 | 0 | 0 | 0 |
| Hotsoak | 0 | 0 | 0 | 0 |
| Idling Exhaust | 0.020 | 0.27 | 0 | 0 |
| Brakewear | 0 | 0 | 0.28 | 0.14 |
| Tirewear | 0 | 0 | 0.071 | 0.026 |
| Resting Loss | 0 | 0 | 0 | 0 |
| Road Dust | 0 | 0 | 0.022 | 0.0033 |
| Running Exhaust | 0.030 | 1.3 | 0 | 0 |
| Running Loss | 0 | 0 | 0 | 0 |
| Starting Exhaust | 0 | 1.2 | 0 | 0 |
| **Subtotal** | **0.050** | **2.7** | **0.37** | **0.17** |
| **Total Mobile Emissions** | **38** | **38** | **37** | **7.3** |

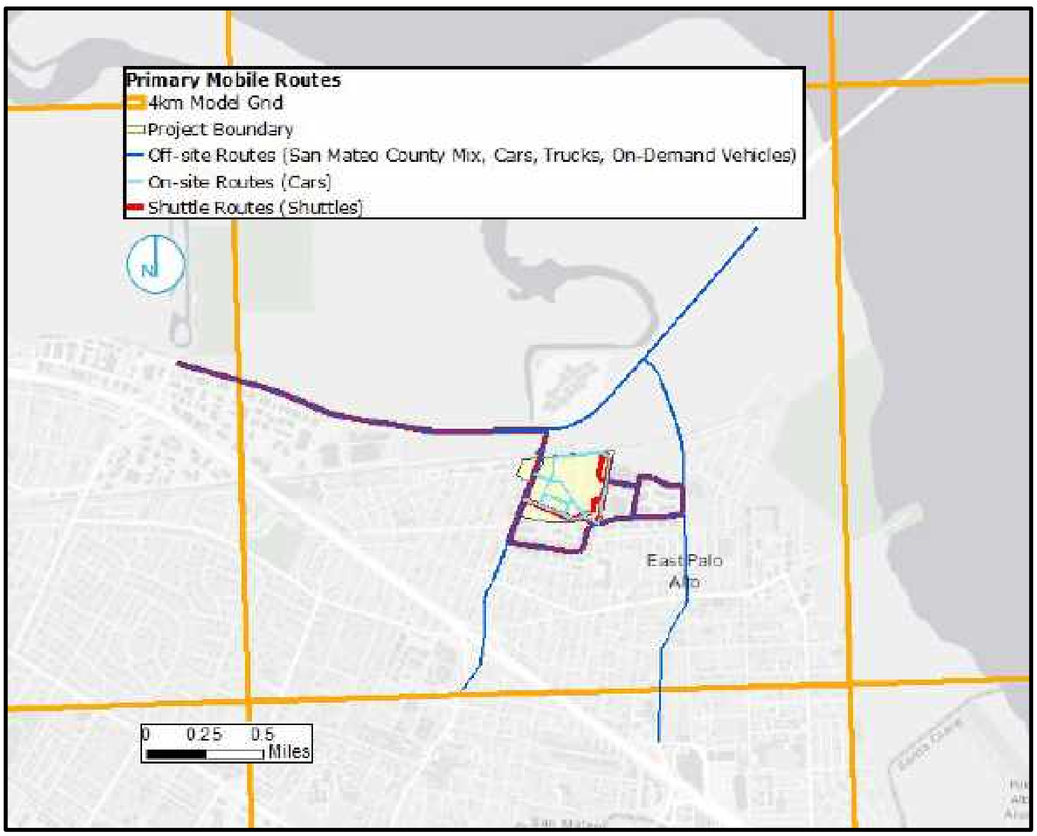
**Table 2-3** provides a summary of the spatial distribution of mobile emissions across each of the mobile fleets evaluated. San Mateo County Mix, On-Demand, and Truck fleets are spatially allocated to off-sites routes; the Cars fleet is spatially allocated to both on-site and off-site routes; and the Shuttle fleet is allocated to designated shuttle routes. Off-site, on-site, and shuttle routes are shown in **Figure 2-1**. Spatial allocation of off-site fleets (Cars, Trucks, On-Demand Vehicles, and San Mateo County Mix) were calculated consistent with the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report, based on the traffic volumes by roadway and expected fleet mix provided by the Transportation Engineer. The Cars fleet travels on both on-site and off-site routes. Emissions from shuttles and on-site routes were assumed to be distributed evenly along their respective routes, calculated by dividing individual segment lengths by the total route length.

**Table 2-3. Roadway Spatial Allocation by Fleet**

| Fleet | Emissions Allocation by Roadway (%) | | |
|---|---|---|---|
| | On-Site | Off-Site | Shuttles |
| Cars | 73.7% | 26.3% | -- |
| Trucks | -- | 100% | -- |
| On-Demand Vehicles | -- | 100% | -- |
| Shuttles | -- | -- | 100% |
| San Mateo County Mix | -- | 100% | |

Project emissions are allocated across the Project site into 4 km x 4 km grid cells for the PGM. **Figure 2-1** below shows the Project boundary overlaid with the 4-km grid. Off-site, on-site, and shuttle routes are shown as well, with allocations as outlined in Table 2-3 above.

**Figure 2-1. Project Site and Modeled Roadways**




## 2.2 Converting Project Inventories to SMOKE Input Format

The first step in the emissions processing was to convert the Project emission inventory into the Flat File 2010 (FF10) format for input to SMOKE. We assigned appropriate Source

Classification Codes (SCCs) to the Project emissions sources. **Table 2-4** provides SCC assigned to each project source.

**Table 2-4. Assigned SCC to Project Emission Sources**

| Emission Source | SCC | SCC Description |
|---|---|---|
| Mobile -LDA | 220100111B | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Brake Wear |
| Mobile -LDA | 220100111S | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Start |
| Mobile -LDA | 220100111T | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Tire Wear |
| Mobile -LDA | 220100111V | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Evap (except Refueling) |
| Mobile -LDA | 220100111X | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Exhaust |
| Mobile -LDT1 | 220102011B | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Brake Wear |
| Mobile -LDT1 | 220102011S | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Start |
| Mobile -LDT1 | 220102011T | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Tire Wear |
| Mobile -LDT1 | 220102011V | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Evap (except Refueling) |
| Mobile -LDT1 | 220102011X | Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Exhaust |
| Mobile -HHDT | 220107011B | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Brake Wear |
| Mobile -HHDT | 220107011I | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Idling |
| Mobile -HHDT | 220107011S | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Start |
| Mobile -HHDT | 220107011T | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Tire Wear |
| Mobile -HHDT | 220107011V | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Evap (except Refueling) |
| Mobile -HHDT | 220107011X | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Exhaust |
| Mobile -HHDT | 220107013B | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Brake Wear |

**Table 2-4. Assigned SCC to Project Emission Sources**

| Emission Source | SCC | SCC Description |
|---|---|---|
| Mobile -HHDT | 220107013I | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Idling |
| Mobile -HHDT | 220107013S | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Start |
| Mobile -HHDT | 220107013T | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Tire Wear |
| Mobile -HHDT | 220107013V | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Evap (except Refueling) |
| Mobile -HHDT | 220107013X | Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Exhaust |
| Mobile -MC | 220108011B | Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Brake Wear |
| Mobile -MC | 220108011S | Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Start |
| Mobile -MC | 220108011T | Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Tire Wear |
| Mobile -MC | 220108011V | Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Evap (except Refueling) |
| Mobile -MC | 220108011X | Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Exhaust |
| Mobile -LDA | 223000111B | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Brake Wear |
| Mobile -LDA | 223000111T | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Tire Wear |
| Mobile -LDA | 223000111X | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Exhaust |
| Mobile -LDDT | 223006011B | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Brake Wear |
| Mobile -LDDT | 223006011T | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Tire Wear |
| Mobile -LDDT | 223006011X | Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Exhaust |
| Mobile - LHDT1 | 223007111B | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Brake Wear |
| Mobile - LHDT1 | 223007111I | Mobile Sources; Highway Vehicles – Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Idling |

**Table 2-4. Assigned SCC to Project Emission Sources**

| Emission Source | SCC | SCC Description |
|---|---|---|
| Mobile - LHDT1 | 223007111T | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Tire Wear |
| Mobile - LHDT1 | 223007111X | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Exhaust |
| Mobile -MHDT | 2230072110 | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Total |
| Mobile -MHDT | 223007211B | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Brake Wear |
| Mobile -MHDT | 223007211I | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Idling |
| Mobile -MHDT | 223007211T | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Tire Wear |
| Mobile -MHDT | 223007211X | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Exhaust |
| Mobile -HHDT | 223007311B | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Brake Wear |
| Mobile -HHDT | 223007311I | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Idling |
| Mobile -HHDT | 223007311S | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Start |
| Mobile -HHDT | 223007311T | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Tire Wear |
| Mobile -HHDT | 223007311X | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Exhaust |
| Mobile -LDT1 | 220932008T | Mobile Sources; Highway Vehicles - Electricity; Light Commercial Truck: All on and off-network processes except refueling: Tire Wear |
| Mobile -OBUS | 220941008B | Mobile Sources; Highway Vehicles - Electricity; Intercity Bus: All on and off-network processes except refueling: Brake Wear |
| Mobile -OBUS | 220941008T | Mobile Sources; Highway Vehicles - Electricity; Intercity Bus: All on and off-network processes except refueling: Tire Wear |
| Mobile -OBUS | 220942008B | Mobile Sources; Highway Vehicles - Electricity; Transit Bus: All on and off-network processes except refueling: Brake Wear |
| Mobile -OBUS | 220942008T | Mobile Sources; Highway Vehicles - Electricity; Transit Bus: All on and off-network processes except refueling: Tire Wear |
| Mobile -SBUS | 220943008B | Mobile Sources; Highway Vehicles - Electricity; School Bus: All on and off-network processes except refueling: Brake Wear |

**Table 2-4. Assigned SCC to Project Emission Sources**

| Emission Source | SCC | SCC Description |
|---|---|---|
| Mobile -SBUS | 220943008T | Mobile Sources; Highway Vehicles - Electricity; School Bus: All on and off-network processes except refueling: Tire Wear |
| Mobile -MDV | 220952008T | Mobile Sources; Highway Vehicles - Electricity; Single Unit Short-haul Truck: All on and off-network processes except refueling: Tire Wear |
| Mobile -MDV | 220953008B | Mobile Sources; Highway Vehicles - Electricity; Single Unit Long-haul Truck: All on and off-network processes except refueling: Brake Wear |
| Mobile -MDV | 220953008T | Mobile Sources; Highway Vehicles - Electricity; Single Unit Long-haul Truck: All on and off-network processes except refueling: Tire Wear |
| Mobile -OBUS | 223007513B | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Brake Wear |
| Mobile -OBUS | 223007513I | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Idling |
| Mobile -OBUS | 223007513S | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Start |
| Mobile -OBUS | 223007513T | Mobile Sources; Highway Vehicles – Diesel ; Heavy Duty Diesel Buses (School & Transit);Rural Other Principal Arterial: Tire Wear |
| Mobile -OBUS | 223007513X | Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Exhaust |
| Fugitive Dust | 2294000000 | Mobile Sources; Paved Roads; All Paved Roads; Total: Fugitives |
| Landscaping Equipment | 2265004010 | Mobile Sources; Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn Mowers (Residential) |
| Emergency Generators | 20300101 | Internal Combustion Engines; Commercial/Institutional; Distillate Oil (Diesel); Reciprocating |
| Architectural Coating | 2401001000 | Solvent Utilization; Surface Coating; Architectural Coatings; Total: All Solvent Types |
| Consumer Products | 2460000000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Processes; Total: All Solvent Types |
| Consumer Products | 2460100000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Personal Care Products; Total: All Solvent Types |
| Consumer Products | 2460200000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Household Products; Total: All Solvent Types |
| Consumer Products | 2460400000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Automotive Aftermarket Products; Total: All Solvent Types |

**Table 2-4. Assigned SCC to Project Emission Sources**

| Emission Source | SCC | SCC Description |
|---|---|---|
| Consumer Products | 2460500000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Coatings and Related Products; Total: All Solvent Types |
| Consumer Products | 2460600000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Adhesives and Sealants; Total: All Solvent Types |
| Consumer Products | 2460800000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All FIFRA Related Products; Total: All Solvent Types |
| Consumer Products | 2460900000 | Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; Miscellaneous Products (Not Otherwise Covered); Total: All Solvent Types |

### 2.2.1 Generate Spatial Surrogates for 4-km Domains

As part of the analysis, the Project source emissions need to be spatially allocated to appropriate geographic locations. The emissions can be allocated to modeling grid cells using gridding surrogates. To process the Project emissions, a Project area-based spatial surrogate was developed. The surrogate was developed using the US Environmental Protection Agency (USEPA's) Spatial Allocation Tool,[18] which combines geographical information system (GIS)-based data (shapefiles) and modeling domain definitions to generate the appropriate gridded surrogate data set. The Project sources were then assigned specific surrogates for gridding by cross-referencing the SCCs. As mentioned above, all Project emissions were distributed in the modeling grid cells where the Project is located as shown in **Figure 2-1**. The mobile sources were spatially distributed in the site's grid cells and surrounding grid cells, as outlined in **Table 2-3**.

### 2.2.2 SMOKE 4 km Processing of Project Emissions

SMOKE system was used to process emissions for the Northern California 4-km modeling grid shown in **Figure 2-1**. Although CAMx is run for each day of the year using each day's meteorological data, emissions are processed using a representative week from each month (seven days a month) to represent the entire month's emissions. This method is used for emissions to avoid redundancy in data and save disk space and computational time since emissions, temporally, during one week of a given month are likely very similar to emissions from a different week of the same month. Holidays were modeled separately as if they were a Sunday. SMOKE was applied to perform the following tasks:

1. Chemical Speciation: Emission estimates of criteria air pollutants were speciated for the SAPRC07 AERO6 chemical mechanism employed in CMAQ in SMOKE processing. We used speciation profiles compatible with the SAPRC07 AERO6 mechanism for $PM_{2.5}$ from the BAAQMD's modeling system to be consistent with the regional modeling emissions. We then converted those emissions into CAMx-ready formats using CMAQ2CAMx conversion program and species mapping.
2. Temporal Allocation: Annual emission estimates were resolved on an hourly timescale for CAMx modeling. These allocations were determined from the particular source category,

[18] https://www.cmascenter.org/sa-tools/documentation/4.2/html/srgtool/SurrogateToolUserGuide_4_2.pdf

specified by the SCC. Monthly, weekly, and diurnal profiles were cross-referenced to SCC to provide the appropriate temporal resolution. The temporal profiles were also obtained from the BAAQMD's emissions modeling system.

3. Spatial Allocation: The Project emission estimates were spatially resolved to the grid cells for modeling using spatial surrogates as described above.

### 2.2.3 QA/QC of Emissions Modeling

Standard quality assurance/quality control (QA/QC) was conducted during all aspects of the SMOKE emissions processing. These steps followed the approach recommended in USEPA modeling guidance (USEPA, 2007). SMOKE includes quality assurance (QA) and reporting features to keep track of the adjustments at each processing stage and ensure that data integrity is not compromised. We carefully reviewed the SMOKE log files for error messages and ensured that appropriate source profiles were used. All error records reported during processing were reviewed and resolved. This is important to ensure that source categories are correctly characterized. We also compared SMOKE input and output emissions: Summary tables were generated to compare input inventory totals against model-ready output totals to confirm consistency. Spatial plots were generated to visually verify correct spatial allocation of the emissions.

### 2.2.4 Merge SMOKE Pre-merged Emissions to Generate CAMx-ready Emission Inputs

The final step in the emissions processing is to merge the Project gridded emissions with other regional components through the gridded merge program (MRGUAM) for CAMx. We merged the daily emissions in the time format required by CAMx.

### 2.2.5 Emissions Summary

Summaries of the Project gridded CAMx model-ready emissions data are provided in this section. **Table 2-5** and **Table 2-6** summarize the annual emission inventory data input to SMOKE from the FF10 data files in pounds per day by project source types and by pollutants. The consistency in data in Table 2-5 and Table 2-6 as well as Table 2-1 offer confidence in the correct operation of the SMOKE emissions processing for CAMx.

**Table 2-5. Project Emission Inventory Data Input to SMOKE by Source Type ( Average lbs/day)**

| Type | ROG/VOC | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| **Mobile (Total)** | **38.0** | **37.6** | **37.0** | **7.3** |
| Offsite Mobile | 30.0 | 33.1 | 26.1 | 5.2 |
| Cars | 7.7 | 1.6 | 9.8 | 1.8 |
| On-Demand | 0.3 | 0.1 | 0.4 | 0.1 |
| Trucks | 0.02 | 0.1 | 0.3 | 0.1 |
| Shuttles | 0.05 | 2.7 | 0.4 | 0.2 |
| **Onsite Area (Total)** | **53.9** | **7.5** | **0.6** | **0.6** |
| Architectural Coatings | 2.0 | -- | -- | -- |
| Consumer Products | 48.9 | -- | -- | -- |
| Landscaping | 2.1 | 0.8 | 0.4 | 0.4 |
| Emergency Generators | 0.8 | 6.7 | 0.2 | 0.2 |
| **Total** | **91.9** | **45.1** | **37.6** | **7.9** |

**Table 2-6. Project Emission Inventory Data Output from SMOKE by Source Types (Average lbs/day)**

| Type | ROG/VOC | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Mobile | 38 | 37.6 | 37.0 | 7.3 |
| Non-Mobile Sources | 53.9 | 7.5 | 0.6 | 0.6 |
| **Total** | 91.9 | 45.1 | 37.6 | 7.9 |

Spatial displays of the gridded emissions data are presented below. We examined the gridded emissions in 4-km grid to verify accurate spatial allocation by SMOKE. **Figures 2-2** through **2-5** displays gridded emissions for the Project inventory in the 4-km modeling grid.

**Figure 2-2. Spatial Distribution of $NO_x$ Emissions (in lbs/day) for the Project in the Northern California 4-km Domain**

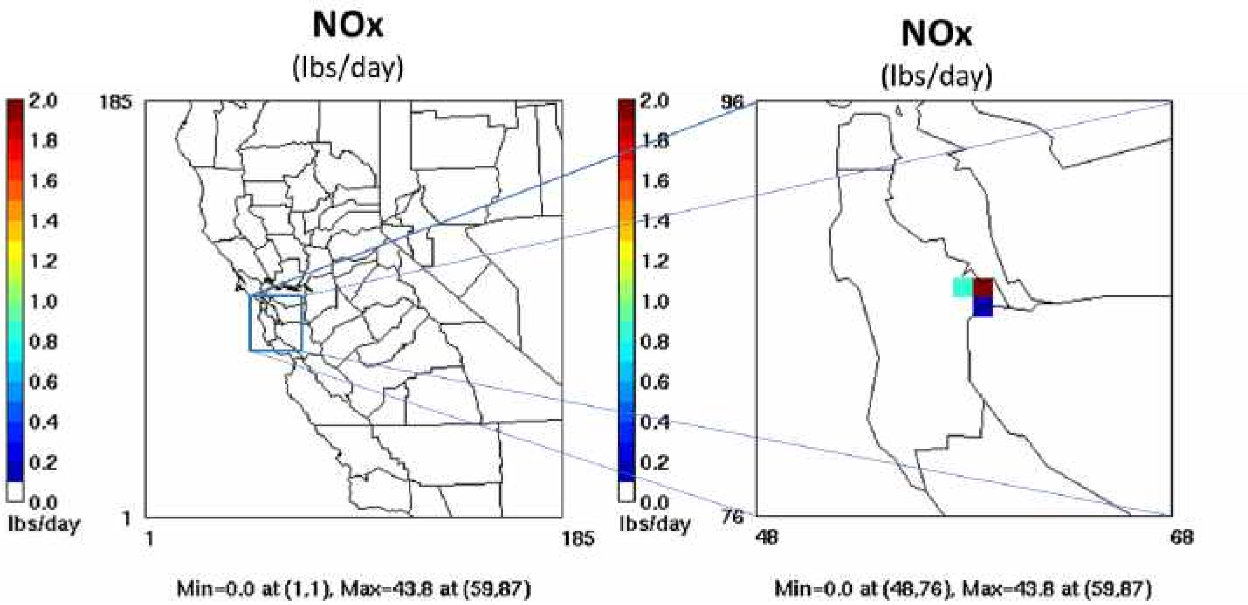



**Figure 2-3. Spatial Distribution of VOC Emissions (in lbs/day) for the Project in the Northern California 4-km Domain**

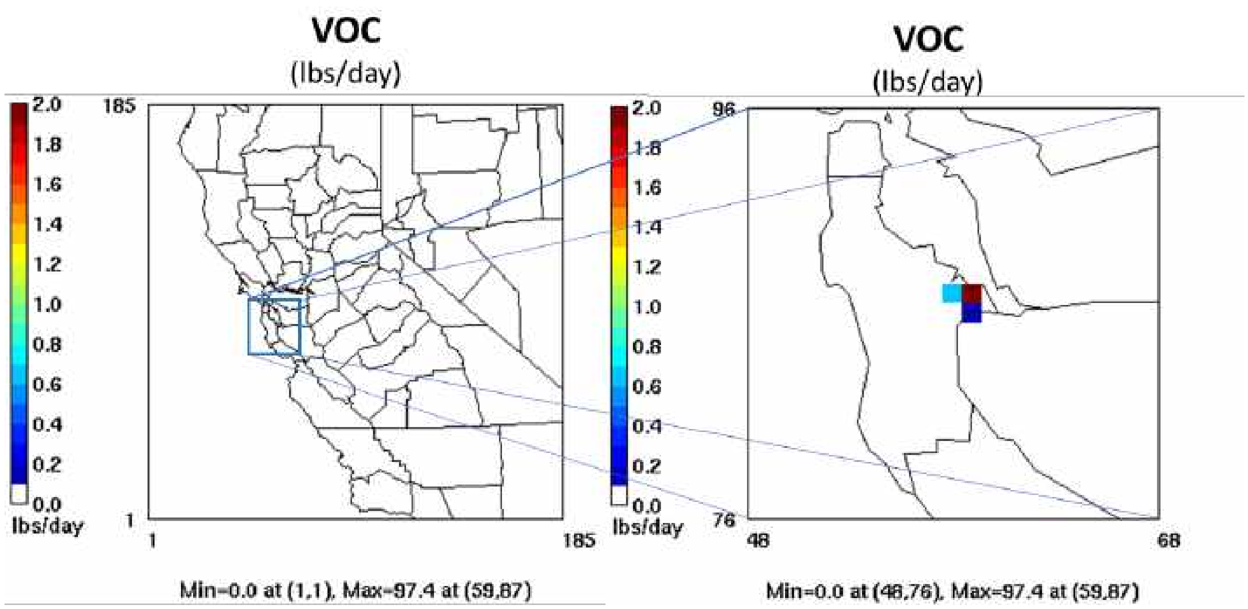


**Figure 2-4. Spatial Distribution of $PM_{10}$ Emissions (in lbs/day) for the Project in the Northern California 4-km Domain**

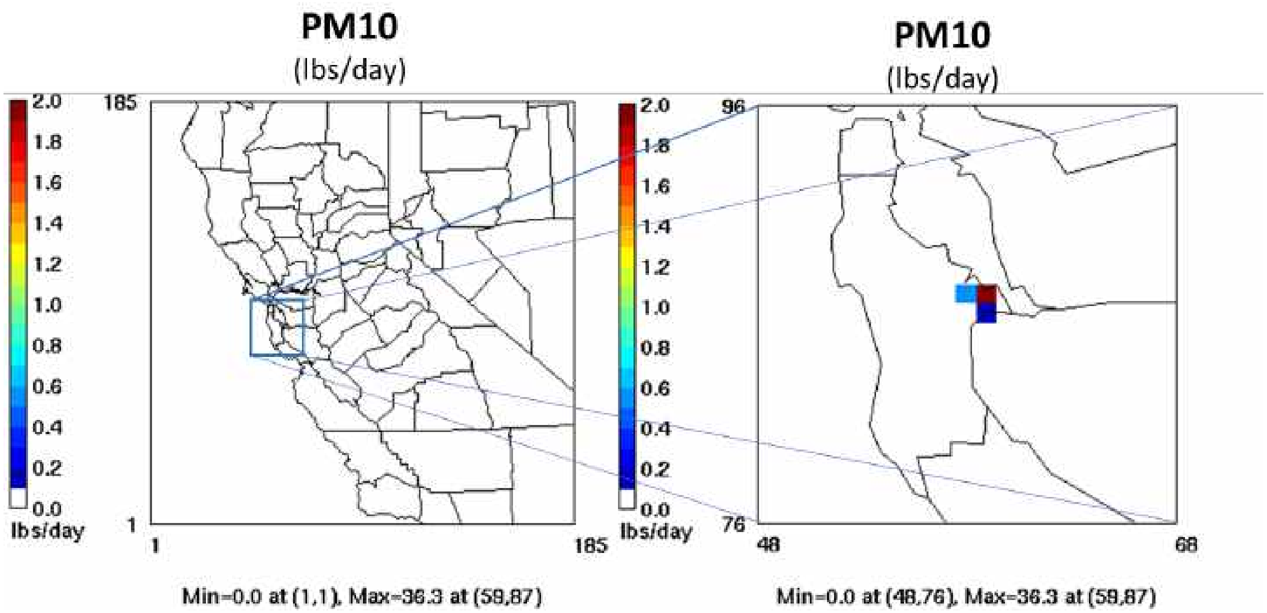
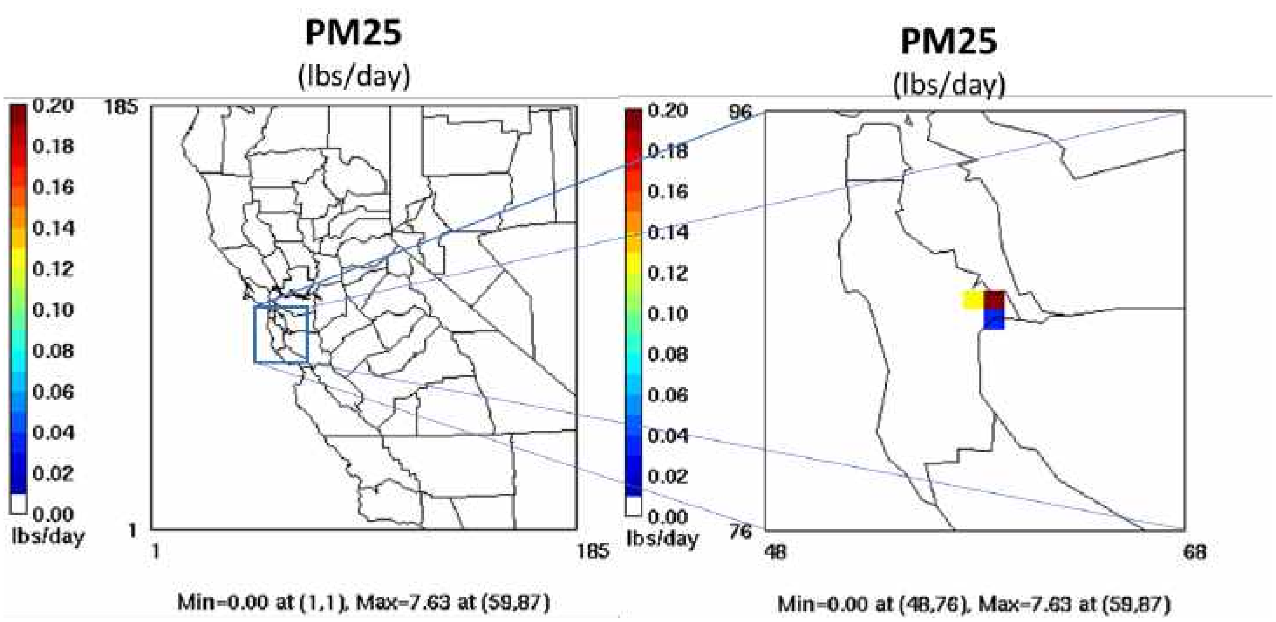



**Figure 2-5. Spatial Distribution of $PM_{2.5}$ Emissions (in lbs/day) for the Project in the Northern California 4-km Domain**



# 3. REFERENCES

Coats Jr., C.J., 1996. High-performance algorithms in the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system. Proc. Ninth AMS Joint Conference on Applications of Air Pollution Meteorology with AWMA. Amer. Meteor. Soc., Atlanta, GA, 584-588.

Coats Jr., C.J., Houyoux, M.R., 1996. Fast Emissions Modeling with the Sparse Matrix Operator Kernel Emissions (SMOKE) Modeling System. The Emission Inventory: Key to Planning, Permits, Compliance, and Reporting, Air & Waste Management Association. New Orleans, Louisiana.

EPA, 2007. Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-454/B-07-002.

# ATTACHMENT B
# PGM INPUTS, OUTPUTS, AND ASSUMPTIONS

# 1. REGIONAL AIR QUALITY MODELING PLATFORM

The latest publicly available Photochemical Grid Model (PGM) database for Northern California was developed by the Bay Area Air Quality Management District (BAAQMD) in support of the 2000 Central California Ozone Study (CCOS), and was adapted for this analysis.[19] The Northern California 2012 4-km CAMx modeling database and a projected 2035 emissions database was used in this assessment.[20] The 2012 base case is based on a PGM modeling databases developed by the BAAQMD. The BAAQMD PGM database is tailored for California using California-specific input tools (e.g., the EMFAC[21] mobile source emissions model) and use a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California. This contrasts with the United States Environmental Protection Agency's (USEPA)national modeling platforms[22] used for national rulemakings (e.g., transport rules such as CSAPR[23] or defining new NAAQS) that use a coarser 12-km horizontal grid resolution.

The BAAQMD selected the computational domain shown in **Figure 1-1** below to keep consistency with the 2000 CCOS (BAAQMD, 2009). The CCOS was established to understand and investigate the ozone formation in Central California, therefore the computational domain included all Central California and portions of Northern California.

Details of the model inputs, configuration, and results are presented in Section 2 of this Attachment.

---

[19] http://www.baaqmd.gov/about-air-quality/research-and-data/research-and-modeling.

[20] Full project buildout is expected to occur as early as year 2026 and emissions were conservatively quantified assuming year 2026 emission factors. Year 2035 was selected for the PGM based on availability of modeling and emission databases for the Northern California domain at the time of the analysis. For consistency, Year 2035 populations are conservatively used in BenMAP, as discussed in Attachment C.

[21] https://www.arb.ca.gov/emfac/

[22] https://www.epa.gov/air-emissions-modeling/2014-2016-version-7-air-emissions-modeling-platforms

[23] https://www.epa.gov/csapr

**Figure 1-1. Air quality modeling domain for Northern California[24]**


# 2. REGIONAL GRID MODELING

In this section we describe the regional PGM modeling setup to assess the outcome of the Project emissions on the ambient $PM_{2.5}$ levels in the region. The 2012 base case modeling databases were developed by the BAAQMD for the Community Multiscale Air Quality (CMAQ) PGM. The CMAQ annual 2012 4-km modeling database and annual 2012 4-km Weather Research and Forecasting (WRF) meteorological model output files were obtained from the BAAQMD. The BAAQMD CMAQ and WRF 2012 4-km data were then processed to obtain 2012 4-km annual PGM modeling database for the Comprehensive Air Quality Model with

[24] https://ww3.arb.ca.gov/research/cabots/docs/9a-cabots-baaqmd-20170419.pdf

extensions (CAMx). The following paragraphs described how Ramboll developed the CAMx 2012 4-km annual database used in this study, starting with the BAAQMD CMAQ and WRF 2012 4-km data. Preparation of the Project emissions inputs for CAMx is discussed in Attachment A.

## 2.1 Model Inputs and Configuration

Ramboll converted the 2012 CMAQ 2-D and in-line point emissions files from BAAQMD to CAMx area-/point-source emissions files using the CMAQ2CAMx interface program.[25] Seasalt emissions were developed using an emissions processor that integrates published sea spray flux algorithms to estimate sea salt particulate matter (PM) emissions for input to CAMx. The CAMx sea salt emissions were then merged with area emissions files. On-road mobile sources in the BAAQMD database were based on EMFAC2014. Thus, on-road mobile sources were first updated to EMFAC2021 using county and pollutant specific scaling factors. We then projected on-road emissions to 2035 using projection factors derived from EMFAC2021. All other anthropogenic sources were also projected to 2035 using county, pollutant and source category-specific growth factors derived from ARB's California Emissions Projection Analysis Model (CEPAM) 2016 state implementation plan (SIP) inventory. The farthest future year available in the CEPAM is 2035. CEPAM estimates emissions for a specific year based on growth and control factors. The growth factors account for county-specific economic activity profiles, population forecasts, and other socio/demographic activity. The control factors reflect the effects of adopted emission control rules.

The most commonly used prognostic meteorological models to provide meteorological fields for air quality modeling are the WRF model (Skamarock et al., 2005) and the Fifth-Generation Mesoscale Model (MM5; Grell et al, 1994). MM5, a nonhydrostatic, prognostic meteorological model developed in the 1970s by Pennsylvania State University and the National Center for Atmospheric Research (NCAR), has been widely used for urban- and regional-scale photochemical, fine particulate, and regional haze regulatory modeling studies. However, development of MM5 ceased in 2006 and WRF has become the new standard model for regulatory air quality applications in the US. WRF was jointly developed by NCAR and the National Center for Environmental Prediction in late 1990s. It has been under continuous development, improvement, testing and open peer-review and is used world-wide by hundreds of researchers and practitioners. BAAQMD adopted WRF version 3.8 for the 2012 simulations. For the current application, the meteorology remains unchanged for the future year simulation and BAAQMD WRF 2012 4-km model outputs were processed using the WRFCAMx[26] processor to generate the meteorological fields ready for CAMx. The WRF model employs a terrain-following coordinate system defined by pressure, using multiple layers that extend from the surface to 50 millibars (approximately 19 kilometers above ground level [AGL]). A layer averaging scheme is adopted for CAMx simulations to reduce the computational burden. **Table 2-1** presents the mapping from the WRF vertical layer structure to the CAMx vertical layers.

[25] http://www.camx.com/download/support-software.aspx.

[26] WRFCAMx is available on the CAMx website (http://www.camx.com/download/support-software.aspx)

**Table 2-1. Vertical layer structure for WRF and CAMx modeling.**

| WRF | | CAMx | | | |
|---|---|---|---|---|---|
| **Layer** | **Height (m)** | **Layer** | **Height (m)** | **Thickness (m)** | **Sigma[a]** |
| 50 | 19260 | 28 | 19260 | 2625 | 0.0000 |
| 49 | 16635 | | | | |
| 48 | 14423 | | | | |
| 47 | 12436 | 27 | 12436 | 1849 | 0.1339 |
| 46 | 10587 | | | | |
| 45 | 9234 | | | | |
| 44 | 8100 | 26 | 8100 | 960 | 0.3119 |
| 43 | 7140 | | | | |
| 42 | 6324 | | | | |
| 41 | 5629 | 25 | 5629 | 594 | 0.4630 |
| 40 | 5034 | | | | |
| 39 | 4524 | | | | |
| 38 | 4086 | 24 | 4086 | 376 | 0.5806 |
| 37 | 3710 | | | | |
| 36 | 3387 | | | | |
| 35 | 3097 | 23 | 3097 | 261 | 0.6668 |
| 34 | 2835 | | | | |
| 33 | 2600 | | | | |
| 32 | 2389 | 22 | 2389 | 191 | 0.7341 |
| 31 | 2198 | | | | |
| 30 | 2028 | | | | |
| 29 | 1873 | 21 | 1873 | 139 | 0.7863 |
| 28 | 1735 | | | | |
| 27 | 1609 | | | | |
| 26 | 1497 | 20 | 1497 | 102 | 0.8261 |
| 25 | 1396 | | | | |
| 24 | 1304 | 19 | 1304 | 87 | 0.8471 |
| 23 | 1217 | | | | |
| 22 | 1133 | 18 | 1133 | 81 | 0.8661 |
| 21 | 1052 | | | | |
| 20 | 974 | 17 | 974 | 75 | 0.8840 |
| 19 | 899 | | | | |
| 18 | 827 | | | | |
| 17 | 758 | 16 | 758 | 66 | 0.9088 |
| 16 | 692 | 15 | 692 | 64 | 0.9165 |
| 15 | 628 | | | | |
| 14 | 566 | 14 | 566 | 59 | 0.9312 |
| 13 | 507 | 13 | 507 | 57 | 0.9382 |
| 12 | 450 | 12 | 450 | 53 | 0.9450 |
| 11 | 398 | 11 | 398 | 50 | 0.9513 |
| 10 | 348 | 10 | 348 | 46 | 0.9573 |
| 9 | 302 | 9 | 302 | 44 | 0.9629 |
| 8 | 258 | 8 | 258 | 40 | 0.9682 |
| 7 | 218 | 7 | 218 | 38 | 0.9731 |
| 6 | 180 | 6 | 180 | 36 | 0.9777 |
| 5 | 144 | 5 | 144 | 32 | 0.9821 |
| 4 | 112 | 4 | 112 | 31 | 0.9861 |
| 3 | 81 | 3 | 81 | 29 | 0.9899 |
| 2 | 52 | 2 | 52 | 27 | 0.9935 |
| 1 | 25 | 1 | 25 | 25 | 0.9969 |
| 0 | 0 | 0 | 0 | 0 | 1.0000 |

[a] The sigma vertical coordinate system is used to simplify the equations solved by atmospheric models and is defined as sigma = $(p-p_T)/(p_S - p_T)$ where p is pressure and the subscripts T and S stand for the top and surface values of the model atmosphere, respectively.

The lateral boundary conditions (BCs) for the 4-km state-wide modeling grid were extracted from a global model simulation for the year 2012. The Model for Ozone and Related Chemical Tracers Version 4 (MOZART-4; Emmons et al., 2010) is a global chemical transport model developed jointly by NCAR, the Geophysical Fluid Dynamics Laboratory, and the Max Planck Institute for Meteorology. It simulates chemistry and transport of tropospheric gases and bulk aerosols. The MOZART-4 simulation with updated meteorological fields derived from the National Aeronautics and Space Administration's Goddard Earth Observing System Model Version 5 (GEOS-5)[27] were downloaded from the UCAR website[28] and the MOZART2CAMx processor was used to derive both the boundary and the initial conditions for the modeling. Five days of spin-up periods were used for the 4-km grids to minimize the influence of the initial conditions.

Additional data used in the air quality modeling include ozone column data from the Ozone Monitoring Instrument (OMI) which continues the Total Ozone Mapping Spectrometer (TOMS) record for total ozone and other atmospheric parameters related to ozone chemistry (OMI officially replaced the TOMS ozone column satellite data on January 1, 2006). OMI data are available every 24-hours and are obtained from the TOMS ftp site.[29] The CAMx O3MAP program reads the OMI ozone column text file data and interpolates to fill gaps and generated gridded daily ozone column input data. The OMI data is used in the CAMx (TUV) radiation models which is a radiative transfer model that develops clear-sky photolysis rate inputs for CAMx. The landuse file was generated with the WRFCAMx processor and modified to remove lakes and set coastal waters with a surf zone width of 50 m, this file was used to update the emissions database and provide more realistic representation of sea salt emissions.

**Table 2-2** presents the CAMx configuration used for the modeling in this Project analysis. SAPRC07TC (Carter, 2010) is the chemistry mechanism used for California SIPs was used here. It includes additional model species to explicitly represent selected toxics and reactive organic compounds and uses numerical expressions of rate constants that are compatible with the current chemistry mechanism solver. The partitioning of inorganic aerosol constituents (sulfate, nitrate ammonium and chloride) between gas and aerosol phases is performed using the ISORROPIA module. The SOAP semi-volatile equilibrium scheme performs the organic aerosol-gas partitioning. These processes are described in more detailed in the CAMx user guide.

[27] http://www.acd.ucar.edu/wrf-chem/mozart.shtml

[28] https://www.acom.ucar.edu/wrf-chem/mozart.shtml

[29] ftp://toms.gsfc.nasa.gov/pub/omi/data/

**Table 2-2. CAMx modeling configuration.**

| Science Option | Configuration | Notes |
|---|---|---|
| Model Code | CAMx v6.5 | Released April 2018 |
| Horizontal Grid | 4-km 1-way nesting | |
| O3 and PM 4-km | 185 x 185 grid cells | |
| Vertical Grid | 28 vertical layers extending up to ~19 km AGL | Collapsed from 50 WRF/MM5 layers (see Table 3-1) |
| Initial Conditions | Extracted from the MOZART global model outputs | 5-day spin-up for 4-km domain |
| Boundary Conditions | Extracted from the MOZART global model outputs | Boundary concentration set for 4-km domain extracted using MOZART2CAMx |
| Photolysis Rate | Photolysis rates lookup table | Derived from satellite measurements and TUV processor |
| Gas-phase Chemistry | SAPRC07TC | Solved by the Euler Backward Iterative (EBI) solver |
| Aerosol-phase Chemistry | ISORROPIA (inorganic aerosol)<br>SOAP v2.1 (organic aerosol) | |
| Meteorological Input Preprocessor | WRFCAMx v4.7 | |
| Advection | Piecewise Parabolic Method (PPM) | |
| Diffusion | Eddy diffusion algorithm | |

## 2.2 Model Results

The future modeling scenario was simulated using the CAMx source apportionment technology. Both cumulative concentrations from all the sources and the concentrations from Project-specific emissions are derived from a single simulation following the previous section model configuration. The model results of hourly $PM_{2.5}$ concentrations were processed into aggregated metrics that are relevant to health effects.

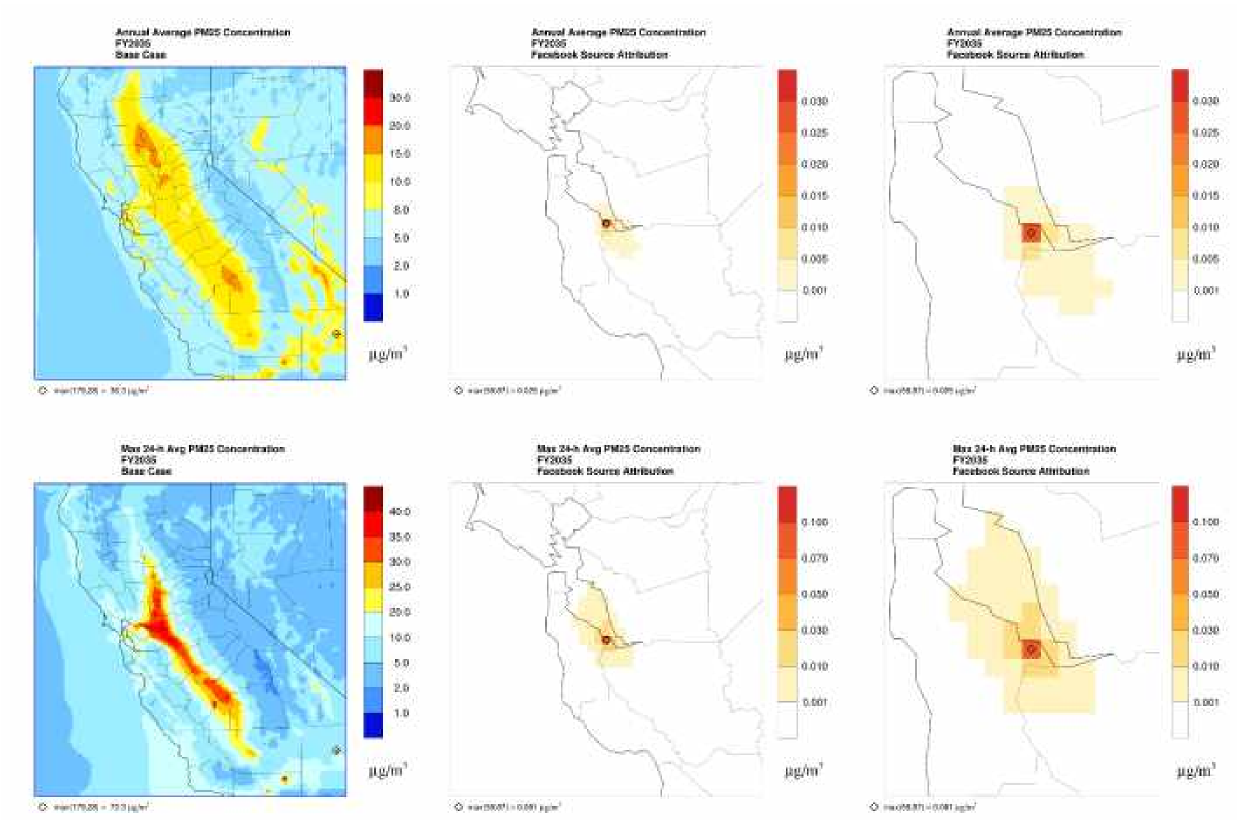
The metrics relevant to the $PM_{2.5}$ health effects selected in this study are 24-hour annual average concentrations (see Attachment C).

**Figure 2-1** shows spatial plots of annual average and a single day episode maximum 24-hour average $PM_{2.5}$ concentrations from the base case. In the base case, the central valley of California shows annual $PM_{2.5}$ concentrations that range between 8 and 20 $\mu g/m^3$. Isolated regions in San Bernardino and Los Angeles counties could reach up to 36 $\mu g/m^3$. The largest increases in $PM_{2.5}$ concentrations from the Project occur over the grid cell where the Project is located, followed by the immediately adjacent grid cells. Contributions of the Project emissions to annual average $PM_{2.5}$ are 0.025 $\mu g/m^3$ at the most affected areas and represent a 0.3 percent increase over the base case concentrations at that location. Contributions to the maximum 24-hour average are 0.081 $\mu g/m^3$ at the most affected area and represent a

0.4 percent increase over the base case concentrations at that location. **Figure 2-2** presents increases in quarterly average and maximum 24-hour average $PM_{2.5}$ due to the Project by $PM_{2.5}$ component at the grid cell of maximum concentration change. It confirms that the $PM_{2.5}$ increases due to the Project are mostly due to primary PM components (the sum of "other", EC and POA in the chart).

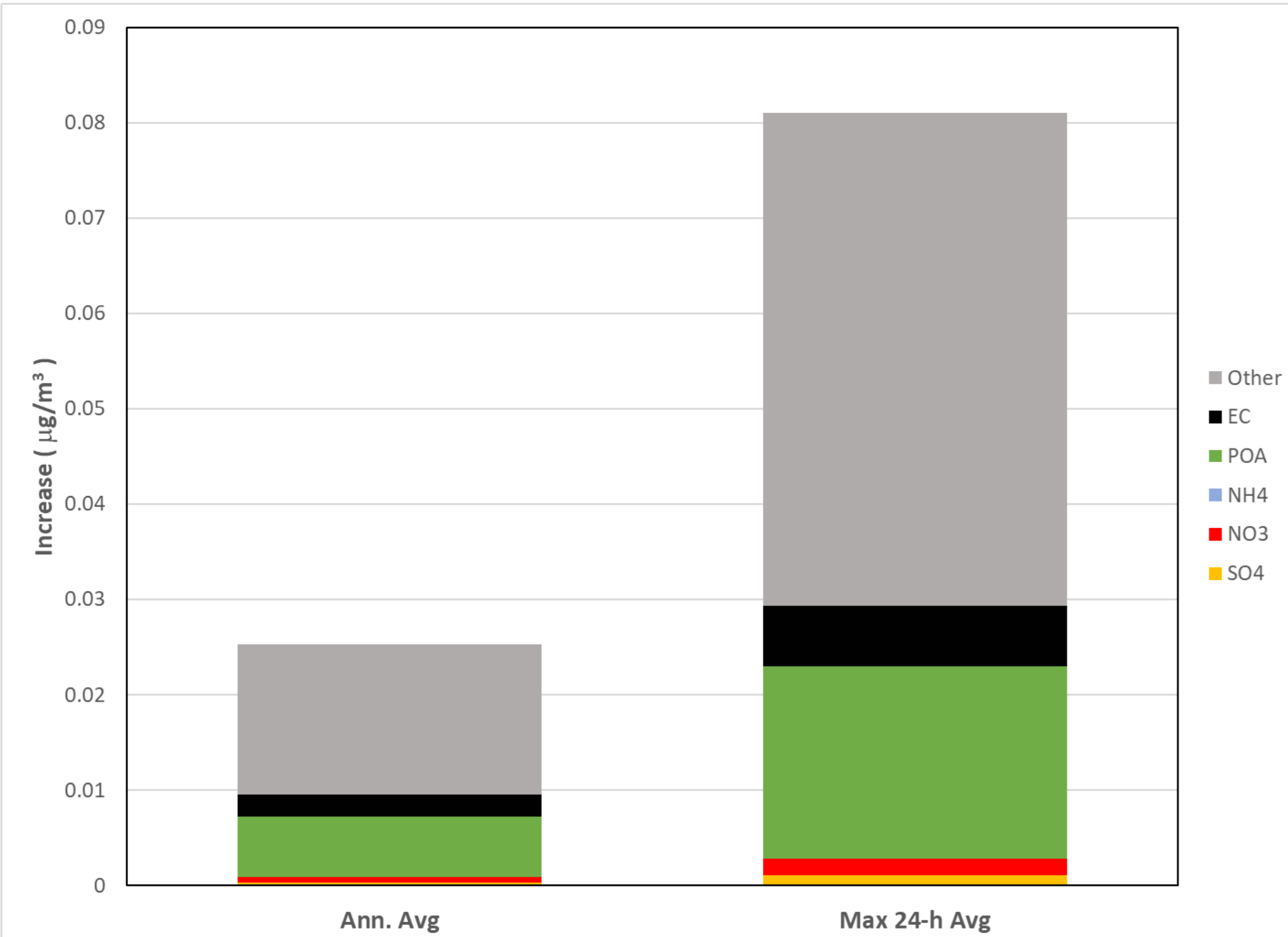
### Figure 2-1. Results of the 4 km $PM_{2.5}$ Modeling Domain

**$PM_{2.5}$ Concentrations from the Base Case Scenario (left panels); Increases in $PM_{2.5}$ due to the Project (center panels show most of the modeling domain[30] and right panels show local project area); Annual Averages (top panels); Maximum 24-hour Averages (bottom panels)**




[30] The center panel was zoomed in slightly from the full modeling domain given locality of impacts.

**Figure 2-2. Increases in Annual Average and Episode Maximum 24-hour Average $PM_{2.5}$ Concentrations due to the Project by $PM_{2.5}$ Component: fine particulate sulfate ($SO_4$), nitrate ($NO_3$), ammonium ($NH_4$), primary organic aerosol (POA), elemental carbon (EC), and other primary PM (Other); Where the Maximum Change due to Project Emissions Occurred**




The metrics relevant to the ozone health effects selected in this study are consistent with the ozone NAAQS (see Attachment C). The model provides hourly concentrations that are further post-processed to produce maximum daily average 8-hour (MDA8) ozone concentrations for each day.

**Figure 2-3** displays spatial plots of the annual average MDA8 ozone for the 2035 emissions scenario and the corresponding annual average MDA8 increases to ozone concentrations due to the Project emissions. In the base case, counties located in the south-eastern portion of the domain (San Bernardino, Inyo, Tulare, Kern) show the highest MDA8 annual average ozone concentration between 45 and 50 ppb with isolated regions in Kern county with up to 53 ppb. The maximum increase in the annual average MDA8 ozone concentrations due to the Project is 0.005 ppb and occurs in Santa Clara County where it represents a 0.012 percent increase over the base case concentrations.

**Figure 2-4** displays MDA8 ozone for the base case and increases in MDA8 ozone due to the project on October 2 of the simulation year, the day that the Project has the highest ozone contribution. The highest MDA8 ozone contribution due to the Project is 0.047 ppb (Figure 2-4, right) and occurs in Santa Clara County where it represents a 0.06 percent increase over the base case concentrations.

**Figure 2-3. Annual Average MDA8 Ozone Concentrations from the Base Case Scenario (left) and Increases in Highest MDA8 Ozone Concentrations due to the Project (center for modeling domain and right for local project area) for the Annual Modeling of the 2035 Emissions Scenario**

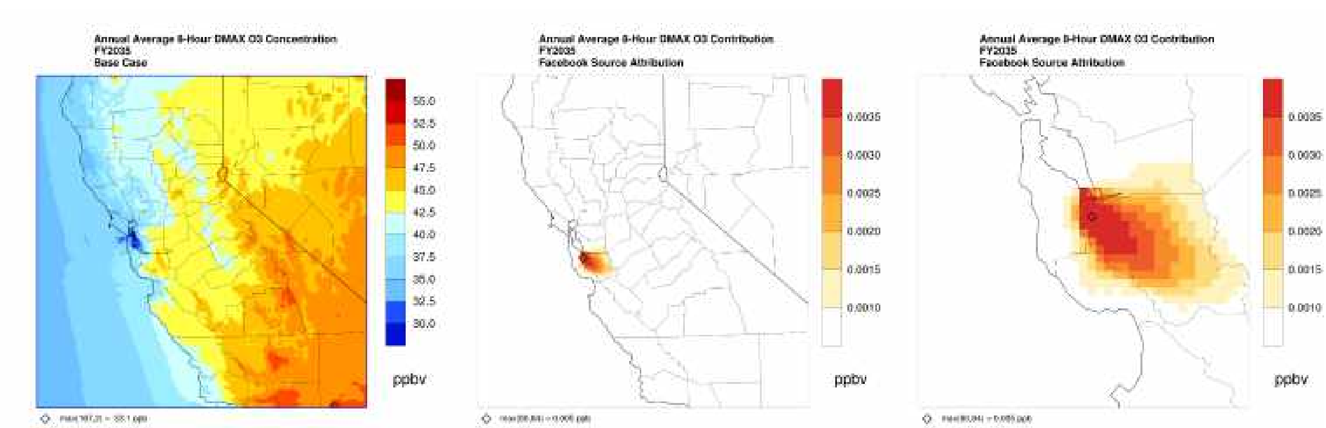
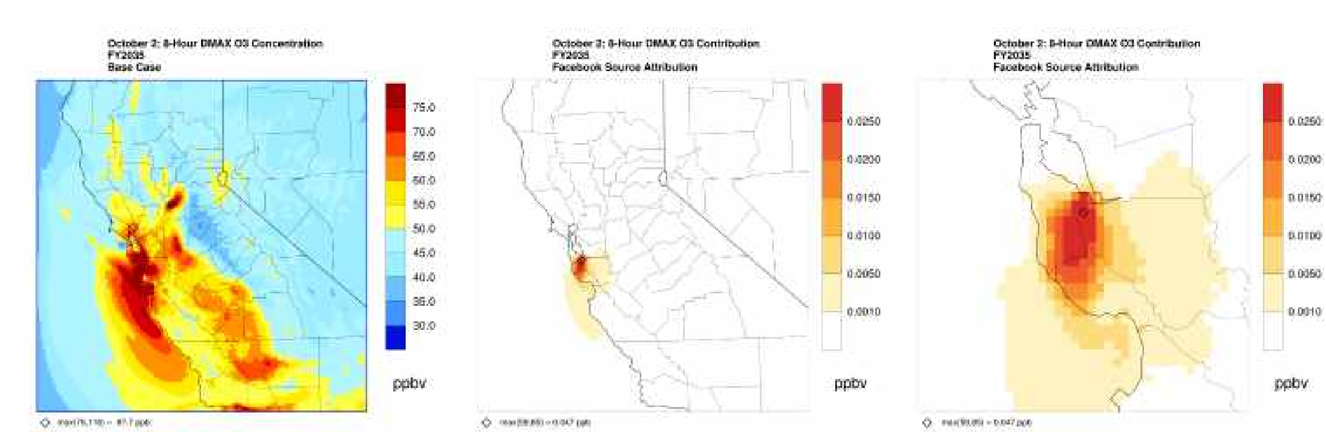



**Figure 2-4. MDA8 Ozone Concentrations from the Base Case Scenario (left) and Increases in MDA8 Ozone Concentrations due to the Project (center for modeling domain and right for local project area) on October 2nd, the Day with the Highest Project Ozone Contributions for the Annual Modeling of the 2035 Emissions Scenario**



## 2.3 PGM Uncertainty

PGMs generally represent the state-of-the-science when the treatment of photochemically formed air pollution is required over multiple spatial scales (e.g., from single-source to continental). PGMs are part of a modeling system in which there are several other major components that determine model performance, including meteorology, emissions inventories (including background), and chemical mechanisms. It is important to note that both the meteorological models that inform the PGMs and PGM predictions, themselves, in accordance with EPA guidance, are compared with available observations through multiple statistical metrics to characterize any biases and errors.

One of the largest sources of uncertainty for PGM is the processing and accurate accounting of all emission sources into the model. PGMs are Eulerian models that require gridded data that vary in space and time. An accurate prediction of secondary formed pollutants, like ozone and secondary $PM_{2.5}$, requires a comprehensive accounting of all possible sources of pollution and not only those specific to a Project. This typically requires a significant level of effort to construct spatially and temporally varying emission inventories where there may be uncertainties in the characterization of emissions.

A second source of uncertainty is introduced by the meteorological inputs. PGMs require gridded meteorological inputs that are typically provided by mesoscale meteorological model (e.g., WRF) that provide three-dimensional characterization of winds, temperature, humidity and other meteorological variables.

An additional source of uncertainty pertains to the PGM formulations themselves. For example, the models' chemical mechanism represents a simplification of the thousands of chemical reactions involving hundreds of species that take place in the atmosphere in order to reduce the computational burden. PGM being state-of-the-science can only reflect what is understood or established on any given aspect: chemistry, transport, aerosol formation, etc. As the science advances and certain processes are better understood, the models' formulations are modified with the expectation to improve their predictions.

Despite these complexities and associated uncertainties, the USEPA recommends using PGM's for a variety of applications including State Implementation Plans and Regional Haze Planning, and CAMx/CMAQ specifically for single-source modeling of ozone and secondary $PM_{2.5}$. The USEPA believes that the relative change in the PGM-predicted concentrations (e.g., the incremental changes due to the emissions from a single-source) is more accurate and reliable than the total predicted concentrations (USEPA, 2020a).

# 3. REFERENCES

Bay Area Air Quality Management. 2009. Ozone Modeling and Data Analysis During CCOS. Tanrikulu,S. Soong, S-T., Tran C. September 2009. http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Research%20and%20Modeling/CCOS%20modeling%20report.ashx

Carter, W.P.L., 2000. Documentation of the SAPRC99 Chemical Mechanism for VOC Reactivity Assessment, Final Report to California Air Resources Board, Contract No. 92-329, and (in part) 95-308, May 8, 2000. http://www.engr.ucr.edu/~carter/reactdat.htm

Emmons, L.K., Walters, S., Hess, P.G., Lamarque, J.F., Pfister, G.G., Fillmore, D., Granier, C., Guenther, A., Kinnison, D., Laepple, T., Orlando, J., Tie, X., Tyndall, G., Wiedinmyer, C., Baughcum, S.L., Kloster, S., 2010. Description and evaluation of the Model for Ozone and Related chemical Tracers, Version 4 (MOZART-4), Geoscientific Model Development, 3, 43-67.

Gery, M.W., Whitten, G.Z., Killus, J.P., Dodge, M.C., 1989. A Photochemical Kinetics Mechanism for Urban and Regional Scale Computer Modeling. J. Geophys. Res., 94, 925-956.

Grell, G.A., Dundhia, J., Stauffer, D.R., 1994. A description of the Fifth-Generation Penn State/NCAR Mesoscale Model (MM5), National Center for Atmospheric Research, Boulder, CO, NCAR/TN-398+STR.

Skamarock, W.C., Klemp, J.B., Dudhia, J., Gill, G.O., Barker, D.M., Wang, W., Powers, J.G., 2005. A description of the Advanced Research WRF Version 2. NCAR Technical Note NCAR/TN-468+STR, June 2005.

Stockwell, W.R., 1999. Review of the updated maximum incremental reactivity scale of Dr. William Carter. Division of Atmospheric Sciences, Desert Research Institute, November 29, 1999. http://www.cert.ucr.edu/~carter/pubs/stockrev.pdf

USEPA. 2018. Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Assessment Division. Research Triangle Park, NC. EPA 454/R-18-009. November 29. https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

# ATTACHMENT C
# BENMAP AND HEALTH EFFECTS

# 1. HEALTH EFFECTS ANALYSIS

The potential health effects of ozone and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) concentrations due to the Project's emissions were estimated using the Environmental Benefits Mapping and Analysis Program (BenMAP), Community Edition v1.5.8.17 (March 2022) (USEPA, 2022a).[31] BenMAP, developed by the United States Environmental Protection Agency (USEPA), is a powerful and flexible tool that helps users estimate human health effects and economic benefits resulted from changes in air quality. BenMAP outputs include PM- and ozone-related health endpoints such as premature mortality, hospital admissions, and emergency room visits. BenMAP uses the following simplified formula to relate changes in ambient air pollution to certain health endpoints (USEPA, 2022b)[32]:

$$\text{Health Effect} = \text{Air Quality Change} \times \text{Health Effect Estimate} \times \text{Exposed Population} \times \text{Background Health Incidence Rate}$$

- Air Quality Change - The difference between the starting air pollution level (the base) and the air pollution level after some change, such as a new source.
- Health Effect Estimate - An estimate of the percentage change in an adverse health effect due to a one unit change in ambient air pollution. Effect estimates, also referred to as concentration-response (C-R) functions, are obtained from epidemiological studies.
- Exposed Population - The number of people affected by the air quality change. The government census office is a good source for this information. This analysis uses data from PopGrid, which is an add-on program to BenMAP that allocates the block-level U.S. Census population to a user-defined grid.[33]
- Background Health Incidence Rate - An estimate of the average number of people over a given population that suffer from some adverse health effect over a given period of time. For example, the health incidence for asthma emergency room visits is the number of people over a given population who might visit the ER due to asthma in a given year. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. BenMAP calculates background health incidence rates based on the available health statistics and population data, with preference given to individual-level data counts (e.g., mortality counts or hospital and emergency department discharges) at the County-level. For California counties, data were available at the individual-level. The background health incidence data are also based on different years depending on data availability. For example, hospital admissions and emergency department visits for California are based on 2011 data. For mortality background incidence rates, USEPA obtained data for 2012-2014 from the Centers for Disease Control WONDER database (http://wonder.cdc.gov) and generated age-, cause-, and county-specific mortality rates as described in the BenMAP manual.[36] The projected mortality

[31] https://www.epa.gov/benmap

[32] The common function used for calculating health impacts is the following log-linear function: Health Effect = Background Health Incidence Rate x [1 – exponential (Health Effect Estimate * Air Quality Change)] x Exposed Population

[33] https://www.epa.gov/sites/production/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf

rates for the years 2015-2035 are then calculated using Census Bureau projected life tables.[34]

The health endpoints analyzed in this study and the BenMAP results are presented in Section 2 of this attachment.

# 2. HEALTH EFFECTS ANALYSIS RESULTS

This section presents the health effects of the Project emissions on the population in the northern California domain, estimated by the BenMAP model. The Comprehensive Air Quality Model with extensions (CAMx) modeling results are processed to generate aggregated daily and annual average $PM_{2.5}$ and maximum daily 8-hour ozone concentrations appropriate for various health endpoints. The CAMx simulation results from the full year (January to December) are used to estimate the health effects of $PM_{2.5}$ and ozone. BenMAP translates increases in the pollutant concentration due to the Project emissions to changes in the incidence rate for each health effect using a C-R function derived from previously published epidemiological studies. BenMAP often provides multiple C-R functions based on different epidemiological studies for a given health endpoint. C-R functions selected here have been used in past USEPA regulatory assessments when evaluating health effects. This analysis uses population data from PopGrid, which allocates the census population to each modeled 4x4 kilometer (km) grid cell.

The population used for both the quantified health effects and the background health incidence presented here is future year 2035. The PopGrid program was used to project 2010 block-level U.S. Census population to 2035. BenMAP reads this file to incorporate population changes into its health effect calculations. The population in the Northern California domain is projected to be 22,502,033 in 2035.

## 2.1 $PM_{2.5}$ Health Effects

Consistent with USEPA's assessment of health effects of particulate matter, our health effects evaluation focuses on $PM_{2.5}$ and not $PM_{10}$, as $PM_{2.5}$ has a much larger body of evidence that this size fraction is associated with health effects due to the sources, composition, chemical properties and lifetime in the atmosphere (USEPA 2009). $PM_{2.5}$ is capable of penetrating deeper into the lungs because of their size compared to larger particles and this is believed to contribute to greater health effects. Consistent with USEPA health effects evaluations, the health effect functions in BenMAP for PM use fine particulate ($PM_{2.5}$) as the causal PM agent.

Although there are a large number of potential health endpoints that could be included in the analysis as described above, we selected health endpoints that have been the focus of United States Environmental Protection Agency (USEPA) risk assessments (e.g., USEPA, 2010; USEPA, 2014; USEPA, 2022c). For example, the USEPA notes that health endpoints were selected based on consideration of at-risk populations (e.g. asthmatics), endpoints that have public health significance, and endpoints for which information is sufficient to support a quantitative C-R relationship (USEPA, 2014).

The health endpoints and associated C-R functions examined in this study are presented in **Table 2-1**. Each C-R function is based on a certain age range for the given health endpoint depending on the underlying epidemiological study on which it is based. Increases in the BenMAP-estimated health effect incidences and percent of background health incidence due to the Project emissions are presented in **Table 2-2**. Mean incidence rates are presented

[34] https://www.census.gov/programs-surveys/popproj/data/tables.html

along with 2.5 and 97.5 percentiles to demonstrate the potential range in estimated health effects. These values reflect the total health effects across the Northern California model domain, though the regions of primary health effect results are shown in Figures 2-1 and 2-2 of Attachment B.

**Table 2-1. Summary of $PM_{2.5}$ Health Endpoints Used in this Study**

| Health Endpoint | Age Range | Daily Metric | Seasonal Metric | Annual Metric | C-R Function Selected |
|---|---|---|---|---|---|
| Emergency Room Visits, Asthma | 0-99 | 24-hr mean | | | Mar et al., 2010[1] |
| Emergency Room Visits, Cardiovascular | 0-99 | 24-hr mean | | | Ostro et al., 2016 |
| Mortality, All Cause | 30-99 | 24-hr mean | Quarterly mean | Mean | Turner et al., 2016[1] |
| Hospital Admissions, Asthma | 0-64 | 24-hr mean | - | - | Sheppard, 2003[1] |
| Hospital Admissions, Cardiovascular | 65-99 | 24-hr mean | - | - | Bell et al., 2015 |
| Hospital Admissions, Respiratory | 65-99 | 24-hr mean | - | - | Bell et al., 2015 |
| Acute Myocardial Infarction, Nonfatal | 18-24 | 24-hr mean | - | - | Zanobetti et al., 2009[1] |
| Acute Myocardial Infarction, Nonfatal | 25-44 | 24-hr mean | - | - | |
| Acute Myocardial Infarction, Nonfatal | 45-54 | 24-hr mean | - | - | |
| Acute Myocardial Infarction, Nonfatal | 55-64 | 24-hr mean | - | - | |
| Acute Myocardial Infarction, Nonfatal | 65-99 | 24-hr mean | - | - | |

[1] C-R functions available in BenMAP (USEPA, 2020a; USEPA, 2022a)

The results show that the highest health effect is for all-cause mortality, with an estimated mean increased incidence of 0.22 deaths per year due to the Project emissions. Smaller mean increased incidences per year were estimated for other relevant $PM_{2.5}$-related health effects: 0.092 increase in incidence of asthma related emergency room visits, 0.038 increase in incidence of respiratory hospital admissions, and a 0.023 increase in incidence of cardiovascular and respiratory hospital admissions.

It should be noted, however, that the estimated increased incidence in those health effects is quite minor compared to the background health incidence values (shown in **Table 2-2** as percent of Background Health Incidence). For example, for asthma emergency room visits, the increase of 0.092 incidences per year due to Project emissions represents 0.000080% of the total emergency room visits due to asthma for people ages 0 to 99.

**Table 2-2. BenMAP-Estimated $PM_{2.5}$ Annual Health Effects of the Project Emissions Across the Northern California Model Domain[1]**

| Health Endpoint[2] | Project Incidences (Annual) | | | Background Health Incidence (Annual) | Project Mean as Percent of Background Health Incidence[4] (%) |
|---|---|---|---|---|---|
| | 2.5 Percentile[3] | Mean | 97.5 Percentile[3] | | |
| Emergency Room Visits, Asthma [0-99] | 0.024 | 0.092 | 0.16 | 115,302 | 0.000080% |
| Emergency Room Visits, Cardiovascular [0-99] | -0.016 | 0.041 | 0.097 | 441,046 | 0.0000093% |
| Mortality, All Cause [30-99] | 0.15 | 0.22 | 0.29 | 256,043 | 0.000086% |
| Hospital Admissions, Asthma [0-64] | 0.0025 | 0.0066 | 0.011 | 13,394 | 0.000049% |
| Hospital Admissions, All Cardiovascular [65-99] | 0.017 | 0.023 | 0.030 | 220,836 | 0.000011% |
| Hospital Admissions, All Respiratory [65-99] | 0.00011 | 0.0028 | 0.0055 | 82,964 | 0.0000034% |
| Acute Myocardial Infarction, Nonfatal [18-24] | 0.0000053 | 0.000011 | 0.0000162 | 27 | 0.000040% |
| Acute Myocardial Infarction, Nonfatal [25-44] | 0.00028 | 0.00057 | 0.00086 | 1,583 | 0.000036% |
| Acute Myocardial Infarction, Nonfatal [45-54] | 0.00063 | 0.0013 | 0.0020 | 4,025 | 0.000033% |
| Acute Myocardial Infarction, Nonfatal [55-64] | 0.0012 | 0.0025 | 0.0038 | 6,762 | 0.000037% |
| Acute Myocardial Infarction, Nonfatal [65-99] | 0.0048 | 0.010 | 0.015 | 28,174 | 0.000035% |

[1] Health effects are shown terms of incidences of each health endpoint and how it compares to the base (2035 base year health effect incidences) values.

[2] Affected age ranges are shown in square brackets.

[3] The percentiles are generated in BenMAP using a Monte Carlo analysis and represent the statistical uncertainty in the incidence associated with the CRF, but do not include other potential sources of uncertainty (i.e., in the air modeling, in estimates of projected background incidence or populations). These confidence bounds are typically used by USEPA to represent the 95% confidence intervals around the mean estimate.

[4] The percent of background health incidence uses the mean incidence.

## 2.2 Ozone Health Effects

As noted above, although a larger number of health endpoints could be evaluated, we selected the health endpoints based on USEPA risk assessments (USEPA, 2010; USEPA, 2014; USEPA, 2021; USEPA, 2022c). The health endpoints and associated C-R functions examined in this study are presented in **Table 2-3.** Each C-R function is associated with a certain age range for the given health endpoint depending on the epidemiological study on which it is based. Increases in the BenMAP-estimated health effect incidences and percent of background health incidence due to the Project emissions are presented in **Table 2-4.** Mean incidence rates are presented along with 2.5 and 97.5 percentiles to demonstrate the potential range in estimated health effects. These values reflect the total health effects across the Northern California model domain, though the regions of primary health effect results are shown in Figures 2-3 and 2-4 of Attachment B.

**Table 2-3. Summary of Ozone Health Endpoints Used in this Study.**

| Health Endpoint | Age Range | Daily Metric | Seasonal Metric | Annual Metric | C-R Function Selected |
|---|---|---|---|---|---|
| Hospital Admissions, All Respiratory | 65 - 99 | MDA8 | - | - | Katsouyanni et al., 2009[1] |
| Mortality, Respiratory | 30-99 | MDA8 | | | Turner et al., 2016 |
| Emergency Room Visits, Asthma | 0 - 17 | MDA8 | - | - | Mar and Koenig, 2009[1] |
| Emergency Room Visits, Asthma | 18 - 99 | MDA8 | - | - | Mar and Koenig, 2009[1] |

[1] C-R functions available in BenMAP (USEPA, 2020a; USEPA, 2022a)

For this Project, asthma-related emergency room visits are associated with the highest health effects due to the Project emissions in the northern California domain (0.11 incidences per year for adults ages 18 to 99 and 0.19 incidences per year for children ages 0 to 17). Mortality due to respiratory issues and hospital admissions due to respiratory issues for adults age 65-99 have lower incidence increases (0.067 and 0.016 incidences per year, respectively).

The estimated increases in those health effect incidences are quite minor compared to the background health incidence (shown in Table 2-4 as percent of Background Health Incidence). For example, the increase in asthma emergency room visits of 0.11 per year represents 0.00029% of the total asthma-related emergency room visits for adults.

**Table 2-4. BenMAP-Estimated Mean Ozone Annual Health Effects of the Project Emissions Across the Northern California Model Domain[1]**

| Health Endpoint[2] | Project Incidences (Annual) | | | Background Health Incidence (Annual) | Project Mean as Percent of Background Health Incidence[4] (%) |
|---|---|---|---|---|---|
| | 2.5 Percentile[3] | Mean | 97.5 Percentile[3] | | |
| Hospital Admissions, All Respiratory [65-99] | -0.0043[5] | 0.016 | 0.036 | 63,783 | 0.000025% |
| Mortality, Respiratory [30-99] | 0.047 | 0.067 | 0.087 | 19,099 | 0.00035% |
| Emergency Room Visits, Asthma [0-17] | 0.034 | 0.19 | 0.34 | 39,464 | 0.00048% |
| Emergency Room Visits, Asthma [18-99] | -0.043[5] | 0.11 | 0.26 | 38,023 | 0.00029% |

[1] Health effects are shown terms of incidences of each health endpoint and how it compares to the base (2035 base year health effect incidences) values.

[2] Affected age ranges are shown in square brackets.

[3] The percentiles are generated in BenMAP using a Monte Carlo analysis and represent the statistical uncertainty in the incidence associated with the CRF, but do not include other potential sources of uncertainty (i.e., in the air modeling, in estimates of projected background incidence or populations). These confidence bounds are typically used by USEPA to represent the 95% confidence intervals around the mean estimate.

[4] The percent of background health incidence uses the mean incidence.

[5] The negative lower bound of the confidence interval represents the statistical uncertainty in the CRF, which in this case is inclusive of a zero increase in the incidence.

## 2.3 Conclusion

The $PM_{2.5}$ and ozone concentration changes modeled by CAMx were converted to potential health effects on various health endpoints including premature mortality, hospitalizations, and emergency room visits, using the BenMAP health effects assessment model and health endpoints typically used in past USEPA regulatory assessments. Estimated changes in the annual health effect incidences are presented across the California grids in the northern California domain. Across the board, the estimated increases in those health effect incidences are quite minor compared to the background health incidence values with the largest $PM_{2.5}$ health effect (all-cause mortality) from the Project (2035 build out) representing 0.000086% of the total of all deaths, and the largest health effect for ozone (asthma related emergency room visits by children) representing 0.00048% of all emergency room visits.

Project-related health incidences occur both in closer proximity to Project emissions, particularly for $PM_{2.5}$ health effects (see Attachment B for maps of modeled concentration changes), or over a large area due to the regional nature of emission dispersion and photochemical reactions that occur, particularly for ozone health effects (concentration changes also shown in Attachment B). When taken into context, the small increase in incidences and the small percent of the number of background incidences indicate that these health effects are minimal in a developed environment.

### 2.3.1 Uncertainty

The approach and methodology of this analysis ensures that the uncertainty is of a conservative nature. In addition to the conservative assumptions built into the emissions noted above, there are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. In the Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter prepared by the EPA (USEPA, 2022c), the EPA acknowledges the many factors of uncertainty in selected C-R functions and resulting risk estimates, including the shape of the exposure-response function and statistical uncertainty (especially at low concentrations), temporal mismatch between ambient air data and the health effect, exposure measurement error in the epidemiological studies that produced the C-R function, potential confounding of the effect of $PM_{2.5}$ or ozone on mortality, and compositional and source differences of PM, all of which similarly apply to the results presented above.

Another uncertainty highlighted by the USEPA (2022c) which applies to potential health effects from both $PM_{2.5}$ and ozone, is the assumption of a log-linear response between exposure and health effects, without consideration for a threshold concentration below which effects may not be measurable. In the latest USEPA Policy Assessment for PM (USEPA, 2022c), while it is noted that some studies show evidence supporting a linear, no-threshold relationship, the USEPA continues to acknowledge that interpreting the shapes of concentration-response relationships is a recognized uncertainty, particularly at lower $PM_{2.5}$ concentrations, where lower data density, possible influence of measurement error, and variability among individuals with response to air pollution health effects can obscure the existence of a threshold or nonlinear relationship. The issue of a threshold for $PM_{2.5}$ and ozone is highly debated and can have significant implications for health effects analyses as it requires consideration of current air pollution levels and calculating effects only for areas that exceed threshold levels. Without consideration of a threshold concentration, any changes in air pollution are assumed to adversely affect health, which is a conservative assumption. Although the USEPA traditionally does not consider thresholds in its cost-benefit analyses, the NAAQS itself is a health-based threshold level that the USEPA has developed based on evaluating the most current evidence of health effects.

For all-cause mortality effects from $PM_{2.5}$, uncertainty stems from the limitations of epidemiological studies, such as mismeasured exposure estimates and the different statistical adjustments to minimize potential confounding from incompletely measured individual lifestyle factors (such as smoking, diet, and others) that may be related to $PM_{2.5}$ or ozone exposure and mortality. Even when studies adjusted for potential confounders, residual confounding may still occur and distort the C-R function.

Several reviews have evaluated the scientific evidence of health effects from specific particulate components (e.g., Rohr and Wyzga 2012; Lippmann and Chen, 2009; Kelly and Fussell, 2007). These reviews indicate that the evidence is strongest for combustion-derived components of PM including elemental carbon (EC), organic carbon (OC) and various metals (e.g., nickel and vanadium), however, there is still no definitive data that points to any particular component of PM as being more toxic than other components. The USEPA has also stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health effects of PM (USEPA, 2009). Further, USEPA (2009) found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality, consistent with the findings by Rohr and Wyzga (2012) and others. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brakewear, tirewear, and entrained roadway dust (see Attachment A), and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative.

For both the PM2.5 and ozone health effects calculated, each of the pollutants may be a confounder of the other. Thus, while the C-R functions are from studies that evaluated the effects for each pollutant individually, while sometimes adjusting for the other as a co-pollutant, both air pollutants could contribute to the health effect outcomes evaluated, and thus the overall health effects from a single pollutant may be overstated.

Specific to potential health effects from ozone, the Integrated Science Assessment for Ozone and Related Photochemical Oxidants (USEPA, 2020b) retained the conclusion that long-term exposure to ozone is likely to be a causal relationship with respiratory effects. Therefore, potential respiratory-related mortality is conservatively evaluated. However, as outlined in the Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards (USEPA, 2020c), the USEPA concluded that currently available evidence for total mortality is suggestive of, but not sufficient to infer, a causal relationship with short-term (as well as long-term) ozone exposures.

As noted above, the health effects estimation using this method presumes that health effects may be seen at any concentration difference, with no consideration of potential thresholds below which health effects may not occur. This methodology of linearly scaling health effects is broadly accepted for use in regulatory evaluations and is considered as being health protective (USEPA, 2010).

In summary, and with consideration of the uncertainty discussed above, health effects presented in this report are conservatively estimated, and the actual effects may be zero.

# 3. REFERENCES

Kelly, F.J., J.C. Fussell, 2007. Particulate Toxicity Ranking Report. Report Number 2/07. Environmental Research Group, Kings College, London.

Lippmann, M., L.C. Chen, 2009. Health effects of concentrated ambient air particulate matter (CAPs) and its components. *Crit. Rev. Toxicol*., 39, 865e913.

Rohr A.C., R.E. Wyzga, 2012. Attributing Health Effects to Individual Particulate Matter Constituents. *Atmos Environ*., 62, 130-152. doi:10.1016/j.atmosenv.07.036.

USEPA, 2009. Integrated Science Assessment (ISA) For Particulate Matter (Final Report, Dec 2009). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=216546

USEPA, 2010. Quantitative Health Risk Assessment for Particulate Matter. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. EPA-452/R-10-005. June 2010. Available: https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf.

USEPA, 2012. Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-12-005. https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-pm_ria_final_2012-12.pdf

USEPA, 2014. Health Risk and Exposure Assessment for Ozone Final Report. Risk and Benefits Group, Health and Environmental Impacts Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. EPA-452/R-14-004a.

USEPA, 2020a. BenMAP Community Edition, v1.5.0.4. Available at: https://www.epa.gov/benmap/benmap-community-edition.

USEPA, 2020b. Integrated Science Assessment for Ozone and Related Photochemical Oxidants. United States Environmental Protection Agency. EPA/600/R-20/012.

USEPA, 2020c. Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards. Available at: https://www.epa.gov/naaqs/ozone-o3-standards-policy-assessments-current-review.

USEPA, 2021. Regulatory Impact Analysis for the Final Revised Cross-State Air Pollution Rule (CSAPR) Update for the 2008 Ozone NAAQS. EPA-452/R-21-002.

USEPA, 2022a. BenMAP Community Edition, v1.5.8.17. Available at: https://www.epa.gov/benmap/benmap-community-edition.

USEPA, 2022b. BenMAP Environmental Benefits Mapping and Analysis Program – Community Edition User's Manual, January 2022. United States Environmental Protection Agency. Available at: https://www.epa.gov/benmap/benmap-ce-manual-and-appendices.

USEPA, 2022c. Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter. United States Environmental Protection Agency. Available at: https://www.epa.gov/naaqs/particulate-matter-pm-standards-policy-assessments-current-review-0.